Disruptions in the Sports Content Delivery Value Chain due to Consuming Sports Content over the Internet

by

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M.S. Electrical Engineering
The Ohio State University, 2000

Submitted to the System Design and Management Program in Partial Fulfillment of the Requirements for the Degree of

Master of Science in Engineering and Management
at the
Massachusetts Institute of Technology

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ABSTRACT

A major component of the highly lucrative sports business is the content delivery value chain consisting of a number of players including the content creators – sports leagues; content aggregators – TV networks; content distributors – pay TV providers; advertisers – one of the main financiers in the value chain; and consumers. The relationships between the value chain players have been both cooperative and competitive, especially when the borders separating them became less defined due to backward and forward integration efforts of players. With the advancements in Internet content delivery and electronic devices, a new form of sports content consumption has emerged that has the potential to re-define the borders between the value chain players and to disrupt the industry. This new form of sports content consumption is Sports over IP (SpoIP, sports content consumption over the Internet). This thesis lays out four different scenarios about how the SpoIP disruption could play out in the value chain. It uses information from similar disruption in other industries and system dynamics modeling to present the ramifications and likelihood of each scenario. This work predicts that the consumers will be the winner of SpoIP disruption because they will have access to good quality and cheaper sports content going forward.
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Chapter 1: Introduction

The sports industry in the U.S. is one of the most lucrative ones, generating revenues for a number of players in the sports ecosystem. According to [1], the U.S. sports market in 2012 is estimated to be $400 to $450 billion. These revenues come from a broad spectrum of sources including ticket sales, content rights, licensed products, sports video games, collectibles, sporting goods, sports-related advertising, endorsement income, stadium naming fees, and facilities income.

The four big leagues in the U.S., the National Football League (NFL), National Basketball Association (NBA), National Hockey League (NHL), and the Major League Baseball (MLB) earned about $25.6 billion in revenue in 2011 [2]. NFL earned the most with $11 billion, followed by MLB, NBA, and NHL with $7 billion, $4.3 billion, and $3.3 billion, respectively. As mentioned in [3], professional teams have started to rely less on tickets sales and more on selling their content rights to generate income.

TV networks, such as ESPN, CBS, Fox, and NBC as well as pay TV providers, such as DirecTV, Time Warner Cable, and Comcast buy content rights from leagues and broadcast them after adding their own complementary programming. These complementary programming include video and audio capture of games, commentaries, previews, feature stories, reality shows, and documentary shows. One popular complementary programming offered by ESPN is SportsCenter [4], which is a daily sports news television show that has existed since the launch of the network in 1979. The show broadcasts news about sports events, some of which with certain restrictions. For example, NFL does not allow in-progress highlights outside of its own life games broadcasts. Other examples of complementary sports programming are Fox Sports1 [5] and The ‘Lights from NBC Sports Network [6]. Significant amount of dollars are transferred
between leagues and networks/pay TV providers for content rights. For example [7], ESPN paid the NFL $15.2 billions for a 10-year content right deal starting in 2011. CBS/Fox/NBC paid the NFL $28 billions for a 9-year deal starting in 2011. The ESPN deal amounts to a 73% increase and the CBS/Fox/NBS deal amounts to a 63% increase from previously made deals. Therefore, the content right fees are not only very high, but they are also increasing sharply. Currently, this trend is mostly benefiting the leagues and hurting the networks, pay TV providers, and the consumers. Networks and pay TV providers absorb part of the increased fee and pass on the rest down the value chain towards the consumers and advertisers. According to [8], sports channels account for about 40% of the cable TV fees, explaining partly why sports programming is so important to pay TV providers and why consumers have to pay more and more for subscription.

Leagues, TV networks, and pay TV providers sponsor part of their operations with high valued advertising deals. Such deals are signed with advertising agencies or directly with companies whose products appeal to the demographic that watches sports. Examples of such companies are Nike, Adidas, Reebok, PepsiCo, and General Motors, marketing products ranging from sport apparel and drinks to vehicles. Although these players are integral part of the value chain, they are excluded from the presented study to limit the scope. Advertisers are considered sources of revenue for various value chain players without talking about how advertisers generate their own income.

This thesis presents the research conducted to analyze and predict future disruptions in the sports content delivery value chain, which is depicted in Figure 1.1, due to consuming sports content over the Internet. Throughout the thesis, such consumption is also called SpoIP (Sports over IP) for brevity.
The remaining parts of the thesis are organized as follows: Chapter 2 talks about the motivation of this research followed by the methodology used in Chapter 3. Chapter 4 presents the details of the sports content delivery value chain and the introduction of the System Dynamics model used in the research. Chapter 5 offers insights about how the hypotheses used in the study have been developed. Chapter 6 presents the results and discussions of the analysis performed via simulations and finally Chapter 7 provides the conclusion and suggested future work.

Figure 1.1: Sports content delivery ecosystem.
Chapter 2: Motivation

Owing to the advances in content delivery over the Internet and electronics devices enabling the consumption of such content, the concept of consuming sports content over the Internet has been an interesting topic to study. The popularity of sports, the tension between the value chain players, and the gradual increase in cost of accessing and broadcasting the content make it very likely that SpoIP will disrupt the industry. This disruption may occur by changing the existing value chain and forcing all players to modify their strategies or exit the market. The big question, however, is how this disruption will play out. Studying and understanding the disruptions will come with the benefit of gaining more insights about this fascinating topic, but more importantly it has implications on the future dynamics of one of the most lucrative industries in the U.S. – the sports industry that generated about $400 billion in yearly revenue in 2012 [1].
Chapter 3: Methodology

As of the writing of this thesis, it was still unknown how the disruption in the sport content value chain due to SpoIP will play out. The effects of the disruptions had started but not settled. Due to this still ongoing process, a hypothesis driven approach was taken in the presented work. The approach is summarized in Figure 3.1.

First, a System Dynamics [9] model was developed to build a simulation platform that is used to test the hypotheses developed in subsequent steps. The model uses revenue as a quantifiable metric to define success. The model was calibrated so that past and present performance of value chain players is matched to publicly available data. Performance drivers were identified and added to the model to create connections between SpoIP and future performance. Assumptions made for future behavior are discussed in corresponding sections that are dedicated to the details of the model.

Second, four hypotheses were developed each representing a different outcome of the SpoIP disruption. The hypotheses were conceived as a result of studying Internet related disruptions in other industries, including music, publishing, TV, newspaper, and telephony.
Third, each of the four hypotheses was tested with the System Dynamics model. The simulation results were analyzed and the conclusions were synthesized. Afterwards, the feasibility of each scenario and outcome were discussed to determine the one that will most likely occur.

In order to limit the scope of this work, only (American) football related revenues of four specific value chain players, namely NFL, ESPN, Comcast, and the Consumer are considered. Therefore, the revenues presented in this work do not amount to the total revenue of the industry, but merely a subset of the revenues that is more likely to be affected by SpoIP.
Chapter 4: Football Content Delivery

4.1 The Business Ecosystem

The ecosystem used for the study in this work in seen in Figure 4.1 where individual players and the flow of revenue and content are shown. Revenues as a financial metric are used to quantify the effects of SpoIP. Therefore, revenue sources that are likely to be affected by sports content consumption over the Internet are used in the model and analyses.

![Figure 4.1: Football content delivery ecosystem.](image)

To limit the scope of the study only football related revenues of four specific value chain players are considered. These value chain players are NFL, ESPN, Comcast, and the Consumer. Figure 4.2 shows a more detailed model depicting the studied dynamics between the players.
Figure 4.2: Football content delivery ecosystem value chain dynamics.

4.2 NFL Model

The NFL System Dynamics model is shown in Figure 4.3. Three revenue sources are considered: Stadium revenues, NFL Network (NFLN) revenues, and content rights revenues. There are of course other NFL revenue sources, such as stadium naming fees, licensed products, sports video games, etc.; however, to limit the scope of the study, it is assumed that SpoIP does not affect these revenue sources.
The three NFL revenue sources are explained in more detail in the following three subsections.

**Figure 4.3: NFL System Dynamics model.**

### 4.2.1 NFL Stadium Revenue

NFL stadium revenue is composed of ticket sales and other income generated during games in stadiums, such as from parking, food, and apparel. This revenue stream \((NFL\text{\_stadium\_rev})\) in Figure 4.4) is modeled as a multiplication of demand for live performance and $100, which is the assumed average revenue generated by each stadium attendee. Parameter demand for live performance is driven by the number of rabid fans, which in turn, is a stock driven by the Rabid fan creation rate. The flow, Rabid fan creation rate, is a function of NFL popularity \((NFL\text{\_pop})\) in
the model), which is set by number of star players. Number of start players is driven by NFL revenue, closing the system dynamics loop shown in Figure 4.4 with bold arrows.

**Figure 4.4: NFL stadium revenue.**

*Demand for live performance* is calibrated to match the past data in [10] and its future behavior is assumed to follow an S-curve. The model output for this parameter is shown in Figure 4.5 for the baseline (BL, a.k.a. no SpoIP) case, presenting the total number of stadium attendance in one year across all stadiums in the US.

The average revenue per NFL stadium attendee is derived from the fan cost index data presented in [11] and [12] and it is fixed at $100 in this study.
According to the data in [13], the average stadium capacity is approximately 70,000. Therefore, a saturation function is implemented in $NFL_{stad\ rev}$ to simulate this limitation on the number of stadium attendees.

4.2.2 NFL Network (NFLN) Revenue

NFL Network is NFL’s broadcast branch [14], offering sports programming dedicated to its content. It can be viewed as a competitor and complementor to similar sports networks, such as ESPN. This revenue stream ($NFLN_{rev}$ in Figure 4.6) is modeled as an addition of NFLN revenue from subscription and NFLN revenue from advertisements.
Figure 4.6: NFL Network revenue.

The system dynamics loop for NFLN rev is shown with bold arrows in Figure 4.6. NFL revenues drives no of star players, which in turn drives NFL popularity. As NFL becomes more popular, more and more rabid and causal fans are created, driving the desire to watch NFL games in video format (modeled with parameter demand for video). Demand for video is divided into demand for watching on the Internet (IP demand) and for watching via pay-TV (payTV demand). Both demand parameters, together with the number of NFL games shown on NFLN, drive the number of NFLN subscriber. Number of NFLN subscriber and the average monthly revenue per NFLN subscriber - which is also a function of number of games on NFLN - set the revenue from NFLN subscription (NFLN rev from subscription), which is calibrated to data provided in [15] to
match past trends. Future behavior is modeled with an S-curve. Figure 4.7 shows the model output of this parameter.

![NLFN rev from subscription](image)

*Figure 4.7: Model output: NFLN subscription revenue.*

![NLFN rev from ad](image)

*Figure 4.8: Model output: NFLN ad revenue.*

Ad revenues are based on historical data given in [15] and number of NFL games on NFLN. Future behavior is modeled so that ad revenues changes in proportion to the number of NFL games shown on NFLN. The model output of this parameter is shown in Figure 4.8.
4.2.3 NFL Content Rights Revenue

Among the revenue sources investigated in this work, content rights amounts to the largest one for NFL as of 2013. NFL gains income from this revenue source by selling the rights of its content (games) to networks. The model of this revenue source is shown in Figure 4.9 with bold arrows.

The revenue stream is modeled as the addition of the rights revenues obtained from DirecTV, CBS + Fox + NBC, and ESPN. Due to the contractual nature of this revenue source, it is not directly driven by NFL popularity and it is kept outside the causal loop driven by NFL revenue. However, indirectly, it is affected by NFL revenue and NFL popularity by tying it to No
games on NFLN (the games shown on NFLN are not shown on any of these networks). The model is calibrated to fit the data presented in [16] and [7] and the outputs are shown in Figure 4.10.

![Content rights fees](Image)

Figure 4.10: Model output: NFL content rights revenue split between sources.

4.3 ESPN Model

The next value chain player in the sports content consumption ecosystem is the cable TV network that owns the content rights of NFL games. In this study, a popular network, ESPN [18], is studied. ESPN is an American cable TV network that focuses on sports-related programing. The System Dynamics model for ESPN is shown in Figure 4.11. The revenue sources are divided into advertising revenues and affiliate fee revenues.
4.3.1 ESPN Advertising Revenue from Football

Advertising revenues come from ad agencies or directly from companies promoting their products on ESPN channels. Figure 4.12 emphasizes the ad related portion of the model with bold arrows. Ad related revenue is driven by No of NFL games on ESPN and by a baseline ad revenue parameter that is used to calibrate the model to past data. For consistency, only football related revenues are considered and they are assumed to be 60% of the total ESPN revenues. The approach outlined in [19] is used to predict the total revenue of ESPN. This approach starts with public financial data of Disney Corporation, which is divided into Media Networks, Parks and Resorts, Studio Entertainment, Consumers Products, and Interactive Media. After identifying ESPN’s as part of Media Networks, numbers from this segment were further sub-segmented into Cable Networks and Broadcasting. After a series of calculations, ESPN numbers, which are part of the Cable Networks segment numbers, were predicted. One major assumption is that 66% of
ESPN revenue comes from affiliate fees and the rest from advertising. The advertising model is calibrated to match the calculated data and the output of the model is shown in Figure 4.13. A slowing growth behavior (S-curve) has been implemented for future trends.

Figure 4.12: ESPN advertising revenue from football.
4.3.2 ESPN Affiliate Fee Revenue from Football

Affiliate fee revenue comes from pay TV providers that carry the ESPN programming in their offerings. According to [20], in 2011 ESPN captured $4.69 per month from each pay TV subscriber who has a package that includes ESPN. Affiliate fees represent ESPN’s main revenue stream and it is assumed to be 66% of the total. Figure 4.14 shows the model, which is matched to data obtained as outlined in [19]. The affiliate fee revenue is driven by \textit{No of NFL games on ESPN} as well as the two video demand parameters \textit{IP demand} and \textit{payTV demand}. These video demand parameters were initially introduced in the NFL model presented in Figure 4.3, showing one of the links between the two value chain players. The output of the model is shown in Figure 4.15.
Figure 4.14: ESPN affiliate fee revenue from football.

![Diagram of ESPN affiliate fee revenue from football]

Figure 4.15: Model output: ESPN affiliate fee revenue from football.

![Graph showing ESPN affiliate fee revenue from football]

ESPN affiliate fee rev

ESPN affiliate fee rev : BL
4.4 Comcast Model

The next member of the football content consumption value chain is the pay TV provider. This study focuses on a US-based cable TV provider called Comcast [21], which besides cable TV offers mass media, Internet, and telephone services. The System Dynamics model for Comcast is shown in Figure 4.16. The revenue sources are divided into advertising revenues and subscription revenues. Similar to the assumptions made in ESPN revenues, a subset of Comcast revenues is calculated to represent football related revenues.

Figure 4.16: Comcast System Dynamics model.
4.4.1 Comcast Subscriber Revenue from Football

The majority of Comcast's pay TV revenue comes from subscribers paying monthly fees to watch a number of cable channels. Although subscribers currently pay for bundled channels, an attempt to isolate football related channel revenues has been made in this work. According to [8], 40% of Comcast revenues come from sports related programming. Moreover, similar to the case of ESPN, it is assumed that 60% of Comcast's sports revenue can be attributed to football. The model used to calculate subscriber revenue is shown in Figure 4.17. It can be seen that this parameter is driven by NFL video demand parameters and No of NFL games on Comcast. The model output, matching the data extracted from [22] is seen in Figure 4.18. An S-curve function is implanted to simulate future behavior.

Figure 4.17: Comcast subscriber revenue form football.
Figure 4.18: Model output: Comcast subscriber revenue from football.

### 4.4.2 Comcast Ad Revenue from Football

The second football related revenue source for Comcast is through advertising. The model of this source is shown in Figure 4.19 and it is driven by *No of NFL games on Comcast* and by a baseline ad revenue parameter that is used to calibrate the model to past data. The subset of football related revenue has been calculated with the same assumptions stated in Section 4.4.1, starting with the aggregated ad revenue data from [22]. The model output is shown in Figure 4.20.
Figure 4.19: Comcast ad revenue from football.

Figure 4.20: Model output: Comcast ad revenue from football.
4.5 Consumer Model

The final player in the modeled value chain is the consumer whose System Dynamics model is shown in Figure 4.21. The model adds up five costs consumers incur when watching football. These costs are: i- the cost of watching live games in stadiums (same as NFL stad rev). ii- the cost of Comcast subscription to watch games on Pay TV. iii- the cost subscribing to other pay TV providers, which all together have 80% of the market. iv- the fees ESPN charges when it reaches consumer directly via SpoIP. v- the fees NFLN charges when it reaches consumers directly via SpoIP. The costs in iv and v are set to zero for the baseline case when there is no SpoIP. Figure 4.22 shows the consumer spending model outputs.

![Figure 4.21: Consumer spending System Dynamics model.](image-url)
Figure 4.22: Model output: Consumer spending.

### 4.6 Summary of Sports Content Delivery Ecosystem Revenues

This section presents simulated 2012 financial numbers of the investigated value chain players to get a feel about the relative sizes of each player in the baseline scenario (status quo, no SpoIP). It should be noted that the presented revenues do not represent the whole industry, but rather the revenues of the chosen players, constituting only a subset of the industry. Moreover, the presented revenues are only football related ones that are likely to be affected by SpoIP — again only a subset of all revenues. Table 4.1 shows the revenues for each player and Tables 4.2-4.4 shows the details of each player’s revenue streams. Table 4.5 shows consumer spending. The following conclusions can be drawn from the tables: NFL and ESPN earn the highest revenues, each about 37% of the total; most of NFL’s revenues (69%) come from content rights; the majority of ESPN revenues (70%) comes from affiliate fees; Comcast earns 90% of its revenues from subscription fees, constituting 93% of consumer spending on football together with the payments made to other pay TV providers.
<table>
<thead>
<tr>
<th>Value Chain Player</th>
<th>2012 Revenues ($B)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFL</td>
<td>8.4</td>
<td>39%</td>
</tr>
<tr>
<td>ESPN</td>
<td>7.4</td>
<td>35%</td>
</tr>
<tr>
<td>Comcast</td>
<td>5.8</td>
<td>26%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21.6</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1: Value chain player revenues in 2012.

<table>
<thead>
<tr>
<th>NFL Revenue Streams</th>
<th>2012 Revenues ($B)</th>
<th>%</th>
<th>Source of Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stadium</td>
<td>1.8</td>
<td>21%</td>
<td>consumers</td>
</tr>
<tr>
<td>NFL Network</td>
<td>0.8</td>
<td>10%</td>
<td>pay TV providers and advertisers</td>
</tr>
<tr>
<td>Content Rights</td>
<td>5.8</td>
<td>69%</td>
<td>networks</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1: NFL revenue streams in 2012.

<table>
<thead>
<tr>
<th>ESPN Revenue Streams</th>
<th>2012 Revenues ($B)</th>
<th>%</th>
<th>Source of Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>2.4</td>
<td>32%</td>
<td>advertisers</td>
</tr>
<tr>
<td>Affiliate Fee</td>
<td>5.0</td>
<td>68%</td>
<td>pay TV providers</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2: ESPN revenue streams in 2012.

<table>
<thead>
<tr>
<th>Comcast Revenue Streams</th>
<th>2012 Revenues ($B)</th>
<th>%</th>
<th>Source of Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>0.8</td>
<td>14%</td>
<td>advertisers</td>
</tr>
<tr>
<td>Subscription Fee</td>
<td>5.0</td>
<td>86%</td>
<td>pay TV providers</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3: Comcast revenue streams in 2012.
<table>
<thead>
<tr>
<th><strong>Consumer Spending</strong></th>
<th><strong>2012 Spending ($B)</strong></th>
<th><strong>%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>NFL Stadium</td>
<td>1.8</td>
<td>7%</td>
</tr>
<tr>
<td>Comcast Cable</td>
<td>5.0</td>
<td>19%</td>
</tr>
<tr>
<td>Other pay TV providers</td>
<td>19.9</td>
<td>74%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>26.7</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4: Consumer spending in 2012.
Chapter 5 SpoIP Disruption Hypothesis Generation

With the goal of developing hypotheses on how the content consumption over the Internet will disrupt the Sports Value Chain, a number of other industries that have been experiencing similar disruptions have been analyzed. These industries are telecommunications, publishing, music recording, newspaper, and television. The analyses are presented in the following sections.

5.1 Voice over IP and the Telecommunication Industry:

The change in value-capture among the value chain players due to the introduction of Voice over IP (VoIP) in the telecommunication industry is summarized in Table 5.1.

<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>Value Captured</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Developers</td>
<td>←→</td>
<td>Majority of VoIP development has been in SW</td>
</tr>
<tr>
<td>Infrastructure Developers</td>
<td>↓</td>
<td>Re-use already existing IP networks</td>
</tr>
<tr>
<td>Service Providers</td>
<td>↑</td>
<td>Lost lucrative long-distance call revenues</td>
</tr>
<tr>
<td>Consumers</td>
<td>↑</td>
<td>Cheaper and better service</td>
</tr>
</tbody>
</table>

Table 5.1: Shift in value capture in the telecommunication industry due to VoIP.

The disruption in the telecommunication industry due to VoIP has been mainly technological and its effects on business models have been limited. VoIP has been a significant technological advancement offering advantages in both cost and revenue potential with useful
features. It’s a cheaper alternative to PSTN (public switched telephone network - the traditional circuit switched voice system). According to studies [23], switching from PSTN to VoIP can save up to 40% on local and 90% on international calls. Moreover, VoIP can be used with ubiqutities, cheap or free hardware and software, such as PCs, laptops, and Skype. It employs the highly scalable IP network and due to its packed-technology, more than two people can talk at the same time. In addition, it has useful features, such as calling anywhere in the world with the same caller ID, forwarding voice mail transcripts to e-mails, and virtual numbers.

While VoIP is potentially a very disruptive technology in the telephony industry, a significant industry disruption has not been played out yet. Incumbent telecommunication companies lost revenues, especially from international calls [23]; however, the downside on these telecommunication companies has been limited because they too embraced and used the new technology and VoIP has been mainly used to emulate traditional services. Going forward, industry experts follow closely the VoIP disruption on the mobile telephony market. Nowadays, about 60% of the roughly $100 monthly smartphone bill payment goes towards circuit switched voice call services. However, these lucrative revenue streams are under pressure with proliferation of mobile application for VoIP service, such as Skype, Tango, and Google Voice, enabling the use of Wi-Fi or data service to make voice calls. Everything being equal and assuming that telecommunication companies allow consumers to have data-only subscription, using mobile VoIP could reduce the monthly smartphone bill by 60%, which is significant.
5.2 Books over IP and the Publishing Industry:

The dynamics in value-capture among the value chain players due to the introduction of Books over IP (BoIP) in the publishing industry is summarized in Table 5.2. It should be noted that the publishers and retailers that lose captured value according to the Table 5.2 are those with traditional physical book business models. Those with hybrid and digital only businesses have been doing better.

<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>Value Captured</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authors</td>
<td></td>
<td>Less dependent on publisher, able to directly reach consumers</td>
</tr>
<tr>
<td>Publishers*</td>
<td></td>
<td>By-passed by authors, not the main value creators (editing, marketing, distributing) anymore</td>
</tr>
<tr>
<td>Retailers*</td>
<td></td>
<td>By-passed by publishers, empty stores</td>
</tr>
<tr>
<td>Consumers</td>
<td></td>
<td>Low cost, flexible, and many alternatives for content</td>
</tr>
</tbody>
</table>

Table 5.2: Shift in value capture in the publishing industry due to BoIP.
* traditional: business model supports only physical books

The traditional publishing workflow, which has been around for many decades, has inefficiencies resulting in long time to market and waste in the supply chain [24]. In this workflow, the author creates the manuscript, hands it over to the publisher who edits and prepares the book for release. The book is released according to publisher standards with hard cover first, followed by soft cover and e-book. Books are distributed through retail channels and on average 30-40% of all books are returned to the publisher for destruction. With this flow the book is brought to market about one year after the author completes the writing and the author
often loses control of the editorial content. Also, there is major waste in the supply chain, which is mostly absorbed by publishers. One way to reduce the waste in supply chain has been to print books after demanded by consumers, greatly increasing the purchase time of the product. With the adoption of e-books a new publishing workflow has emerged. In this workflow, the author gives the content to the book printer who prints on-demand while at the same time a digital version of the book is available. The digital version can be distributed as e-books or sent to retailers, enabling them to print on-site when demanded by consumers. At the same time, the author promotes the book him/herself using popular channels, such as social media. In this workflow, the author maintains control over the content and the waste in the supply chain is greatly reduced by accurately matching inventory to demand.

5.3 Music over IP and the Recording Industry:

The change in value-capture among the value chain players due to the introduction of Music over IP (MoIP) in the recording industry is summarized in Table 5.3 [25].

<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>Value Captured</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artists</td>
<td></td>
<td>Less dependent on labels; able to directly reach consumers; quick feedback from consumers</td>
</tr>
<tr>
<td>Record Labels</td>
<td></td>
<td>By-passed by artists, lost bundling advantage of album sales</td>
</tr>
<tr>
<td>Retailers*</td>
<td></td>
<td>By-passed by artists and labels; lost bundling advantage of album sales</td>
</tr>
<tr>
<td>Consumers</td>
<td></td>
<td>Low cost; no need to pay for unwanted songs in albums; easy access to content</td>
</tr>
</tbody>
</table>

Table 5.3: Shift in value capture in the music industry due to MoIP. * traditional: business model supports only physical music media
Before the consumption of music over the Internet had started the recording industry was dominated by recording companies (labels), such as EMI Recorder Music, Sony Music Group, Universal Music Group, etc. offering highly specialized services at high costs. Therefore, labels captured most of the value generated by the value chain and only few artists earned significant income form song sales and they mostly relied on concerts for revenues. As a result of proliferation of music over the Internet, alternative distribution channel were created. Labels as well as artist started to by-pass retailers by directly connecting to consumers. The ease of distribution also increased music piracy through peer-to-peer sharing. Besides, the ease of distribution, the availability of virtually any song via connected PCs made piracy especially compelling to some consumers. Another disruption led by music over the Internet has been the wider reach of radio stations that can be now listened to in any location around the world that has access to the World Wide Web. Together with Apple’s iTunes, music consumption over the Internet led to unit of sale to change from the album to song, removing the revenue advantage that has been enjoyed with bundling. In summary, as a result of this disruption, artists and consumers are better off, while labels and traditional retailers are worse off.

5.4 News over IP and the Newspaper Industry:

The change in value-capture among the value chain players due to the introduction of News over IP (NoIP) in the publishing industry is summarized in Table 5.4.

The newspaper industry has been a victim of the news over IP disruption starting with its degradation in classified advertising revenue. Daily newspaper classified advertising peaked in 2000 at $19.6 billion and in 2010 it had fallen to $5.65 billion [26]. Newspaper lost about 70% of their lucrative ad revenues to disruptors such as Craig’s List, monster.com, and realtor.com
because they offered lower price (sometimes free), speed (instant posting), and wider reach (wherever there is Internet). Although the incumbent news organization had access to the disrupting technologies, they did not react soon enough due to fear of self-cannibalizing their lucrative print business. However, as former Apple Inc. CEO Steve Jobs stated, if you don’t cannibalize yourself someone else will [27]. Despite the recent challenges, the 2011 The Economist article [28] finally offers some better news for the newspaper industry. Subscription based revenue streams have stabilized for a number of newspapers (e.g. NYT) that implemented paywalls for online content consumption. The preliminary success of the paywalls can be attributed to the technological development in online payment systems, increased attractiveness of digital subscription due to the popularity of tablets and mobile devices, and clever strategies, such as the “soft” paywalls allowing consumers to read a number of articles per month for free before being asked to pay. It is clear, however, that digital ad revenues will not compensate the lost print ad revenues. Historically, print ads contributed to 80% of the paper revenue. Going forward the ad contribution is set to more like 50%, indicating a goal of less dependence on ad revenues. The paywall idea is a step in that direction. Newspapers have been the biggest losers in this disruption; however, their losses have slowed down as a result of accepting the disruption and adapting to the digital ways of news consumption.
### Value Chain Players | Value Captured | Comments
---|---|---
Journalists | Up | Less dependent on newspapers; can reach readers directly
Advertisers | Up | More options; technologies available to measure ad effectiveness
Newspapers | Down | Besides brand name no much power left; other players can easily by-pass
Consumers | Up | Low cost; many channels available to access content; no need to purchase whole bundled product

Table 5.4: Shift in value capture in the newspaper industry due to NoIP.

#### 5.5 TV Shows over IP and the Television Industry:

The change in value-capture among the value chain players due to the introduction of TV Shows over IP (ToIP) in the television industry is summarized in Table 5.5.

The TV business model for the past 50 years relied on a number of foundations [29]: not much to do at home besides watching TV, no way other than TV to get video content, no options other than TV to reach viewers as advertisers, no options other than cable and satellite to get quality TV. These foundations have been cracked lately due to technological developments. For example, other means of home entertainment have emerged - Internet, Facebook, and games; new platforms to get TV content have been developed — Hulu, YouTube, and iTunes; other channels for advertisers to reach viewer have emerged — Internet, e-mail, and portals.
<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>Value Captured</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors/Actresses/Producers</td>
<td>↑</td>
<td>Less dependent on powerful TV Networks; easier access to consumers</td>
</tr>
<tr>
<td>Advertisers</td>
<td>↑</td>
<td>Alternative and cheaper access channels to consumers</td>
</tr>
<tr>
<td>TV Networks</td>
<td>↓</td>
<td>By-passed by content creators and advertisers</td>
</tr>
<tr>
<td>Consumers</td>
<td>↑</td>
<td>Low cost; original content (sometimes); convenient access; time shifting</td>
</tr>
</tbody>
</table>

Table 5.5: Shift in value capture in the television industry due to ToIP.

Internet portals, such as YouTube, Hulu, and Amazon have the potential to disrupt the TV business, but they haven’t really done so - despite offering “good enough” and cheap programming - for at least two reasons: First, the content that they provide is not unavailable in other outlets and second, these portals still require a broadband service – if you already pay on average $70 for broadband Internet, how significant is the incremental cost of adding cable to your bill? [30]. On the original content front, Netflix seems to have learned the “content + convenience” lesson by offering a unique content, the House of Cards, which is also an example of a creative content called Webisodes. Webisodes are launched online as a bundle rather than series at certain times, shifting the power of consumption from the broadcaster to the consumer who can watch the content at any convenient time. Hulu, on the other hand, has less control over its original content because its traditional media owners who fully control the content and licensing fees provide it [31].
5.6 Summary of XoIP Effects on the Investigated Industries:

As a result of the above-mentioned analyses, whose results are summarized in Tables 5.1-5.5, we can divide the value chain players into five categories: content creators, financers, aggregators, distributors, and consumers. Content financers are advertisers and sponsors while content distributors are organizations that merely connect content creators with content consumers with some added value – mostly not directly linked to the content. For example, a retail store selling many genres of music CDs in one place is a content distributor. Table 5.6 shows a summary of changes in captured value after re-segmenting the previously analyzed value chains according to the newly defined four categories. It is clear that content creators, financers, and consumer benefit while content distributors lose from the distribution of the content itself over the Internet. It is interesting to note that although five different industries have been analyzed, their dynamics in response to the Internet have been quite similar. Content creators have benefited from the Internet because they have gained power over distributors due to the creation of alternative channels to directly reach consumers. The proliferations of alternate distribution channels have also benefited content financers who don’t have to work with only few players in the concentrated distribution business. The consumers gain from the disruption because they have convenient access to cheaper content. Convenience and low cost attracts more consumers helping the overall market [32]. On the other hand, aggregators and distributors lose from the trends because their main revenue streams are under pressure from the Internet, which set the foundation to use newer and cheaper technologies to offer same or good enough services. Moreover, these value chain players are often paralyzed and cannot easily follow the trends due to the fear of self-cannibalization of their current business models. These similarities in the value
chain dynamics of the analyzed five industries can be extended to the sports industry to develop some hypotheses, which are presented in the next section.

<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>VoIP</th>
<th>BoIP</th>
<th>MoIP</th>
<th>NoIP</th>
<th>ToIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Creator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content Financer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content Aggregator/Distributor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content Consumer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.6: Shift in value capture in all analyzed industries due to the Internet.

5.7 Hypotheses about Sports over Internet and the Sports Industry:

Based on the conclusions drawn from the analyses conducted on the telephone, publishing, music, newspaper, and TV industries, there is a great likelihood that content creators, consumers, and financers will gain, while content aggregators and distributors will loose form the consumption of sports content over the Internet. However, the final outcome of the disruption will depend on the strategic choices each player in the value chain makes. Hence, it is premature to determine winners and losers at this point and a more insightful study is to use the above-mentioned analyses to develop a number of hypotheses and determine the conditions for these hypotheses to be true and predict the dynamics in the value chain with a set of simulations. In this study, the content financers, such as advertisers, are not included in the analyses to limit the
scope. Four hypotheses have been developed and each hypothesis has one winner in the value chain.

**Hypothesis 1 (H1): Sports content creators are king.** According to this hypothesis, leagues (content creators) will benefit the most by directly connecting to consumers; they will work less with content aggregators, such as ESPN, and even less with content distributors, such as Comcast.

Content creators, such as the NFL, add the most value in the sports value chain. They create the content, which are the sport events that consumers watch. Therefore, it is likely that they will capture most of the value that is created by the entire value chain. Traditionally, leagues have had to share the captured value with aggregators, such as ESPN, and distributors, such as Comcast, because they have partnered with them to reach consumers. However, with SpoIP, leagues can reach consumers through an already established, easily scalable, and cost effective infrastructure – the Internet. Although the league will have more opportunities to reach directly the consumers, they will still continue working with aggregators and distributors due the currently established revenue streams with content right fees and the added values of these value chain players – the complementary programing created by aggregators and distributors. However with time, the leagues will develop capabilities to cost effectively offer the same values and replace the revenue streams from the content aggregators and distributors, reducing their dependencies on these value chain players and therefore reducing the value that is captured by them. The number of fans will increase as well, increasing the number of rabid fans that generate league revenue in stadiums [32].
**Hypothesis 2 (H2): Content aggregators are king.** The premise behind this hypothesis is that content aggregators, such as ESPN, will maintain their strong relationship with leagues and content distributors, like Comcast and enjoy the benefits of increased sports content viewership, while capturing more value at the expense of content distributors, such as Comcast.

As a content aggregator and developer of complementary programming, such as SportsCenter, ESPN can be viewed as a pseudo-content creator acting as a complementor to the leagues. So, its good relationships with the leagues will continue. On the other hand, ESPN will have increased negotiating power with distributors because it will have the opportunity to reach customers directly via the ubiquitous Internet. With time, ESPN will reduce its dependency on distributors and find new revenue streams to replace those it currently enjoys from distributors. Although this seems to be unlikely today because the content distributors are also controlling the Internet connections to consumers, this will change in the future with the proliferation of mobile Internet with technologies such as LTE offered by wireless telcos, such as AT&T and Verizon.

**Hypothesis 3 (H3): Content distributors are king.** According to this hypothesis, content distributors, who currently have the closest relationship with customers will embrace the new technology and will benefit the most from SpoIP.

Content distributors, such as Comcast, have the benefit of substantial income to finance new technologies and access to end consumers. As seen with the recently launched “TV Everywhere” program, this value chain players will offer the benefits (lower price and convenient access to content) of SpoIP while at the same time continue to generate revenue. Currently, Comcast does so by allowing access to premium sports content over the Internet to its paid cable subscribers, who enjoy the value added service.
**Hypothesis 4 (H4): Content consumers are king.** This hypothesis states that due to the disruption in the sports content distribution industry via SpoIP, prices to watch sports events will drop, content quality will stay the same or increase, and the consumers will capture most/more of the value that is created.

The downward pressure on price and content quality increase will occur due to competition among content creators, aggregators, and distributors, each trying to directly reach consumers. Moreover, the low cost distribution over already existing Internet infrastructure will enable these players to incur less capital cost and charge less to consumers to payback their investments. Another key benefit that is assumed with this hypothesis is that similar to the digital music unbundling – where consumers can buy only the songs they like rather than the whole album – there will be an unbundling in sports content consumptions. For example, fans of the football team Dallas Cowboys can watch only their team’s games no matter where they are located physically; paying only for those games and not games of other teams. This a la carte model will enable the consumers to pay only for what they are interested in without having to subsidize other fans. This phenomenon will not only reduce the cost to the consumer, but also increase the quality of the offerings – as it has been in the music industry. If the artist or label wants to revenue from each song, they need to ensure that they are all good.

Table 5.7 shows the summary of the developed four hypotheses. In the table, red and yellow down arrows represent significant and modest decline in value capture, respectively. Chapter 6 presents the test conducted to proof or refute these hypotheses together with analyses.
<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Creator (NFL)</td>
<td></td>
<td>![up]</td>
<td>![down]</td>
<td>![down]</td>
</tr>
<tr>
<td>Content Aggregator (ESPN)</td>
<td>![down]</td>
<td>![up]</td>
<td>![down]</td>
<td>![down]</td>
</tr>
<tr>
<td>Content Distributor (Comcast)</td>
<td>![down]</td>
<td>![down]</td>
<td>![up]</td>
<td>![down]</td>
</tr>
<tr>
<td>Content Consumer (Fans)</td>
<td>![up]</td>
<td>![up]</td>
<td>![down]</td>
<td>![up]</td>
</tr>
</tbody>
</table>

Table 5.7: Shift in value capture in the sports industry based on hypotheses H1, 2, 3, and 4.
Chapter 6 SpoIP Hypotheses Tests and Analyses

In this chapter, the four hypotheses that are summarized in Section 5.7 are tested and the results are discussed. The goal of this chapter is to predict what will happen in the sport content consumption value chain due to SpoIP. The method for the prediction is to assert a number of assumptions about the value chain; run the developed System Dynamics model based on the assumptions; present and analyze the result; and finally discuss the feasibility of the assumptions. Figure 6.1 summarizes the structure used in testing the hypotheses.

![Figure 6.1: Structure to test SpoIP hypotheses.](image)

6.1 Hypothesis 1 (H1) – Content Creator (NFL) is King

According to this hypothesis, NFL will benefit the most from the SpoIP disruption by directly going to consumers. The league will stop partnering with ESPN and Comcast as it develops the required capabilities currently offered by these content aggregators and distributors, respectively. Consumers will win too as they will not exposed to expensive complementary programing offered by the “middle men” and they will not forced pay higher price for bundled channel offerings. The ramifications of H1 are summarized in Table 6.1.
Table 6.1: Shift in value capture based on H1.

<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Creator (NFL)</td>
<td>↑</td>
</tr>
<tr>
<td>Content Aggregator (ESPN)</td>
<td>↓</td>
</tr>
<tr>
<td>Content Distributor (Comcast)</td>
<td>↓</td>
</tr>
<tr>
<td>Content Consumer (Fans)</td>
<td>↑</td>
</tr>
</tbody>
</table>

6.1.1 H1- Hypothesis Driven Assumptions

The underlying assumptions of this hypothesis are summarized below in terms of key drivers implemented in the System Dynamics model.

*pc IP demand*: percentage of IP demand with respect to total video demand will increase from 20% in 2013 to 40% in 2017 and 60% in 2022.

*No of NFL games on NFLN*: NFLN retains the content rights of 13 games in 2013. In 2017 NFLN will show 128 games per season (50% of total) and in 2022 it will show 256 games per season (100% of total), bypassing content aggregators and distributors; reaching out to consumers directly using SpoIP.

*No of Football games on ESPN*: In 2013 ESPN shows 17 games. The number of games will drop to 8 in 2017 and to zero in 2022.

*No of Football games on Comcast*: While Comcast shows 50 games in 2013, it will show 25 games in 2017 and none in 2022. The 50-game assumption in 2013 comes from the 20% market share Comcast has in the Pay TV industry and from the total number of NFL games of approximately 256 per season.
Percent of NFLN subscription revenue charged to consumer: It is 0% in 2013 and increases to 50% and 100% in 2017 and 2022, respectively due to NFL reaching consumers directly with SpoIP.

6.1.2 H1- Assumption Driven Simulations

![Graph showing NFL revenues: baseline vs. H1.](image)

Figure 6.2: NFL revenues: baseline vs. H1.

As the number of games shown on NFLN increases, the league will loose income from content rights. However, the increase in income from NFLN subscription fee and ad revenues will overcompensate the drop in content rights revenue and they contribute the increase in overall revenue as seen in Figure 6.2. To a lesser degree, the increased popularity of NFL due to SpoIP pulls also the overall revenue higher.
As the number of NFL games shown on ESPN decreases, the company loses its subscription and ad revenue based on football.

Figure 6.3: ESPN revenues: baseline vs. H1.

Figure 6.4: Comcast revenues: baseline vs. H1.
Similar to the ESPN case, as Comcast reduces the number of NFL games shown on its sport channels, its revenue – composed of subscription fee and ad revenues - from football will drop.

![Graph of consumer spend](image)

**Figure 6.5:** Consumer spending: baseline vs. H1.

Figure 6.5 shows that besides NFL, the consumers also benefits from the conditions that dictate H1. In the baseline scenario, the majority of the consumer spending is towards Comcast (20% market share) and other Pay TV providers (80% market share). With H1, consumers cease paying to these entities and shift their dollars to NFLN that offers the same content at a cheaper price.
As seen in Figure 6.6, overall value chain revenues increases in 2017 but decreases in 2022. NFL revenues increase steadily at the expense of ESPN and Comcast revenues.

As depicted in Figure 6.7, overall consumer spending on football decreases with the majority spending shifting from Pay TV providers to NFLN.
6.1.3 Feasibility of H1

This section discusses the feasibility of assumptions and required conditions for H1.

NFLN needs to by-pass Comcast by allowing it to show 50% fewer games in 2017 and none in 2022. Feasible: Use IP to reach consumers rather then cable TV; develop relationships with advertisers to increase ad revenues. Not feasible: Quality of Service (QoS) over IP may not be as good at cable TV; need income form pay TV providers to fund content generation efforts; Comcast and similar pay TV providers control IP networks.

NFLN needs to by-pass ESPN by allowing it to show 50% fewer games in 2017 and none in 2022. Feasible: Develop capabilities to convert raw football content into consumable content with complementary programing; develop relationships with advertisers. Not feasible: Already signed long-term content rights contracts with networks; need income form aggregators to fund content generation.

By 2017, NFLN needs to command $10 per subscriber per month. This scenario is obtained from the simulations. Feasible: Although the $10 per subscriber is a huge jump from $1 it commands in 2013 through Pay TV providers, it is feasible because in 2013 ESPN already charges around $5; so the consumer’s willingness to pay (WTP) premium amounts already exists. It is likely that consumer WTP will increase if consumers do not have to pay for bundles (a la carte model). Not feasible: The a la carte model may not gain traction.

Overall the possibility for this hypothesis to become true is medium.
6.2 Hypothesis 2 (H2) – Content Aggregator (ESPN) is King

According to this hypothesis, ESPN will remain a dominant player in the value chain as a pseudo-content creator with its complementary programming, such as SportsCenter. The firm will continue its strong partnerships with the leagues and content distributors to enjoy the benefits of increased sport content viewership due to SpoIP. With time however, ESPN will start bypassing content distributors by reaching consumers directly via IP, gradually increasing its value capture at the expense of content distributors, such as Comcast. NFL is considered a loser in the hypothesis because it does not capture most of the SpoIP related value. H2 is summarized in the Table 6.2.

<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Creator (NFL)</td>
<td>↓</td>
</tr>
<tr>
<td>Content Aggregator (ESPN)</td>
<td>↑</td>
</tr>
<tr>
<td>Content Distributor (Comcast)</td>
<td>↓</td>
</tr>
<tr>
<td>Content Consumer (Fans)</td>
<td>↑</td>
</tr>
</tbody>
</table>

Table 6.2: Shift in value capture based on H2.

6.2.1 H2- Hypothesis Driven Assumptions

**pc IP demand:** percentage of IP demand with respect to total video demand will increase from 20% in 2013 to 40% in 2017 and 60%.

**No of NFL games on NFLN:** The number of games of 13 in 2013 will drop to 6 in 2017 and to none in 2022.
No of Football games on ESPN: In 2013 ESPN shows 17 games. The number of games will increase to 25 in 2017 and to 50 in 2022. The remaining games will be shown on other networks – NBC, Fox, CBS, etc. It is assumed that the 254 games are approximately equally divided between the five major networks.

No of Football games on Comcast: While Comcast shows 50 games in 2013, it will show 25 games in 2017 and none in 2022 because all networks will use IP.

Percent of ESPN affiliate fee revenue charged to consumer: It is 0% in 2013 and increases to 50% and 100% in 2017 and 2022, respectively due to ESPN reaching consumers directly with SpoIP.

6.2.2 H2- Assumption Driven Simulations

Figure 6.8: NFL revenues: baseline vs. H2.
With this hypothesis, NFL revenue will increase from Stadium and content rights (as a result of selling the rights for the last 13 games as well) and it will decrease from NFLN, which will dominate leading to the overall reduction of NFL revenue under H2 (Figure 6.8).

![ESPN rev](image)

Figure 6.9: ESPN revenues: baseline vs. H2.

As a dominant player in the value chain, ESPN maintains its dominance by earning the rights for more NFL games, leading to increased revenue from ads and subscription fees. The increase in revenue due to increased NFL popularity as a result of SpoIP contributes to ESPN’s increased revenues as well. The aggregate behavior is shown in Figure 6.9.

Comcast revenues drop gradually (Figure 6.10) because the company retains fewer NFL games content rights with time. The overall consumer spending reduces with this hypothesis as shown in Figure 6.11. Similar to H1, this hypothesis asserts consumers will not pay as much money to pay TV providers; instead, they will pay less money to content aggregators to access the same content over IP.
Figure 6.10: Comcast revenues: baseline vs. H2.

Figure 6.11: Comcast spending: baseline vs. H2.
Figure 6.12: Value chain player revenues: baseline vs. H2.

Figure 6.13: Consumer spending: baseline vs. H2.

Figure 6.12 shows that the overall value chain revenue will increase under H2 and ESPN will capture most of the value mostly at the expense of Comcast. Figure 6.13, on the other hand, depicts that the consumer will also benefit with H2 due to reduced spending on football. A significant shift in spending from Pay TV providers to ESPN is observed because ESPN will increase its number of games shown and as it will start to bypass pay TV providers. Consequently, collecting fees directly from consumers who will enjoy the games over the Internet.
6.2.3 Feasibility of H2

This section discusses the feasibility of assumptions and required conditions for H2.

ESPN needs to by-pass Comcast by reaching to consumers directly over the Internet. Feasible: Use IP to reach consumers rather then cable TV; develop relationships with advertisers to increase ad revenues. Not feasible: Quality of Service (QoS) over IP may not be as good at cable TV; need income form pay TV providers to fund complementary content generation efforts; Comcast and similar pay TV providers control IP networks.

ESPN (and other networks) need to convince NFL to give 50% of content rights by 2017 and 100% of them in 2022. Feasible: NFL still benefits from the increased football popularity due to ESPN and it maintains it lucrative content rights revenue streams Not feasible: NFL will be reluctant to concentrate value chain power to content aggregators by giving them most of the business.

By 2017, ESPN needs to command $10 per subscriber per month. This scenario is obtained from the simulations. Feasible: Although the $10 per subscriber is a large jump from $5 it commands in 2013 through Pay TV providers, it is feasible because in 2013 ESPN already charges around 5 times more than any other network; so the consumer’s willingness to pay (WTP) premium amounts already exists. It is likely that consumer WTP will increase if consumers do not have to pay for bundles (a la carte model). Not feasible: The a la carte model may not gain traction.

Overall the possibility for this hypothesis to become true is medium.
6.3 Hypothesis 3 (H3) – Content Distributor (Comcast) is King

The premise behind this hypothesis is that content distributors, such as Comcast, will maintain their strong brand appeal and access to consumer and use their resources to invest in SpoIP technologies. These distributors will enhance their relationship with the NFL and increase their generation of complementary programing, gradually phasing out the content aggregators, such as ESPN. The recently launched “TV Everywhere” program by Comcast is a step in a direction that supports this hypothesis. With this program, cable TV consumers are allowed to access a subset of cable content with their other devices, such as tablets and computers via the Internet.

<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Creator (NFL)</td>
<td></td>
</tr>
<tr>
<td>Content Aggregator (ESPN)</td>
<td></td>
</tr>
<tr>
<td>Content Distributor (Comcast)</td>
<td></td>
</tr>
<tr>
<td>Content Consumer (Fans)</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.3: Shift in value capture based on H3.

6.3.1 H3- Hypothesis Driven Assumptions

pc IP demand: percentage of IP demand with respect to total video demand will increase from 20% in 2013 to 40% in 2017 and 60% in 2022.

No of NFL games on NFLN: The number of games of 13 in 2013 will drop to 6 in 2017 and to none in 2022.
No of Football games on ESPN: In 2013 ESPN shows 17 games. The number of games will reduce to 8 in 2017 and to none in 2022.

No of Football games on Comcast: While Comcast shows 50 games in 2013, it will show 66 games in 2017 and 80 games in 2022 as a result of capturing the games the other value chain players loose.

6.3.2 H3- Assumption Driven Simulations

Figure 6.14: NFL revenues: baseline vs. H3.

Similar to the H2 case, in H3 NFL revenues drop compared the baseline case due to foregoing the income form NFLN (Figure 6.14).
As seen in Figure 6.15, ESPN revenues will drop drastically as NFL bypasses the content aggregator and goes directly to pay TV providers, such as Comcast. The drop in ESPN revenues results from drop in affiliate fees and ad revenues from football games.

Figure 6.16: Comcast revenues: baseline vs. H3.
As the dominant player and winner according to H3, Comcast steadily increases its revenue as seen in Figure 6.16. This increase in revenue is fueled by increase in subscription fees and ad revenues as a result of earning the content rights of more NFL games.

![Figure 6.17: Consumer spending: baseline vs. H3.](image)

According to this hypothesis, the consumers are clear losers because their spending for football spectatorship will increase drastically, up to 4 times by 2022. This phenomenon is depicted in Figure 6.17.
Figure 6.18: Value chain player revenues: baseline vs. H3.

The overall value chain revenue does not change drastically compared to the baseline case, but it is important to note that the revenue capture shows a clear shift from ESPN to Comcast in Figure 6.18.

Figure 6.19: Consumer spending: baseline vs. H3.

The above-mentioned increase in consumer spending in Figure 6.17 is also clearly shown in Figure 6.18. Consumers need to pay more and more to watch football whose distribution is mostly controlled by pay TV providers that historically charge premium prices due to bundling.
6.3.3 Feasibility of H3

This section discusses the feasibility of assumptions and required conditions for H3.

Comcast needs to increase its efforts to create content similar to ESPN: Feasible: The company has already such capabilities (e.g. Comcast SportsNet – CSN); it has the cash flow to support the development of these capabilities; Comcast’s acquisition of NBC [33] is an indication of the desire to become a player in the content creation space. Not feasible: It may not be good to expand the scope of the company so much.

Comcast (and other pay TV providers) need to convince NFL to give 50% of content rights by 2017 and 100% of them in 2022. Feasible: NFL still benefits from the increased football popularity due to ESPN and it maintains it lucrative content rights revenue streams Not feasible: NFL will be reluctant to concentrate value chain power to content distributors.

By 2017, Comcast needs to command $150 per subscriber per month. This scenario is obtained from the simulations. Feasible: Consumers already pay close to $100 per subscription. The popularity of football will allow Comcast to charge more for the service. Not feasible: The a la carte model may gain traction, reducing the margins that pay TV providers enjoy.

Overall the possibility for this hypothesis to become true is low.

6.4 Hypothesis 4 (H4) – Content Consumer is King

According to this hypothesis, the disruption in the sports industry due to SpolP will result in increased competition among the value chain players, resulting in increased quality and lower prices for consumers. Therefore, most of the value capture shift will be in favor of consumers. Table 6.4 shows the value-capture changes with this hypothesis.
### 6.4.1 H4- Hypothesis Driven Assumptions

**pc IP demand:** percentage of IP demand with respect to total video demand will increase from 20% in 2013 to 40% in 2017 and 60% in 2022.

**No of NFL games on NFLN:** The number of games of 13 in 2013 will remain the same.

**No of Football games on ESPN:** In 2013 ESPN shows 17 games and it will show the same number of games in the future.

**No of Football games on Comcast:** The number of games shown on Comcast will remain at 50.

**percent change in avg revenue per NFL stadium attendant, percent change in avg monthly revenue per NFLN subscriber, percent change in avg monthly revenue from ESPN subscriber, percent change in avg monthly revenue per Comcast subscriber:** Due to competition fueled by the proliferation of SpoIP, prices will drop so that these revenues will drop 20% in 2017 and 40% in 2022.

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<table>
<thead>
<tr>
<th>Value Chain Players</th>
<th>H4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Creator (NFL)</td>
<td></td>
</tr>
<tr>
<td>Content Aggregator (ESPN)</td>
<td></td>
</tr>
<tr>
<td>Content Distributor (Comcast)</td>
<td></td>
</tr>
<tr>
<td>Content Consumer (Fans)</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.4: Shift in value capture based on H4.
6.4.2 H4- Assumption Driven Simulations

![NFL Revenue Graph]

Figure 6.20: NFL revenues: baseline vs. H4.

As pointed out in Figure 6.20, NFL revenues remain nearly flat with H4 because stadium and NFLN revenues drop from reduced prices. Content right revenues are not affected by the consumer price reduction, but this revenue stream alone is not enough to maintain increased overall revenue.

![ESPN Revenue Graph]

Figure 6.21: ESPN revenues: baseline vs. H4.
As a result of price reduction due to fierce competition in the value chain, ESPN and Comcast revenues drop significantly as seen in Figures 6.21 and 6.22, respectively. Since Comcast’s revenues depend more heavily on subscription fees its percent drop is larger than that of ESPN’s.
Figure 6.23 confirms that the consumer is the winner in this hypothesis. As a result of paying less to watch football in stadiums and on pay TV channels, their spending drops. This trend is also seen in Figure 6.25 below. Consumers still spend most of their football dollars on pay TV and less amount to stadium. This is similar to the baseline case. However, with H4, the spending drops gradually.

The price war effect resulting from competition among value chain players is seen Figure 6.24. The overall revenue of the value chain drops while the relative position of each player remains the same – ESPN still captures the highest football related revenue and Comcast the least.

![Value Chain Player Revenues (b), Baseline](chart1)

![Value Chain Player Revenues (b), H4](chart2)

Figure 6.24: Value chain player revenues: baseline vs. H4.
6.4.3 Feasibility of H4

This section discusses the feasibility of assumptions and required conditions for H4.

NFL, ESPN, and Comcast need to embrace SpoIP: Feasible: All three firms already have presence on the Internet; the investment needed to offer content over the Internet is not significant due to the availability of scalable IP networks. Not feasible: QoS for content over IP may not be good enough; some players may fear self-cannibalization of their existing distribution channels.

All three value chain players need to reduce their fees by 15% and 30% in 2017 and 2022, respectively: Feasible: The cost of distributing content over the Internet can be cheap due to the already existing infrastructure and this cost savings can be passed on to the consumers. Not feasible: The three players will not enter a price war and keep their fees high.

Overall the possibility for this hypothesis to become true is high.

The next chapter presents the conclusions of this work and suggests future work.
Chapter 7: Conclusions and Suggested Future Work

7.1 Conclusions

The test results and the feasibility of each hypothesis are summarized in Table 7.1. The test results are summarized in terms of 2022 revenue change for each value chain player under each hypothesis vs. that of the baseline scenario (no SpoIP). Similarly, change in consumer spending is calculated and presented in the table. Favorable changes are shown with bold numbers. Finally, the feasibility of each hypothesis is stated in the last column.

H1 received a mid feasibility grade because it requires both ESPN and Comcast to cease operations that generate revenue from football. While possible, it is not very likely due to these companies’ already made investments in this field and their brand names. There is still a possibility for H1 to become true because it results in the most important players in the value chain, the content owner (NFL) and the content consumer, to benefit greatly.

H2 also received a mid feasibility grade due to the requirement of Comcast to forgo any football revenue. Again, this may be a difficult proposition because of the already established relationships between consumers and pay TV providers, such as Comcast. Moreover, some pay TV providers also control Internet access. On the other hand, consumers benefit in this hypothesis, making it a possible outcome, albeit with small probability.

H3 received a low feasibility grade because it makes Comcast the sole winner in the value chain, while ESPN and the consumer lose greatly. Even if ESPN somehow forgoes its football revenues, it would be very hard to convince the consumer to pay much more than they already do to watch football.
Finally, H4 received a high feasibility grade because it keeps all the value chain players intact and it creates a scenario in which all the player loose and the consumer wins moderately. According to this hypothesis, the value chain players will earn less revenue as a result of SpoIP. This may be acceptable because SpoIP related technological advances should also reduce their cost, keeping their profits at reasonable levels. Attracting more consumers could also push down the average fixed costs for value chain players that enjoy greater economies of scale. Based on the research conducted in this work, this scenario is chosen to be the one with the largest likelihood to become true.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>2022 Revenue Change</th>
<th>2022 Spending Change</th>
<th>Feasibility of hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NFL</td>
<td>ESPN</td>
<td>Comcast</td>
</tr>
<tr>
<td>H1</td>
<td>136%</td>
<td>-100%</td>
<td>-100%</td>
</tr>
<tr>
<td>H2</td>
<td>-10%</td>
<td>149%</td>
<td>-100%</td>
</tr>
<tr>
<td>H3</td>
<td>-10%</td>
<td>-100%</td>
<td>101%</td>
</tr>
<tr>
<td>H4</td>
<td>-5%</td>
<td>-13%</td>
<td>-17%</td>
</tr>
</tbody>
</table>

Table 7.1: Value chain revenue and consumer spending: 2022 H1,2,3,4 vs. baseline.

### 7.2 Suggested Future Work

Suggested future work can be segmented into three groups:

**System Dynamics Model:** Currently, the model takes into account revenue sources that are directly affected by SpoIP. The model can be extended to take into account other revenue sources that are indirectly affected by SpoIP, making the model more comprehensive. For
example, it is very likely licensing deals may become more lucrative as the NFL popularity increases with SpOIP.

**Hypothesis Generation:** The hypotheses generated during this work have one clear winner, representing extreme cases. As future work, hypotheses in which a number of value chain players win at the same can be developed and analyzed to take into account competitive strategies the players will execute to stay relevant in the business.

**Ecosystem:** To limit the scope of this work, the football content delivery ecosystem was studied. Studying other sports, such as baseball, basketball, hockey, or soccer, could generate more insights and confirm the results obtained form this study.
Appendix

A.1 NFL system dynamics model equations

This section presents equations used in the model shown in Figure 4.3.

- **NFL rev** = NFL content rights rev + NFL stad rev + NFLN rev [Dollars]
- **No of star players** = (NFL rev*(4e+09/8.5e+09)*(25/100))/1.5e+07 [Person]
- **NFL pop** = (No of star players / 1600) [Dmnl]
- **Causal fan creation rate** = IF THEN ELSE( No of causal fans >= 2.75e+07, NFL pop * 2e+07 * 0.25 , NFL pop * 2e+07 ) [Person/Year]
- **No of causal fans** = 2e+07 + INTEG(Causal fan creation rate) [Person]
- **Rabid fan creation rate** = IF THEN ELSE( No of rabid fans >= 2e+06, NFL pop * 62000 * 16 * 0.25, NFL pop * 62000 * 16 ) [Person/Year]
- **No of rabid fans** = 62000*16 + INTEG(Rabid fan creation rate) [Person]
- **demand for live performance** = No of causal fans * 1 + No of rabid fans * 1 [Person]
- **pc change in NFL stad rev** = WITH LOOKUP (Time) Initial Value ([(0,0)- (3000,10)],(2008,0),(2013,0),(2017,0),(2022,0)) [Dmnl]
- **NFL stad rev** = IF THEN ELSE(demand for live performance * 100 * (1 + pc change in NFL stad rev/100) < 2.15e+09 , demand for live performance * 100 * (1 + pc change in NFL stad rev/100) , 2.15e+09 ) [Dollars]
- **demand for video** = No of causal fans * 1 + No of rabid fans * 1 [Person]
- **pc IP demand** = WITH LOOKUP (Time) Initial Value ([(0,0)- (3000,10)],(2008,0.2),(2008,0.2),(2012,0.2),(2015,0.2),(2017,0.2),(2017,0.2),(2022,0.2) ) [Dmnl]
- **IP demand** = pc IP demand * demand for video [Person]
- **payTV demand** = demand for video [Person]
- **No of NFLN subscribers** = IF THEN ELSE( (IP demand + payTV demand)* (65/30) * (No games on NFLN/13) > 1.2e+08 , 1.2e+08 , (IP demand + payTV demand)* (65/30) * (No games on NFLN/13) ) [Person]
- **No games on NFLN** = WITH LOOKUP (Time) Initial Value ([(0,0)- (3000,300)],(2008,8),(2011,8),(2012,13),(2013,13),(2017,13),(2022,13) ) [Dmnl]
- **pc change in NFLN rev from subscription** = WITH LOOKUP (Time) Initial Value ([(0,-30)-(3000,10)],(2008,0),(2013,0),(2017,0),(2022,0)) [Dmnl]
- **NFLN rev from subscription** = 12 * Avg monthly rev per NFLN subscriber * No of NFLN subscribers * (1 + pc change in NFLN rev from subscription/100) [Dollars]
- **Avg monthly baseline rev per NFLN subscriber** = WITH LOOKUP (Time) Initial Value([(0,0),(3000,10)],(2008,0.45),(2009,0.52),(2010,0.6),(2011,0.68),(2012,0.79),(2013 ,0.91),(2014,0.92),(2015,0.94),(2016,0.96),(2017,0.98),(2018,1),(2019,1.02),(2020,1.04), (2021,1.06),(2022,1.08)) [Dollars]
- **Avg monthly rev per NFLN subscriber** = IF THEN ELSE(Avg monthly baseline rev per NFLN subscriber * (No games on NFLN/13)> 10 ,10 ,Avg monthly baseline rev per NFLN subscriber * (No games on NFLN/13) ) [Dollars]
0.2 NFLN system dynamics model equations

This section presents equations used in the model shown in Figure 4.11.

- NFLN ad rev coeff = WITH LOOKUP (Time) Initial Value ([(0,0)-(3000,8e+09)],(2008,1.25e+07),(2011,1.25e+07),(2012,1.54e+07),(2022,1.54e+07)) [Dollars]
- NFLN rev from ad = IF THEN ELSE( (NFLN ad rev coeff * No games on NFLN) > 1e+11, 1e+11, (NFLN ad rev coeff * No games on NFLN) ) [Dollars]
- NFLN rev = NFLN rev from ad + NFLN rev from subscription [Dollars]
- DirecTV content rights fee = 7e+08 + STEP((1.2e+09 - 7e+08), 2011) [Dollars]
- CBS+Fox+NBC content right fee = 1.9e+09 + STEP((3.1e+09 - 1.9e+09), 2011) [Dollars]
- ESPN content right fee = 9e+08 + STEP((1.5e+09-9e+08), 2011) [Dollars]
- NFL content rights rev = ("CBS+Fox+NBC content right fee" + DirecTV content rights fee + ESPN content right fee) * (256 - No games on NFLN)/(256-13) [Dollars]

A.3 Comcast system dynamics model equations

This section presents equations used in the model shown in Figure 4.16.

- Comcast rev = Comcast ad rev + Comcast subscriber rev [Dollars]
- Comcast ad rev = IF THEN ELSE( Comcast baseline ad rev * ( No of NFL games on Comcast / 50 ) > 1e+11, 1e+11, Comcast baseline ad rev * ( No of NFL games on Comcast / 50 ) ) [Dollars]
- Comcast baseline ad rev = WITH LOOKUP (Time) Initial Value ([0,0)-(3000,2e+09],[2008,7e+08],[2011,8e+08],[2014,1e+09],[2017,1.2e+09],[2019,1.3e+09],[2022,1.4e+09]) [Dollars]
- No of NFL games on Comcast = WITH LOOKUP (Time) Initial Value ([0,0)-(3000,50],[2008,50],[2012,50],[2013,50],[2017,50],[2022,50]) [Dollars]
- Comcast subscriber rev = IF THEN ELSE((4.4e+09/2.5e+07)*(IP demand + payTV demand) * (No of NFL games on Comcast / 50) * (1 + pc change in Comcast subscriber rev/100) > 2.16e+11, 2.16e+11, (4.4e+09/2.5e+07) * (IP demand + payTV demand) * (No of NFL games on Comcast / 50) * (1 + pc change in Comcast subscriber rev/100)) [Dollars]
- pc change in Comcast subscriber rev = WITH LOOKUP (Time) Initial Value ([0,-30)-(3000,10],[2008,0],[2013,0],[2017,0],[2022,0]) [Dollars]

A.4 Consumer system dynamics model equations

This section presents equations used in the model shown in Figure 4.21.

- consumer spend = Comcast subscriber rev + consumer spend on ESPN + consumer spend on NFLN + NFLN std rev + "consumer spend on non-Comcast payTV" [Dollars]
- consumer spend on ESPN = ESPN affiliate fee rev * (percent of ESPN affiliate rev charged to consumer / 100) [Dollars]
- consumer spend on NFLN = NFLN rev * (percent of NFLN subscription rev charged to consumer / 100) [Dollars]
- consumer spend on non-Comcast payTV = (Comcast subscriber rev / 0.2) * 0.8 [Dollars]
- percent of ESPN affiliate rev charged to consumer = WITH LOOKUP (Time) Initial Value ([0,0)-(3000,10],[2008,0],[2017,0],[2022,0]) [Dollars]
- percent of NFLN subscription rev charged to consumer = WITH LOOKUP (Time) Initial Value ([0,0)-(3000,100],[2008,0],[2013,0],[2017,0],[2022,0]) [Dollars]
References


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