Education in bits?

An Analysis of the effects of Digitisation on the Higher Education industry, Using the Music Industry as Comparison.

Julius Kvissberg 860707-0094
Paula Kjellén 910424-4208

Bachelor thesis, spring 2016
Supervisor,
Peter Jochumzen
Lund School of Economics and Management
Department of Economics
Abstract

Digital technology has revolutionised modern society and brought about profound changes to the way many of us live our lives. It has enabled unlimited free access to many products that were previously scarce and expensive. We have gotten accustomed to on-demand music and movies, and we are used to being able to have answers to all questions at the tip of our fingers, carrying it with us at all times in our pockets.

This shift has brought many challenges to incumbents and have forced whole industries through at times painful changes. The music industry is just beginning to recover from over 15 years of decline, and new business and pricing models have emerged. Can the higher education industry go through this transformation unscathed?

Keywords: Digital Economy, Information Good, Digital Good, Online Education, E-learning, MOOCs, Disruptive Innovation,
Table of contents

Glossary 4
Introduction 5
    Formulating the problem 6
    Purpose 6
    Method and delimitations 7
1. Innovation and creative destruction 8
2. What is a digital good? 10
3. Marginal cost and pricing models 12
4. What is “free”? 19
5. The rise of free, and how it affected the music industry 21
    5.1 The traditional business model 21
    5.2 Adapting to a digital world 22
    5.3 Solutions in a digital world? 23
    5.4 A hope for a new beginning? 24
6. Free and the education industry 27
    6.1 The traditional model and rising costs 27
    6.2 Digital competition? 29
7. Why would you pay for something that is free? 32
    7.1 If everything is free, what do you charge for? 33
    7.2 Further research 36
Reference list 37
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowdfunding</td>
<td>The practice of funding a project or venture by raising monetary</td>
</tr>
<tr>
<td>DRM</td>
<td>Digital Rights Management</td>
</tr>
<tr>
<td>GDI</td>
<td>General Definition of Information</td>
</tr>
<tr>
<td>IoT</td>
<td>The Internet of Things</td>
</tr>
<tr>
<td>MaaS</td>
<td>Music as a Service</td>
</tr>
<tr>
<td>MOOC</td>
<td>Massive open online course</td>
</tr>
<tr>
<td>P2P</td>
<td>Peer-to-peer, a distribution and file sharing technology that allows users to share content directly with each other</td>
</tr>
</tbody>
</table>
Introduction

Digital technology has revolutionised close to every market in modern society and brought profound changes to the way many of us live our everyday lives. The Internet, and a seemingly unlimited supply of free information has reshaped the landscape of supply and demand for information goods. Digitisation as disruptive innovation has potential to break down whole markets and business models and two clear example of this is the music industry, that was severely rocked when Napster entered the picture in June 1999, and the entertainment industry that has tried to figure out how to combat piracy and remain profitable.

These industries faced the same challenge, unlimited free copies, immediately available on-demand to the consumer over the Internet. In order to survive, these industries had to adapt and develop new revenue models and new ways to capture the attention of consumers. There have been attempts at both trying hard to fight the shift to a digital economy as well as attempts to adapt, and in the end this has given rise to new business models.

The higher education sector is currently facing many of the same problems faced by the music and entertainment industries. The last few years have seen an explosion in free educational content available on the Internet. Textbooks and journals are being pirated, teachers, NGOs, companies, and individuals are creating and sharing video lectures on YouTube and whole platforms that specialise in free higher education have appeared. Information is becoming free and lectures are no longer exclusive to the lecture halls.
The rest of this paper is structured as such, in Chapter 1 we present the theory of creative destruction and the impact innovation can have on traditional business models. In Chapter 2 we define what we mean with a ‘digital good’, and how ‘digital goods’ behave differently from traditional physical goods. In Chapter 3 we show what happens when marginal cost reaches zero, we go through different pricing models in a zero marginal economy. In Chapter 4 we go through the history of ‘free’ and the difference between ‘twentieth-century free’ and ‘twenty-first century free’. In Chapter 5 we look at how ‘free’ has affected the music industry. In Chapter 6 we take a look at the higher education industry, and finally in Chapter 7 we compare what has happened in the music industry to what is happening in the education industry and analyse the challenges facing the education industry today.

Formulating the problem

The ‘digital revolution’ has fundamentally changed many industries and the shift to digital has not been painless for many of the affected industries. The music industry has seen over 15 years of falling revenue and the adaption to a working digital business model has been a bumpy ride. The industry for higher education is not immune to this shift towards a digital economy, and is bound to be impacted by the rapid growth of free information on the Internet. Universities will have to adapt to these changes, how fast they are able to adapt and change may impact their growth and revenue model.

Purpose

The purpose of this paper is to investigate from a microeconomic perspective the impacts of digital technology on higher education by investigating what happens with the university pricing model when the marginal cost of information is zero. Will the industry for higher education follow the same development path as the music industry? Is the Internet disrupting
the traditional university model? What will the impact on the university pricing model be? And how will universities tackle the rapid growth in free education? The purpose of this paper is not to be a critique of the traditional university model, but rather to investigate how it is impacted by new circumstances.

We therefore propose the following research question:

*How will the education industry be affected by the rise of 'free', and how can it adapt to the digital economy?*

**Method and delimitations**

This paper offers an analysis based on microeconomic theory on the implication of zero or near zero marginal cost goods on various industries. We have looked at how the conditions for the industry of higher education might change based on what has happened in other industries with comparable circumstances with a special focus on the music industry.

As plenty of the literature on this subject focuses on the US, many of the examples provided in this paper are from the US. However, the analysis is still applicable to other markets outside of the US.

We have not tried to offer a practical full fledge business model for universities in a zero marginal cost economy as that is outside the scope of this paper. The analysis focus on how the education industry might change by comparing with other industries where the shift towards a digital economy started earlier and the impacts have been felt harder.

We verbally formulate different pricing models that can be applied to information goods (for a mathematical pricing model of digital goods see Fournier (2014) or Huang & Sundararajan (2011)).
1. Innovation and creative destruction

Lange (1937) noted that the unprecedented economic progress since the industrial revolution was due to innovations that had increased productivity. According to Lange there are two effects of such innovations, 1) the company that is introducing an innovation gains an immediate benefit and 2), the companies using antiquated means of production, or producing competing goods that are replaced by a cheaper substitute, suffer losses. He argues that each innovation is connected to a loss of value of certain old investments, and that “entrepreneurs and investors have to submit to the losses and devaluation of old investments resulting from innovations, for there is no possibility to counteracting it.”

Joseph Schumpeter (1942) introduced the term “creative destruction” to describe innovative activities by entrepreneurs that sustains long-term economic growth that revolutionises the economic structure from within. According to Schumpeter, monopolies enjoy significant barriers to entry that leads to a situation where new entrants to a market needs to be radically different and this has the potential to give rise to fundamental improvements. He stressed the role innovation has in improving technology and the contribution it makes towards increased productivity and efficiency.

The digital revolution can be viewed from this perspective of ‘creative destruction’, we have seen how the ‘digital revolution’ has transformed almost every industry in some way. Knowledge intensive industries have all more or less made a shift towards the digital economy, for example financial services and entertainment have increasingly moved online, and we are starting to see this shift in industries like healthcare and education. Other less
knowledge intensive industries like retail, manufacturing and travel are also shifting towards the digital economy (Carlsson, 2004).

Rifkin (2014) even goes further, he argues that the digital revolution and the Internet of Things (IoT) coupled with advances in renewable energy, automation and 3D-printing will enable the zero marginal cost economy to enter the physical world.
2. What is a digital good?

A ‘Digital good’ is a form of ‘information good’, and these two are sometimes used interchangeably. Information is a complex concept, which lacks a single, unified definition. Floridi (2011) writes: “Information is notoriously a polymorphic phenomenon and a polysemantic concept so, as an explication, it can be associated with several explanations, depending on the level of abstraction adopted and the cluster of requirements and desiderata orientating a theory.” (p.117).

Several analyses in information science, information systems theory, methodology, information (systems) management and database design have adopted a General Definition of Information (GDI) in terms of \textit{data + meaning}.

The tripartite definition of GDI is (Floridi, 2011):
\(\sigma\) is an instance of information, understood as semantic content, if and only if:

(GDI.1) \(\sigma\) consists of one or more \textit{data};

(GDI.2) the data in \(\sigma\) are \textit{well-formed};

(GDI.3) the well-formed data in \(\sigma\) are \textit{meaningful}.

Resources can be divided into scarce and non-scarce resources, where a non-scarce resource is something that exists in abundance, and how scarce or abundant a resource is will affect the price of that resource. The more abundant a resource is, the more the price will fall (Robbins, 1935), and there are some resources that exist in such abundance that they become free. As digital goods have the potential to be copied an unlimited amount of times they fall into this category (air and saltwater\(^1\) are two examples of tangible goods that are also so abundant that they become free).

Goods can be divided into tangible and intangible goods and Fournier (2014) offers the following definition of an intangible good: “An Intangible Good is a virtual object having

---

a significant value for a set of individuals, and a null margin cost”. Digital goods are intangible and compared to tangible goods, which even during mass production only can reach a very low marginal cost, intangible goods may be duplicated infinitely at zero (or near zero) cost.

Digital goods therefore differ from traditional goods; when you share a digital good or make a copy, the original version is still available for others to consume since digital goods are non-rivalrous in nature (Aichroth & Hasselbach, 2003: Weller, 2011). The marginal cost of creating another copy of a digital work is the cost of infrastructure, e.g. fibre-optic cables and computing power (Huang & Sundararajan, 2011: Weller, 2011). The more times a digital good is copied, the closer this cost gets to being free, and the marginal cost for production approaches zero. This is a huge shift in distribution models for content industries, Weller (2011) makes the case that these industries are making a shift from an economics of scarcity to an economics of abundance.

In the traditional model for the music industry from a scarcity/abundance perspective, talent is scarce, difficult to locate, the goods are physical and manufactured according to demand, and access to this content is scarce. Talent scouts spend time discovering new talent to sign to a label that then has to record and produce music that is sold in a physical format. This physical copy is then distributed to shops with limited opening hours, and limited storage capabilities. Now artist can create their own content and distribute it, nearly for free online (Berry, 2011: Moyon & Lecocq, 2014: Weller, 2011). Music is increasingly not sold, but subscribed to, and is available instantly to the consumer via distribution networks like Spotify or Soundcloud (Swanson, 2013: Weller, 2011). Music is no longer a scarce resource, which changes the relationship the consumer has to music, the scarce resource is now instead the time and attention of the consumer (Weller, 2011).
3. Marginal cost and pricing models

In most cases the marginal cost will increase as a producer reaches capacity and investments become more and more expensive, however, if the cost of producing one additional good is zero, marginal cost will also be zero.

Producing an intangible good requires input of labour and capital, and distribution relies on infrastructure that can be costly to put in place. Fibre-optical cables have to be dug down under the streets of our cities and sunk into our oceans. Satellites have to be sent up to space and server parks have to be built and maintained. And even after all that is fully paid for and plugged in, there will still be some costs associated with generating and distributing information, i.e. electricity to run servers etc. (Rifkin, 2014). However, when producing one additional digital good these costs are so small, and they are continually shrinking, that it is relevant to look at a model with zero marginal cost when discussing pricing of intangible goods.

Furthermore, if you look at costs from a perspective of a single entity like a university, the cost of distribution can vary depending on what distribution model the university chooses. If a university publishes a lecture on YouTube or on Coursera, the university pays zero for distribution. In this case from the university's point of view, the marginal cost for an extra copy of a video lecture is truly zero as they do not have any costs associated with distribution. If a university use a third-party platform that charges a per-user price or a per-click price for distribution, the MC will still be constant although not zero.

In both these cases the university has an incentive to “produce” as many copies as possible (given that the university can monetise the content in the second case).
Chart 3.1

Chart 3.2
Huang & Sundararajan (2011) puts forth a model for pricing a digital product whose supply function is discontinuous. Distribution of digital goods depend on network infrastructure and computing power. Variable increases in demand are met with adding another block of network infrastructure or computing power. Each one of these blocks have a fixed cost and enables the seller to fulfil a large fixed amount of demand at zero cost.
According to Huang and Sundararajan (2011), IT-based products and services like internet services, telephony, on-demand software and streamed video on demand are not really information goods. As variable increases in demand are fulfilled by addition of blocks and their cost structure resembles a mixture of positive periodic fixed cost and zero marginal costs.

This type of pricing models could also be relevant for education distribution platforms like Coursera or edX. For a university this pricing model is only relevant if: 1) The course of content require no input from teachers, i.e. a fully automated course like a MOOC, or if the university produces open resources and distributes them for free and: 2) The university host their content locally and have to invest in network infrastructure.

If the university opts instead to use a third party distribution platform the pricing model changes. Hosting in this case can either be completely free for the university, for example hosting a MOOC course on Coursera or sharing educational videos on open platforms like YouTube or Vimeo, or with a LMS that offers a pay-per-learner or pay-per-use model (Pappas, 2015).

The main price models for digital goods with zero marginal cost are bundling, pay per use, subscription, freemium or offering content for free.

Bundling is becoming increasingly more common when many economies are moving away from production and towards services. Physical products are sold bundled with services, a phone is sold with a plan and a car can be sold with insurance and roadside Assistance services.

Bundling with digital goods can include giving away the digital object for free and charge for a physical object, or if there are no physical object a producer can charge for a service related to the free digital product, for example software that is made available for free online can be bundled with support or consultancy services (Weller, 2011).

As the revenue for many MOOC platforms (for example, Coursera and edX) is accrued by selling certificates to a learner that completes a course, they want as many people to take the course as possible. The number of certificates they sell will increase with the number of participants taking the course, it is therefore in their interest to get as many people onto the platform as possible. In order to do this they offer the courses for free, and the learner only pays if he/she wants to get a verified certificate for a completed course.
This can be described as a freemium model, which is a business model that has become very popular for digital goods. It combines ‘free’ with ‘premium’ consumption in association with a product or a service. You give away a certain level of your product for free and charge for a premium version (Niculescu and Wu, 2011; Pujol, 2010).

The term Freemium was coined by venture capitalist Fred Wilson and is now one of the most common web business models (Anderson, 2013). Examples of the Freemium business model is a free version of a software with a “pro” version that cost money, or listening to music for free with ads on Spotify, and a premium subscription to get rid of the ads.

Of course only a part of learners on MOOC platforms choose to pay for a certificate, but as Anderson (2013, p.247) puts it:

[F]reemium as the opposite of the traditional free sample: Instead of giving away 5 percent of your product to sell 95 percent, you give away 95 percent of your product to sell 5 percent. The reason this makes sense is that for digital products, where the marginal cost is close to zero, the 95 percent costs you little and allows you to reach a huge market. So the 5 percent you convert is 5 percent of a big number.

Bundling and freemium can also be combined. One example of this is Coursera, they make their money by selling certificates and offers a split revenue model with partner universities. The educational resources are bundled with a certificate; the course participants do not have to pay to take the course but rather pay to obtain a certificate of completion.

There are also some colleges that are employing an ‘All You Can Eat’ Pricing Model, five examples of this are Capella, Northern Arizona, Southern New Hampshire’s College for America, University of Wisconsin Flex Option, and Western Governors. These universities offer students a subscription based pricing model where the students pay for a set period of time during which they can take earn as many credits as they want (Kelchen, 2015). This model is also used by many private education providers like Lynda.com (for a discussion on an advertising supported content-for-free model versus a subscription supported
pay-for-content business model see Punj (2015), and for a discussion on subscription pricing for academic journals see Liu (2011)).

The last model we will discuss in this paper is, offering content for free. This is common for businesses that rely on ad revenue. G-mail, YouTube and Facebook are three examples of this. The product is offered to the consumer for free, and the company makes money by showing ads to the user (Weller, 2011; Anderson, 2009; Rifkin, 2014).

Content can also be available free without ads if the purpose of distribution is not to incur revenue, for example if a university makes parts of their courses openly available in order to attract students.

Free educational content online has exploded during the last few years. Many universities are producing and publishing MOOCs, individual teachers are creating content for their students and sharing it on YouTube, and then there are websites like codecademy.com that teach people how to code for free, Duolingo that offer language courses for free, and Khan Academy that have as a mission to “to provide a free world-class education for anyone, anywhere” (Khan Academy, 2016). And there are thousands of other channels on YouTube dedicated to education. Currently the top 100 education channels on YouTube have over 11 billion video views and over 28 million subscribers. Khan Academy’s lectures have for example been viewed over 800 million times (Socialbakers, 2016). A lot of these YouTube channels are what might fall under edutainment (see for example the Green Brothers\(^2\) that have a network of education channels on YouTube like Crashcourse and Scishow\(^3\)), but there are also a lot of content that is aimed specifically at university students. Marginal Revolution University\(^4\) and ACDCLeadership\(^5\) for example offer free online courses in economics and host all their video content on YouTube.

Some of these ventures are funded by donations from large companies and charities like Google and Bill and Melinda gates foundation (Williams, 2014), but also by donations from consumers themselves, either direct donations through for example Paypal, but facilitation tools for this type of continuous ‘crowdfunding’ have begun to emerge (see for example patreon.com). This pay-only-if-you-want model is quickly becoming more popular.

---

\(^2\) [https://en.wikipedia.org/wiki/Green_brothers](https://en.wikipedia.org/wiki/Green_brothers)
\(^5\) [https://www.YouTube.com/user/ACDCLeadership](https://www.YouTube.com/user/ACDCLeadership)
and is proving to work. Content creators give away their content for free and the consumer can choose to pay if they want to support the content creator.
4. What is “free”?  

Companies giving away their product for free is not new, giving things for free has been a strategy of many successful businesses since Woodward, the owner of the struggling company behind Jell-O started giving away free cookbooks with Jell-O recipes that propelled Jell-O from a failing product to a mainstay in American Cuisine. Woodward understood the power the word ‘free’ had on consumer psychology and its ability to create new markets and break old ones. Equally important he understood that ‘free’ is not the same thing as profitless, for him it was just a different more indirect path from product to revenue. Since then the strategy of giving away something for free in order to charge for something else has been a common business strategy and the concept of a ‘loss leader’ is something that today is thought at every business school around the world and is a foundation of many businesses like mobile network operators, gaming console makers or producers of coffee capsules (Anderson, 2009).

With the explosion of digital goods and services that can be produced at near zero marginal cost, the new form of free that is emerging is different from the old one that we are used to. Anderson (2009) makes a distinction between ‘twentieth century free’ and ‘twenty-first-century free’, and he writes “Twenty-first-century free is different from twentieth-century free. Somewhere in the transition from atoms to bits, a phenomenon that we thought we understood was transformed: “free” became free.” (p.3).

This new type of free is according to Anderson (2009) not a “not a gimmick, a trick to shift money from one pocket to another. Instead, it is driven by an extraordinary new ability to lower the costs of goods and services close to zero. While the last century’s free was a powerful marketing method, this century’s free is an entirely new economic model” (p.12).

When something becomes bits instead of atoms it inevitably also becomes free. While traditional free often feels like bait, you are going to have to pay for something else, or the ‘free’ product or service is baked into the price of something else, like free shipping can be baked into the price of the product. In an atom economy you are almost always paying one way or another. Thus ‘free’ in the atoms economy are rightly meet with suspicion from customers. In a bits economy on the other hand, free can be truly free (Anderson, 2009).
The shift to digital has caused widespread concern amongst established players in a variety of industries. The majority of all music, film or TV-series produced are instantly available for free online as soon as they are released. Traditional methods to stop illegal sharing of content has proven futile, copyright restrictions and a myriad of new DRM systems has not been able to stop illegal file sharing of copyrighted content (Varian, 2005).
5. The rise of free, and how it affected the music industry

5.1 The traditional business model

In the traditional music industry business model a few major media companies had control over essentially every aspect of the industry. It was a linear value chain where the record label had control of manufacturing, reproduction, promotion and distribution and the artist had very little control, if any. Without a contract with a record label it was hard for an artist to produce and distribute music. In addition to controlling every aspect of the value chain, this also gave the majors control of content (Berry, 2011).

This business model was severely disrupted with the digitisation of audio and the spread of personal computers and the internet. In 1992 the Moving Picture Experts Group published the audio coding format MPEG1 Layer 3 (better known as MP3) which greatly reduced file sizes (The Moving Picture Experts Group, 2005), and with faster internet speeds and smaller file sizes, sharing music over the internet became easier. When Peer-to-Peer file sharing program Napster launched in June 1999, sharing music over the internet became systematic. One year after it launched Napster had 20 million members (Ante et al., 2000), and at its peak almost a 100 million people were using Napster to download MP3 music files for free (Carlsson & Gustavsson, 2001).

Napster gave people access to a vast library of free musical content for the first time, it also allowed people to download individual songs, effectively offering unbundled songs in contrast to the way songs comes bundled on an album.

The total real value of recorded music sales had reached its peak in 1999. After Napster had appeared, sales started decreasing, 5 percent in 2000 and 6.7 percent and 9.6 percent in 2001 and 2002 respectively and they continued to decline after that. The recording industry attributed this decline to file sharing and proceeded to launch legal action against Napster, and succeeded in 2001 to close Napster down (Hong, 2013).
Chart 5.1. Total real value of record shipments in the USA. Refer to the RIAA’s year-end statistics. Total sales include CDs, cassettes, LPs, and music videos. Starting from 2004, total sales also include digital formats such as legitimate download (Hong, 2013).

But the damage was done, consumers had learnt that music could be free and music sales continued to plummet. Napster was just the first of many file sharing tools and with the advent of bittorrent P2P protocols, file sharing became easier than ever before.

5.2 Adapting to a digital world

The earliest attempts at creating a legal business model around digital downloads essentially all failed. The main reasons for this failure were 1) consumers complained that the price of digital downloads were high in comparison with the physical copies, 2) rigid DRM systems curtailed the use of the digital product. For example, seller used file format that only worked with their own software or tried to curtail how many computers a consumer could use to play back the digital tracks, 3) the number of songs on offer were meagre in comparison with the vast amount available for free through various P2P file sharing networks. This was mainly due to the failure to reach agreements between content providers and distributors. 4) The quality of legal alternatives were often inferior to pirated ones. The legal alternatives often used heavily compressed format for delivery while it was often quite easy to find less
compressed or even lossless versions of the same song pirated online. And 5) While communities, chat rooms and forums cropped up around piracy platforms, early music stores completely failed to offer any alternative to this (Peltz, 2013).

We are just starting to see the music industry turning around and adapting to this change in distribution models. For example, in 2012 digital music sales in the UK overtook physical sales and after 15 years of decline, this was also the first year that the UK music industry as a whole grew (Peltz, 2013).

5.3 Solutions in a digital world?

The main digital distribution models for music that have emerged are, pay-per-use, free (either ad-funded or truly free) and subscription. iTunes Music Store was the first successful attempt at monetising digital downloads and they succeeded where many other failed because they let users buy only the songs they wanted, a sort of a-la-carte for music, and massive sales of the at the most popular music player, the iPod, increased demand for digital songs and at the same time it locked consumers into their own music player, iTunes, that integrated with the music store (Breen, 2013). iTunes also offered new features and functionality like smart playlists, file tagging and CD-ripping that made it easy for consumers to combine their physical music collection with their digital one (McElhearn, 2015).

There are many content creators that offer their music for free on websites like Soundcloud, for example with the intention to get discovered, grow their market or hoping to sell something else, like admission to concerts or merchandise. Some content creators are also using a name-your-price or pay-only-if-you-want-to strategy where the consumer is given the option to donate to the artist, or pay for a song only if they want to. Music consumption through streaming has grown fast in the last few years. With streaming, music is not sold as a good, but rather as a service. The consumer is paying for the platform and for the convenience of on-demand content more than the actual songs they listen to. Most Music as a Service providers (MaaS) offer their content as a freemium model with either ads or a with a flat fee subscription model. The ad-funded model is one of the most dominant business

---

6 iTunes is another example of a freemium or loss leader strategy, it is offered for free to consumers in order to increase sales of music, apps, iPhones/iPods etc.
models digital economy used by huge players like Google and Facebook (Peltz, 2013). Spotify, currently the largest music streaming platform by subscribers7 of a freemium based business model, has an ad-funded model that consumers can access without paying any money and a premium subscription plan, where the consumer pay to get rid of ads, access your music offline and stream music in higher quality.

5.4 A hope for a new beginning?

It is evident that the music industry has changed since Napster. Overall sales have been declining and consumers have been looking for new ways of listening to and sharing music. The on-demand all-you-can-eat streaming model championed by Spotify have already helped turn around declining sales in Sweden and the UK, and Spotify is still growing rapidly. As listening habits change, “Spotify offers a way to monetise free listening - something traditionally we haven’t been able to do” (Swanson, 2013).

Spotify managed to address many of the issues consumers had with early alternatives to piracy. All the five major issues mentioned above have been addressed. 1) Price, Spotify offered a price that was acceptable to most consumers. 2) DRM, Spotify is in itself a type of DRM system in the sense that you have to run it in order to listen to music, and it restricts how many users that can use the account at the same time. But it is far less inconvenient than the DRM systems adopted in the beginning of digital music sales. 3) Limited choice, users can now choose from a catalogue of over 30 million songs (The Spotify Team, 2016). 4) Quality, Spotify offers users the ability to stream music at up to 320 kbps, while this is not lossless it is good enough that the vast majority cannot tell the difference. 5) Community, Spotify integrates with Facebook and lets you follow and share music and playlists with your friends. It also allows you to follow your favourite artists. With all these issues addressed the Spotify business model is proving popular with consumers all around the world, and “if legal distribution services provide a superior user experience, piracy will lose customers” (Peltz, 2013).

---

7 In June 2015 Spotify had 20 million paying subscribers and over 75 million active users (The Spotify Team, 2015), and in March 2016 total subscribers had reached 30 million (Singelton, 2016).
In markets where Spotify or similar services have a large presence there is evidence of a sharp decline in piracy. In Norway for example, piracy for music has all but disappeared. According to a survey in December 2014, only 4 percent of Norwegians under 30 years answered that they still used illegal file-sharing platforms to acquire music compared to 80 percent in 2009. And the main reason for this steep decline of piracy in Norway is the availability of a product that is more appealing to consumers than piracy (Ingham, 2015). Aguiar & Waldfogel (2016) finds empirical evidence that streaming over Spotify displaces piracy.

In 2015 digital sales contributed 45 percent of total industry revenue globally and overtook physical revenue for the first time. This helped fuel a total increase in global music revenues of 3.2 percent, the first such increase in 15 years (IFPI, 2016a). In Sweden where the shift to digital started earlier the share of digital sales of total revenue is 85.1 percent (IFPI, 2016b).

Source: IFPI (2016a)
This is not a unique situation for the music industry, many businesses have struggled with the twenty-first-free, for example, newspapers have tried implementing pay-walls to counter decreasing sales of the print version, makers of computer software have implemented DRM systems to try to curb illegal downloads, and all-you-can eat subscription models are becoming increasingly popular as a distribution channel and pricing model for TV-shows and films.
6. Free and the education industry

6.1 The traditional model and rising costs

The costs of universities are rising, and the rising costs have been passed on to the students. College is becoming increasingly unaffordable. Over the last few decades tuition have risen faster than the levels for inflation in many countries. In the United States state support measured in constant (2008) dollars per full-time-equivalent student has fallen from $7,269 in 1985 to $6,445 in 2005, a drop of 11.3 percent. In contrast, tuition fees have seen a sharp increase over same period. U.S median income from 1982-2006 grew by 147 percent, while college tuition and fees increased with 439 percent during the same time (see chart 6.1). It is unlikely that tuition fees can keep outstripping median income indefinitely, and to quote Stein’s Law “If something cannot go on forever, it will stop.” (Breneman & Yakoboski, 2011, p.18). Among households owning student debt in the US, the average outstanding student loan balance increased from $23,349 in 2007 to $26,682 in 2010, and one in five households have outstanding student debt\(^8\) (Fry, 2012).

---

\(^8\) For households headed by a person younger than 35 years 40 percent owe student debt.
Chart 6.1 Growth rate is calculated from a baseline average of 1982, 1983 and 1984. Data are from 1982 to 2007. All industries, except median family income, are components of the CPI. (Breneman & Yakoboski, 2011, p.16)

At the same time as costs are rising, we also need to educate more people now than ever before. The middle class in fast growing economies like India and China is growing rapidly, and the world is becoming increasingly global and automated. With a massive increase in labour productivity in manufacturing the percentage of workers employed in industry has declined steadily for over a century. Jobs have instead moved to the service sector of the economy where productivity growth is slower (Archibald, 2011). This has led to an increased need for middling level of education which has led to a sharp increase in students aged 35 or older enrolling. In the US, 314,000 students aged 35 and up enrolled in higher education in the 1990s, but in the 2000s this number had risen to 899,000 (The Economist, 2014).

At the same times as costs are rising, real wages in the US have remained stagnant, and there are growing concern amongst would be students if attending college is worth the time and money required to obtain a degree. Although enrolment levels in the US are at
record levels, when asked “57 percent of the population says that the investment [in college education] is failing to provide good value for the cost” (Pew Research Center, 2011).

*Average hourly wages, seasonally adjusted*

![Chart 6.2](chart.png)

Chart 6.2 Note: Data for production and non-supervisory employees on private non-farm payrolls. (Desilver, 2014)

Breneman & Yakoboski (2011) propose that it is reasonable to argue that universities will not be able to continue raising tuition fees at the same rate as the last two decades without pricing a large part of students out of the market since higher price, all else equal, also means lower demand.

6.2 Digital competition?

At the same time as college tuition is rising, many players in the education industry are starting to seriously play with the idea of cheap or even free high quality education online. In his book The Long Tail (2008) Anderson brings up the vast capacity of the world wide web to store almost unlimited amounts of data at only the cost of entering it. With huge amounts of data being generated every day at an increasingly rapid rate⁹, the availability of things that

---

⁹ According to IBM (2016) we are currently creating 2.5 quintillion bytes of data every day. 90 percent of all the data in the world today has been created in the last two years alone.
were previously not available online is exploding, goods that have not historically been available due to lacking demand is now available online, and a lot of it is free. This increase in variety and emergence of more niche products is what Anderson refers to as ‘the long tail’.

This holds true also for the education industry, courses that universities were unable to hold regularly or unable to hold at all due to a lack in popularity amongst campus students can now be given online. The much larger market allows for far more specialised and niche courses and this abundance of information enables education sector to support high quality mass higher education on a scale that has not been seen before.

In 2011 Stanford professor Sebastian Thrun offered a free online version a course in artificial intelligence he was already teaching on campus. Normally, Thrun had about 200 students enrolled in this course, and he expected that he could probably get a few thousand people that wanted to take the free version online. When the course started 160,000 had signed up and 23,000 of those students went on to complete the course and graduate (Rifkin, 2014). Thrun later said that this response “absolutely blew [his] mind”, and later he left Stanford to found Udacity (Cadwalladr, 2012).

In 2015 there were 500+ universities offering 4200 courses to over 35 million students\textsuperscript{10} for free on websites like Coursera, edX, Udacity and FutureLearn. In 2015 alone, 1800 new courses were announced (Shah, 2015a; 2015b)

\textsuperscript{10} This is the total number of students that had signed up to take at least on course.
These MOOCs operate at near zero marginal cost (truly zero for from the perspective of the university if they do not have to pay for hosting the course on the platform). Many of these courses are taught by some of the most distinguished professors in the world, and there are some cases where universities have started offering credits for MOOCs (Rifkin, 2014; Haynie, 2015). Six universities from Australia, Europe and North America are also in talks to set up a global credit transfer system for courses taken online that would enable students to use online course to count towards their degrees (Grove, 2016).
7. Why would you pay for something that is free?

The business model for universities consist of selling information, i.e. education, to consumers, i.e. students. Some universities do not charge the students directly or are funded by other means, grants, taxes etc. However, the business model is still money for education. When information becomes free, how can you charge people money for it?

When consumers can find a substitute that is cheaper they will choose that, granted that they are a rational consumer. If it is not just cheaper, but free, it becomes very hard to compete with. For example, if a student can choose between a) going to class, or b) watching a series of video lectures online, the student will choose whichever one of these that gives the highest utility. If the professor holding the class is famous for explaining things and the quality of the video lectures are poor, the student might choose a. But if the professor is known as not being very good at explaining things, and the video lecture is of a high quality, the student might choose b. Whenever the student feels that option b is better they will choose that over option a.

Increasing quality in a physical classroom requires investments, better chairs, nicer classroom, preparation time for the professor etc. Therefore, quality on campus is rising slowly. In contrast, both the quality and the variety of courses offered for free online are rising sharply. For example, in just four years, the number of courses being offered for free on Coursera has risen to over 1800\textsuperscript{11}. And students all over the world are substituting traditional textbooks and lecture notes with digital resources and free lectures that teachers have uploaded to the internet.

If universities are unable to charge for information, they might have to rethink their business model.

\textsuperscript{11} As of May 2016, Coursera offered 1,893 courses. https://www.coursera.org/about/partners
7.1 If everything is free, what do you charge for?

When there are so many people and organisations offering easy accessible content available to anybody anywhere completely for free, the question arises, why should a consumer pay for something that they can get for free somewhere else? Private citizens, NGOs and corporations alike seem willing to create content and give it away for free. How do you compete with something that is free?

The traditional system of higher education is still organised around the principle of scarcity. It is assumed that the resources needed to provide education must exist around one place, the campus, partly because there is an insufficient supply of those resources in the general community. In the past this has been true, information has always been scarce and we organised schools and universities that decide who gets to access this information, and there was not really any other way to do higher education. You needed to have expensive infrastructure, libraries, facilities and laboratories to host and support the students who came to learn. If you wanted to increase supply there was no other way than to expand infrastructure or build more universities (Smith, 2011).

However, this model is facing diminishing returns and soaring costs, and is at the same time surrounded by information abundance. Students now have the possibility to access world class educational recourses absolutely for free over the internet, so how do they create value that make people want to pay for university?

When people learn something, they also want to be able to prove that they have learned something, they want formal recognition for their efforts. Universities already provide this service, a large part of why a student chooses to study at a university rather than learning the same thing from another source is because universities offer a means to prove that you have a certain knowledge or skillset, and this is valuable to the student when they begin looking for a job. Already today students can take a course at a university, but receive all the information from elsewhere, they can read other books, watch other lectures via the internet, and only show up for the test. In this case all the school does is provide a means to test the students’ knowledge.

The first universities to adapt also have a chance to monopolise a large part of the market. IT has enabled a large increase in the supply and demand of niche products, what can
be described as a ‘Long Tail’, but at the same time many online markets have developed into ‘winner-take-all’, also called ‘Superstar’ markets where blockbusters and large players dominate sales (Brynjolfsson et al, 2010). We see a trend with platforms that consumers do not want to have to go to two different platforms to do the same thing; Facebook, YouTube, Steam and Google hold a much larger share of the market than competing rivals (Statista, 2016a; 2016b; 2016c; Cole, 2014), and in 2014 Coursera claimed more student signups than all other MOOC platforms combined (Shah, 2015b). When a platform gets a large user base it gains a competitive advantage, if all your friends are on Facebook, you would also feel inclined to be on Facebook instead of another social media network where none of your friends are (Anderson, 2009).

The value of these platforms are not the content they create, none of them host their own content, but how many users they have. The more users they can get on their respective platforms, the more valuable they become. And by growing larger than their rivals these companies have gained comparative advantages since and they have created barriers of entry to the market. To start a new Facebook today would be very hard.\footnote{But if we have learned anything from the evolution of the internet, it is not improbable that at some point in the future, something new will arrive that replaces Facebook, just as Facebook replaced earlier social media platforms like Myspace.}

We have already seen universities experiment with various different models in the world of twenty-first-century free. The rapid expansion of the modern MOOC is one such example (Shah, 2015a), and the dean for graduate education at MIT is taking a leave of absence to start a non-profit university with a completely new model for a research university with no majors, lectures or classrooms (Navarre, 2016; Osler, 2016). Emerging partnerships for content sharing and accreditation of courses given online is another example (Grove, 2016). By partnering and sharing resources, you are effectively making your ‘platform’ bigger, without having to invest heavily in doing so. By having more universities accepting credits from courses you give in their degrees, you are increasing the value of your own courses.

To maximise profits, it is in the interest of a producer to stop charging for goods that can be produced for free if they cannot control the spread or copying of these goods, and instead focus on goods that they can charge for. This is essentially the rationale behind the freemium model. Give away the good that is abundant and cheap for free, and charge for the
‘premium’ good that is scarce. If the marginal cost of the information the university sells trends towards zero, so will the price.

If a good is digital, sooner or later it is going to become free and there is no way of stopping it becoming free. This has been tried unsuccessfully many times. In the digital realm the force of economic gravity will win (Anderson, 2009). There is no way for a university to stop free education online, and if universities cannot charge for information anymore, they have to try to figure out what else they can charge for, what other benefits or ‘premium’ services they can offer students. It is possible to make money from free, there are many things that consumers are willing to pay for, for example they will pay to save time, they will pay to lower risk and they will pay for status (Anderson, 2009).

If universities can maintain their monopoly on accreditation, they will not have to compete with free education online. If they can find a good way to tap into the free resources available online, or create networks for sharing educational content between universities they won't even have to produce the educational content themselves.

Campus does have advantages over online education, being in the same room as your teachers and your peers makes dialogue easier. Being in the same laboratory makes collaboration on experiments and projects easier. If universities shifted more of their focus from creating and providing educational content to testing and applying it they already have a comparative advantage to new potential rivals because the necessary infrastructure is already in place.

It might be hard for universities to compete with free educational content online, but they might not have to if they can compete where their competitive advantages are stronger. Maybe universities will continue to dominate higher education, or maybe we will see creative destruction run its course and something we cannot think of today will emerge and take on the education role that universities have today?
7.2 Further research

In this paper we have focused on the music industry and the industry for higher education. Thus we have not made a deeper analysis on how zero marginal cost and the digital economy might affect other industries. It was not the purpose of this paper to suggest a concrete pricing model for higher education and this is an area where there is room for further research.

It might also be interesting to look at the assertions Rifkin makes (2014) about the zero marginal cost economy entering the physical realm with the aid of cheap renewable energy, the IoT, robotics and automation, and 3D-printing.

Blockbuster movies are raking in more money than ever, even though pirated versions of the same films are available online, and companies like Netflix offers a flat-rate subscription for on-demand all-you-can-eat films and TV-series. Is it possible to quantify the added value, in economic terms, of going to the cinema versus watching for free at home? The same train of thought can be used for many other industries, even education. How much is being in the same room as your teachers, classmates and network worth to a student, and what would be an optimal price for university education?

Lastly, another interesting area would be to investigate how much in utility terms a diploma or certificate from a MOOC provider is worth to a student, and what would make it more/less valuable.
Reference list


Berry, J. (2011). Welcome to the machine : changing music industry value frameworks and the key characteristics of new music industry business models.


Cadwalladr, C. (2012, November 11). Do online courses spell the end for the traditional university?. The Guardian. Retrieved from
http://www.theguardian.com/education/2012/nov/11/online-free-learning-end-of-university

doi:10.1016/j.strueco.2004.02.001


38


from


