Change and Growth of Australian Music Value Chains

A thesis submitted in fulfilment of the requirements for the degree of Master of Design

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Declaration

I certify that except where due acknowledgment has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

Sam Steedman,

February 2008.

Acknowledgements

I wish to acknowledge the assistance of my supervisors, Lawrence Harvey and Dr Jonathan Boymal, for their time and guidance in the preparation of this thesis.

I also acknowledge my family and friends, especially my parents and wife for their assistance throughout this study. I could not have completed it without their support.

Forward

This study of Australian music distribution systems is a culmination of my experience in the music industry over the past 10 years. Whilst having a strong background in music performance, composition and production it was the opportunity to participate in the development of a music distribution system that enthused me to follow an academic course.

In 2000 there was a lack of legitimate digital distribution systems and services. There was also a lack of skilled music personnel, and foresight from financial institutions and Internet service providers with regards to the potential of online music distribution. Generally the industry did not understand the importance of the emerging group of music and technology users.

Following much time and effort in preparing a small website and database the technology market changed dramatically and the risks for such a project out weighed the benefits and development was halted, due to the local communications company and banks charging excessive fees for information uploads and downloads, and bank transfers.

I have subsequently worked for a variety of music oriented businesses within the creative industries including a merchandising company and a private music school in parallel to my undergraduate and postgraduate studies. This study is an accumulation of my experiences in the rapidly changing Australian music industry.

Abstract

The Australian music industry is growing and developing yet specific information about the ways in which distribution systems develop is limited. In this study I examined the growth and change of the Australian music value chain. This includes the development of digital distribution systems and the effect that peer-to-peer technology has on system development, specifically the disintermediation between consumers and artists to the detriment of the multinational value chains. The drivers of this change are broken into social and technical elements in order to describe the growth and change occurring.

The method used included a comprehensive literature review and use of secondary data from key music industry associations. The Australian music industry is a subset of the global industry and is led by foreign markets and their methods in which music content moves from the creators to the consumers.

The consumption patterns of Australian music consumers are changing. The overall value of the music industry is dropping as the new digital downloads market emerges and the overall volume of sales increases; this reflects similar trends in foreign markets. CD single sales have dropped and digital single sales (in MP3 format) have increased. However, there needs to be a balance in the future development of Australian music distribution systems between the needs of music consumers and the sustainability of music companies, where there is both connectivity and steady revenue flow.

There are technical elements that have caused a movement away from the traditional forms of music distribution as new technologies facilitate the change, such as Apple's iPod and broadband Internet connections. Advancement of distribution systems has increased piracy levels and the response has been the implementation of digital rights management (DRM), which prevents connectivity. There are also social elements that affect growth and change such as connectivity, or the consumers freedom to choose when, where and how to listen to their music. When music product has a restriction placed upon it its value to the consumer drops. Multinational music companies have failed to recognise the value users place on the freedom to pick and choose and have tried to control rather than to co-develop systems that meets both parties needs.

Glossary Of Terms

ABS – Australian Bureau of Statistics

AUD – Australian Dollars

ACCC - Australian Competition and Consumer Commission

ACIL - ACIL Tasman Consultants

ADSL- Asymmetric Digital Subscriber Line

AFR - The Australian Financial Review

ARIA - Australian Recording Industry Association

BWR - Australian Business Weekly Review

CD - Compact Disc

DCITA - Department of Communications Information Technology and the Arts.

DMNRG - Digital Music News Research Group

DRM – Digital Rights Management

DVD - Digital Versatile Disc.

EBIT - Earnings Before Income Tax

FTP - File Transfer Protocol

GDP - Gross Domestic Product.

http - Hyper Text Transfer Protocol

IDC - Interactive Data Corp.

IFPI - International Federation of Phonographic Industry.

IODA - Independent Online Distribution Alliance

IP - Intellectual Property

iPod – Apple's portable MP3 music playback device.

ISP - Internet Service Provider

Kbps - Kilobytes Per Second

LP - Long Play Record

Mb - Mega Bytes

MP3 - MPEG-1, Layer 3

MPEG - Moving Picture Experts Group

OECD - Organisation for Economic Cooperation and Development

OPBT - Operating Profit Before Tax

P2P – Peer-to-peer file sharing technology

PC - Personal Computer

PPCA - Phonographic Performance Company of Australia

R&D - Research and development

RMP - Revolutions per minute

RSS - Real Simple Syndication

SMS - Short Message Service

TCP/IP - Transmission Control Protocol/Internet Protocol

TPM - Technical Protection Measures

USD – United States Dollars

VHS - Vertical Helical Scan

WAP - Wireless Application Protocol

Wav - High resolution music file format

WiFi - Wireless Fidelity

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CHAPTER 1

INTRODUCTION

1.1 Background

Rapid growth of new digital technologies in the global and Australian music industries occurred during the decade 1997 to 2007. This growth caused significant changes in music creation, distribution and consumption, which have significantly shifted the dynamics of the global and Australian music market. Selected aspects of the economics of the global music sector are discussed in Chapter 2. A profile of the Australian industry, as part of the global industry, is outlined in chapter 3. During the past decade the music industry has evolved around digital technologies and people now have access to more music than ever before. The relationship between the artists, music companies and consumers has shifted as new digital technologies have given choice to the consumer and flexibility to artists. Although the multinational music companies are maintaining their dominant market position the new technologies have reduced their control over the value music chain.

The music value chain is discussed in section 4.1 and is a global organisational system that adds value to the music content between artists, and consumers. The organisational system is designed where value is added at each stage of the system, which includes production and manufacture of content, and the distribution and shopfront sales to consumer. Australia is a part of this global value chain and organisational system, as the Australian music industry is predominantly made up of global companies. Music content was traditionally carried in technologies such as cassettes, vinyl records and compact discs that were distributed and sold to consumers. However, the technology components of the value chain have changed significantly with the advent of the MP3 file format and broadband Internet.

In this landscape of change, there is debate about the cultural and financial sustainability of Australia's music industry. There are high rates of piracy

(section 3.10) as many people show a disregard for copyright laws, depriving the music creators of their rightful income. This has also caused the multinational music companies to loose vast sums of money. These new technologies give the consumer an immediate advantage and access to music. The Internet has allowed music content to be freely transmitted outside the traditional music value chain.

Chapter 1 gives an outline as to the direction of the study and the theories applied. Chapter 2 aims to outline the activity in the global music market in order to compare and contrast it to the Australia market in chapter 3. Chapters 4 and 5 analyse the music value chain and its components. In chapters 6 and 7 this study explores the influence of technology and the consumer respectively on the value chain. It will be shown in some cases that consumers lead the changes in the value chain, while in other cases the technology leads.

The overall theme of this study is the forging of a balance between the opportunities that new technologies bring and the sustainability of existing systems. New ideas and methods could be bought to the attention of consumers and played out in the marketplace where a combination of creators, distributors and consumers determine success. The initial reaction to recent technological developments by the distributors in the music industry has been about maintaining control over the value chain.

1.2 Objectives

Technology facilitates both legitimate and illegitimate use of music content and the subsequent distribution methods. Consumers' and the multinational music companies drive both the technology. This study's aim is to consider the drivers of change within the Australian music value chain, and the influence of the multinational music companies' participation in the Australian music value chain. To achieve this aim the objectives are to:

- evaluate the influence of global industry on the Australian market;
- analyse the value chain and its components;
- give an overview music technology developments;
- asses the change the value chain due to technologically developments;

- determine if the technology or consumers drive the change in the Australian music value chain.

1.3 Scope

This study was confined to the use of reference material from journals, textbooks and newspaper articles. It was also constrained by the availability of funding for the purchase of private reports detailing specific music industry data. This study has also been limited to information in the public domain and has relied heavily on reports written between 1997 and 2007, including statistics from the Australian Recording Industry Association (ARIA), the Organisation of Economic Cooperation and Development (OECD) and the International Federation of Phonographic Industry (IFPI). This study takes the analysis of statistics and reports from ARIA, IFPI and OECD and combines it with a literature review of Australian music and creative industries.

The music industry has its own nomenclature and accordingly the following definitions are used throughout. Digital refers to the sampling of analogue music signals, which are represented by continuous sequence of discrete values of arithmetic numbers that form a digital music file. This file is encoded and compressed to a specific format such the MP3 (section 3.7). For example, vinyl is an analogue format and compact discs (CDs) are digital. Digital content means any encoded music file. Content means any material prepared and developed by professionals for mass (broadcast) consumption. Connectivity means a program or devices ability to connect with other programs or devices. System means the way in which there is mass broadcast or consumption, or the technique in which content is delivered. System administrator means governments, multinational recording companies and media companies. Piracy means the unauthorised use, distribution or reproduction of music content in any format.

CHAPTER 2

ASPECTS OF MUSIC ECONOMICS

The global entertainment industry is now one of the largest economic activities in existence. Within the general entertainment industry music is a major component, and one that often leads other sub-components in technological innovations and new models of distribution. The outline in section 2.1 includes figures to support the level of activity and key historical changes to the composition of the music value chain. More recently, new value chain technologies have entered the field, demanding new pricing regimes for consumers. These regimes can be described through pricing theory, which in the case of online music distribution has been what economists refer to as perfect price discrimination. This chapter will provide a broad outline of music economics to establish the scope of global activity in music sales and distribution.

2.1 Global Industry and Market

The global music market is worth USD 33.6 billion (IFPI, 2005a, p. 1) and is considered the most easily personalised and accessible form of entertainment, in which it can readily infuse virtually every culture and level of society. It is considered one of the most fundamental of entertainment businesses (Vogel, 2004. and OECD, 2005a, p. 17).

Member countries of the OECD accounted for 94 per cent of the music market (OECD, 2005b, p.22). The largest global markets were the United States (US) with a 37 per cent market share worth USD 11.9 billion, followed by Japan with a market share of 15.3 per cent worth USD 4.9 billion, and the United Kingdom with a 10 per cent share worth USD 3.2 billion. United States digital music sales in 2005 were estimated at USD 1.1 billion, triple the sales from 2004. United States consumers spent an estimated USD 9 billion in 2005 on portable music players, USD 75 billion for broadband subscriptions and USD 50 billion on

mobile data services (Kennedy, 2006, p. 3). The highest spending per capita countries were Norway and the United States.

World music sales grew from approximately USD 1.5 billion in 1973 to USD 3.7 billion in 1999 (figure 1). However after 1999 sales dramatically declined to USD 2.9 billion. By 1999 there were only three major technologies contributing to world sales being singles, long play records (LPs) and compact discs (CDs). Both singles and LPs were sold through out this period while CDs grew from their introduction in 1982 to occupy most of the sales. The decline in sales after 1999 is not properly explained by looking at the traditional value chain of Figure 6.

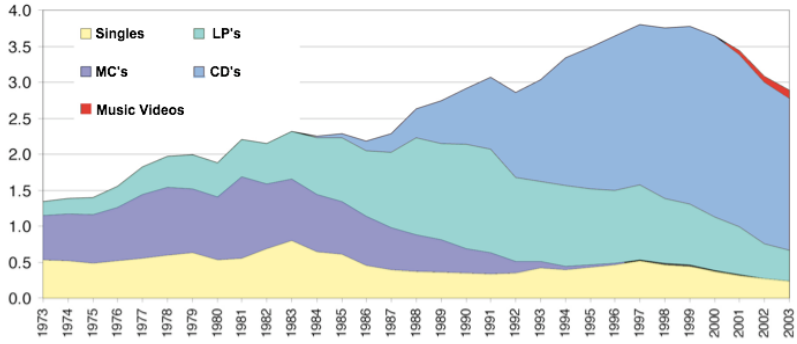

Figure 1: World sales (USD billions) by format for the period 1973 - 2003 (OECD, 2005).

2.2 Some Economics of Value Chain Technologies

The relationship between global technologies and sales is shown Figure 1. Changes in the technologies have improved the delivery of the music content and have increased the global sales. Accordingly the changes have occurred for both financial and functional reasons.

There has been a rapid consumer interest and uptake resulting in the expansion of the demand for online music. This has allowed US based company Apple to provide iTunes music software that corresponds to their MP3 player (iPod) free to market. It has captured many new users by offering the incentive of free software. Apple's iTunes is becoming a critical economic force, as its distribution of a complementary technology increases its user base and results in increased MP3 player sales. By providing free technology users will take this incentive to change. These incentives involved with switching from one technology to another can be either positive or negative. Consumer incentives are fairly

straightforward and include cash, gifts, lotteries, and other free or reduced price goods and services for the benefit of the specific consumer (Kane, etal., 2004, p. 39). For example, a positive incentive would be a reduced cost for an album of MP3 files, plus instant access compared to the full price purchase of the CD version from a retail outlet.

Illegal file sharing is also having an impact on consumer uptake, as the incentives for users are no cost and instantaneous music content. In Europe 11 per cent of the population swap files using P2P software. Only 6 per cent of these users have paid for downloads and of this group only 4 per cent regularly download at all. The majority consider digital music a new concept (IFPI, 2006b, p. 19). However, the legal online consumption is catching up with illegal file sharing in Europe. In the UK and German markets legal downloads exceed P2P file swapping by 5 per cent to 4 per cent respectively, while the 22 per cent of online buyers shows industry is attracting new users straight to the legitimate systems. Shifting the market from unauthorised services to legal services will take more time. Around 25 per cent of illegal sharers in this market are willing to move to legal services. The challenge lies in Australia and abroad in increasing this percentage (IFPI, 2006b, p. 19).

2.3 Pricing Theory

Another basic economic example is Figure 2, which shows the relationship between pricing and sales and can be applied to online music models in order to gain the maximum revenue. Examples A and B explain the trade off in revenues where a high price is expected to sell to only those who value the product highly and a low price to sell to many consumers. Example C suggests a variable pricing structure to increase revenue.

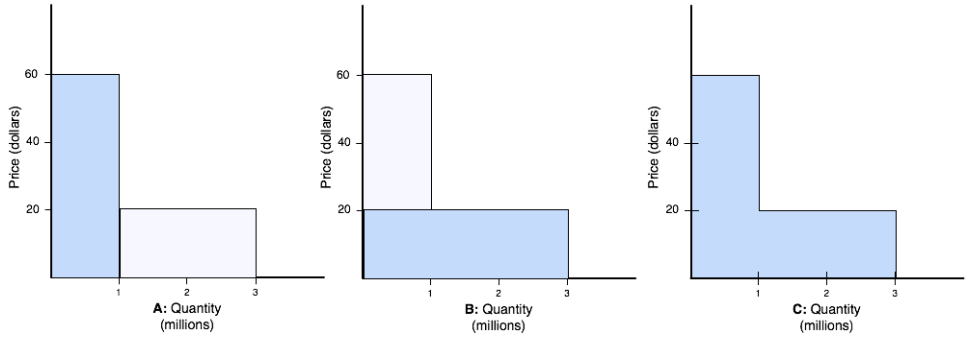

Figure 2: High, Low and Differential Pricing (Shapiro & Varian, 1999).

2.4 Pricing in the United States

Pricing products on the Internet makes it easy to personalise your product. If the information is highly crafted to meet the needs of specific consumers then there is no need to worry about generic competitive products (Shapiro & Varian, 1999, p. 37). Pricing of digital music is important in developing a digital music economy. Prices for downloading songs and for subscriptions in the past had varied according to the country and the music service. Generally speaking there is the concern by multinational music companies of whether the price of the downloaded tracks is causing a soft demand as these services are in direct competition with illegitimate services. If prices are too low then a loss will occur (OECD, 2005, p. 52).

Apple, through iTunes, offers a standard rate of USD 0.99 for a single track and USD 9.99 for an album in 2007. Figure 3 outlines the distribution of revenue for US digital track sales. Most of the sales revenue goes to the recording company and the Internet service provider. There is a considerable fee for the distribution affiliate (such as iTunes) that is comparable to the mechanical royalties portion of this chart and the producer of the track. This leaves the artist with USD 0.07 out the USD 0.99, around 7 per cent of the worth of the track. There is also the cost of transmission across the network that is called bandwidth.

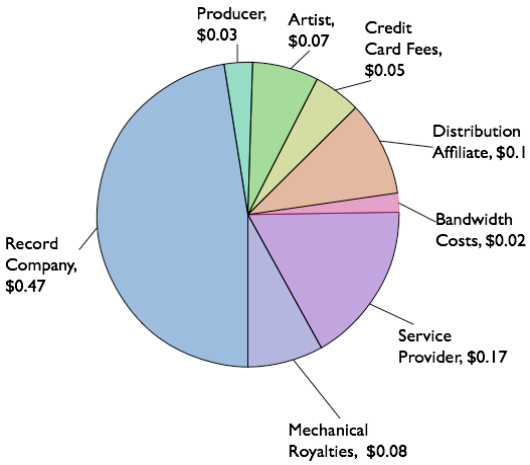

Figure 3: Estimated Revenue Distribution Through Value Chain for US Digital Downloads Based on USD 0.99 per track (OECD, 2004).

This is referred to as perfect price discrimination. It means that you charge each customer just what he or she is willing to pay. This is difficult to achieve as

determining the maximum and minimum prices customers are willing to pay is not simple. The Internet offers a customised environment where point-to-point sales are possible and differential pricing can be achieved. There are three types of differential pricing: personalised pricing, versioning and group pricing. Personalised pricing involves setting a different price for each user depending on what they believe is the value of the product or service. Versioning refers to offering the consumer a product line of varying function and quality and allowing them choose depending on their needs and requirements. Group pricing refers to the setting of prices depending on the target group and their perceived value and willingness to purchase. For example students, pensioners and unemployed people would be less likely to pay a premium price for a product of service (Shapiro & Varian, 1999, pp. 38-39).

At present there is a consistent price and quality of service offered in Australia. For AUD 1.69 the consumer can purchase content in a track form with a sample rate of 128kbps (kilo bytes per second). There is no group discount. There is no trade off of price for quality and there is personalisation in the pricing of the content. The distribution system in Australia could directly benefit from increased revenue that would come from a differential pricing system. More consumers would be participating in the digital economy and might add more value, and subsequently the recording companies could possibly recoup more of their investments.

While the Australian music industry is a very minor component of the global industry, it is also highly concentrated. As a country with small population clustered in five large costal cities, the potential for a small number of multi-national companies to dominant the Australian music market has always been likely. The recent digital music revolution has challenged the dominance of multinational music companies in a small market, with some interesting results.

CHAPTER 3

PROFILE OF AUSTRALIAN INDUSTRY

The Australian music industry is small yet it is subject to the same drivers of change of foreign value chains. This aim of this chapter is to evaluate the Australian music industry in order to compare and contrast it to the wider and larger global industries. Section 3.2 describes some specific economic aspects. Section 3.7 explains the similarities Australia has with foreign music value chains. Section 3.9 however, highlights the deficiencies in Australian such as government broadband policy.

3.1 Creative Industries and Music

The Australian Government Department of Communications Information Technology and the Arts, has released a report into the creative industries and music called *The Current State of Play* (DCITA, 2005). The Australian music industry has evolved as a small part of the wider sector known as Creative Industries. Australian creative industries are oriented around activities that generate intellectual property commodities such as the arts, film and television, games and fashion (DCITA, 2005, p. 10).

The creative industries in Australia include the Australian Broadcasting Corporation (ABC) and represent government participation in the industry. They are not a multinational music company. The ABC has played a limited role in the music value chain and has provided an independent music content catalogue covering classical and country genres for more than fifty years. Since around 1987 it has developed a mainstream popular music audience in radio and television mediums. Throughout its entire operations of more than seventy-five years the ABC has embraced the technologies of the day. During the past five years it has continued to developed an Internet capability

3.2 Aspects of Australian Music Industry Economics

Australian creative industries have been estimated to contribute over $21 billion annually to the Australian economy or nearly 3.5 per cent of Gross Domestic Product (GDP). It also employs around 300,000 people. The value of the music industry is modest compared to other industry sectors. The combined size of the printing, publishing and recorded media industry in Australian is 8.7 billion (ABS, 2006a).

Arts-related activities in the Australian economy are growing at a faster rate than the overall economy and have been doing so for the past twenty years. There is a growth rate of 4.4 per cent per year in the music industry as compared with a 3.1 per cent average growth across the rest of the economy. The Australian music industry accounts for a very small proportion of the global music sales. The annual growth rate was very strong at 6.4 per cent from July 1998 to July 2003 (ABS, 2006a). In 2001-02 the gross value added and contribution to gross domestic product (GDP) was AUD 7.195 billion. In the period from 1988-2003 the industry has grown by 13.8 per cent and has made a contribution to GDP of 10.9 per cent. At the industry subdivision level (1988-2003) profit margins for the printing, publishing and recorded media industry ranged from 15.2 per cent to 6.2 per cent. During the period 2004-2005 the industry recorded a 9 per cent increase in industry value added (IVA), matching its increase in sales and service income. Wages and salaries increased by 9 per cent, trading profit increased by 9 per cent, earnings before income tax (EBIT) increased by 26 per cent and operating profit before tax (OPBT) by 22 per cent. Printing, publishing and recorded media's share of manufacturing purchases of goods and materials was at 4 per cent (2004-2005), significantly less than its contribution to manufacturing's total IVA of 10 per cent. Employment was at 10 per cent, wages and salaries 11 per cent, sales and service income 7 per cent, and EBIT and OPBT were both at 12 per cent. Conversely, labour costs constituted 30 per cent of the total expenses of this industry, compared to 18 per cent at the total manufacturing level (ABS, 2006a).

Australians spend a total of AUD 9 billion each year on arts and entertainment. Exports of cultural goods earn AUD 750 million per year and royalties earned by Australians overseas for use of cultural property totals AUD 128 million. This data suggests that although Australia’s music industry is small it is also strong and has one of the strongest growth rates in the world. It is expected the

popularity of music and music related products is part of Australian culture and will continue to grow and develop in the future.

The use of the Internet has grown significantly and is part of the development of Australia industry. There are no specific figures of the volume of traffic or the revenue received from the creative industries sector via online sales. The ABS estimated Internet income was AUD 33 billion during 2003-2004. This figure is equal to approximately 4 per cent of GNP for 2003-2004 (DCITA, 2005, p. 15). As of 30 September 2006 broadband connections in Australia totalled 3.64.million. The adoption rate has also increased by 51 per cent (1.23 million) from the September 2005 figure of 2.4 million. The user adoption rate of Asymmetric Digital Subscriber Line (ADSL) services is just above 2.76 million and quarterly growth in broadband was at 9.3 per cent for the September 2006 quarter (ACCC, 2007, p.1).

There are many people connecting to the Internet to trade a wide variety of goods and services, music being just one of them. Current trends suggest that businesses will continue to derive income from the Internet as users become more accepting of legitimate online e-commerce. Figure 4 shows the income derived from the use of the Internet in Australia. Such adoption rates indicate that the popularity of Australian Internet for businesses and consumers alike will continue to rise.

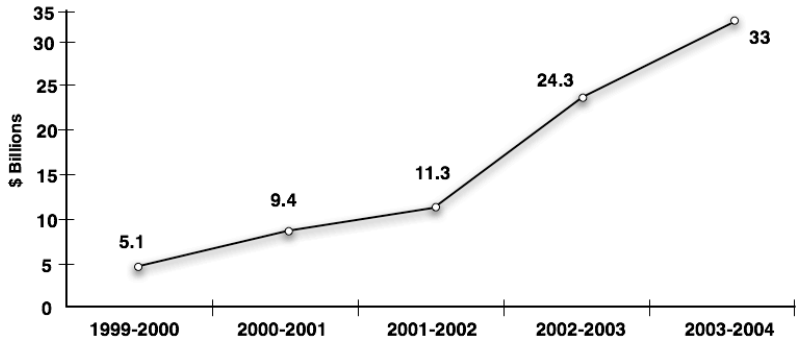

Figure 4: Australian Business Internet Income in AUD (ABS, 2005)

3.3 ARIA Economic Assessment

The Australian industry accounts for a small proportion of the global music sales at 2.1 per cent worth USD 673.8 million (OECD, 2005, p. 22). During 2004-2005 the sales revenue was AUD 539 million (ARIA, 2006) and had dropped by 11.2

per cent compared to the previous year. Similarly sales revenue was AUD 511 million during 2005-2006 representing a 3.11 per cent drop in value from the previous year (2004-2005). However, the falling sales value was accompanied by a 27 per cent growth in volume of shipped units. At the same time there was a 250 per cent growth in digital sales representing revenues of AUD 27 million or a 5.5 per cent of the market share. Of the digital sales most of the purchases were singles tracks (ARIA, 2006a). For the six month period before June 2007 CD singles sales halved to 1.3 million; individual track sales grew by 61 per cent to 8 million; CD album sales fell by 13 per cent to 17.6 million; there was an increase in digital sales from 5.5 per cent 9.75 per cent of total market share. The total value of physical sales for the six month period dropped from AUD 203 million to AUD 168 million. Digital album sales have increased by 130 per cent to total 383,245. The digital sales volume grew by 11 per cent yet the value fell by 13 percent to be worth AUD 186 million (Westwood, 2007, p. 3.). There was also a higher volume of sales that produced a lower total value of sales. This is due to the different pricing of music that is available in a CD format or as an MP3 download. It relates to the value the market places on the MP3 format (section 6.6).

The decline in Australian sales during 2004-2006 is reflected in the global sales Figure 1 for the preceding period 1999-2003. It is thought this decline is limited to the vinyl and CD sales as consumers download the music content through the Internet. In the period January-June 2006 recorded music sales in Australia increased by 5.8 per cent (AUD 12 million) to over AUD 224 million from the previous period in 2005 (ARIA, 2006a). The market for CD albums experienced the greatest movement with over 3 million extra units shipped to retail. This represents a 17 per cent increase on the same period last year. However revenues were up only 4.65 per cent illustrating a further decline in unit wholesale prices. From this data it can be concluded that the popularity of the CD is growing at a steady rate and that digital sales have shown a dramatic increase in popularity. Interpretation of this data might suggest the difference between the actual revenue increase of 4.65 per cent and the expected revenue increase (that would accompany a 17 per cent rise in shipped units) is indicative of the revenue loss caused by piracy in Australia.

3.4 Pricing in Australia of an MP3

Assuming the same ratios as figure 3, an estimate for distribution through the Australian value chain for digital track sales is shown in Figure 5.

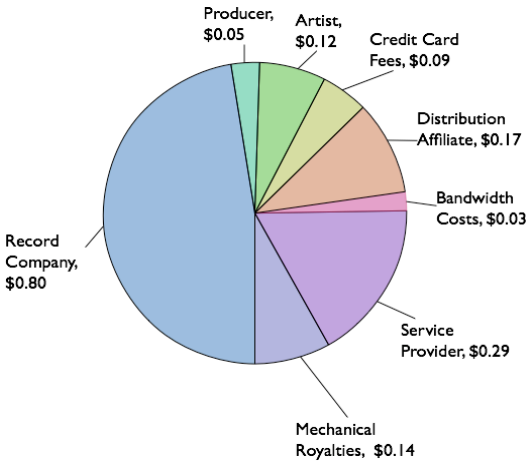

Figure 5: Estimated Revenue Distribution through Australian Value Chain for Digital Downloads Based on AUD 1.69 per track (cf. Figure 3).

This shows a large proportion of the digital sales revenue dispersed to the multinational recording companies. If the revenue to the multinational companies was reduced this could affect the track price, or increase the value in the artists/creators favour. A consequence of lowering the track price is increased incentive for the consumer and could likely result in an increase the volume of sales and an increase in the value of the content for the Australian consumer.

3.5 Australian Copyright

The development of new distribution technologies has stimulated copyright violation or piracy in Australia, as indicated by the decline in sales revenue during 1999-2007 (sections 2.1, 3.2 and 3.3). Copyright is the right or ownership of a product and questionably fundamental to any developed society. Copyright is a means with which a society accords recognition for creativity and innovation to be exploited by the owner for commercial benefit. It is very important for both the culture and economy of our community as it protects the owner of rights to the music content. Copyright is the underlying means in which revenue is generated in the music industry (Simpson, 2002, p. 141). Australia copyright protection covers music content and is extensive. The owner has the right to

reproduce the music content in either sheet music or a recording for films television programs or advertisements. They have the right to communicate their work in a public forum specifically through live performances, playing recorded music in public or on the radio television or the Internet and making an adaptations to the work such as arrangements and transcriptions. Copyright may also cover the technologies, but is unlikely to cover the entire value chain or organisational system.

Copyright varies slightly from country to country and in Australia was provided by the Copyright Act 1968. The right to communicate works to the public is extremely broad and copyright reinforces the owners' basic right to control the use of their work, especially in a digital environment. When copyright is violated the system slowly erodes (Simpson, 2002, pp. 143-171). The Copyright Amendment Act of 2006 was passed on the 5th of December 2006 and came into effect on 11th of December 2006. The amendments concern private copying of sound recordings, copyright enforcement, technological protection measures, special exceptions for non-commercial activities by libraries and educational institutions, fair dealing for parody and satire, private copying of sound recordings and the jurisdiction of the Copyright Tribunal (Attorney-General, 2007).

There is a new and limited exception for private copying of sound recordings. The private copying exception allows consumers to make a copy of a legitimately acquired recording (either physical or digital) for private and domestic use, for playing on different devices owned by the consumer. This means that a consumer can: copy recordings from their CDs onto their MP3 player; burn legitimately acquired digital files onto a CD for playing in their home sound system; make more than one copy of a recording, provided each copy is used in a different device owned by the consumer, for example, the private copy may be played on the consumers PC, MP3 player or mobile phone.

There are a number of important limitations to the private copying exception. The exception does not: allow consumers to sell, give away (except to family), distribute, perform in public, or broadcast the private copies (if a consumer performs any of these acts, the copy becomes an infringing copy); apply if a consumer makes the private copy from an illegitimate recording for example, from a burnt CD or from peer-to-peer (P2P) files; allow consumers to share music online; allow users to upload or distribute music via the Internet that will

continue to infringe copyright holders rights. In addition, the consumer also loses the benefit of the exception if they give away their original copy.

There is a new time shifting exception that allows consumers to record content to view or listen to at a later time. The time shifting exception does not permit the time-shifted copy to be used over and over again. Consumers are also not able to sell or distribute the time-shifted copies or cause the time-shifted copy to be heard in public. A consumer can also re-format content for personal use. The consumer cannot, however, sell, distribute or give the format-shifted copies away.

These amendments introduce a tiered range of copyright offences. Different offences are available depending on the seriousness of the conduct and are either criminal or large scale commercial offences. The more serious offences are, for example, deliberately selling infringing copies of recordings. These offences attract fines of up to AUD 60,500 or imprisonment for up to five years or more for individuals and corporations. An infringement notice scheme is intended to provide a cost effective process for dealing with minor copyright crime. Expanded remedies are available for large scale online commercial infringement.

There are technological protection measures (TPM). TPMs are technical locks that copyright owners use to stop their material being used, copied or accessed and appear in the form of passwords, encryption software and access codes (Attorney-General, 2007). There is a new fair dealing defence for parody and satire. A parody transforms and comments on the copyright material itself, whereas a satire uses copyright material to draw attention to a more general comment on society. The parody and satire fair dealing exception may allow users to copy extracts from recordings to make new recordings, only if the new recording can be characterised as a parody or satire of the original recording, or makes a satiric comment on any issue.

The Copyright Tribunal now has jurisdiction in relation to any license administered by a collecting society such as the Phonographic Performance Company of Australia (PPCA). Licensing activities of the Australian Recording Industry of Australia (ARIA) are not, however, within the jurisdiction of the Copyright Tribunal. The amendments also include a number of changes relating to the role of the ACCC in Copyright Tribunal proceedings (ARIA, 2006b).

3.6 Shopfront and Digital Retail Sales of Music Content

Content is defined as any material prepared and developed by professionals for mass (broadcast) consumption, such as music, books, newspapers, movies, and sports events (Odlyzko, 2001, p. 13). Music content has traditionally been sold through retail shop sales, which includes local and foreign content in a variety of formats that include both vinyl and CDs (sections 2.1 and 3.2; Figure 1).

The purchase of music content delivered offline is a major e-commerce driver (OECD, 2005, p. 46). For example, Internet sales of physical products sold online increased in Germany from 1 per cent (1999) to 12 per cent (2003). Online retailers directly compete with record companies by delivering directly to customers, disrupting the value chain between the record companies and traditional retailers.

In Australia retail sales of local music content (in album form by local artists) have grown to represent 31.8 per cent of the top 100 albums chart for 2006. This is an increase from 23 per cent of the top 100 albums from last year. This reflects the consumers' value for Australian music in the percentage growth of local content. Likewise, the top 100 singles chart has also seen an increase in Australian representation with 31.7 per cent of top 100 sales by local artists. This is an increase from 25 per cent for the corresponding period last year (ARIA, 2006a). Both album and single formats are increasing their share of the total market worth, and this means that Australian consumers are buying more locally made product in addition to purchasing foreign product.

Multinational music companies supply Australian consumers with music from other markets, to the extent that 78 per cent of total sales were foreign products, as of the end of 2006. By contrast only 18 per cent of total popular music content was domestic product. Per capita Australia citizens spend AUD 63.76 every year on records while US citizens spend AUD 39.60. This suggests that Australians value their music and are committed to spending, although primarily on foreign product. (ARIA, 2006a).

In 2006 the Australian recording industry shipped just under 50 million CD album units. This was an increase of approximately 7.9 per cent on the same period for the previous year. However, the value of those sales fell by just over 5 per cent. The wholesales digital (digitally distributed) sales in 2006 were just

under 21 million units. This is 4 times more than in 2005. By volume, Australian repertoire represented 27.2 per cent of the top 100 singles chart for this period, an increase from 22 per cent in 2005. It represented 37.7per cent of the Top 100 album chart for the period, up from 27 per cent in 2005 (ARIA, 2006a). The volume of units shipped has increased, yet at the same time the value has decreased. Of the volume increase Australian content is gaining a stronger share of the market and digital sales are also increasing dramatically.

Digital sales posted very significant gains. To facilitate the 9.75 per cent gain of the market share digital retailers emerged. The following is a list of some of the current Australian digital music retailers, which have gained prominence in the past five years (Pro Music, 2007, p. 1).

- Big Pond Music
- Chaos Music
- Harvey Norman Channel Go
- iTunes
- JB HiFi
- MP3.com.au
- Mule Music
- Nine MSN
- Optus Zoo Music
- Ozmusicweed
- Ripit.com.au
- Sanity.com.au
- Soundbuzz
- Zooloader
- Martian Music

3.7 Value chain

The following figure 6 outlines the traditional method of making and distributing music content to the consumer. Music content flows through the value chain. Each component of the chain is an area within the industry that has value. When one part of the chain is changed it affects the value of the other components.

Figure 6: Traditional Music Industry Value Chain. Source: (OECD, 2005)

The content creation involves the artists and repertoire department of the multinational music companies seeking out and developing new talent. Composers sign copyright agreements with publishers and either sell the rights to their music or own their own rights. The production involves the recording

and production of the music content ready for CDs. The manufacturing involves the physical making of the CD and artwork. Some multinational music companies own their own plants, while others out source this part of the process. The sales and marketing component sees the use of the media to publicise the product. All types of media are used from television to print, radio and the Internet. The distribution involves a global network that can deal with sales distribution and marketing. The wholesale companies purchase from the multinational and forward to large retailers. The retailers who vary in size and complexity purchase the music from the wholesalers.

Many of these organisations are content driven and rely on the sale of music. The music industry is an intricate group of interrelated companies. These companies vary in function and purpose, and are all associated towards making money from the central product, music (Simpson, 2002, p. 292). For example, there is an audience (say either a solitary person or 1000 member auditorium), the music (either live and pre-recorded) and the playback device (orchestra or MP3 player). The orchestra charges admission prices and the performers and venue are paid, similarly the MP3 is paid for and downloaded from the website and the owners and the website receive payment. In more recent times the technologies have advanced dramatically the distribution ability, yet the core principle of making music and distributing it to the consumer remains the same for consumers listening to an orchestra a century ago or a person in the street today with an MP3 player.

Alternate to the OECD 2005 value chain, figure 7 is the Music Council of Australia's value chain. It shows that music is created, produced and then delivered via the medium of live performance, pre-recorded sales and through other industries such as radio broadcast. It is a more simplified version and highlights invariance between the two systems. There is creation of the music in figure 7, as with figure 6, yet the recording, manufacture and sales and marketing have been simplified into one phase called production.

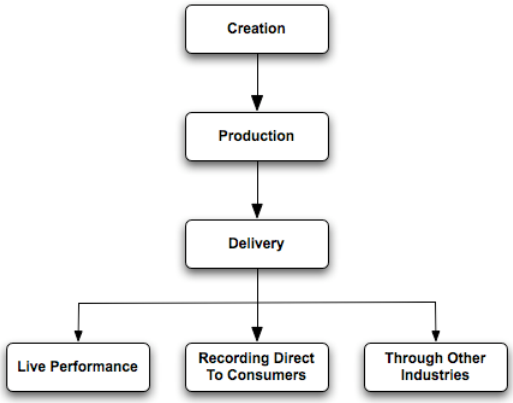

Figure 7: The Creation, Production and Delivery of Music. Source: (MCA, 2007)

In the past the audience have had limited choice as to the format they consume. This has largely been due to the economic viability of the format. There are larger costs involved in distributing many thousands of records around the world. Each new format, from shellac gramophone records to compact discs and MP3 files has presented the music world with a wide variety of opportunities and challenges. New distribution methods have enabled greater consumption and growth. New format technology has provided improvements in sound quality. As technologies advance the old systems and formats are usually superseded by new, but not necessarily superior, systems and formats.

The standard mainstream example to this technological phenomenon is the Betamax and VHS (Vertical Helical Scan) home video formats. VHS was the better marketed and the prevailing format for mass consumption. A music industry example is the Mini Disc and the Compact Disc. The Mini Disc format never became a popular medium to the same extent as the CD even though it had a comparative quality and greater functionality. Also, at the time of the mini-disc introduction the recordable CD did not exist.

However, the technology that provides superior quality does not always prevail. It is usually the technology that can be consumed with the greatest ease that becomes the standard. The music consumer usually wants a specialised product and will satisfy their need for a quality and customised product. Currently there is a divide between what the large companies find profitable to produce and what the audience want, which highlights what they can't provide and leads to piracy in order to fill the gap (Von Hippel, 2005, p. 43).

Currently the global (and Australian) music industry is in a period of revolution where it is losing money due to new technologies eroding its relationship with

customers. It is also in the process of making adaptations, or evolving, in an attempt to curve the exploitation of the MP3 (section 6.6). The value chain has altered from the traditional forms of making and selling music. The multinational music companies purchase copyrighted music content from creators. They own copyright and supply the music content on CDs. The multinational music companies manufacture the CDs and the consumers then buy the music content on CD. However, consumers post the music content (from CD) as MP3 files on the Internet. The change in the MP3 technologies market is growing faster than CD market. Multinational music companies are slow to exploit modern Internet based distribution and have not developed sophisticated digital distribution systems. Yet, the consumer market demands both CDs and instant access to MP3s. As the demand for instant access to MP3s has not been entirely satisfied by the multinational music companies a third party met the market demand. The original distribution system was Napster (see section 6.4 p. 53). Therefore, consumers' gained access free MP3 downloads of the multinational music companies' copyrighted music. The result is a loss of revenue and a main claim of piracy.

The general trends of the music industry though in the past have been that new technologies have lead to new business models and new opportunity for growth. Currently the Australian recording companies are experiencing the challenges of making viable and cost effective the digitisation, distribution and consumption of music. Websites such as Napster have proven the consumer is willing to take the music for free, while the music industry work on sustainable models so that creators receive revenue from consumption.

3.8 Control of Value Chain

The legal grant of exclusive rights does not (via copyright, patents and trade marks) confer complete control over information. There is a large problem that has arisen with digital technologies and the Internet, one of enforcement of such laws. Digital information can be transmitted anywhere around the world, although producers of information might not be able to retrieve their production costs (Shapiro & Varian, 1999, p. 4). Multinational companies controlled the value chain up to 1999 when substantial music piracy started and effectiveness to retrieve production costs has dropped. Figure 1 (p. 14) shows a drop in world sales around 1999 and might help explain the subsequent loss in control.

The multinational music companies in Australia have also enjoyed control over the value chain. They have had influence over what is recorded and distributed and have controlled the format with which the material was distributed. They also built and controlled the wholesale and retail outlets. Influence of multinational music companies over the distribution systems in Australia is also considerable. With a of value of USD 674 million (2003) (OECD, 2005a, p. 22) they include: Electric and Musical Instruments Limited (EMI) with a 19.7 per cent market share (2005/06) (Nicoli, 2007, p. 15); Sony-Bertelsmann Music Group (BMG) with a 29 per cent market share (OECD, 2005a, p. 38); Universal Music with a 20.1 per cent market share (OECD, 2005a, p. 38); Warner Music with a 15.2 per cent market share (OECD, 2005a, p38). *For additional information on the organisation history of the music industry in Australia see Appendix B*.

3.9 Australian Government and Broadband

Australian government policy has had a direct affect on the development of music distribution systems and the greater communications industry in the past 5 years. Broadband has been considered by the government for over ten years and was dealt with by the creation of the Broadband Services Expert Group that dates back over ten years. It warned the nation would fall behind international standards if it could not match other developed countries in terms of communication. Recently Telstra cancelled its AUD 4 billion fibre optic network that could have made Australia competitive with the rest of the world. The consequence of a limited broadband network on Australia's economy is unknown.

The proposed Telstra network would likely have offered a broadband transfer speed of 12 megabits per second to a large proportion of the 4 million homes that are currently connected. However, the proposed plan would provide a network that is not competitive with other networks. Japan and Korea both offer 50 megabits per second connection speeds and plans are underway to implement 100 megabits connections second plans in the near future. Singapore intends to make 100 megabits per second connection available to every citizen also. Australia has a slow and relatively high priced network that ranks 17th in terms of global network connection speeds.

It has been suggested by economic consulting practice ACIL-Tasman that broadband boosts national wealth. In 2003 the Allen consulting group concluded that broadband could boost Queensland's gross state product by AUD 854 million each year through to 2019. If, in 2004, 70 per cent of Victoria were using broadband by 2015 the state would gain AUD 15 billion in gross state product and an extra 153,000 jobs (Crowe, 2006. p. 3). Regional Australia could create 10,000 jobs and generate economic benefits of AUD 920 million from improved broadband (ACIL, 2004, p. 42).

In the US it has been proven that a region's broadband deployment has affected the economic growth of a particular area. Massachusetts Institute of Technology has stated that communities with broadband created more jobs and higher property values and formed more new businesses that those without. Areas with broadband also enjoyed employment growth rates 1 per cent higher than those without. The price of the housing growth rate was 6 per cent higher and in addition the rate of new business growth (Crowe, 2006, p. 3).

Policy makers need to promote the use of broadband. Australia has ADSL 2-plus (Asymmetric Digital Subscriber Line) connections available with a theoretical transfer speed of 23 megabits per second. This translates in to actual variable speeds depending on the quality of individual configurations that would include line quality and equipment quality. The average real world connection speed in Australia is around 3 megabits per second (Crowe, 2006, p. 3).

The delivery of online digital content requires new technologies and an environment that facilitates its creation, acquisition and management. The technologies that are needed relate to the field of hardware, Internet services, and software such as Digital Rights Management (DRM). These technologies need to be adapted for both mobile and wireless systems. Platforms for the distribution of audiovisual content and technological and business solutions are in high demand. These scenarios are likely to involve open and interoperable platforms and eventually the convergence of multiple technological solutions to deal with the different forms of content. In addition to these compelling offers, security and privacy are also essential to build consumer trust, acceptance and uptake of new developments.

While market players are responsible for creating innovative solutions, such as the multi-national recording companies labels and technology companies,

governments also need to be involved to provide an environment conducive to research and development and innovation. As part of its research and development programme, the European Union is fostering the study of technological solutions that allow cross-platform access to content. These programs are concerned with fostering research in imaging technologies, audiovisual representation and development of multi-dimensional environments including virtual reality technologies. The promotion of environments aimed at the circulation of content data resulting from research and development is also part of Japan's promotion policy for content business as devised by the office for intellectual property strategy. The Korean digital content promotion policy also includes research and development aspects that foster 3D graphic production capabilities, mobile content, infrastructure services, (wire and mobile high speed network infrastructure), digital animation (3D content production) and standardisation. The support of leading advanced tech-based content and the fostering of technical protection measures (DRM, encryption, watermarking) are also essential. As product and process innovation are shown to involve business re-organisation and new strategic partnerships, the Australian government regulatory environment needs to be conducive to these changes. In particular, research into societal and economic impacts of new content offerings and the role of government is necessary. This is needed in order to provide more opportunity for growth the information and technology sector, and in the creative industries.

Australian government policy needs to facilitate vigorous technological development and the beneficial use of digital technologies whilst controlling the interactions between technological development and the effective protection of intellectual property (OECD, 2005. p. 85). Around 13 percent of new music buyers make artist discoveries within retailers themselves, noticeably less than figures of 37 percent for traditional radio and 25 percent for word of mouth recommendations. (Resnikoff, 2007, p. 1).

If Australia is to have a communications system that is competitive with the rest of the world then implementation of a high speed broadband connection is vital. If Australia is to have a globally comparable music distribution system government communications policy will have to be controlled and developed. Australian research and development has little influence on the value chain technology.

3.10 Piracy In Australia

It is estimated globally that 37 per cent of CDs (1.2 billion) purchased in 2005 (illegal and legal purchases) were pirated (Kennedy, 2006. p. 4) Australian is no different. Australian recording industry sales are declining, but there is a growth of local content as a percentage of the total value. The total sales value of Australian music product dropped by 11.2 per cent between 2004-05 to AUD 539 million (ARIA, 2006a) it is likely this is due to piracy.

Australian P2P traffic is estimated to account for 17 per cent of Australian Internet use as of October 2004. The transmission of such a volume of information costs AUD 60 million in bandwidth charges (Cochrane, 2005, p. 3). There is an additional concern, that the stimulated traffic flow from P2P use has provided an increase in revenue for ISP's yet at the same time devaluing the music industry. This would suggest, in addition to piracy, a redirection of revenue away from the music industry and into the communications industry. At present P2P users represented 0.2 per cent of the total general population (OECD, 2005a, p. 108). If the number of P2P users grows well beyond 0.2 per cent and the sales growth is steady then it will significantly reduce the available cash in the music industry by redirecting it to ISPs and the communications industries. *For additional information on piracy in Australia see Appendix C*.

It seems that the digital technologies that facilitate piracy and the legitimate purchase of Australian music content are a key drivers of change in the music value chain.

The Australian music industry and market are small compared to foreign industries and markets. It is however growing and changing. It is also an easy market to enter and dominate. The ease with which large organisations influence in the market is substantial and as technology develops and changes, so to will the value chain that facilitates the movement of music content.

CHAPTER 4

VALUE CHAIN AND TECHNOLOGY

Advances in technology have changed the importance of components along the music value chain. Specifically, there have been changes in the system that facilitates the flow of music content, and changes in the configuration the content takes as it passes along the chain. The aim of this chapter is to identify the affect technology has had on the music value chain. Section 4.2 looks at music file formats. Section 4.3 identifies changes due to Internet technologies. Section 4.4 outline some associated technologies along the value chain.

4.1 A New Value Chain

In the past the music distribution value chains have changed and evolved in parallel to technological and social developments. Digital technology emerged in the 1930's and initially had military applications. Microprocessors were developed for a wide variety of uses during the 1970-80's. Eventually there was a diffusion of microprocessors and digital technology into the music business where the technology was embedded in devices such as CD players and MP3 players.

Advances in technology have enabled developments in the Australian value chain. The Traditional Music Industry Value Chain (Figure 6, p. 26) outlines the traditional methods employed by the music industry. This can now be expanded to include the Internet as a means to distribute music.

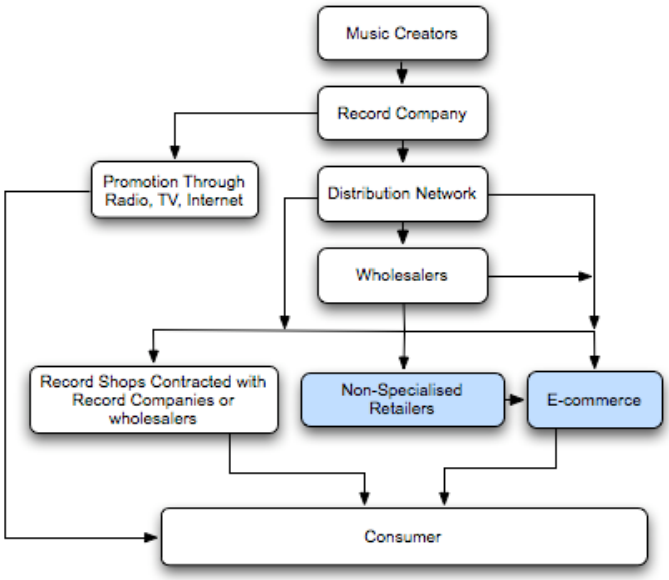

Figure 8: New Digital Arrangements Before Digital Distribution. Source: (Based on OECD, 2005)

The multinational (and Australian) recording companies use the radio and television media to market and deliver directly to the consumer in addition to the established wholesale and retail distribution network. The use of non-specialised retailers (retailers not directly involved in the traditional value chain) and e-commerce systems provided the consumer with an alternative to the established retail outlets. One trend is increasing distribution through non-specialised mass-market retailers (OECD, 2005, p. 46). E-commerce systems such as Chaos music based in Melbourne are a good example of e-commerce where a user can order music online and have the CD shipped to their premises. These non-specialised retailers are now highly specialised in a new market that provides a platform where music libraries can be viewed and music sampled via small pieces or whole songs, either streamed or available for free download. They have redirected value and created and new chain. In addition, this produced benefits for the creators and artists as the costs of traditional distribution and retailing of music can account for somewhere between 30 to 40 per cent of the cost of a CD (OECD, 2005, p. 46). Through the use of e-commerce systems it might be possible for the creators of the product to gain a higher share of the sales (Figure 5, p. 22).

4.2 Music File Formats

Technology has provided many critical effects and processes in the music world and the shopfront sales from Figure 1 (p. 14) shows the commercial and

technological evolution from the vinyl analogue format to the digital CD format. The consumer at the end point in the value chain purchased a single or LP vinyl disc or in more recent times a CD. The analogue vinyl and digital CD formats have different underlying technologies in the recording, storage and transmission of sound.

The value chain has been improved by technology. As new formats have been developed and implemented the value of music sales has increased. This is shown in Figure 1, where the CD sales grow to compensate for the decline in vinyl and analogue sales and add value to the overall sales. The difference in 2007 compared with circa 1983 is that the new format sales are not replacing the previous formats sales and adding value.

By contrast the digital music transmitted over the Internet is different from the shop front sales in that a physical item is not purchased. What is purchased is a file of coded numbers that has value. The MP3 file format has provided the ideal compact high quality, easily transmittable and containable format for the Internet. MP3 distribution has diverted revenue away from organisations that normally distribute the music using the CD format. The creators, meanwhile, who rely on CD sales suffer financially while the consumer benefits.

The concept of change is dependent on the acceptance of technology and quality of the music content by the consumers and the ability to generate revenue and profit for the owners of the value chain. As formats evolve and distribution techniques move with different trends users develop new needs. There is a definite relationship between the technical development and users needs.

High end computer technologies are now available to the general public. Creators of music can use professional software to record their own material. High speed Internet connections provide a distribution platform where almost anyone with a computer can access music. The digitisation and complete portability of the MP3 file format means that the consumers can easily download to any type of playing device and listen to a high quality product. These devices can store entire music collections in one portable place ready for access. The new technology has again provided a new economic model for industry growth as well as socially providing access to new music and the means to consume it. *For a brief history of music format evolution see Appendix A: The Evolution of Music Formats and Technology*

4.3 Change in Value Chain Introduction of Internet Retail

The decade preceding 2007 saw the emergence of a change in the traditional value chain (Figure 6, p. 26) with the expansion of the Internet and surrounding technologies. Figure 9 outlines a new online distribution system of Internet retail sales. This helps depict the Internet as a means that simplifies the process of reaching new audiences and explains why multinational music companies started to lose control of value chain.

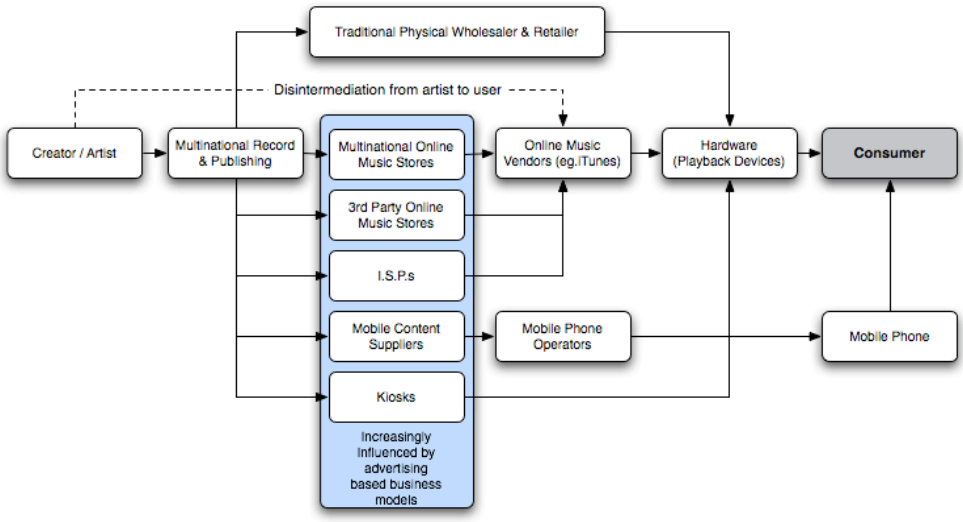

Figure 9: New Online Music Distribution Figure. Source: (OECD, 2005)

The creator now has two paths to the consumer either the traditional route through record companies and publishers or through online music vendors such iTunes or Bigpond Music. Once the music is purchased from the website it can be played on the machine used to download it or transferred on a portable playback device such as an MP3 player, making creators closer in the chain to the consumer.

There is also another method of music distribution that exists outside of the legitimate system previously mentioned. It is a system of music delivery between the creator and the consumer known as a peer-to-peer (P2P) file sharing system where the music content is posted online and shared without generating revenue for the established value chain. *For additional information see Appendix D: Music Content Distribution Methods on the Internet*

Another distribution system is website databases providing consumers with online catalogues where orders for CD can be made and copies received via regular mail. Other types of websites offer downloadable songs at no cost to the

consumer from a database of specifically selected tracks. The multinational recording companies permit their content to be sold over the Internet. The Internet reduces their handling and distribution costs and increases their profits. However, the Internet lowered the barriers to market entry, where smaller operations could gain access to the marketplace and push their product, allowing more local competitors in the Australian marketplace.

4.4 Technologies in Value Chain

All technologies in the Australian music value chain, and the diverse attempts to commercialise and sell to the consumer must address the format with which to house the music, how to distribute this format and what device is needed for playback.

Digital technologies are now part of the Australian music culture. Connections to the Internet for both business and consumers is at an all time high. The Internet is seen as an expanding market for business (Figure 4, p. 20). The result is music that is delivered to the consumer in formats such as: *a-la-carte* downloading, podcasting, streaming, and both structured and unstructured P2P file sharing. *For additional information about these types of delivery methods see Appendix D: Music Content Distribution Methods on the Internet.*

In 2004 more than 1.2 million people requested files from peer-to-peer service each day (Cochrane, 2005, p. 34). Such technology was designed to distribute large amounts of data between users without consuming costly server and bandwidth resources (*see Appendix D)*. The popularity of file sharing caused growth in the software applications used by industry to deal with the sudden rise in traffic. The following is a list of the top P2P applications in the US, by installation percentage (DMNGR, 2007, p. 1).

- LimeWire (18.63)
- Azureus (3.43)
- uTorrent (3.07)
- BitTorrent (2.58)
- Opera (2.15)
- Ares (2.15)
- BitComet (1.99)
- eMule (1.98)
- BearShare (1.64)
- BitLord (1.38)

There is a new trend appearing in US based systems for portable music subscriptions where music can be purchased or rented. There are two leaders in this field Yahoo Music Unlimited and Real Networks. Yahoo Music Unlimited is in

beta testing and is a subscription based service that costs USD 60 a year or USD 6.99 a month. Benefits include the introductory price and rented tracks can be transferred to portable devices. In addition, rented tracks can't be used with the iPod. The Real Networks Rhapsody and Rhapsody To Go service costs USD 14.99 a month. Any rented tracks can be transferred to portable devices. Non-subscribers get 25 free tracks and access to 25 radio stations per month. There are problems however in the software that makes it difficult to create searches for new tracks to import. Using this service the user can't transfer rented tracks to their iPod (Baig, 2005, p. 1). As observed in the Rhapsody and Yahoo platforms portable music subscriptions are limited by connectivity to different devices.

The affect of the music value chain by technology is substantial. Therefore, the format needed for market acceptance has been the MP3 file, the distribution method is the Internet and the playback device is the MP3 player. Whereas a century ago, it might have been that notated music was the format, the distribution method was live performance and the playback device was the orchestra.

The Internet is critical to evaluating the changes in the music value chain as its associated technologies have added and redirected value. This has had both positive and negative consequences for the Australian market.

CHAPTER 5

VALUE CHAIN AND INTERNET

This chapter aims to analyses the changes in the music value chain associated with the progress of the Internet. Section 5.2 evaluates connectivity between users and section 5.3 outlines some of the new business models that have evolved because of increased connectivity and section 5.4 briefly outlines the need for marketing.

5.1 Distribution through Internet

Technical Internet development in Australia's is well behind global standards. Our broadband speeds are slow and government policy impedes development (Crowe, 2006, p. 3). However, the Internet is helping inject more value into Australian music. The value of technology is specific and valued by the particular societies that use it. Technology has no value in itself. Its importance and hazards are the results of humans placing a worth on it. (Simpson, 2002, p. 290).

Digital music retailer iTunes is presently attempting to stimulate the Australian market and increase consumers' interest and perceived value in digitally delivered music content. It is achieving this by offering the remaining tracks when a single is purchased from that album. A typical album costs AUD 16.99 and if a consumer has purchased only three tracks from the album then they can buy the remaining tracks for AUD 11.92 (MX, 2007, p. 25).

5.2 Connectivity

Connectivity, or the ability for the user to connect with the music is a key element in the development of music distribution systems. Music can be consumed in a car, with a car CD-radio player or in a park with an MP3 player. Music can also be streamed over the wireless fidelity (WiFi) Internet connection directly into a portable device. Developments have been rapid. In the past the CD Walkman provided the latest technology in portable music consumption. There

were different brands offering different features that played a standard CD or recordable CD (CD-R). Currently there are MP3 player manufactures offering a variety of services. The iPod has been the market leader, yet is restricted to playing the MP3 format using its software, iTunes. Microsoft has released its competitor the Zune player into the market that offers the ability to play most formats, not just the MP3 file format. The Zune also offers the ability to send music via the WiFi connection to anyone in the vicinity for a trial period of three days or three plays.

A diversity of compatible content, standards and hardware are likely to prove most beneficial to competition and efficient development of online content distribution systems and markets. However, the digital delivery of online music involves the rise of an increasing amount of ownership formats (including DRM), networks, services, and consumer devices. Some of these standards act as key facilitators for online music distribution while reducing piracy but they also cause concerns about compatibility, transparency and unintended or exaggerated usage restrictions. Incompatible software, DRM formats and hardware devices could depress the growth of online music (OECD, 2005a, p. 92).

Digital standards are likely to allow numerous and different entities to create technically compatible goods and services and this plays a fundamental role in the establishment of DRM in the marketplace. There are numerous industry initiatives underway that are aimed at promoting standardisation and interoperability amongst all the components of the music industry value chain. There are no standardised technological protection measures. Incompatible technologies may be deemed to be detrimental to the growth of digital broadband content. For example, there are efforts to create digital content standards (including DRM) and enhanced co-operation with the International Standards Organisation that are part of the new Korean growth strategy (OECD, 2004b).

Another example of level of standardisation and the resulting connectivity would be the types of music software applications in the market. The following outlines the top digital music application installations in the US by percentage. It is likely that the Australian market will have similar installation percentages also (DMNGR, 2007).

- Windows Media Player (66.9)
- Real Player (39.4)
- iTunes (26.8)
- Record Now (23.1)
- Nero & Nero Ultra (19.5)
- Music Match (11.5)
- Win Amp (10.1)
- MSN Music Assistant (8.7)
- Rhapsody (8.7)
- Creative Media Source (6.5)

These systems provide the platform for delivery of MP3 files, windows media files and a variety of audiovisual media. Many of these systems aren't compatible. However, the central issue surrounding connectivity and the distribution and consumption of music content is the social networks that surround the music. Social networks, as with traditional email, works off the premise of bi-directional communication, where two parties communicate back and forward. The communication has to be authorised by both parties. When an email is sent without authorisation it is an in-bound uni-directional type of communication (spam). The receiver has had no influence over the message at all. Social networks such as Myspace and Facebook operate off a system where authorisation is required by all parties involved before communication can be initiated and is more of and out-bound multi-directional form of communication. Where bi-directional communication is aimed at forming equality in digital communications, multi-directional social networking aims at forming barriers at each stage of the process. Each user has a history of use and a detailed set of authorisation protocols, or preferences in place to make sure that unwanted access is prevented. This seems likely to be the key to social networking.

Social networking is the best method for the business community and the recording industry to understand the future of music distribution on the Internet. New digital media has caused a disruption to the technology and entertainment industries partly because it has allowed users to obtain information without paying for the content and without exposure to advertising. Social networks will most likely be the best method for marketing to specific audiences in the future.

Consumers are driving the next set of value creations in the value chain and there is a focus on consumer applications such as Google, Skype and Youtube. Traditional content providers, such a the Hollywood film and multinational music industries, and leaders in the US are now only just understand the importance of consumers wanting to share their media socially on the devices

that they have chosen. The future of music connectivity is not clear. What is known is that there is a large intellectual property (IP) network between the content and the user where much value is created.

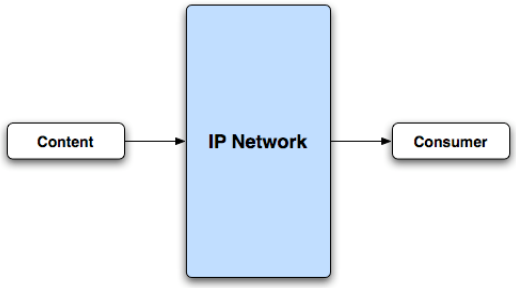

Figure 10: Content, IP network, consumer

In theory, for maximum economic growth to occur, it is important that technological protection measures like copy controls, access control, electronic envelopes, encryption, watermarking, metering and monitoring of usage and remuneration systems be developed and broadly adopted by all players in the value chain associated with online music delivery, and that they are utilised or implemented in as interoperable fashion as the various market sectors will permit. However, for maximum user uptake and acceptance it is probable a limited DRM system (if any) be in place.

5.3 New Internet Based Businesses

There are many new e-commerce websites emerging that offer increased decentralisation using a system that sells directly from the creators to consumer that disintermediates portions of the value chain. The new Internet based businesses offer a wide variety of services that include DRM. This is a crowded and competitive marketplace with a great deal of choice for the consumer. After many years of hesitation and litigation multinational music companies are beginning to evolve with websites such as Myspace and Youtube. They are focusing on the licensing of copyrighted product for users to manipulate at their will. Instead of litigation against the illegal distribution they are striking agreements for the licensing in an attempt to integrate and add value into the new value chain. The following outlines some of the most prominent e-commerce businesses emerging from the US marketplace:

Snocap provides audio fingerprinting technology. Services such as Audible Magic and Gracenote, will play a key role in monetising user-generated content by shifting the burden of acquiring licenses for copyrighted works from the end user to the service provider. Each time a user uploads a copyrighted track the technology notes who owns the rights and which advertisement is on the page hosting the content and from that information determines how much the service provider is then owed. Snopcap solutions also include: a facility that allows stores to be embedded anywhere on the Internet where html can be edited; a flexible solution that integrates content sales into a website; plus a plug-in that allows P2P technology to be used while protecting copyright law.

Brightcove is a service that facilitates content owners, for example Warner Music Group, to make video clips available to fans wishing to post content on their blog or website. The embedded video technology then tracks how many times a given clip is viewed and compensates rights holders via its advertising platform. With broadband now in around 80 per cent of US households Internet video is expected to be the most important form of online media in 2007.

The Venice Project is a P2P video device projected to be successful in 2007 Founded by J. Friis and N. Zennstrom (Kazaa and Skype) the service uses P2P technology to distribute video in the same way BitTorrent does. In addition users can also modify the content within the parameters the copyright holders set in advance. Unlike Kazaa, the Venice Project is designed to protect the copyright owners and already has attracted Paramount Pictures, Music Television (MTV) Networks, Twentieth Century Fox Film and Warner Bros. Home Entertainment.

iLike is a website designed to offer music recommendations by comparing the musical preferences of members and matching those with similar interests. The sites' social-networking aspect provides a human element to counter competitors that rely too heavily on algorithms to search for music. iLike's integration of Apple's iTunes music service makes it unique. None of these music-discovery services (others include Last.fm, MOG and Mercora) actually sell music themselves, instead linking to other services. For example, Ticket Master's mid-December 2006 25 per cent investment in iLike illustrates how digital retailers and other music interests will seek to either partner or acquire such sites to better link the discovery process with a sale.

Peer-retailing services like PassAlong reward users for the sale of each digital track they recommend to friends. To date such services haven't been successful in the U.S. There have been efforts to branch out with applications like a service called OnTour, which notify users when any artist in their digital music library is scheduled to appear in their town. More social networks continue to follow MySpace's lead entering the digital music retail market including peer retailers like PassAlong, Weedshare and Peer Impact. Access to this site was restricted to windows operating system as of 20th March 2007.

The Independent Online Distribution Alliance (IODA) provides a variety of services to the music and video market. They include: a service that provides metadata and sales administration within an application called a Rights-holder Dashboard; digital marketing and promotion through tools such as Promonet; in-house technology including reporting tools and media delivery systems; a collective licensing negotiation with digital content retailers and an aggregated royalty collection and payment administration system. This site provides a means to sell digital media from a social network or website. It provides both a subscription and a fee per transaction based service. It also offers MP3 sales at customised quality levels. There is a DRM service that sells protected tracks in Windows Media Audio (WMA) formats at a quality of 128 kilobytes per second (kbps) and Windows Media Video (WMV) (DMR protected) and MPEG4.

5.4 Marketing in the Music Value Chain

The Internet has a climate of low attention spans and a high volume of low quality traffic and an inversely low volume of high quality traffic. Advertising is adapting to the development in the music value chain. This is going to a contentious issue in the future as the music industry invents new ways to generate revenue from music consumption. The Internet is fast becoming a participant economy where amateurism is the key driver and where the market has more influence over what is placed on the Internet. The result will be a market that is flooded with choice. Consumer choice of product may be influenced by advertisements and marketing that gives value to the product especially if Australia follows the trends in the US and adopts the new business mentioned in section 5.3.

The Internet is the fastest growing medium for advertising in Australia. In 2005 online advertisement revenues jumped by 59.8 per cent to be worth AUD 620

million. 2006 saw another jump in the first quarter of 63.5 per cent. It is estimated that the total value of advertising on the Internet in Australia as of early 2007 is worth AUD 1 billion (BRW Newspaper, March 21st 2006, p. 63).

Internet developments have improved connectivity as demonstrated by the success of websites such and Myspace. As a result new business models have developed and assisted with the movement of IP along the value chain. While Internet technology has helped facilitate the movement of IP and promote change along the value chain it is highly probable the consumers, through acceptance of the content and the surrounding Internet technologies, directly drive that value chain growth.

CHAPTER 6

INFLUENCE OVER THE VALUE CHAIN

Changes in the music value chain have made it easier for music creators to gain the attention of new audiences and provide a large volume of new music for consumers. This chapter aims to explain the influence that these two groups have had on the value chain. Section 6.2 looks at the way in which consumers choose their music, while sections 6.4 and 6.5 look at barriers to market entry and consumer acceptance of new technologies.

6.1 Consumers

In contemporary western society there is a constant desire for new products and services, a feeling that extends beyond the music world and one that stretches into many other facets of life. There is considerable evidence that middle-class Australia focus not on what they have but on the gap between what they have and what they want, creating a sense of material deprivation in a time of plenty (Hamilton, etal., 2007, p. 9). As a result of such desires, the availability of new music formats have helped improved the use of music content and create new opportunities for those who make, distribute and consume music.

The social drivers of change relate to people and their behaviour (Fox, 2002). For the purpose of this study they include: the desire, need, availability, acceptance and popularity of new technologies; attitudes towards the Internet and piracy, the value of music to the consumer and ease of use of new technologies and consumer choice. The technical drivers of change involve the development of the means in which music is produced, distributed and consumed (Fox, 2002). These include: broadband bandwidth, storage capacity, format quality and compression, DRM, P2P networks, streaming and podcasting. Connectivity amongst users, their devices and software and the development of systems designed to deliver content are in competition.

6.2 Consumer Procurement Retail Behaviour

In theory there is need for a balance between the two systems that will provide economic stability and growth as well as retain consumer freedom and choice. By posting a copy of a song on a website large numbers of consumers can access instant music content without loss of quality and at no cost. Initially this seems ideal for the consumer. In practice this means the music providers (artists and music companies) are omitted from the value chain. The consumers now have influence over the value chain through their choice of distribution system they use.

In order to describe how consumers choose music, figure 11 shows the cycle of music consumer behaviour. Beginning with an individual desire for music there are two basic traits displayed, socio-demographic and music specific. These include age, education and income and could influence the ability to access some of the new technology. Music relevant traits refer to the experience the user has had dealing with music that would include genre of choice, their expertise in choosing music and their experience and perceived risks using the systems of distribution in place.

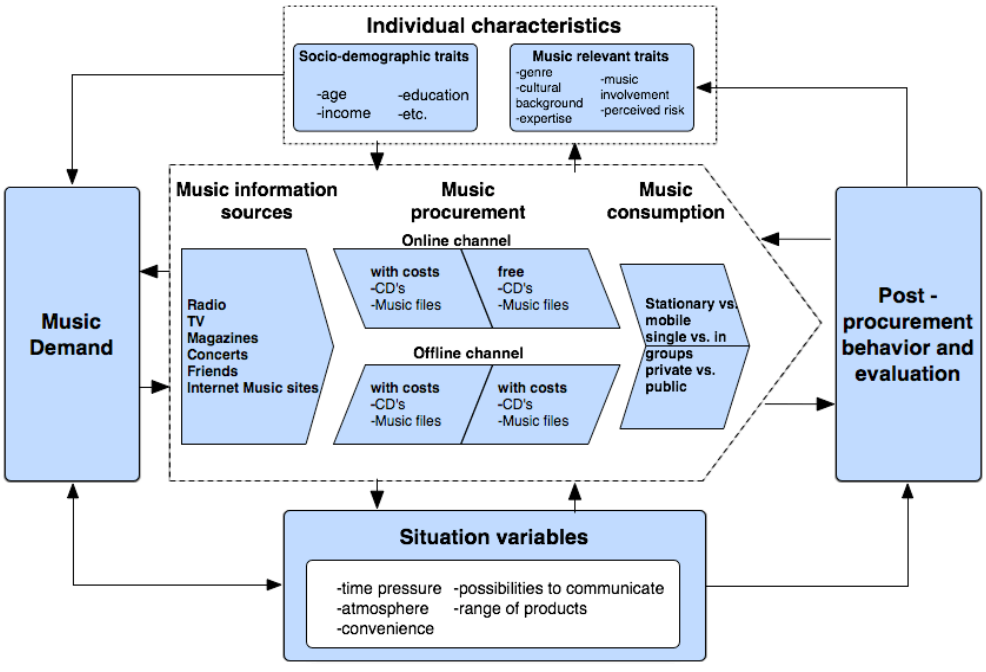

Figure 11: Internet-induced Changes In Consumer Music Procurement Behaviour: a German perspective. Source: (Walsh etal., 2003)

Once the individual's preferences have been described they are then influenced and informed about music in different ways. These include the radio, television,

live performances, the Internet and word of mouth recommendations. Once influenced, the consumer then procures the music content in either the traditional offline retail environment or in the online retail environment. Both methods include the delivery of a CD or a music file of some sort. The next phase of this figure is the method of consumption. This has three variables: stationary music consumption versus mobile music consumption; single users versus group users; private consumption versus public consumption. The traditional model of music content consumption has been a single stationary music user that consumes privately at home using a home system and radio. With the advent of websites such as Myspace and MP3 players music is now portable and group oriented, where the user can see who has similar tastes. Music is consumed everywhere, both in private and in public. The central portion of figure 11 shows the influences on behaviour of the consumer. After they have procured their product the consumer will either be enthusiastic about the music and spread it through personal recommendation or be apathetic and do nothing. If the individual has limited time and resources at hand and is offered a limited range of products then uptake of new music and services may be slow. This inturn influences the demand for music.

In figure 12, the procurement behaviour has been simplified into three main groups that influence online consumer behaviour: demographics, economics and technology. For example, it is likely that a teenager will have a thorough knowledge of the available technology, value the product and have access to a disposable income. The equivalised disposable household income in 2005-06 was AUD 644 (ABS, 2006d). Usually they have little to no income and access an Internet connection where they can instantly pay for or steal their music.

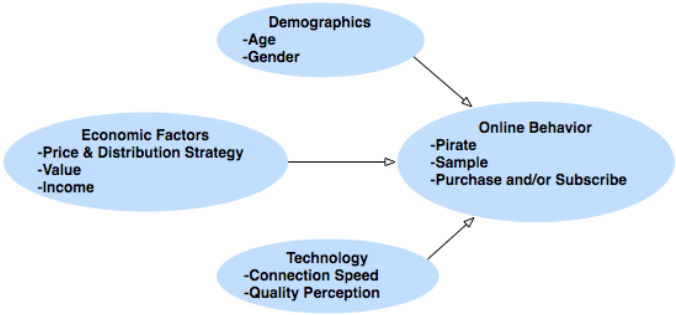

Figure 12: Online Music Piracy.

In describing the development of social drivers the assignment of value to the different areas of a system can be used. Along with the available technology the

socio-cultural environment drives the ways in which media cultures, consumer behaviour and the music industry develop policy. It is a cyclical process where the advent of a new trend or technology can spur the system off into new developments. Each component of the value chain is subject to influence. Consumer behaviour is subject to influence from the media and is part of the reason why the current music industry has grown to be so strong over the past century. Consumer behaviour is also influenced by new technologies, such as the iPod which has sold millions of units around the world. The new technologies have influenced the media and consumers by providing an exciting new portable and compact way to use music. Influence on the music industry has been positive, as it has boosted legitimate sales. It has also had a negative affect in boosting the popularity of illegitimate file sharing and use of the MP3 file format. This has resulted in a change of policy by the music companies and an open display of support by the music consumers. This in turn feeds back to make up the current socio-cultural environment where music can now be legitimately downloaded and played on an MP3 player despite the fact you can't share music between different operating platforms.

Another method to describe the development of the social drivers behind the development of music value chains in Australia is to look at what is wanted by the participants in the value chain and compare that to what is actually available in the market. As outlined in figure 13 the pressures, both direct and indirect affect the state of play.

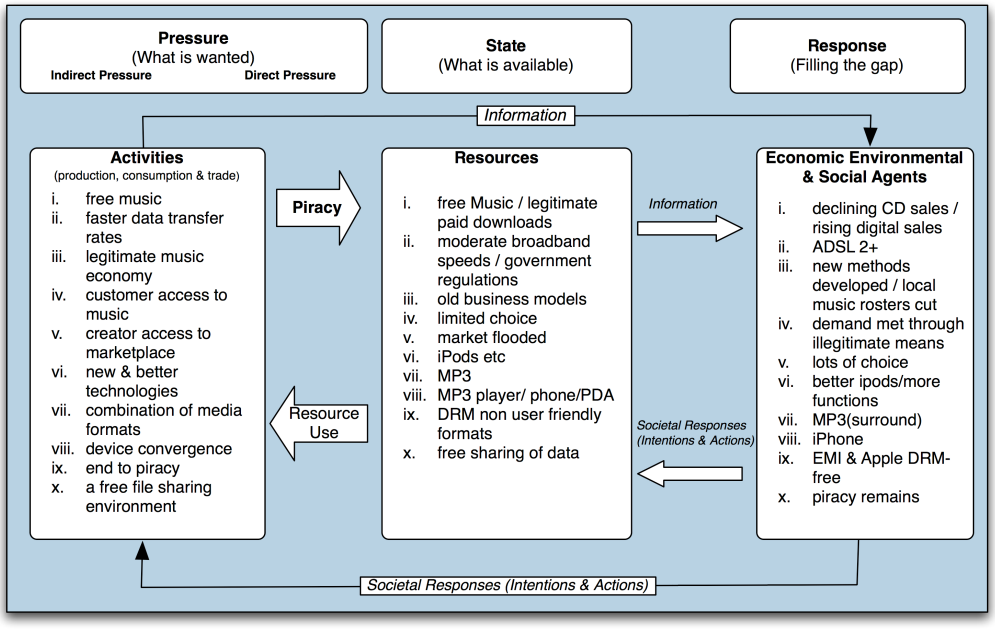

Figure 13: Pressure State Response Source: (Based on OECD, 2003)

This result is a *response* to the difference between what the market demands and what is available. The responses then influence both the *pressure* and *state* components of the cycle and can change the *socio-cultural environment*. For example, working from the response of P2P websites, there was and is consumer desire for instant access to music over the Internet. The market response was to develop a system to fill the gap. Napster was the first to do so. This resulted in piracy affecting the state of the music market. A new pressure then developed where the multinational music companies attempted to stop the change, which was driven by their need to maintain growth rates and control over the value chain. The cyclical nature of figure 13 shows that there is a constant development and change occurring between what is wanted, what is available and how the gap between the two is met.

6.3 Portability of Music Content

In the realm of the Internet and digital wireless technologies there is discussion of which is more important, connectivity between users or the content that is delivered and developed by businesses and firms. Historically governments and decision makers have emphasised content while the users prefer connectivity. For example, connectivity between users involves a high volume of low quality content, the Short Message Service (SMS). While content driven products and services such as the Wireless Application Protocol (WAP) have a high quality of content transmission but a low volume. In this social climate, attention spans seem to be growing shorter while the value of connectivity is increasing the importance of each transmission, creating an overall reduction in the quality of content and an increase in the volume.

The Australian music industry is also faced with some issues similar to those of the emerging telephone industry. Specifically, how to diffuse the technology into the community so that everyone will use the service you are providing. Currently the music industry is focusing its attention on the content aspect of its value chain. It is dealing with piracy and licensing issues and trying to protect its content. Australian music companies could develop better connectivity models in conjunction with content protection. It is also worth noting that if DRM is dropped, as EMI and Apple have done and it results in revenues rising from increased usage then there will be a balance between providing content, connectivity and revenue.

6.4 Barriers to Entry and Innovation Outside the Value Chain

There are a variety of obstacles, or barriers to entry, to overcome if digital music distribution systems are to have a significant impact on the Australian music economy. To the small Australian market (and larger foreign markets) the consumers in the value chain are vital. There is a digital divide occurring in Australia. As the music market grows so does its value. As its value grows the barriers to market entry are raised. The success of user uptake is critical to the success of the value chain development. There are specific market barriers that restrict the uptake of technology and the music value chain that include basic literacy, owning or having access to a computer, computer literacy, access to broadband, skills education to use the hardware devices and associated software. There are just under 3.64 million ADSL connections in Australia (ACCC, 2007). As of September 2006 Australia's total population was just over 20.67 million, and 63 per cent of the population have access to broadband connections (ABS, 2006b). Broadband uptake is critical to the success of the development of the music value chain in Australia.

Consumers are however adopting new technologies. The development of new technologies have dramatically changed live performance and broadcast communication methods. In the past century both the quality of recordings and the availability and ease of distribution methods has improved dramatically also. As a result the number of people consuming such recordings increased in direct contrast the numbers consuming live performance decreased. Consumers have spent vast amounts of time listening to these recordings. The numbers of performers, both professional and amateur, have declined over the past century and control over consumption has become concentrated in the hands of a small group of organisations (OECD, 2005, p. 47).

There are two issues when considering adopting a new technology. Firstly, there are different methods with which to consume music content; secondly, there is the diffusion of the surrounding technology that makes the consumption possible, such as the playback device. As the technology changes, the economic laws do not. The basic economic factors that determine success or failure of a technology remain the same (Shapiro and Varian, 1999, p. 2). For example, if a product has a low price it will have a high volume of sales and if it is highly priced there will be a lower volume of sales. Control of such economic laws is important in the control over the value chain. Information, or anything that is in

a digital form, is costly when producing the first unit and relatively inexpensive (low marginal cost) for successive units. Music content is no exception (Shapiro and Varian, 1999, p. 5). The multinational music companies were once the innovators in their field, as leaders and controllers, they guided the user to what they wanted and assigned value to the music. They helped the user experience and value the music content. This has now changed with the advent and use of digital distribution technologies. The user now has more control and is not under as much influence as to how they experience the music content offered by the multinational music companies and therefore the user has influence over the value chain.

The consumer, or end user, is partly responsible for current events unfolding in the music world (Von Hippel, 2005, p. 39). The methods used over the past century of distributing and using music are being drastically reconsidered. The market demand for the latest product or service is both influenced by technological development, and influences and drives that same development. User innovation has influenced the current situation originating with illegitimate digital music provider Napster in the late 1990's. Napster was the first decentralised P2P website, constructed by socially and technically aware users. These users were willing to try and adapt the new technologies to their needs, where the established systems were unable or unwilling to develop and supply. The established systems continued to remain static in the face of change opting to try and quell the revolution within the value chain.

The conventional term for an individual end user (consumer) wholly suggests that users are not active in product and service development (Von Hippel, 2005, p. 35). However, change is born out of necessity or desire by the consumer for something new that is better than the previous version (figure 13). The user does actually have a strong influence on the development of products and services. Using this precept retrospectively it is easy to see how the multinational music companies developed their strategy. The music end user has had a resounding affect on the global music value chain by participating in illegal downloads and file sharing.

When driving change in the value chain the multinational strategy is to gain user acceptance of the change that is offered. There are two basic approaches when dealing with consumers and their acceptance of technology: Firstly, to provide the best possible product in terms of performance (revolution); secondly, to

compromise on the performance in order to provide compatibility and encourage user uptake and acceptance (evolution). Figure 14 outlines this concept. There is an outcome of high compatibility with limited performance improvement in the upper left hand corner of the figure, the evolution approach. In the lower right hand corner there is an outcome of limited compatibility and increasing performance, a revolution outcome. Ideally there would be a balance between superior performance and user compatibility within the installed base of existing users. This is not always possible as technology takes time to develop and can often have problems in its early developmental stages (Shapiro & Varian, 1999, p. 191).

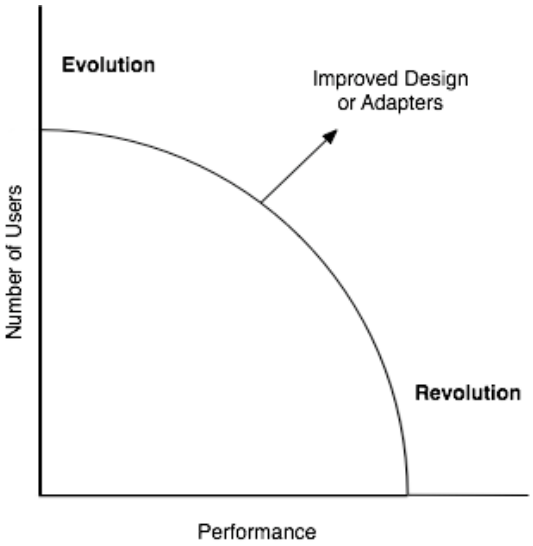

Figure 14: Performance versus Compatibility (Shapiro & Varian, 1999)

Digital music distribution systems in Australia initially fell into the realm of revolutionary. There were high performance capabilities yet low numbers of users. MP3 players also fell into this category with a revolutionary performance. Subsequently they have moved into the evolutionary stage where the number of users has grown dramatically and offset the revolution. Format technology also classifies as a revolution. The advent of surround sound MP3 files for example, is a new technology that provides an innovative performance and compatibility, yet it is relatively unknown, with few users to give value to the new technology. Currently Australia is in the evolutionary stages of development where the broadband technology is becoming more and more popular yet the performance is low compared to other countries. With regards to music website distribution services Australia is in the bottom left of figure 14 with a low number of users and a low performance level and limited choice compared to other countries.

Evolution is a key driver in the development of music value chains. When a technology is introduced and the users can take, manipulate and customise it to fit their own requirements technology evolves from its original form. The situation where multinational strategy was unwilling to evolve with the revolution was a considerable flaw. Their other major flaw was providing (all their) music on a perfect loss-less format ready for prolific copying without any sort of control mechanism. At present the revolution continues and the multinational music companies are now evolving and adapting to market demands.

The concept of positive feedback is also another method used in understanding the economics of information technology and specifically the Australian music value chain. Positive feedback (no capitalisation) refers to the strong getting stronger and the weak getting weaker. This results in critical outcomes such as the dominance of the marketplace by one particular form of technology (or organisation in the case of iTunes in Australia). Figure 15 shows the battle in the marketplace for market share. The consumer has to make the choice between a variety of goods and services in an attempt to choose the technology that will eventually become the standard (for example, VHS versus Beta). Eventually VHS won and was eventually superseded by digital technologies such as DVDs (Shapiro & Varian, 1999, p. 177).

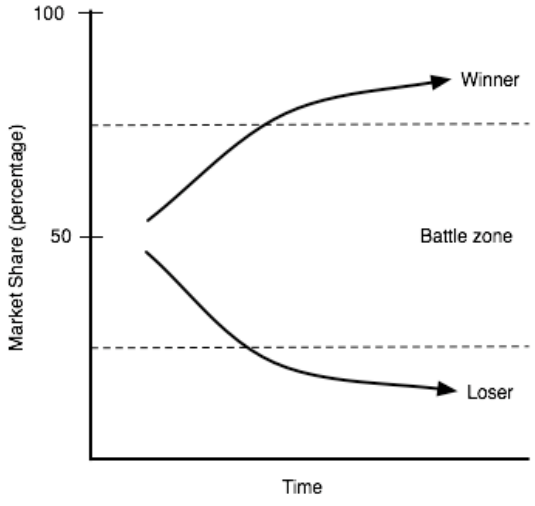

Figure 15: Positive Feedback (Shapiro & Varian, 1999)

Positive feedback systems follow predictable patterns. Figure 16 outlines the adoption rates of new technologies, which forms an s-shaped curve. There are three phases with the uptake and acceptance of new technologies. Firstly there is

the launch phase, followed by steep increase due to the positive feedback kicking in. Finally there is levelling off as the market becomes saturated. This pattern has been prevalent with the adoption of the fax machine, the CD, colour television, video games, emails and especially the Internet (Shapiro & Varian, 1999, pp. 178-179).

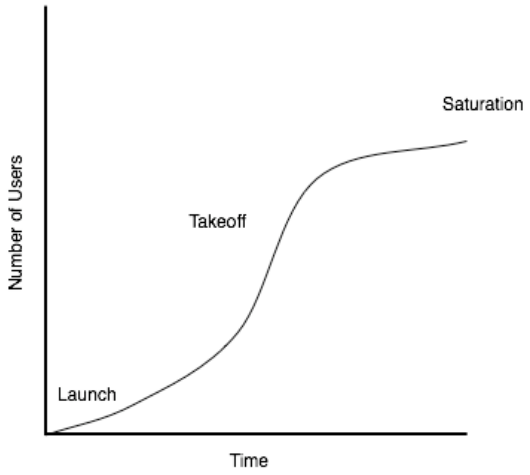

Figure 16: Adoption Dynamics (Shapiro & Varian, 1999)

Currently we are seeing the emergence of the digital music economy in Australia. There has been the launch of such sites as iTunes in Australia. Market acceptance seems to be positive. The adoption of the MP3 player can also be plotted on this curve. The market has seen the launching phase and is now in the throws of the takeoff phase. In the future the market might be saturated with MP3 player or similar technology.

Another social driver behind the development of distribution systems in the value chain in Australia is the concept of demand-side economies of scale. The success or failure of a product or service is driven as much by consumer expectations and luck as by the value of the product or service. Marketing designed to influence consumer expectations is critical to the network markets and the Australian music value chain. Figure 17 outlines the relationship between popularity and value. In the upper right hand corner there is a virtuous cycle in motion, where more and more users adopt the technology. This adds value to the technology for the rest of the users as it moves closer to becoming the standard technology. At the other end of the curve is the vicious cycle where popularity quickly fades and users switch to other brands. This removes value from the installed base and makes switching costs for those who hang on expensive.

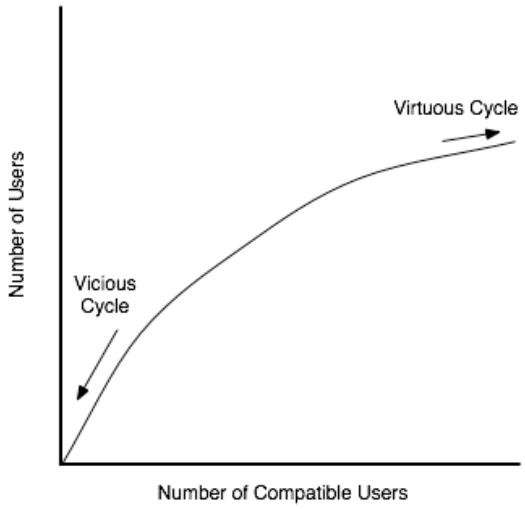

Figure 17: Popularity Adds Value in a Network Economy (Shapiro & Varian, 1999)

At present we are seeing more and more people adopting music related software (section 5.2). In the US Windows Media Player application has a 66.9 per cent market penetration followed by Real Player and iTunes with 39.4 per cent and 26.8 per cent market share respectively (DMNGR, 2007). As more and more users adopt the changes in the value chain the pricing system should allow for drops in the price of the music content.

6.5 Market Acceptance and Attitude

We are now in the period where development is being driven by economic forces. There is a battle between the idea of paying for music online and stealing it. Change is underway to prevent piracy. So in economic terms we have yet to see realised technical change in the economy as the proportion of digital music sales represent only a small part of the overall music market. A new invention creates new technologies and new opportunities. The diffusion of the new technology to the economic agents (the consumer) determines the rate and direction or realised technical change in the economy (Bresnahan and Yin, 2005, p. 2.). A decade ago the MP3 wasa high quality music format but the success of the format was limited by the distribution method and ease of playback. There was little or no incentive for the user to switch from CD to MP3 as the functionality of the format was very limited.

There are many factors that influence the way these technologies are accepted and diffused. The incentive to acquire is based on providing an advance over a previous version, for example an MP3 player, which allows entire record

collections to be accessed in a high quality format. This is an improvement over the earlier versions of MP3 players, mini disc players and the CD Walkman. This functionality of the iPod has helped with its diffusion and commercial success. This aligns well with the theory that adopters of new technology will also wait rather than adopt immediately (Hall, 2004. pp459-484 and Bresnahan & Yin, 2005, p44). For example, In April of 1989 the Fraunhofer Institute received a German patent for MP3 around the same time the CD was becoming a massive worldwide success. The compact disc helped to digitise the music world while the MP3 quietly evolved. In 1992 Fraunhofer and Dieter Seitzer's audio coding algorithm was integrated into the first version of the MP3 known as MPEG-1. In 1994 version two, the MPEG-2, was developed and then published a year later. In 1996 the US patent for the MP3 was issued and then in 1998 Fraunhofer started enforcing its paten rights and started collecting fees. The record label Sub Pop began to distribute its music on the Internet in 1999 using MP3s. This was closely followed by the emergence of the portable MP3 player in the same year (Inventors, 2006, p. 1). The format technology was available, yet there was little incentive to use it. This was a considerable barrier to entry into the market for the MP3 format.

Without digital technologies the personal computer and the Internet would not have been possible and music distribution systems and the value chain would be different. Without the personal computer and Internet becoming a significant place of business music distribution systems would not have been so popular and developed in the way it has. A primary concern in the diffusion of technologies generally is the importance of raw technical progress versus economic forces (Griliches, 1957, pp. 501-522). With the development of high-speed broadband connections and P2P file sharing tools music technology advanced. The new systems gave industry new ways and methods to deliver music to the consumer. The consumer had instant access and portability and subsequently valued the product and service. The incentives to change, or upgrade, were becoming greater and greater. The major incentive being free and instant access to a large amount of music.

Understanding social attitudes towards the Internet and music content are vital for the development of advanced value chains in Australia. There are a wide variety of attitudes towards the Internet. There are those who believe in the own-nothing-have-everything philosophy where whatever is available is to be

taken advantage of, and those who believe the Internet should provide an opportunity for the development of the Australian music value chain. There are also those who resist change, such as rejection of the concept of online purchasing with credit card or equivalent. By understanding the different attitudes toward the technology presented to the marketplace, a better value chain can be developed.

6.6 MP3 Market Acceptance

It is crucial to have social acceptance and the ease-of-use of a format in order for it to drive the value chain development. The MP3 has high acceptance and ease-of-use and is easy to distribute. However, there is no guarantee it will become a standard. The MP3 format is based on psychoacoustics (see Appendix A, p. 88) that masks certain frequencies audible to the human ear. This reduces the overall quality of the music as compared to other digital formats, such as the *Wav* (wave) file, but not the perceived quality. The *Wav* file is uncompressed and large, while the smaller MP3 file has an advantage in its ease of distribution. It does however, lack the quality and dynamic range that is needed to faithfully reproduce genres such as classical music. The main reason for the use of the MP3 format (in addition to social acceptance) is its ease of distribution. The use of the MP3 also drives the current digital music value chain for popular genres of music. When broadband speeds increase to the point where the format of the digital music is not a consideration a changing market trend is likely to move away from the MP3. This won't occur for sometime as we are at the early stages of online music content development. For example, CD sales in the US for the period January 2004 to August 2004 have been estimated to have generated around USD 6 billion (Billboard, 2005, p. 1). This is around 6 billion one track downloads as compared with 100 million in the same period the year before. Digital sales with have to increase by a factor of 60 times in order to have comparable CD revenue streams. This is unlikely to occur in the immediate future.

When considering if a format is going to prevail as a standard technology the reasons for consumer selection need to be taken into account. It is crucial to try and test a technology before switching in order to decide if the cost to switch is worthwhile. This activity of choosing and testing is referred to as the lock-in cycle. The lock-in cycle is a dynamic concept that grows from investments made

and needs realised, at different points in time. As the name suggests, this is an ongoing cycle that is always in a state of movement and development (Shapiro & Varian, 1999, p. 131). Figure 18 outlines this cycle: the customer chooses a new brand at the *brand selection* point. This could include anything from software programs to buying a new car or music player. At this point the customer has no preference for any particular brand or product. They are not locked in. The next part is the *sampling phase* where the customer takes advantage of incentives offered by the business, such as free downloads or samples of song files. There is a risk here for business that the incentives offered will be taken and the customer will not return as a paying customer. The *entrenchment* component of the cycle involves the customer taking the next step and purchasing the product or service and then developing a preference of some sort to that particular product or service, and they may even become locked in by making some sort of corresponding investment. The common trend of the supplier is to extend, or actively delay, this period of consideration of other brands. The result is an increase in the costs to switch to another brand. Lock-in occurs when the switching costs become too expensive. At this point in the cycle the customer again comes back to consideration of the brand. They either switch brands or consider switching without actually doing so. Circumstances have now changed since the last time around the cycle. Switching costs will be higher, suppliers may have dropped out and new technologies may have been developed (Shapiro & Varian, 1999, p. 132).

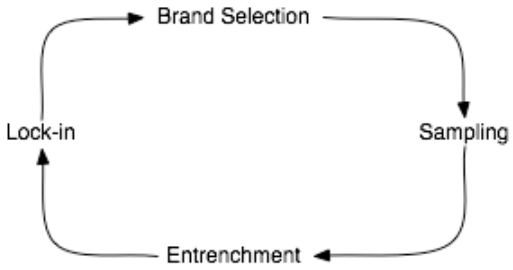

Figure 18: The Lock-In Cycle (Shapiro & Varian, 1999)

If the current technology is focused around the creation and delivery of MP3 files and a better technology comes along offering superior performance then we could see a new revolution begin. If the market accepts MP3 as the standard in digital music, where large investments along the value chain have been made then it could lock the industry into this format and not allow it to evolve services.

Digital technology lowers barriers to market entry and affects the development of music value chains mainly in two ways. Firstly, the digital technologies reduce the cost of making perfect copies of the original, and secondly it allows for quick and easy distribution of the copied information. This poses both threats and opportunities. Reduced distribution costs help to promote products by making free samples cheap and easy to give away. This is good when there is a demand for samples or previews of products, such as thirty-second previews of songs, where the basic idea is giving away free samples helps to increase sales.

MP3 copy protection schemes impose costs on users and are highly vulnerable to competitive force. Standardisation problems and competitive pressure mean that copy protected material is unlikely to be a major force in the market place for goods and information. Recently both the multinational recording company EMI and technology company Apple dropped plans for the development of DRM music formats.

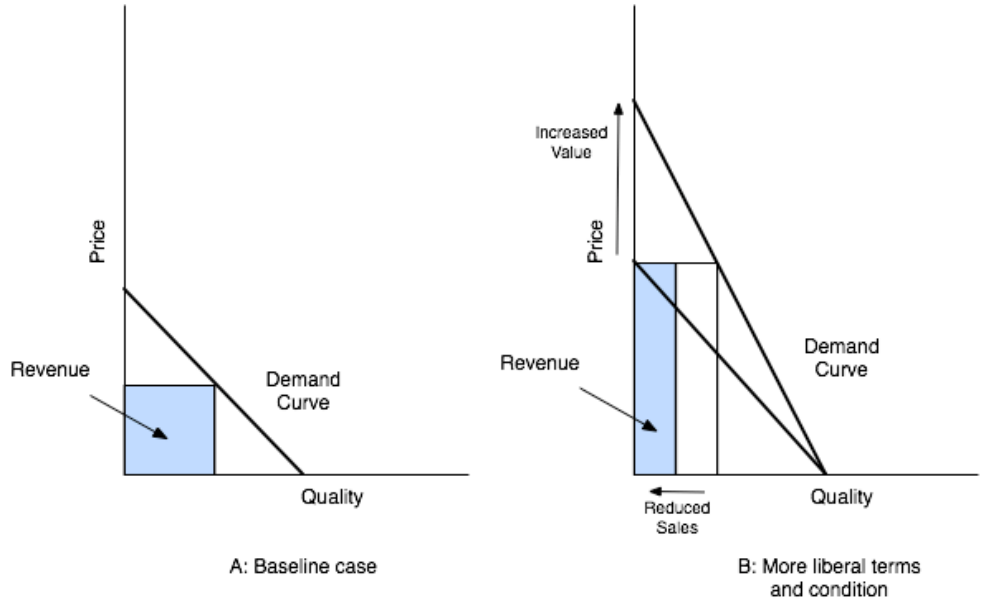

Figure 19: Balancing Terms and Conditions of Sale with Amount Sold. Source: (Shapiro & Varian, 1999)

Copy protection can be seen as providing technology with less liberal conditions to the market. Changing the terms and conditions with which music is used can affect sales volume. Figure 19A is a demand curve that details the basic economic rule of a high price leading to low volume and low price leading high volume sales. The shaded area represents revenue where there is a balance between quality and price that maximises the revenue. If the terms and conditions with which the product is offered change and become more liberal and relaxed then the value of the product to the consumers rises and this shifts

the demand curve up. With liberal conditions come higher copying and piracy rates where the producers loose sales. In figure 19B the curve is twice as steep as the baseline case and means that every consumer is willing to pay twice as much for the intellectual property under these conditions. These conditions also mean the producer sells less. Figure 19B assumes sales have fallen by 50 per cent. The new box has twice the height and half the width leaving the revenue unchanged. If conditions reduced sales by more that 50 per cent this would result in reduced producer revenue. If the conditions reduced sales by less than 50 per cent this would increase producer revenue. The overall outcome means that if the terms and conditions reduce sales by more that 50 per cent it would reduce revenue. If sales were reduced by less that 50 per cent this would increase the revenue. The changing of the sales terms and conditions increases profit and increases value to the customer. The producer can use this added value by increasing prices to offset the drop in sales. The key is to maximise the value of the IP by picking the correct terms and conditions of sale to suit the market and not in order to maximise the protection of the IP (Shapiro & Varian, 1999, pp. 99-102). The Australian government has used this rule with the implementation of new copyright legislation (section 3.5) in an attempt to give more value to local IP.

Consumer acceptance of the new technologies drives development of the value chain. Through advances in procurement methods, format availability and ease of use, access to the relevant technology and the acceptance of the new technologies they affect change.

Changes in the music value chain are presented to the consumers in the global marketplace where they are either accepted or rejected. The rates of acceptance determine if a new technology will become a standard. It is probable trends in accepting new technologies in international markets are reflected in the Australian market.

CHAPTER 7

DISCUSSIONS

The Australian music industry is small, popular and valued by Australians. Digital music distribution system development has been retarded by reluctance of the multinational recording companies and their hesitation to enter the market with new products and services. Australian consumers are ready and willing to accept new methods of consuming music as reflected in the growth of the digital marketplace. New technologies adversely affect the creators and system developers in the short term while the consumers have more choice at a lower cost. As it is a popular industry and developing faster than the rest of the economy, current trends suggest that it should continue to do so. Digital sales could compensate for the decline in CD sales and the availability of new technologies might become more popular in the wider community and result in an increase in the percentage of total sales for the Australian music industry.

The music industry in the past has survived and flourished by controlling and manipulating the music value chain. New technologies have now been embedded in the music value chain (over the past decade) that has removed the ability of the established organisations to influence consumers and creators of music. There needs to be development of industry regulations aimed to balance the interests of creators, distributors and consumers, in areas such as the protection of intellectual property rights, and digital rights management. This has to be achieved without disadvantaging innovative new business models. The new business models need to have a balance between protecting the IP for distributors and ensuring control and choice for the consumer. The IP needs to be protected along each part of the value chain.

Whilst technology has provided opportunity it has also caused the multinational companies to lose sight of the importance of creating a sustainable marketplace that is durable to change a development. Although the music industry has been developing faster than the rest of the economy its growth rate is now easing.

This has provided other organisations with the opportunity to enter the Australian market and influence value chain development. Foreign influence is both a good opportunity for access to the latest technology and a barrier to market entry.

The new distribution systems that are available in Australia provide choice and ease of access to customers. Two steps could be taken in order to ensure the economic sustainability of the Australian music value chain: Firstly, digitising the music content without the unique identification and watermarking, ensuring the consumer friendly DRM rules that increase the consumers' choice, availability and connectivity whilst protecting creator copyright. This is needed in order to stimulate the use of the digital distribution systems that are required to attain positive feedback and sustainability; secondly, confirmation of rights clearance and renegotiation of the licensing agreements between the creators and the distributors, which is likely to ensure the appropriation of revenue from downloadable digital music is equitable.

The battle for market share between digital downloads and the traditional CD sales in Australia is still weighted towards the CD industry. The market share that digital music holds has partially offset the drop in CD sales over the past 12 months since 2006, yet it is unclear as to what extent future CD sales will be substituted by digital music. IFPI research suggests it will be gradual rather than sudden. One in three music buyers says that a CD is more valuable than music downloads. Trends in international markets offer an insight to the smaller Australian market. Piracy is likely to affect the system that produces the music and will result in reduced access to new music. Portability is the key driver in digital music as 45 per cent of all file sharers transfer music to a portable player on a monthly basis. Legal down loaders are catching up, with 29 per cent of music buyers regularly transferring songs to portable players. Around 10 per cent of Internet users have purchased a digital audio player in the past 12 months since 2006 and 15 per cent of Internet users have a portable player. Some 35 per cent of illegal file-sharers are buying fewer CD as a result of their downloading.

A key requirement for the creation of an efficient music value chain in Australia is a competitive and extensive access to broadband infrastructure. The delivery of online content necessitates new technologies and an environment that facilitates the creation, acquisition, management and delivery of music content.

Alliances between content providers, broadband and technology providers that devise new business models play a critical role in driving the consumer adoption rates of licensed music content services. A diversity of content, standards and hardware are likely to prove most beneficial to efficient online content markets. With particular consumer standards, and an environment where small and innovative market participants can compete is likely to be maintained. The Internet already provides new forms of advertising at lower cost, lower barriers to entry for artistic creation and lower costs of finding new talent. However, the effects of authorised and unauthorised file sharing and digital music services with pay-per track offers on creators and the music supply are not yet obvious and need further study.

More emphasis needs to be placed on the importance of government actions to take steps in addressing online music piracy. Approximately one third of Internet users in OECD countries have downloaded files from P2P networks. File sharing software is an important new and innovative technology, yet it promotes piracy, which is a significant obstacle to the development of legitimate online content services and a sustainable music value chain. The primary concern is to forge a balance of available legitimate use, and innovative use, of new technologies and the necessary protection of associated intellectual property rights whilst not restricting the consumer.

Dealing with piracy is a critical issue in the evolution of Australian music value chains. Piracy results in a loss of jobs, a loss lost tax revenue for governments and undermines the creative element in society by devaluing IP, as it is one of the foundations of the modern knowledge economy. There needs to be investment in resources to enforce the violation of copyright and the penalties that result. There needs to be an education program implemented to ensure further generations have access to new music. Government departments also need to be united and coordinate their efforts. Education is also important when tackling piracy. Copyright is not widely understood by the greater public. Illegitimate music distribution needs further monitoring and ISP's could play a key role in reducing rates of music piracy.

Australian music sales revenues in have been dominated by multinational music companies (sections 3.2, 3.3 and 3.6). In doing so they have brought the manufacture and production and recording technologies into Australia and they continue to embrace significant technological changes (Figure 1, p. 14). They

have also controlled a significant portion of the creative industries of the Australian economy (section 2.2). The control has been primarily managed throughout the value chain and ensured a return on investment by controlling national pricing (section 3.4). Multinational music companies' dominance has greatly influenced the popular music available to consumers and has dictated the format and the technologies associated with the movement of IP through the value chain. However, the ABC has provided independent government participation in the value chain, which has partially balanced the cultural influence of the multinational music companies. The ABC was originally concerned with content from the classical and country genres, and has only recently branched out into mainstream popular music content. The ABC also has generally followed global trends in technologies, which is presumably driven by cost considerations and market share and the facilitation of IP movement through the value chain.

There are small independent companies in Australia such as Festival/Mushroom, similar in value chain influence as the ABC. They also follow the technologies and global music trends. Such small independent companies are participants only and do not influence the value chain. As a result the ABC and the small independent companies cannot control their profits to the same extent as the multinational music companies.

7.1 Technical Drivers

New technologies facilitate change in any society. The desire for new and improved methods of living is essential to the western world where consumption drives development. The Australian music value chain is changing due to advances in digital technology and is driven, in part, by increased consumption through better distribution. The Internet has helped to increase distribution as well as piracy and copyright violation and multinational music companies have lost revenue. This has resulted in a change in the value of the components within the value chain.

Technology has no value, it is its application that has significance. The application of technology that is behind the music content is crucial to the development of the value chain. New formats bring new opportunities and new risks in developing new distribution systems. The MP3 and the Internet made mass, instant distribution possible. Digital Distribution can be in the form of

downloads, podcasting, streaming and P2P networking. It could be possible to rent music on a portable subscription model where advertising revenue can be drawn from tracking the usage of a file.

Advancement of distribution systems has increased piracy. To fight piracy DRM techniques have been employed. DRM decreases piracy yet restricts connectivity. The result is a music market where there is a wide variety of choice of formats to consume. It might follow that the most advanced piece of technology isn't always guaranteed to have a significant influence over the value chain as consumer acceptance and uptake of technology affects its popularity and success. This trend suggests that consumers affect the value chain through their choice of technology. Music consumption is personal and subject not just to technological issues but social issues. There are many social aspects that drive the development of Australian music value chain.

7.2 Social Drivers

The social drivers of change have lead to piracy and have retarded the development of the Australian music value chain. The constant desire for new products and services has been stimulated by new technologies, which provide opportunities to consume music in different ways.

Distribution systems change through user innovation. In the period 1997 to 2007 such systems evolved to meet the gap left by multinational music companies. Given the popularity of systems that provide instant access to content with no DRM, current trends would suggest that the consumer needs freedom of choice when using music. Connectivity and portability of music are key drivers in value chain growth. A balance between connectivity and a content driven value chain is needed where the value chain generates revenue and the creators receive their rightful income and the consumer maintains their freedom of choice.

Technology directly affects consumers' choice over the consumption of their music. User innovation has occurred due to a lack of choice and control. By the implementation of further control methods, such as DRM, user innovation will continue and will fill any gap between market demand and the legitimate value chain in place. The lack of choice and control in Australia has been partially caused by regional branches of multinational recording companies hesitating

and waiting to follow the lead of other regions in bigger markets. There are general observations about global music that can be applied to the local markets, for example dealing with piracy.

Variable pricing structures are also important and non-existent in the Australia music value chain. As different consumers value music in individual ways and such a structure could help reflect the social value of music by offering varying quality tracks at different prices, that is low, medium and premium prices.

The traditional methods of making and selling music are changing from ownership of an object to the right to access a database. The distributors have tried to control the technology and influence the value chain and have failed. Consumers have developed new systems in response to the lack of choice. New technologies adversely affect the creators and system providers in the short term whilst giving the consumers more choice.

The changes in the value chain caused by new digital music distribution techniques are a sign of development. Such activity has been a standard in the music industry for over a century as it indicates growth.

7.3 Conclusions

It seems that the digital technologies that facilitate both piracy and the legitimate purchase of music content on a global scale are a key drivers of change in the Australian music value chain. It is also seems that music consumers from foreign markets affect the development of digital technologies within the Australian music value chain and that Australian music consumers do not affect Australian music value chain development. Further more, the Australian music value chain does not affect change, or exert influence over foreign music value chains.

The drop is the value of sales in Australia is partially offset by piracy and a sharp increase in digital sales. The difference between the increase and the drop in sales value might indicate the value of pirated music in Australia. Australian multinational music companies might influence consumer spending by redistributing music content and lowering prices. There could be further social and economic research and development of the music value chain.

The Internet in Australia has radically altered the Australian music value chain and has allowed consumers to bypass the multinational music companies and go

almost directly to the creators of the content. As broadband speeds increase and the technology is upgraded there will be a strong need for the advertising of the content to the consumer as the marketplace will be flooded with choice. As a result marketing will become a key element in the Australian music value chain.

The Australian music value chain does not affect any component of foreign or global music value chains due to the size of the Australian market. Australia would benefit from a specific music distribution system tailored to the needs of music consumers that would include features such as a price differentiating system. Social attitudes towards the acceptance and knowledge of digital systems will grow and develop. It is likely that there will be a focus on a sustainable and stable music economy in Australia. It is probable that there will be the beginnings of a movement away from the concept of ownership of digital music. This will most likely not occur in the near future. Initially this change will be a niche market. However, Australians do value the ownership of music IP in both CD and MP3 and hard copy physical formats will remain important.

The drop in total value of sales in the Australian music industry (and an increase in volume of sales) is not exclusively due to a differing in the price of the various formats. It is also related to the social value that the market places on the new format. Digital retailers are still controlling the market by offering limited versioning of the MP3 by providing limited resolution and quality for sale. If they were to expand their pricing systems and allow different quality versions of the same track it is highly likely the market would accept this. This would increase revenue and add value as well as volume to the industry.

As the legal use of digital music increases it is possible there will be a change and development in the demographics and economic factors that affect online behaviour and music piracy. There are three possible outcomes that the use of legal digital download systems might have on piracy: Firstly, the use of legitimate systems could reduce piracy. Consumers might find legal systems more beneficial and more cost affective. A wider spread of demographics is likely to use the new systems, and purchasing and subscription would continue to change and evolve. IP rights would be protected and the creators would receive their rightful income directly from the sale of the music. Secondly, the use of legal systems might increase piracy. The increase in the popularity of legitimate systems, and compliant consumers, might be balanced with an increase in irreverent consumers and piracy. This assumes that there are new consumers

who are unaware of the new opportunities to defraud the new legitimate systems. Thirdly, the increase in popularity of legitimate digital distribution systems might have no affect on piracy rates. This would suggest that there are two different types of consumers and imply two different markets.

A clear distinction between the types of consumers is unclear, as a particular individual will value content in different ways. It is possible that an individual could occupy both classifications of consumer simultaneously. When a consumer has the desire for content, a song, and it is not available on the legitimate websites then they might turn to illegitimate websites to fill the gap. It is probable to suggest that it is not the act of piracy but the lack of access to music content that becomes a key driver in the Australian music value chain.

Piracy is also important in stimulating usage, development and evolution of music value chains. Although, not all users will pirate music and a proportion of those that do could be encouraged towards the use to legitimate systems. The traditional value chains should remain strong in the short term and decline in the long term while new technologies will help establish and refine the current music value chain in Australia.

Technology affects the consumer's choice over the consumption of music and user innovation in developing and accepting technology. This has occurred due to a lack of choice and control. The best and most advanced piece of technology isn't always guaranteed to have a significant influence. Consumer acceptance of technology is subject to marketing and this affects technology's sphere of influence. As a result, consumers directly affect the development of music value chains. Without market acceptance of the MP3 format the value chain would have evolved in the manor it has. Australian regional branches of multinational music companies might have caused the lack of choice and control in the market. Their hesitation and need to follow larger market trends could mean that Australian consumers don't get the music services they desire. Perhaps, when piracy activity is reduced and the control over the systems is balanced then the development of a system that can evolve might be built. The value chain developers will have the skill and knowledge and the users will have the power and the creators provide the content. Harmony between change and positive growth is essential to a sustainable music value chain.

7.4 Outlook

The Australian music value chain should continue, as it has in the past, to develop, reflect and match the larger international markets and value chains.

New technologies are likely to enhance and refine the current distribution systems and affect the global music value chain. New distribution systems are likely to create new business models that will, it seems, ensure the survival of the music value chain.

Traditional marketing will likely play a key role in the commercial success of local and foreign artists and music companies. The market is likely to be flooded with clever and pervasive music marketing techniques. Although this kind of advertising has existed in all forms of media innovative with which to market online will be vital to the success of new business models.

New business models based on advertising revenues could evolve out of new methods of tracking the movements of digital song files although this could been seen as another form of DRM by the market. Distribution systems should become faster, provide more choice, give greater reach into the market place and provide new formats with which to consume. The access to product is likely be enormous and the market will be flooded with choice.

It is likely portions of the market will resist such change as barriers to evolution are formed. It is probable that value chain evolution will dived the music world initially in to a subscriber style service streamed directly to a device and the traditional saving and storage of a file or equivalent. Social networks of music users might grow in a similar way in which Myspace, Youtube and Facebook have. Music use (illegal and legitimate) is likely to be prolific.

There might be a violation of privacy where the tracking systems imbedded in digital content report to a central body on consumer behaviour. Some users won't accept DRM systems in their music. Eventually, in future generations the concept of unit sales might shrink to niche market size sales in the same way vinyl sales have. Online music will be shared prolifically and customised to suit each individuals taste.

Handheld devices could converge further into one product and increase connectivity. Or the system and content could initially become more important

that connectivity. If so, then the content driven media business models would probably suffer.

The multi channel or surround sound file format (MP3 or other) may supersede the current stereo MP3 format of 128 kbps that is popular at present, however, this is dependent on marketing. There could be different versions and quality ranges offered as streaming directly to devices eventually becomes an option.

It is probable that multinational recording companies growth rates will decline as the new music business methods become popular. The multinational music companies would probably be consumed and centralised by global organisations who could control greater control every facet of the Australian music value chain. Smaller content providers could splinter from the main group and be efficient innovators, providing the market with the desire for new trends and technologies, for example Google, Apple and Island Records.

The outlook for the Australian music industry value chain is positive and it likely to evolve and endure global development and change, which will ensure that Australian music continues to be a distinctive and stable component in global music community.

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APPENDICES

A: The Evolution of Music Formats and Technology

A successful music format creates a new way to make and deliver music to the consumers. Successful production and delivery of music has come from the acceptance of the format the music is delivered to the consumer with. From wooden instruments to MP3 devices the principles remain the same. Early instrument makers would not have been successful if the musicians weren't available to perform in public. As human technologies have advanced and changed so to have the methods of making and listening to music.

Interdependent with distribution systems is format type. Before modern recording technology a live performance was the only way music could be heard or played back. The distribution system is usually designed and built around the format that is available and commercially successful. The distribution system and payback device for music made before recording technologies was the orchestra. It travelled from place to place with music in a notated text format ready to be performed.

After delivery of the music to the consumer (in whatever format) the next technically significant issue is the playback device. Figure 20 outlines the significant music formats and the playback devices needed by the consumer to listen to their music. There was production of vinyl and cassettes and their corresponding players in the 1980's that has subsequently stopped as of the 2000's. CDs, radio and television have consistently developed formats for the mass delivery of media to consumers. As the additional formats, including MP3s, DVDs, evolved and became popular so too have the playback devices. It is important to note that the development of MP3 playback devices such as Apple's iPod device helped to some extent drive the success of the new format, although it was the MP3 format's popularity, ease of use and distribution that made the playback device so popular.

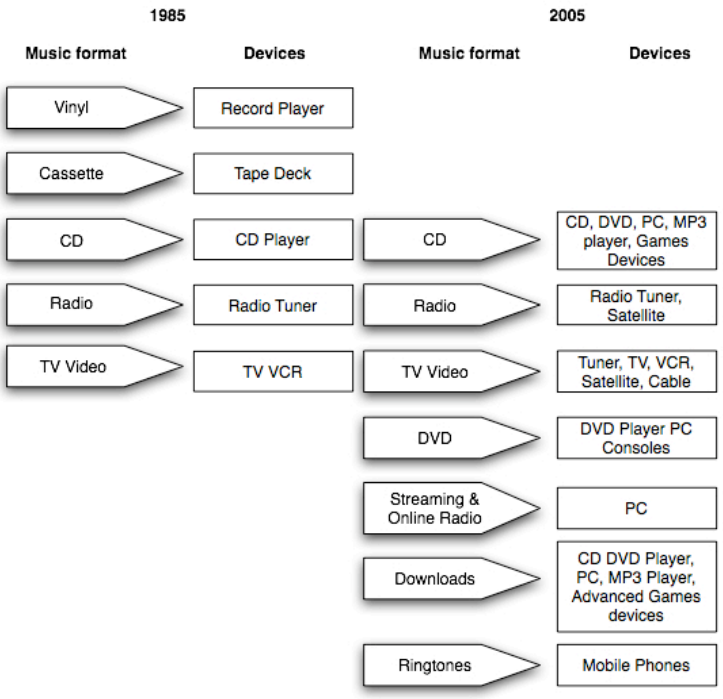

Figure 20: Music Formats and Playback Devices 1985-2005 (OECD, 2005)

Prior to 1987 the commercially successful formats were vinyl and cassette. After 1987 the CD format was deployed and saw the transition from analogue to digital as the primary form of sales revenue. With the format change came a device specifically designed for playback of the format. Popularity of both the playback device and the format are very important drivers in the technical development of the music industry. After 2005 the variety of formats and distribution methods for music consumption increased, the most recent being files downloads, streaming and ring tones all designed for either the mobile telephone, MP3 player and personal computer playback devices. The CD industry existed along side the vinyl and cassette as a sustainable format for a short period of time. It then grew rapidly to out sell and eventually make these formats obsolete and not cost effective. However, the vinyl format is still in production but not of the commercial magnitude it once was. It has been relegated to the ranks of a niche and specialist format (Figure 1, p. 14).

Music formats (and technological development generally) are key drivers in the development of music distribution systems. As new formats are developed and tested in the market place the systems for delivery are also tested and refined. The uptake of these new communications technologies are often adopted rapidly but not at the popular rates associated with the Internet (Odlyzko, 2001. p. 13). There can be new formats and systems developed and implemented that are

measurable in terms of popularity but not in a monetary or commercial sense. Australia's mobile phone industry, which has been expanding at a considerable rate since 1987, is now a serious force in the communications industry. Prior to 1997 it was only an emerging market that showed potential. It is plausible that the digital music downloads industry could follow a similar path in terms of consumer popularity (Figure 17, p. 58). The method with which the consumer plays back their music is crucial to the development of distribution systems. The following is a brief outline of the developments in music format technology:

The mechanical age of music originated with a device called the music box. It was a small wooden box that played a short melody when opened. This was considered high-end technology in the 1800's. Copyright and international protection had its origins here and still present (and very important) in today's modern industry. In 1877 Thomas Edison played the first know tune *Mary Had A Little Lamb* on the music box. In 1898 The Columbia Phonograph Company was formed. It was the first record company and first in the USA to mass-produced the wax cylinder. Unfortunately it proved a commercially unsuccessful venture. In 1930's the Piano Roll was developed becoming the predominant home entertainment device. Such a format and playback device provided composers such as Cole Porter and Irving Berlin mechanical copyright income. This technology would become obsolete by the 1950's. Importantly technology was moving forward and socially music was becoming a personal medium (Simpson, 2002, p. 254).

On May 16, 1888 Emil Berliner developed the flat phonograph record and founded the US Gramophone Company. It was based on the method that French painter Leon Scott de Martinville used in 1857 to make a recording using a piece of paper. This was a critical and pivotal moment in the history of the music industry where the music format changed from a cylinder to a flat disc and would provide a new paradigm that would remain for the next 120 years. The phonograph record was to provide a superior performance quality. It could be mass-produced and was not limited by the number of reproductions the social classes or political boundaries.

The phonograph had automated production line and went into mass production in 1892. In 1894 US Gramophone sold 1000 gramophones (the playback device) and 25,000 discs (the format). This put Berliner in competition with Edison's Columbia Company. In 1900 Thomas Lambert was able to mass-produce the

cylinder on celluloid. This greatly lowered the cost of each cylinder and put Edison out of business. Lambert sought legal protection, patented his idea and was successful. Edison challenged the patent with an expensive lawsuit designed to drive Lambert out of business and was victorious. Eventually the new format technologies prevailed and by 1913 Edison gave up the idea of cylinders and moved to the flat shellac and then to the plastic that would dominate the industry for three quarters of a century (Simpson, 2002, pp. 255).

The physical form of music was to be surpassed by electrical formats and the sound quality was about to rise dramatically. In 1933, the first Stereo Master Recordings made by the UK company Electric and Music Industries (EMI). EMI pioneered the shellac format that would be at the core of the industry for years to come. Implications on an artistic level meant the long play (LP) records could have pieces of music that lasted over three minutes in length. Jazz music in the 1930's had long been enduring this restriction and was forced to play standards at sped up versions in order to fit the tune on one side of the record. LPs (and in the future CDs) had lifted restrictions placed on the industry by the three-minute song. Also, the 3 minute song trend continues today on most commercial radio stations around the world to this day (Simpson, 2002, pp. 256).

Electricity provided many effects to everyday life including the radio. In 1906 the first known public radio broadcast took place. The audience size was unknown and the program ran for only half an hour. It was the beginning of a new period of influence where mass communication was not concerned with a newspaper arriving at a target market, as with the print industry. Radio's focus was sound and music and the influence of culture over the airways, it was a new form of mass communications. Flat discs were becoming old-fashioned and seen as an individual way to consumer, whereas the radio was a more community (or socially) oriented medium. This community spirit created by radio technology could well have been the precursor the occurrence of the modern day community based websites such as Myspace, Youtube and Facebook and Lastfm.

In 1937, using electricity, Alan Reeves patented a new idea called digital recording. This was the latest technology at the time and was called vacuum tube technology. The timing of this development was unfortunate as the computers at the time were specifically designed to measure the ballistics of world war two cannon shells and other ballistics. Early computers couldn't deal with the

amount of information created and problem was deemed impossible and was put aside.

In 1948 the 78 revolutions per minute (rpm) shellac record wad replaced by the 33 rpm micro groove technology that was also developed in WWII. It was based around the idea of faster recording passes that gained more information and increased the resolution and quality of the sound. Again, records became cheaper to make and more viable to sell. Incidentally, this technology provided the rebirth in the popularity of opera (Simpson, 2002, pp. 256).

High Fidelity (Hi-Fi) music was supposed to be as close to true to life recording as possible. RCA was the first to make the microgroove Hi-Fi records. They were quickly the surpassed by the more successful CBS version developed by Peter Goldmark. 1958 saw the first stereo records made by companies Pye, Decca and Audio Fidelity based of theories developed by EMI employee Alan Blumlein, who held the patent from 1931 when he invented it. EMI extended the patent to 1952, which expired before the first reales of a stereo record. 1958 saw the first commercial release of a stereo recording. This provided the opportunity for any musician who performed live to be compared with the leading practitioners of the time or in the past (Simpson, 2002, p. 257).

An important development happened in 1947 when Bell Laboratories employees John Burden and Walter Bratten replaced the delicate vacuum tube technology with a Transistor. It proved a far more durable piece of equipment and was much cheaper to produce than the vacuum tubes. Enthusiasm in the American market waned, as the Americans didn't foresee the potential applications for the transistor. Two Japanese businessmen then purchased the patent. They went on to found the Sony Corporation and provide the world with its first portable playback device, the portable tape recorder. This technology spawned a new cultural movement of portability that has eventuated in the modern day. As portability is the key driver in digital music (IFPI, 2006, p. 3).

The first integrated circuit was made in 1958 and in 1959 Professor Okamura patented the idea of placing large amount of information on magnetic tape. He was unlucky as the patent expired in 1973 and he didn't profit form his invention. In 1957, 30 million transistors were being made annually. Car radios and cassette players were cheap and robust and were becoming standard with

every car. Music technology was making its way into everyday life (Simpson, 2002, pp. 257-258).

Magnetic tape was invented in Germany in the 1930's. It was a critical technical development as well as being and artistic one. The general public could listen to high quality music without the performer, which meant that the music that was once accessible only to a privileged few was now available to everyone.

In the1960's Phillips produced the Compact Cassette. It was a development from the first magnetic tapes made by AEG Telefunken and J.G. Farben in 1935. Originally it was developed for use in offices for dictation and not music. Its application to music was poorly suited as there was too much background noise for realistic sound and music reproduction. Fortunately Ray Dolby supplied the marketplace with a noise reduction system that proved very successful. It was called the Dolby Noise Reduction System and has developed today in multi channel sound formats of which most notable is the Dolby 5.1 surround sound home movie theatre format (Simpson, 2002, p. 258).

The development of digital technologies was the beginning of the blurring of the lines between information and music. Data and music were becoming the same thing. Science being a key driver in the 1970's the Compact Disc (CD) was made using polycarbonates to make the storage medium as well as the lasers to read the information.

Phillips and Sony spent millions of dollars making compact discs and players for the public to consume. In 1982 it would seem that the right technology was provided to the public at the right time. Vinyl ceased to be economically viable, while CD technology meant copies of original recordings could be made without a loss in quality, as there were no moving mechanics and friction to degrade over time. The concept of multiple copies being made without loss in quality resulting in the copy being exactly the same as the original is at the centre of the digital revolution. The music companies provided both an unprecedented access to information and at the same time a crippling blow on the future music economy. Today the music is still in a digital data form only we have progressed in format of delivery and playback devices.

The multinational music companies have sold millions upon millions of CDs over the years and provided the world with high quality digital sound. People who

owned cassette and vinyl formats replaced their collections with the new formats and as a result made vast sums of money for the multinational music companies. The multinationals were so focused on sales in the 1980's they spread there material to every corner of the world in a high quality and degradation free format. There was no file encryption. No encoding or watermarking to identify the source. There was not DRM of any sort. In the beginning the benefits of CD technology would help build empires for the multi nationals. (Simpson, 2002. pp, 259-260).

There is the Digital Audio Tape (DAT) cassette that is still in use today, although mainly by sound professionals. There was a push to compete with the CD format that failed ironically, as there were concerns about the affects of illegal copying. So much so there was a campaign to add spoiler technology in the playback machines to avoid second-generation copies. The campaign was successful but the format was never as successful as CDs. Perhaps the implementation of DRM onto a format hindered the acceptance of the new technologies and can be compared to the modern day DRM when tracking digital music and MP3's.

There was also the 8-track (Elcasettes) and Digital Compact Cassettes (DCC) made by Phillips. They had a stationary record/playback head and could playback ordinary tapes. This was a perfect example of the right product made at the wrong time, as they weren't at all popular or profitable.

Sony made a 75mm Mini Disc that looked similar to a CD but smaller. There was an issue with compression technology on the mini disc that could match the reproduction quality of CDs. It wasn't a problem for modern day popular music but was crucial to the classical formats with greater dynamics in the sounds. This technology also failed. The year 1990 saw the CD-Rom (Read Only Memory) format appear. This configuration began to mix audio and audiovisual aspects, reflecting peoples desire to interact with the material and artist. It wasn't lucrative. Interaction has now become a new focal point of today's industry and again can be compared with sites such as Myspace and Youtube that thrive off the interactivity. Retrospectively, perhaps CD-ROMs gave a little insight in to what people would value in the future. Laser discs were developed, designed and marketed to hold movies and large amount of information at a higher quality that Video Tape. They were big and cumbersome, about the size of a 33-rpm vinyl LP and were superseded by the smaller Digital Versatile Disc (DVD). The recordable CD was developed and called CD (R). They have a 700 Mega Bytes

(Mb) limit, or 74 minutes of music playback at standard resolution. They can hold music and data. In 1989 CD (R) recording hardware cost the public AUD 35,000. In 2006 they are under AUD 400. This technology encouraged the pirate music trade to once again prosper.

Personal Computers (PC's) became widespread in the 1990's, appealing not only to the technology expert but to the mainstream culture. Mass production became more efficient and reduced the costs of production. PCs became cheaper and faster and more accessible to the average member of the public. PC's can play CDs, DVDs and CD-ROMs and they can copy and store the data from these formats of their hard drives. It is of crucial importance that when this technology was being developed it could have been designed to stop the unsolicited copying of music, as with the DAT format. Such legislation was discussed in the US and was decided not applicable to the computer industry. Again music executives around the world were blinded by the massive sales revenues of the time (Simpson, 2002, pp. 260-264).

A US company called Advanced Research Projects Agency Network (APRANET) developed a network in the middle of last century that connected computers together that could survive the demise of one of the machine in the network. It began with 4 machines that were interconnected and self-sufficient. What began as a military application moved to a scientific and university based development to result in the modern day Internet. (In Australia 3,639,700 people have broadband connections to the Internet (ACCC, 2007). The development of the Internet greatly affected the production of the PC, and the popularity of the PC has made the Internet what it is today.

The important cultural application of the Internet was the nurturing of unique cultures based on freedom of access to information. There were no laws. It was a borderless momentary on-line world. This was not a good thing for a culture, such as the western world, based around ownership and economic rights. Protection of these rights proved to be the major challenge to the net. Intellectual Property (IP) Laws were developed that protected copyright, confidential information, trademarks, designs and patterns. Although such measures were being put in place the Internet was to become a refuse from the multi-national corporations where the subversive culture of the elite and technology savvy minority to grow and develop the hacking a piracy culture (Simpson, 2002, pp. 264).

The MP3 is a digital audio file has been elemental in the development of music distribution systems. It is file that is compressed to reduce its size. The Motion Pictures Experts Group (MPEG) was formed to develop techniques for dealing with digital video. Since most video also contains audio the MP3 was developed as an audio addition. Officially known as *MPEG-1, Layer 3*, the MP3 is a lossy compression algorithm that uses psychoacoustics as a modelling method to reduce the size of audio files by up to 90 per cent. Psychoacoustics takes advantage of deficiencies in the human hearing system to throw away digital bits corresponding to sounds that cannot be heard. The human ear cannot hear soft sounds in the presence of loud sounds having a similar frequency. For example, a voice conversation becomes inaudible when a jet flies low overhead. This effect is known as auditory masking, and done correctly the discarded sounds will not be missed. The MP3 is also based on an algorithm where the original bits cannot be recreated from the compressed bits. In terms of hearing, however, MP3 is loss-less because the human ear cannot distinguish between a CD recording and a properly encoded MP3 copy of the recording. MP3s achieve this transparency at a bit rate of approximately 256 kilobits per second about one sixth of the 1.4 megabits per second required by the compact disc format.

MP3s can be recorded at lower bit rates, reducing space, but audible differences begin to appear at sample rates below 128 kilobits per second. At these lower bit rates, MP3 can use a trick known as joint stereo to improve quality. Audio generally consists of left and right audio tracks. Joint stereo combines the sounds common to both left and right tracks into one track as opposed to of left and right (Simpson, 2002. pp. 265). The MP3 format is also an open standard, and therefore available to anyone. This has played a major role in the widespread adoption of the MP3 format. There are patents held by the Fraunhofer Institute as well as numerous open source adaptations (Wisegeek, 2007a).

The evolution of music formats and the surrounding technologies have revolved around two main concepts; the quality of sound reproduction and the ease of distribution of the format. As the format technology improved, and in parallel the playback technology, music consumption became more appealing to the consumer and business. While mechanical formats like plastic discs were a breakthrough at the time the major development in the recent past had been the Compact Disc. This format provided what no other format had, an almost perfect sound reproduction that was undiscernible to the untrained ear.

B: Outline of Organisational History of Australian Music Industry

The Following is a brief description and history of Australian music companies and their levels of participation in the music industry:

Electric and Musical Instruments Limited (EMI) can be traced back to 1897 when it was known as The Gramophone Company and based in London. It is the only UK based multinational company in Australia and it has a 19.7 per cent market share (2005/06) (Nicoli, 2007, p. 15) up from 18.4 per cent in 2004 (OECD, 2005a, p. 38). It remains an important influence in Australia as a manufacturer of the CD and vinyl formats. It has been a major supplier of manufacturing to the other multi-national companies in this country

Sony-Bertelsmann Music Group (BMG) is a combination of Sony Music and Bertelsmann Music Group and has 29 per cent market share in Australia (OECD, 2005a, p. 38). Sony was a subsidiary of Columbia Broadcasting System (CBS). In Australia an office opened in 1936 and merged with the Australian Record Company in 1939. Today the company has investments in the latest technology CD and DVD mastering, printing and artwork production in Sydney. Bertelsmann Music Group is a multi-national founded in 1901 under the name Victor Talking Machine Company by Emil Berliner and Eldridge Johnson. In 1929 the company was purchased by the Radio Corporation of America (RCA). In the mid 1980's it was acquired by the Bertelsmann family conglomerate, and renamed The Bertelsmann Music Group. In Australia there is also an alliance with Festival Records to distribute its products.

Universal Music consists of the companies Music Corporation of America (MCA) and the PolyGram Group and has a 20.1 per cent market share in Australia (OECD, 2005a, p. 38). Dutch company Phillips started a company with German group Siemens. Siemens owned the company Deutsche Gramophone Gesellschaft. Phillips and Siemens created PolyGram and Polydor. In Australian the Melbourne Company Astor Records was purchased. Today PolyGram doesn't exist in Australia.

Warner Music was founded by the Warner brothers in 1958 in the USA. It started in Australia in 1970 and has a 15.2 per cent market share (OECD, 2005a, p38). They have collaboration with EMI in the pressing of records by their North

American plant. It took over its own distribution from CBS in 1972. Warner was then involved in a joint venture between Sony and EMI.

Festival-Mushroom is considered a major label in Australia although not actually a major in an international context. It is the twentieth largest independent label in the world and is know abroad as News Media Records. Harry Cohen founded Festival in 1954. He then went bankrupt and the company was sold for the value of its land alone to a real estate company L.J. Hooker, and Frank Lowy. In 1963 Festival-Mushroom was purchased by News Corporation. It lost revenue due to heavy investment in international catalogue at the expense of local artists. In the mid 1990's it was reorganised and purchased 50 per cent of another independent company, Mushroom records. In 1998 News Corporation purchased the remaining 50 per cent of Mushroom records.

The Australian Broadcasting Commission (ABC) was a government agency formed in the 1920's and based in Sydney. The Commission had a strong history in the classical music production and recording until the early 1980's. The Commission was reconstituted to form the Australian Broadcasting Corporation, which is owned by the Australian Government. The present ABC is not a conventional Record Company. It has a wide variety of cross promotional mechanisms at its disposal. ABC television, radio video, bookshops and recording combined have unusual ability to trade in music. The ABC plays a significant role in national classical and country music.

Independent Companies make up the small remainder of the marketplace. There are a multitude of independent companies in the country who take pride in disassociating themselves from major label values. These small companies have an advantage over the majors by having quicker response to market trends. Their turn around on product production is remarkable compared to the majors. The foremost disadvantage of the independent label is the lack of financial backing and limited reach in the national market. Mushroom Records is probably the most recognisable of the independents.

There are specialised physical distributors in Australia and theses include Shock Records Distribution, Phantom/MGM Distribution and Oracle Distribution. This is not a highly profitable sector of the industry due to the large distances that have to be travelled to move stock.

Specialising in back catalogues and licensing these from majors and independents there are television based marketing businesses or telemarketers that provide records to a specific segment of the market through television advertising. There are companies specialising in budget music, who sell records at 50 per cent to 60 per cent off the retail cost of premium records. Specialising in shopping malls and petrol stations where they need high turn over to make money. These companies occupy a slice of the market the majors generally leave alone.

There also are record clubs based on subscriber-oriented systems. There are two club systems operating in Australia as of 2003, Music Direct and Reader's Digest. There are suggestions that the rise of Internet MP3 distribution could see the demise of such record clubs and that the Internet may reshape this market sector. Festival, the ABC and the remaining independent companies have a combined market share of around 17 per cent (OECD, 2005a, p. 38 and Simpson, 2002, pp. 302-314).

Therefore an interpretation of this industry profile would mean that the Australian music industry is subject to foreign influence. The existence of the ABC and the abundance of independent companies is an important part of the music industry as it provides an alternative to the methods of consuming music offered by the major companies. Such choice is crucial in the development of Australian music systems and the development of Australian music, as discussed in section 5.8.

C: ARIA Research - Music Piracy in Australia (2003)

Piracy in Australia is considered a large problem. The following is a summary of piracy activities in Australia based on ARIA research in 2003. ARIA estimated that:

- 3.6 million Australians illegally burnt a music CD in the six month period prior to the research;
- 3.4 million Australians illegally downloaded music files via file sharing services (1.8 million of these have used file sharing services in the one month period prior to the research);
- file sharing and CD burning is higher in the under 25 age group;

- file sharing was 11 per cent of the general population versus 26 per cent of under the 25 age group;
- illegitimate channels account for 10.7 per cent of all music acquired by the general population versus 52 per cent of under 25's and 40 per cent of the general population have at some stage received a burnt CD; and
- the average volume downloaded was 19.6 files per head per month for the general population versus 32.4 files in under the 25 age group.

This survey suggests than 50 per cent of file sharers tend not to buy music they have downloaded. Among file sharers, there is a net decrease of 12 per cent in CD purchasing, which ARIA identifies as being a direct result of file sharing. In terms of consumer awareness, 66 per cent of the sample group were aware that CD burning and file sharing was illegal. The study showed that 57 per cent of the general population agree that burning music without paying for it is stealing. This data confirms the theory that people are increasingly comfortable with accessing music in an online environment.

The results conclude that CD burning and Internet file sharing are significant in Australia. This has a substantial impact on sales of legitimate music. The Australian data is also consistent with overseas information. Of particular interest are the sizeable sales decreases in key North American and European markets (ARIA, 2003).

D: Music Content Distribution Methods on the Internet

The following outlines the legitimate and illegitimate distribution methods used to move music content on the Internet:

Also know as *a-la-carte* downloading, online music stores such as iTunes and Bigpond use this method. There are two computers involved in this transfer, a server and a client. The file transfer protocol (FTP) server, running FTP server software (for example iTunes), listens on the network for connection requests from other computers. The client computer initiates a connection to the server. Once connected, the client can do a number of file manipulation operations such as uploading files to the server, downloading files from the server and either rename or delete theses files. Any software company or individual programmer is able to create FTP server or client software because the protocol is an open

standard. Virtually every computer platform supports the FTP protocol. This allows any computer connected to a Transmission Control Protocol/Internet Protocol (TCP/IP) based network to manipulate files on another computer on that network regardless of which operating systems are involved. There are many existing FTP client and server programs (Wisegeek, 2007a).

Podcasting is an automatic means where multimedia files are transferred from a server to a client. It this particular instances an MP3 audio file (or multiple files) is created and made available on the Internet. Information about the file can be viewed before downloading. The content provider then acknowledges the existence of that file by referencing it in another file known as a feed. The term feed refers to a list of the URLs by which these multiple or single files can be accessed. This list is usually published in Real Simple Syndication (RSS) format is a relatively new and easy way to distribute content. It provides other information about the files before downloading has commenced such as date published date, titles, and accompanying text descriptions of the series and each of its episodes. Another term for this information is *feed*. The feed may contain entries describing all the episodes in a television mini-series or the contents of the news program. Standard podcasts consist of a feed from one author. More recently multiple authors have been able to contribute episodes to a single podcast feed using concepts such as public podcasting and social podcasting.

A program called a podcast specific aggregator is usually automatically started and runs in the background when the computer is turned on. It works in a similar way a newsreader would when managing other web subscriptions. The aggregator manages a set of feed URLs added by the user and downloads each at a specified interval, such as every two hours. If the feed data has significantly changed from when it was previously checked the program determines the location of the most recent item and automatically downloads it to the user's computer.

The downloaded episodes can then be played, replayed, or archived as with any other computer file or stored to an MP3 player. To conserve bandwidth, users may opt to search for content using an online podcast directory. Some directories allow people to listen online and initially become familiar with the content provided from an RSS feed before deciding to subscribe. For most broadband users, bandwidth is generally not a major consideration although in Australian it is of more concern due to slow transmission speeds. Podcasting

popularity is linked with the development of global bandwidth and broadband access. In Australia podcasting is still in its early phases (Wisegeek, 2007b).

Streaming refers to media or multimedia that is continuously received by and displayed to the user at the same time. It gives instant access to multimedia content without waiting for the entire file to download. There is no ownership of the content when streaming. Attempts to stream media on computers date back to the earliest days of computing. Initially, little progress was made due primarily to the high cost and limited capabilities of computer hardware. As hardware production costs decline and power and effectiveness rise streaming technologies are dramatically improving. To date adoption of streaming methods of consumption is relatively low as consumers value ownership of the music (OECD, 2005, p. 50).

There is no method to prevent a user from recording a media stream that has been delivered to their computer. Many broadcasters continue to prevent piracy taking place by making it inconvenient and (or) illegal. Broadcasters can make it inconvenient to record a stream by using unpublished data formats or by encrypting the stream. Of course, data formats can be reverse engineered, and encrypted streams must be decrypted with a key that resides somewhere on the consumer's computer, so these measures are secure but difficult to understand. Efforts to make it illegal to record a stream rely on copyrights, patents and license agreements (Wisegeek, 2007c).

Experiments in the 1970s provided the basic concepts and feasibility of streaming media on computers. During the late 1980s, consumer-grade computers became powerful enough to display various media. The primary technical issues with streaming were firstly, having enough CPU power and internal computer bandwidth to support the required data rates, and secondly, creating low-latency uninterrupted paths in the operating system to prevent buffer underrun. Unfortunately computer networks at this time were limited, and media was usually delivered over non-streaming channels, such as CD-ROMs.

Further technological developments in the late 1990s saw the commercialisation of the Internet where there was greater network bandwidth was developed; increased access to networks, especially the Internet; the use of standard protocols and formats, such as TCP/IP, Hyper Text Transfer Protocol (HTTP),

and Hypertext Mark-up Language (HTML). These advances in computer networking combined with powerful home computers and modern operating systems made streaming media practical and affordable for ordinary consumers. Stand-alone Internet radio devices are offering listeners the option of listening to audio streams without the use of a desktop or laptop computer.

P2P technologies are defined as a communication structure in which interaction is decentralised and without hierarchy. Users can share information, make file available contribute to shared projects or transfer files (OECD, 2005, p. 75). The term P2P refers to a network of computers. A P2P computer network relies on the computing power and bandwidth of the individual machines in the network. P2P networks are typically used for connecting users via random connections. This is useful for sharing files containing audio, video, data or anything in digital format (Wisegeek, 2007d).

A pure P2P network does not have the notion of clients or servers. It relies on equal peer nodes (users) that simultaneously function as both clients (downloading & uploading) and servers (storage system) to the other nodes on the network. A single user uploads and downloads at the same time. This model of network arrangement differs from the client-server model where communication is usually to and from a central server. A non P2P file transfer would rely on a file transfer protocol (FTP) server where the client and server programs are quite distinct and where the clients initiate the downloading and/or uploading and the servers facilitates these requests.

The earliest P2P network in widespread use was the Usenet news server system. Users communicated with one another in order to circulate Usenet news articles over their entire network. The news server system also acted in a client-server form when individual users accessed a local news server in order to read and post articles. Some networks and channels such as the Napster server channels use a client-server structure for some tasks (searching) and a P2P structure for others. Networks such as Gnutella or Freenet use a P2P structure for all purposes. These are occasionally referred to as true P2P networks although Gnutella is greatly facilitated by directory servers that inform peers of the network addresses of other peers. P2P design uses the absence of a central-indexing server in its architecture for exchanging multimedia files.

An important goal in P2P networks is that all clients provide resources including bandwidth storage space and computing power. As nodes arrive and make a demand on the system it increases and the total capacity of the system also increases. This is not true of a client-server architecture with a fixed set of servers as adding more clients could result in slower data transfer for all users. The distributed nature of P2P networks also increases sturdiness in case of failures by replicating data over multiple peers and in some P2P systems, by enabling peers to find the data without relying on a centralised index server. In the latter case, there is no single point of failure in the system.

When the term P2P was used to describe the Napster network, it implied that the peer protocol was important, when the great achievement was actually empowerment of the peers, or fringes of the network, in association with a central index. It resulted in making it fast and efficient system to locate available content. There are unstructured P2P networks formed when links are established arbitrarily. Such networks can be easily constructed as a new peer that wants to join the network can copy existing links of another node and then form its own links over time. In an unstructured P2P network when a peer wants to find a desired piece of data in the network the query is flooded through the network in order to find as many peers as possible that share the data. The main disadvantage with such networks is that the queries may not always be resolved and information hard to find. Popular content is likely to be available at several peers and any peer searching for it is likely to find the same thing. If a peer is looking for rare data shared by only a few other peers then it is unlikely that the search will be successful. Since there is no correlation between a peer and the content managed there is no guarantee that this style of searching by flooding will find a peer that has the desired data. Flooding also causes a high amount of traffic in the network causing poor search efficiency. Most of the popular P2P networks such as Gnutella and Limewire are unstructured.

Structured P2P networks employ a globally consistent protocol to ensure that any node can efficiently route a search to a peer that has the desired file. Such a guarantee necessitates a more structured pattern of links. Unfortunately the development of P2P networks have bought with it the advent of illegitimate and unauthorised transferring of music and other digital products where copyright laws are violated. The use of P2P networks is unregulated and can be influenced

by people with a variety of motives. There are definite risks associated with the use of free-for-all systems, they include:

- providing files whose contents are different from the description.
- polluting or inserting corrupt chunks or packets into an otherwise valid file on the network.
- defection where users or software that make use of the network without contributing resources to it.
- insertion of viruses to carried data (downloaded or carried files may be infected with viruses or other malware).
- malware (malicious software) in the peer to peer network software itself (distributed software that may contain spyware).
- denial of service attacks (attacks that may make the network run very slowly or break completely).
- filtering (network operators may attempt to prevent peer to peer network data from being carried).
- identity attacks (tracking down the users of the network and harassing or legally attacking them).
- spamming (sending unsolicited information across the network not necessarily as a denial of service attack) (Wisegeek, 2007c).

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