The Impact of Satellite Transmission on American Sport Economy in the 1970s and 80s

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The purpose of this study is to examine the role played by the technological development of TV satellite transmissions on the rapid expansion of sport economy in the United States in the 1970s and 80s. The satellite transmission technology, especially the adoption of Ku-band frequencies, created ‘superstations’ and put an end to the exclusivity of the nationwide land-line networks by the ‘Big Three’ TV Networks. Thousands of isolated cable systems managed to receive programmes from other areas of the country via these superstations due to the creation of these satellite networks. Owing to the new networks, the number of the nationally televised sports games/matches drastically increased, most of which used to be only broadcast locally. Accordingly, the price of broadcast rights, the ad-boards, and merchandising increased. In conclusion, the rapid expansion of the sport economy in the US was caused by the technological innovation of satellite transmissions, and this process occurred between approximately 1978 and 1984.

Keywords: sports, satellite, television, network, economy

1. Introduction

The proliferation of television (TV) broadcasting undoubtedly had a strong influence on sports. Some argue that the TV programming ‘commercialised’ sports especially after the financial success of the Olympic Games in Los Angeles in 1984. However, it is not clearly explained why the development of TV changed sports, or how TV accelerated the ‘commercialisation’ of sports. In other words there is no explicit explanation about the mechanisms between the development of TV and the transformation of sports.

This study focuses on the development of satellite transmission technology of TV signals to explain the mechanisms of, and reasons how, television changed sports. The purpose of this study is to examine how and why the development of satellite transmission technology, using geostationary satellites in the 1970s and 80s, transformed the circulation of money flow and brought a sudden expansion of the American sport economy. In this paper the case in the United States is examined, where satellite technology was advanced in this period. The period of the discussion range is approximately 1970 to 1990.

2. Literature Review and Method

The author of this paper tried to review as many literature as possible the subject of which is sport broadcasting, sports economy, satellite transmission, laws and statutes on TV and communications in the US, from 1960 to 1990. For this purpose the electronic search engines such as SPORTDiscus, Google Scholar, IEEE Xplore, Routledge Online, Taylor and Francis Online, CiNii, New York Times Archives, and references of each paper were used.

As a result, the literature can be grouped into three categories: Firstly, the researches focused on the analysis on the TV sports programming and its development and transformation from historical, political, and sociological points of view, secondly, the researches on the economic influence of TV broadcasting on sports, and thirdly, the researches focusing either on the technological development or on the Federal communication policies.

In the first group, some researchers such as Hayakawa (1961) and Kawaguchi (1995) focused on the analysis on the TV sports viewers and sports programmes. Others, such as Bellamy (1988), Kawaguchi (1993), Nakamura (1995) and Hashimoto (2002) examined the development and transformation of sports programming on television.
Andreff and Staudohar (2000), Hayakawa (2000), Siegfried and Zimbalist (2000), Hoehn and Lancefield (2003), Nys (2007), McAllister (2010), and some others belong to the second group. Among them, Gaustad (2000) analyses the effect of broadcasting on sports, but he regards the digitalisation in the 1990s as the cause of the changes of sports by television, but this approach fails to explain the change in the 1980s.


The research of the first group tends to take the increase of sports broadcasting hours and revenues as a given condition and discuss its social and moral effects based on that condition. The research belong-
ging to the second group does not offer the link of TV technology as the driving power for the economic development. Literature of the third group does not consider the effect on sports.

In order for the purpose of this study to examine how and why the development of satellite transmission technology brought a sudden expansion of the sport economy, a method was taken to overlook the groups of literature and to clarify the relationship among these three categories in concrete language, based on my actual experience and knowledge obtained as a broadcaster of this period.

3. The development of satellite transmission in North America

3.1. The early days

Satellite transmission is the technology to send and receive audio and/or video signals by means of a satellite orbiting the earth, and in particular, a TV’s video and audio signals (VandA). Almost all satellites used for VandA transmissions are geostationary*1) ones.

The first practical use of satellite transmission for live broadcasting was the Olympic Games in Tokyo in October 1964 when the TV signal was transmitted from Japan to Los Angeles via Syncom-3 satellite (Miya, 1970). However, the VandA occupied a large frequency range, equivalent to 5000 telephone lines, and geostationary satellites were not really ‘stationary’ at the time, requiring fine tuning of the direction of the parabolic antenna (often referred to as a ‘dish’). It was not until the latter half of the 1970s that this technology became a common tool for world broadcasters (Mizuike and Kinuhata, 1980). The number of potential transponders for VandA transmissions for North America reached 120 by the end of 1976 (NASA, 1997), all of which were in C-band*2).

3.2. From land-line to Ku-band*3)

In the 1970s the TV programme distribution/contribution routes in the US totally depended on American Telephone and Telegraph Company (AT&T)’s land-lines, not satellite (Hubbard, 1988). The routes were composed in a hub-and-spoke format from New York City where the headquarters of three big networks (NBC, CBS and ABC: commonly referred to as the ‘Big-Three’*) were located, as Figure 1 shows. The Big-Three distributed their programmes to their affiliate local stations through these land-lines and also received news and sport video materials through these land-lines. New York City was the hub of this system with a few exceptions (Kanoh, 1986). The land-lines, before the development of fibre-optics, were composed of a mixture of coaxial cables and terrestrial microwave links.

Figure 1 The concept of the structure of Land-Line networks in the U.S.A.
The drawing was made by the author based on the description and data from Kanoh (1986) and Hubbard (1988)
To examine the land-line structure from the end-users’ side (i.e. local TV stations) at the time, each station was connected only to New York City. No other connections existed. With this set-up, there was no problem when material was sent to New York, be it news, sports, and any other sort. However, once they wanted to send anything to another local station, permission was needed from the parent network company in New York to send it via New York City. Therefore, the local exchange of the visual material among local stations was very difficult, and rare.

The only way to form local networks among the affiliates in the 1970s was to use the C-band satellite transmissions. But C-band dishes were huge and usually located at specialised earth station sites hundreds of kilometres away from TV stations, not to mention the comparatively expensive rates of transmission (Hubbard, 1988).

The first Ku-band compatible satellite, Canadian ANIK-B, was launched in 1978 (Telesat Canada, 2001). The start of Ku-band transmission had totally overturned this traditional bilateral contribution-distribution structure based on the land-line networks. The advantages of Ku-band versus C-band were the antenna’s size, price, set-up space, and permissions.

The Ku-band dish was much smaller (Telesat Canada was using a 2.3 metre dish in 1984) and much cheaper compared to C-band, and was easily set it up in a backyard or in the car park of a local TV station. There was also an institutional convenience for Ku-band: It did not need the C-band station prior permission by the Federal Government for set up. It was these advantages that suddenly enabled TV stations to mount a Ku-band dish on a van rooftop and transmit from any location (Hubbard, 1988). Ku-band gave broadcasters a freedom they had not experienced with C-band.*4)

3.3. The impacts of the introduction of Ku-band transmissions

In the United States, quite a few local UHF-TV stations were established in the 1960s, and the number reached more than 500 in the early 1980s (Kanoh, 1986). However, these local stations were obliged to choose either to be an affiliate of the Big-Three or to remain as an isolated local station, since there was no way to form regional networks because of the structure of the land-lines.

Once Ku-band transmissions became available and feasible in the late 1970s, both technically and financially, the formation of new networks via satellite among local stations became technically possible. This new way of transmission had overthrown the traditional order of the hub-and-spoke land-line network, and gave those local stations total freedom of transmission choice. This new way also enabled ‘multi-lateral’ transmissions, not point-to-point, and once the signal was uplinked to the satellite, it was received at any point in North America, as shown in Figure 2. Now, all that was needed to receive/send any signal from/to any place was a small Ku-band dish in a backyard. This was a revolution in networking.

In parallel with the advance of satellite transmissions, cable-TV systems were being established in the 1970s. Cable-TV is a system to connect households in an area to the TV station by cable, and to send multi-channel programmes. Cable-TV started in mountainous areas in order to re-transmit over-the-air TV signals, to then be spread throughout cities since it was too costly to lay cables over a long distance and not technically practical to send the signal to remote places in scarcely inhabited rural areas with many amplifiers along the way. Therefore, cable-TV of the day was a series of closed and isolated systems, not connected to any other systems, and only carried the re-transmission of local over-the-air stations and the Big-Three’s programmes. But once satellite transmission became technically feasible.

Figure 2  Concept of simultaneous transmission via satellite. The drawing was made by the author based on the description and data from Kanoh (1986) and Hubbard (1988)
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and affordable, the exchange of programmes and news material with the cable-TV systems in other parts of the country became easy, and networking among cable operators came within their reach (Bellamy, 1988).

The policy change of the Federal Communications Commission (FCC) in the late 1970s also helped the development of cable-TV. Up until the early 1970s, FCC's policy had been very restrictive of cable-TV operations. The importation of programmes from non-local stations was prohibited. FCC's initial priority lay in the protection of small-town local TV stations, and this policy prevented cable operators from going nationwide. In 1972 FCC issued a new version of the Cable Television Report and Order, which lifted some of the restrictions, including importing distant signals ('leapfrogging'). This was a breakthrough in the expansion of nationwide networks. FCC also established the ‘Open Sky’ policy in 1972 allowing any company to own and operate communication satellites (FCC, 1990).

3.4. Ted Turner, an intermediary between sports and TV technology

Ted Turner (Robert Edward Turner III, born November 19, 1938) was the owner of a local TV station in Atlanta called WTCG. He was also a sportsman who had won sailing’s America’s Cup in 1977 as well as the owner of Atlanta Braves baseball team. He was one of the pioneers who had a solid understanding of the potential of satellite transmissions. Turner built his own earth station and started to distribute WTCG’s local programmes to other local and cable stations all over the US through C-band satellite called K-1, in 1976. WTCG changed its name to WTBS and widely known as Turner Broadcasting System (TBS). By 1980 it was fully operational, transmitting its own programmes, various films, and Atlanta Braves home-games. Turner also started CNN in 1980, based in Atlanta, and was carried across the US via satellite (Bellamy, 1988). By the late 1970s, media started to refer to these stations, such as TBS, WGL in Chicago, and KTLA in Los Angeles, as ‘super stations’ or ‘superstations’ (NY Times, March 3, 1979).

By the mid-1980s cable systems became familiar with Ku-band transmissions. Once cable systems broke out of regional isolation, they started to increase rapidly in number, and so did cable-TV viewers. Cable-TV penetration in the US jumped from 9.8 million households in 1975 to 36.3 million in 1985 (Uozumi, 2007). For the national ‘networks’, or the Big-Three, this marked the end of an era; their monopoly came to an end in early 80s, with new-born networks via satellites popping up across the country, providing coverage.

3.5. Transformation of sport broadcasting by satellite transmissions

The universal use of Ku-band transmissions drastically increased and widened the quantity and types of sports broadcasting. Sports were very attractive programmes for superstations for three reasons*: Firstly, there were a lot of non-broadcast games/matches already existing with built-in supporters, or potential viewers, for each sport. Secondly, the production cost of sport programmes per hour was much cheaper than that of news, drama, documentary, and other types of programmes. Thirdly, sport events were free from copyright, unlike films. Superstations sought out sports in which abundant games were regularly played, like Major League Baseball (MLB), the National Basketball Association (NBA), and the National Collegiate Athletic Association (NCAA) Football. Both cable and local TV welcomed this programming.

MLB had been broadcast by the Big-Three since the early days of TV history but the Big-Three focused on the post-season games, expecting higher commercial revenue per hour. Therefore, they showed as few as 16-25 regular season games, even though 26 teams (in 1980) played more than 2,100 games in a season (Bellamy, 1988).

Once cable systems started to join the national networks via satellites, quite a number of regular season games, not taken by the Big-Three, were transmitted by superstations. TBS broadcast about 120 Atlanta Braves games live each year via satellite, and the games were carried by 4,152 cable systems in 50 states in 1982 (Taaffe, 1982). Since TBS was included in most of the cable systems’ ‘basic service’, Atlanta Braves games were watched all over the United States.

Later, Madison Square Garden cable television network (MSG Network) in New York City reached a 12-year broadcast agreement with the New York Yankees baseball team and started to put 150 games
exclusively on air excluding the games nationally televised by CBS (NY Times, April 9, 1990).

In 1989, another cablecaster, Entertainment and Sports Programming Network (ESPN), made an epoch deal. ESPN, an affiliate of the American Broadcasting Company (ABC), agreed with MLB to broadcast 160 games each year for a four year term. ESPN was also among the ‘basic service’ of most of the cable operators and was watched nationally.

New York Times reported, “There is an extraordinary gain for a fan living in, say, the New York metropolitan area: It is now possible to bring in about 600 games a year. But there is also a catch: The fan must have cable TV.” (NY Times, April 9, 1990). Considering that CBS only broadcast 16 of these 600 games, this figure explicitly shows how the tremendous expansion of ‘televised’ sports and radical rise of cable systems was helped by satellite transmissions.*6)

Among amateur sports, collegiate football is the most popular in the US, and ABC had broadcast college football since 1966. But annual broadcast games were only around 20, even at the end of the 1970s.

Once superstations managed to form national networks in the early 1980s, they aggressively bought up college football rights. Table 1 shows the comparison of the broadcast college football games in Chicago metropolitan area on the first Saturday in October in 1983 and in 1990. In 1983 only two games were shown by CBS and Chicago-based WGN. In 1990 two of the Big-Three and four cable channels broadcast 10 games in total. The total number of college football games played in a season had been stable, and this proves the first wave of expansion occurred between 1983 and 1990 (Clotfelter, 2011).

In order to specify the ‘watershed’ more precisely, one must focus on the period in the early 1980s. In one season each college played 11 games. Mawson and Bowler (1989) conducted direct research by sending questionnaires to 105 Division-I college football teams and received answers from 43 of them. According to the results, the average broadcast games by school were 2.1 games in 1981, 2.9 in 1982, and 2.7 in 1983. In 1984 the average broadcast games increased to 3.4, then 3.9 in 1985, and 4.1 in 1986. The average number of broadcast games doubled during these five years. According to this research, 1984 seems to be the watershed, and actually quite a number of cablecasters started college football shows in this year.

The results of these studies show that the number of the games/matches broadcast on TV started to climb in the early to mid-1980s, regardless of the sport being professional or amateur, and it is also apparent that the opportunities for TV viewers had quickly widened as games/matches played outside of their own areas/regions became available. In other words, local sports events were ‘nationalised’ by superstations during this period.

### 3.6. The transformation of the sports economy caused by the expansion of sports broadcasting

The variety of sports programmes on TV was rapidly enlarged and the total broadcasting hours increased as a consequence of the development of satellite transmission including the introduction of Ku-band transmission. A New York Times columnist, in 1988, warned of a new agreement between cable television and MLB, “baseball risks becoming just another TV show instead of a spectator sport.” (NY Times, December 11, 1988). The columnist had aptly recognized that the symptom of the transformation in sport was caused by a rapid expansion of the broadcast hours by cable systems.

The transformation of sport was most remarkable in its economy. Figure 3 shows the broadcast rights fee paid to MLB and its teams from 1976 until 1993. In the 1970s, the rights fee remained stable, with an increase starting in 1980 when superstations began to enter the market (TBS started to transmit Atlanta Braves games via satellite in this year). The amount and the increase of ‘Other TVs’, mainly superstations, surpassed that of the Big-Three, and this tendency continued throughout the period and was accelerated when ESPN joined the race in 1990.
Another remarkable point is that the increase in ‘Other TVs’ was the pulling force of the entire rights fees increase, and the Big-Three followed.

Next, the tendency of the increase of the revenue of MLB teams is examined. As the indicator of the total revenue, the level of the players’ salary is used here. According to research by Haupert (2010), in 1981 the average annual salary of the MLB players was 200 thousand dollars, but in 1986 it was doubled to 400 thousand dollars. The background of this sharp increase was not only the television rights but also the introduction of a free-agent system. In the late 1980s, the commissioner and some owners of the teams united and tried to restrain the hike by not hiring free-agents, and for once the average salary levelled or even declined. In the 1990s, the free-agent system was accepted by the owners and established and the salary hike resumed.

This process can be more closely examined by comparing four MLB teams; Atlanta Braves, Chicago Cubs, Seattle Mariners, and Minnesota Twins. Figure 4 shows the average annual salary of these four teams from 1976 to 1989. In the 1970s there was no big difference among these four teams. However, the change started in 1980 when TBS Atlanta and WGN Chicago started to transmit Atlanta Braves and Chicago Cubs games to all over the US, respectively. The total salary of Atlanta and Chicago team players increased at a much quicker pace than the others, until 1986. On the other hand, Seattle Mariners and Minnesota Twins, both based in the cities where superstations did not exist, experienced a widened gap in salary, comparatively, until 1986. This fact tells us that there was a distinctive difference in players’ salary, or teams’ revenue, between the cities where superstations existed and those where they did not. This fact also shows that the increase of the players’ salary was not a general tendency for all teams caused by the free-agent system but rather that it depended very much upon the existence of daring superstations using satellite transmissions.

The same tendency is observed in college football. The broadcast rights fee was stable at the level of 10 and 20 million dollars a year until 1977, and it started to increase in 1978, jumping to 60 million in 1982 because of the new joint long-term contract by ABC and CBS as well as the entry of TBS into NCAA football coverage (Zimbalist, 1999).

The expansion of the broadcast also brought the increase of the revenues other than the broadcasting rights. Figure 5 shows the annual total revenue of the MLB and its teams, excluding broadcast rights fee, from 1969 until 1988. This includes gate fee...
(tickets), concessions sales and parking revenues, billboards sales, merchandising, and other revenues. Between 1969 and 1973 the revenue was stable and about 80% of it came from the gate fee. Between 1974 and 1982 the available data cannot be found. Between 1983 and 1988 there is no breakdown of the revenue and just shown as ‘other income’. Even with these limitations it is apparent that there was a significant increase in ‘other income’ in 10 years between 1973 and 1983. The number of MLB teams in 1969 was 24, and from 1972 till 1988 was 26 teams, and the increase of the revenue far exceeds that of the number of the teams (Haupert, 2010).

The revenue includes ad-boards and merchandising goods utilising the images of the players such as baseball cards. The hike of the value of these items seem to have pushed up the income because the markets of the ad-boards and merchandising had been extended from regional ones to national because of the nationwide television coverage through superstations and cables.

These examinations on both professional and amateur sports in the US showed a clear principle: Superstations which managed to create national networking with land-lines, dominated by the Big-Three, and facilitated the creation of additional national networking with land-lines, dominated by the Big-Three, and facilitated the creation of new networks beyond cities, states, and even borderers, via satellite.

Cable systems used this opportunity to end their isolation by taking remote signals of various programmes. Some local stations delivered their programming to those cable systems nationwide. Sport events were favoured because of the low per-hour production cost and copyright-free status.

As a result, local sport games/matches spread nationwide, and the number and total hours of televised sports games drastically increased. Accordingly, the broadcast rights fee of these sports hiked, and so did the value of ad-boards and merchandising, since the number of the viewers, or virtual audience out of the stadia/gymnasia, also quickly expanded. This was the mechanism which brought huge cash flow into sports from various sources.

In conclusion, the rapid expansion of sport economy in the United States was caused by the technological innovation of satellite transmissions, and this process started and spread nationwide in a very short period, approximately between 1978 and 1984.

4. Conclusion

The driving power of the television’s influence on sports in the United States was satellite transmission technology. The development of the TV signal transmission, using geostationary satellite and Ku-band, broke down the restrictions put in place by the traditional national networking with land-lines, dominated by the Big-Three, and facilitated the creation of new networks beyond cities, states, and even borderers, via satellite.

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Notes
*1 'Geostationary satellite' is a satellite revolving the earth on a circle orbit 35,786 kilometres above the equator with the same angular velocity, so it looks as if it stays at the same point in the sky.
*2 ‘C-band’ is the name for the frequencies between 4 GHz and 8 GHz, given by the Institute of Electrical and Electronics Engineers (IEEE). In order to send/receive analogue signal of this frequency in a stable manner, a huge parabolic antenna is required. For example, C-band transmitter of Mexico Olympic Games in 1968 was 32 metres in diameter.
*3 'Ku-band' is a higher frequency band than C, between 12 and 18 GHz. Now in 2012 most of the satellite broadcasting all over the world uses this frequency and the dish can be much smaller, as small as 30 cm in diameter for reception.
*4 The world broadcasters, at first, were not keen on using Ku-band, because theoretically, rainfall and snow interfered with Ku-band frequency potentially weakening the signal. For this reason it was as late as in 1989 when regular transmission by Ku-band started in Japan.
*5 These points are referred in and concluded from the following sources; “Senate Unit Kills Cable Sports Curb”’, NY Times, June 12, 1974, “Combination of Cable TV and Satellites Creates National ‘Super Stations’”, NY Times, November 28, 1977, and NHK (2008).
*6 NHK, Japan’s public broadcaster, started MLB broadcast in 1989, about 160 games in a season. This was enabled by the concentration of MLB games signals via satellite from all over the U.S. to NHK’s contracting earth station in New Jersey. Domestic games transmission also helped MLB to be international.

References
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