# Unit-2: HISTORY OF TELEVISION BROADCASTING

## UNIT STRUCTURE

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2.3 Origin and Development of Television

2.4 Transmission of Television System

2.5 Broadcasting

2.6 Colour Television

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## 2.1 LEARNING OBJECTIVES

After going through this unit, you will be able to -

- describe the evolution of television
- discuss the discoveries made by the pioneer of television inventors
- analyse the television technology development
- list the recent trend of Digital Television

## 2.2 INTRODUCTION

In the previous unit we were introduced to the television medium, its features and its impact and reach. The unit also provides the distinctions between television and the audio medium. In this unit we shall discuss

about the overview ofthe history of television, inventions, early technological development and the new trends in the television industry around the globe.

## 2.3 ORIGIN AND DEVELOPMENT OF TELEVISION

Television has become one of the important parts of our everyday life. It is a general known fact that television is not only providing the news and information but it is also entertaining us with its variety of programme series and shows. A majority of home-makers cannot think about spending theirafternoon leisure time withoutthe dose of daily soap opera; a concerned citizen cannot think of skipping the prime time in news channel or a sports lover in India cannot miss a live cricket match.

Television hasbeen around for morethan 150 years now. Earlier it was difficult to understand if the invention would change the communication process and mode of entertainment forever. Now, internet and satellite broadcasting have brought overall change in the broadcasting system. The medium is evolving and is adding to its new strata of broadcasting for the people around the globe.

Before it was just an idea to create visual image and transmit through air waves. One discovery of television component leads to another and ultimately the development of a pioneer technology, Television was made.In 1818, a Swedish Chemist Jons Jakob Berzelins discovered, 'selenium', a chemical element that has the capacity to carry electrical current and that depend upon the amount of light that stuck it. This phenomenon is called as photoconductivity. In 1875 Boston Civil Servant, George Carey put forward the drawings for a "selenium camera" that would enable people to "see by electricity"and made the first crude television system using these photoelectric cells. However, to run his apparatus a great number of wires, photoelectric cell and bulbs were required. Later, there were many initiatives taken by the scientist to develop the system. Then to simplify Carey's apparatus, in 1884 a German, Paul Nipkow invented what is known as Scanning Disk. This is the simplified television system where only one photoelectric cell and a lamp were needed that served as the foundation for experiments on the transmission of visual images for several decades. In

this system, the disk is a large flat metal with series of small perforations which is arrange in a spiral pattern. When the disk rotates, the lights passes through the perforated holes separating the pictures into pinpoint of light which are then transmitted as a series of electrical lines. Each rotation of the disk creates a television frame. In 1897, a German physicist Karl Ferdinand Braun invented the cathode ray tube (CRT)that effectively combined the main principles of electricity and that of camera.When the electron beams struck the florescent screen of the tube, itemits lights in the form of images. The two inventions of scanning disk and cathode ray tube were combined in the third discovery of primitive television system. Russian Scientist Boris Rosing in 1907 used CRT as the receiver and the focused electronic beams to display image in a geometric pattern onto the television screen. Boris also used the mechanical disk system as a camera for his television invention.

## 2.4 TRANSMISSION OF TELEVISION SYSTEM

There was the transmission of mechanical television system which was developed out of Nipkow's scan disk. In 1926, British inventor John Logie Baird pioneered the first crude television system where he had used mechanical disk. In this device the disk scan the moving images which is converted into electronic impulses and transmitted to the screen with the help of cable. The first television program was operated with ventriloquist dummies out of audience's sight which displayed low resolution pattern of light and dark images. After two years Baird extended his television system by transmitting the signal between London and New York.Later British Broadcasting Corporation (BBC) had also adopted his mechanical television system. Baird had converted his television into the commercial usewhere he could sell 10,000 sets. He had definitely able to bring his television system into the market;yet it had many flaws and limitations in technicality. Its total resolution of the television could hold only 240 lines, whereas the modern television now has 600 line of resolution. This means the image which it created had fuzzy appearance. Beside, the spinning disk limited the number of new pictures in per second which resulted in flickering effect. During the

same time as Baird, an American inventor, Charles Jenkins was also developing mechanical television.

Philo T. Farnsworth and Vladimir Zworykin have started working on the first television camera, not knowing about each other or about the work that they had undertaken. Philo T. Farnsworth was born on 19th August, 1906 near Beaver Creek, Utah. Farnsworth belongs to a poor family and his father had hard time to get a proper job which led them to move Rigby, Idaho where they lived in a ranch. From childhood he was very keen to learn about electricity and the place he lived gave him ample scope to experiment by taking apart and putting back together the ranch's generator. Besides, his science teacher, Justin Tolman, help him to learn all about science and technology. However, his learning was not restricted to what his teacher taught him about advance science but he also gathered knowledge from magazine articles to textbooks, and the knowledge he gained helped to spark his inventor's imagination. Farnsworth practiced what he learned from others about the inventions and functions of circuits and how electric devices works in radio, telephone and electric light system. This knowledge had helped him to work on the ideas for a television system on the blackboard. Mr. Tolman who was very inspired seeing the circuit drawing of television system. In summer 1926, Farnsworth persuaded a group of men from San Francisco who gave him money to set up his own laboratory and turn his ideas into real equipment. This was just the beginning of what he had invented. He had patented his idea of invention from the United States Patent Office in Washington, where he could protect his idea and helped him to earn some money.

Vladimir Zworykin, had worked in Russia and France before moving to America. He had worked as a scientist before getting job at the Washington laboratory in United States. It was during this time when his teacher wrote articles on how a camera might be made without using film and Philo Fransworth read these articles during his high school in Rigby, Idaho. Zworykin along with his teacher worked on the television system. Like Fransworth even Zworykin was trying to get patent for the television invention. Both tried to prove themselves for their design to get patent.

During this conflict, Fransworth though remembered his design but had no sketch of it which he had drowned back in his school days. Mr. Tolman came down in Washington to testify his design and with other evidence Fransworth could able to get his design patent first.

However, Fransworth could not earn much profit out of his invention. This is because during World War II the government had suspended the sells of television sets and his term of patents was almost over when the war ended. However, the advantage of electronic television was that it had better picture quality, no noise, compact size, and fewer visual limitations which made it superior to mechanical television.

## 2.5 BROADCASTING

In 1928, Federal Radio Commission had authorized Charles Jenkins to broadcasted television programme. This programme was broadcasted through W3XK, an experimental stationwhich gave coverage to the Maryland suburbs of Washington, DC.Itbroadcasted images from the motion picture in the silhouette form consisting of 48 lines of resolutions. There were few more experimental stations which also broadcasted programmes. Later in 1939 the NBC (National Broadcasting Company), subsidiary of RCA had become the first network to broadcast regular programme. In its first broadcasting, Franklin D. Roosevelt became the first president of United States to appear on television which broadcasted on the programme of World's fair in New York. This was however broadcasted to a handful of television sets in the New York City.Few weeks later, the first sports event was telecast when a New York station showed the Princeton-Columbia baseball game.As said in the initial stage it broadcasted to only 400 television sets which served 4000 to 8000 people in New York City. The size of the television set at that time came with 5, 9 or 12 inches which is only the fraction of what we have in modern television sets.These were the regular broadcasting in the United States while in Germany broadcasting began as a non experimental national television service in 1935 and England's British Broadcasting Corporation (BBC) began broadcasting the following year.

Prior to World War II, the sales of television were not very productive

due to the threat of war, high cost of television sets and limited number of programmes that was offered. Many unsold television had to stored back and when the war ended the sales of television resumed.

In 1930s, Columbia Broadcast System, a rival of RCA Radio also started to provide regular programs. Hence, the Federal Communication Commission had outlines a single technical standard so that viewers could able to watch the programs without changing the television set for two different networks. Besides, there were other recommendations which include the 525 line system and an image rate of 30 frames per second and that all US television should operate using analogue signals. During World War II there was more concentration on military electronic equipments for which many companies including RCA and General Electric had diverted their production from television broadcasting. The war had also reduced the broadcasting to only 4 hours per week or sometimes went off altogether.

In 1946, there were rise of sale of television sets again, and network television began to provide programming. During this time, here were only ten licensed television stations in the country. However, radio was already the dominant broadcast medium, it almost reached thirty-four million homes, but once television was well established in the market, radio experience a mass exodus of its audience.

## 2.6 COLOUR TELEVISION

In 1928, John Logie Baird demonstrated the colour television system where he had used the Nipkow's Scanning Disk with three spirals representing red, green and blue colour. In 1940 Hungarian Engineer, Peter Goldmark had used Baird's design to further develop the mechanical colour television. This colour television did not pull the market instantly; it took more than a decade to become popular among the audience. At the time of World War II, the National Television System Committee (NTSC) in accordance with FFC approval had initiated to develop electronic colour system that would compatible with black and white set. Then in 1953, a year later NBC broadcasted its first colour transmission of Tournament of Roses Parade. The sales of television had outnumbered in the year 1972.

Production of numbers of television system had increased to a great extend in 1950s.The main reasonwas the substantial lower cost of purchasing television set. In 1945, there were 10,000 sets in United States, after five year it increased to 6 million and more than 60 millions in 1960. The program formats of early broadcasting were based on radio shows. It was dull and static as the news presenter would read the news as they do in radio programme. Beside, some of the earliest entertainment programming on television came directly from radio, such as Amos 'n' Andy, The Adventures of Superman, The Lone Ranger, and a number of soap operas. For the news footage, the network would depend on the newsreel company. The 1950s were considered to be the "golden age" of television and there were certain changes over the programmes pattern which hadappeared during this period. They had included programmes which were borrowed from the theatres to develop dramatic presentations such as Playhouse 90 (1956) and The U.S. Steel Hour (1953) and the news had good quality contents that was based on daily news coverage.The live broadcasting of programmes also became popular during the golden age. I Love Lucy was produced with a new technique as there were three camera setup which reduced the interruptions and retakes of scene. The programme re-telecasted the filmed episodes and sold into syndication for extended profits. The network broadcaster continues using this kind of production techniques and others.

The programmes which were broadcasted in a network started sponsoring by a single company or organization. In this way there was control over the programme contents by the sponsors. Later, the broadcaster started increasing their programme duration from 15 minutes to 30 or more, the networks also increased the advertising cost of sponsor programmes. It prohibited for a single autonomy of a sponsor and thereby many other sponsors and advertisers started paying for the programmes.Today show, The Tonight Show and variety Music Shows of early 1950s had pulled many crowds.The programmes featured multiple segments which ran for several hours. They were broadcasted on daily basis which increased advertising costs and due to which the networks also started to sell spots advertisements

for 30 to 60 seconds in between the show.

The networks started to broadcast programmes genre of Radio quiz shows. In between 1957-58, it got popular and the networks introduced 22 quiz shows because of inexpensive and easy to produce. This kind of programme helped the sponsors to have their names displayed on the set throughout the show. However, by 1959 ended the prime time quiz shows for 40 year due to controversial issues, untill it was revived by ABC (American Broadcast Company) in 1999. In between 1960s to 1970s, medical and police related content became hit among the audience. The science fiction programme and fantasy genre such as Star Trek had a good number of viewers. The audience for television started diminishing as cable television and recorded home video came into the scene.

## 2.7 CABLE TELEVISION

Cable television was formally known as Community Antenna Television. In remote and mountainous region of Oregon, Pennsylvania and Arkansas had poor receptions quality of television signals. To meet this requirement, the people of this region started cable television in 1940s. The cable towers were installed in higher location which is connected to homes to receive the broadcast signals. This system was further developedin 1950s with microwave to connect from distant cities. The capability to bring signals from far area added advantages for the cable operators to concentrate more on extensive programmes for consumers rather than focusing of local community services. More channels were offered in rural areas as operations started to import programmes from independent channel of New York and Philadelphia. The good receptive quality and varied number of channels also attracted the urban audiences and at the end `of 1962, there were 800 cable systems serving the people of the region. Federal Communication Commission (FCC) on demandfrom the local broadcaster and television stations had restricted the cable operator to import program from distant stations. This had evaded the cable operator to grow and develop in the market. After 1970s, when the restrictions gradually decreased, the cable operators brought in the evolution into the cable

industry.In 1972 cable pay service was introduced by Home Box Office (HBO). To access the cable television show and video on demand, the customers had to pay for the subscription fee. Later, HBO had use the satellite to make the network accessible to the entire United States. Another television network, Fox Broadcast Network was launched in 1986 and by 1990 it produces successful program such as Beverly Hills 90210 and Simpsons which targeted the young audiences.By this time, many earlier programmes almost disappeared but few prime time programmes were however maintained such as sitcom, dramas and reality shows. In 1990s there was increased competition among broadcasters like the United Paramount Network (UPN), the Warner Bros. Network (WB) debuted in January 1995 and Paxson Communications' PAX-TV debuted in 1998.

In 1990s the cable operator also initiated the technology advancement to upgrade the system by building higher capacity hybrid networks of fiber optic and coaxial cable. This system was far better and advance to provide multichannel networks and other services such as internet, telephone, digital video service.

## 2.8 TELEVISION NEWS

The first television news was broadcasted during World War II. The Newscaster, Edward R. Murrow was known as the "newsman's newsman" for his news coverage of Europe on CBS Radio. Later he with his colleagues joined television in the 1950s. Murrow's See It Now was one of the forerunnerof many of the magazine shows that appear on television. He was also known for exposing the Joseph McCarthy, the Wisconsin senator who falsely accused many people of having Communist sympathies. Besides, he hosted many shows like Pearson to Pearson which featured celebrity interviews.

The television news gave live coverage of mourning of the nation when President Kennedy was assassinated. This had brought in new age of news reporting where people no longer relied only on newspapers for news and information. Television news further matured with the war related news which became part of news broadcasting. Antiwar demonstrations

and the civil rights movement also gained wide exposure in television.In 1969, people glued to the television as live pictures were beamed back from the surface of the moon. News coverage on Watergate hearing became so popular that every individual was familiar with the story. Satellite technology started providing live news by the networks in 1980s from around the world. In 1990s, satellite technology allowed live coverage of missile attacks and fighting during the Gulf War.Internet television or online television is the next extension of television up gradation. It is the alternative for viewers to typical broadcast. Most of news network used internet to provide news items to the world. The pioneer group was Hulu, a division of NBC who distributed their own news material over the internet.

## 2.9 DIGITAL TELEVISION

Early television set received analogue signals consisting of radio wave. There were different methods to receive the signals into the television system. They are airwave, cable wire and satellite transmission. Signal transferred through analogue system had poor quality pictures that had static and distortion.As the television grew bigger, the resolution of the picture started to degrade. Upon the recommendation of the cable industry to FCChad created a committee to study the durability and impact of switching the television system into the digital.The Advisory Committee on Television Service had initiated for testing of both the television systems, analogue and digital in 1987. Upon the analyses of the findings, in 2009 the committee agreed to switch the television system from analogue to digital technology. In digital, the signal is converted into binary code with less frequency space and higher picture quality. However, there were few issues arose due to the acceptance of digital technology. The broadcaster had received transition period to send the programmes signals to both analogue and digital channel. Even after the switching was done many analogue televisions were not able to receive the digital signals without the aid of cable, the satellite service or the converter. To overcome these issues, the Federal Government offered $40 gift card to acquire the digital converter for the analogue television and the old analogue broadcast spectrum was set for auction to regain the costs.



**CHECK YOUR PROGRESS**

Q.1:How does the scan disk function?

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Q.2:What was the impact of switching the television system into the digital?

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Q.3: Who invented the cathode ray tube (CRT)?

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**ACTIVITY 2.1**

Students are to choose any one television network and study the variousgenre of program telecasted in an effort to learn and understand about the way in which it attracts an audience and advertisers.

## 2.10 HIGH DEFINITION TELEVISION

US government were on the stage of reviewing both the analogue and digital technology. While Japan was more advance in bringing out system that has far better technology to create crystal clear pictures in wide screen format known as the High Definition Television (HDTV). The picture resolution gives five times as many pixels per frame which is much higher than the standard television system. In its initialstage of production in 1998,the cost of the HDTV was too highwhich was not possible to purchase by all kind of customers. After couple of years, the cost of the television went down making HDTV affordable and by 2010 nearly half of the American citizen was

watching television on this new technology. This new technology had also increased the duration of television watching. Nielson Company in their measuring analysis on audience viewership concluded that the households with HDTV watch 3 percent more primetime television. The company also found that the cinematic experience of HDTV is bringing familiestogether, where individuals tend to watch television alone on smaller screens.However this pattern of viewership has changed to an extent. As the development of Internet and its uses of television program is also available online.



## 2.11 LET US SUM UP

Let us summarise some of the important points of this unit in the following way-

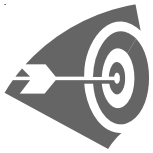
- Photoconductivity is a phenomenon when a chemical element called selenium could able to carry the amount of electrical current depending on the amount of light that struck it.
- In 1884 a German named as Paul Nipkow invented what is known as scanning disk.
- John Logie Baird, British inventor pioneered the first crude television system in 1926 by using a mechanical disk.
- Franklin D. Roosevelt became the first president of United States to appear on television which broadcasted on the World's fair in New York.
- Edward R. Murrow was known as the "newsman's newsman" for his news coverage of Europe on CBS Radio.
- John Logie Baird had invented a television system which could hold only 240 lines in comparison of today's television of more than 600 line of resolution.
- Karl Ferdinand Braun a German physicist invented the cathode ray tube (CRT) that effectively combined the main principles of electricity and that of camera.

- Playhouse 90 (1956) and The U.S. Steel Hour (1953) are the programmes who's contents were borrowed from the theatres to develop it into a dramatic presentations.
- In 1999, American Broadcast Company revived the prime time quiz show which was dead for 40 years.



## 2.12 FURTHER LEARNING


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- Owen, C.H.. (1962), Television Broadcasting', IEEE.
- Bognar, Desi K., (2000), International Dictionary of Broadcasting and Film. Boston: Focal Press.

## 2.13 ANSWERS TO CHECK YOUR PROGRESS

**Answer to Q.No. 1:** The disk scans the moving images which is converted into electronic impulses and transmitted to the screen with the help of cable. The program was operated with ventriloquist dummies which displayed low resolution pattern of light and dark images.

**Answer to Q.No. 2:** The Advisory Committee on Television Service had beginthe testing of analogue and digital television in 1987. The study found that the digital television has better and improved receptive quality. The signals in digital convert to binary code which takes less frequency space and produce higher picture quality.

**Answer to Q.No. 3:** Karl Ferdinand Braun invented the Cathode Ray Tube.



## 2.14 MODEL QUESTIONS

**A. Very short questions**

Q1. Who pioneered the first crude television?

Q2. Who authorized Charles Jenkins to broadcasted television programme in 1928?

Q3. What do you mean by photoconductivity?

**B. Short Questions (Answer each question in about 150 words)**

Q1. What were the flaws and limitation in earlier television systems?

Q2. How does World War II hamper the sales and productions of television systems?

Q3. Briefly explain the evolution of cable network.

**C. Long Questions (Answer each question in about 300-500 words)**

Q1. Elaborate the development of television technology and programmes during the Golden Age of Television System.

Q2. Explain how Philo T. Farnnsworth had struggled to get his invention patented.