

SCIENTIFIC DEVELOPMENTS FOR SOCIAL AND EDUCATION SCIENCES

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Doç. Dr. Mehmet Dalkılıç

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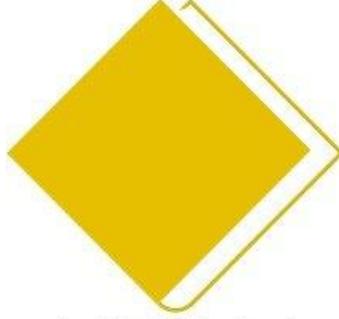
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Tel: 0 232 484 88 68

www.duvar yayinlari.com

duvarkitabevi@gmail.com

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Scientific Developments for Social and Education Sciences



CHAPTER 15

**The Digital Revolution in Radio Economy (Mihalis
(Michael) Kuyucu)**

The Digital Revolution in Radio Economy

Mihalis (Michael) Kuyucu

¹*Alanya HEP University, E-mail michaelkuyucu@gmail.com:*

1. Introduction

Radio is the world's most popular and one of the oldest media. The radio network has developed progressively since the 19th century. The traditional AM and FM analog transmission means have survived for over a century. However, more effective ways of broadcasting have emerged within the past three decades. The use of digital and internet radio transmission have made the transfer of audio and other media formats easier. The development has brought several benefits to both the radio networks and listeners.

2. History of Web Revolution in Traditional Radio

The wireless transmission of the audio message has significantly developed through a significant period. The technique originated from 1964 when a mathematician by the name James Clerk Maxwell explained that electromagnetic waves could transmit signals through space. Following the theoretical explanation, David Edward Hughes experimented in 1880, and it worked. Later in 1888, Heinrich Hertz proved Hughes' electromagnetic experiment by sending electromagnetic waves. Several scientists kept working on the electromagnetic wave transmission experiment until 1894. It was in the year when an Italian by the name Guglielmo Marconi made the first device that could transmit messages using electromagnetic waves that Hughes had proposed.

In 1895 Alexander Popov built the first radio receiver using the ideas that other scientists had explained. The radio transmitter and receivers kept improving throughout the 20th century. In 1912 the Italian Marconi opened the first radio manufacturing factory in the world in Chelmsford, England. On 31st August 1920.

On 31st August 1920, station 8MK, in Michigan, became the first to broadcast news. The first radio station to broadcast sports events did so in 1921 by airing a football match between West Virginia and Pittsburgh. In the 20th-century, radio broadcasting was through commercial amplitude modulation (AM) until the 1960s when stations adopted the VOR system. By the 1970s, radio technology developed, which used metal oxide semiconductors (MOS) and large scale integration (LSI) (Bennett, 1984). The LSI and MOS technologies made it easy to manufacture radio receivers, which were portable and practical.

In 1995 a new radio transmission model called Digital Audio Broadcasting (DAB) began in Europe, which formed the basis for the development of the digital radio. In 1996, Japan launched another digital radio transmission mode called ISDB-S and later started another one named ISDB-T. The digital audio broadcasting system proved to be more effective than the traditional AM and FM. The DAB system can offer different stations within the same bandwidth and provide higher quality audio than the conventional AM and FM. At the time of its launch, the DAB allowed radio stations to transmit and codec audio formats (Devlin, 2018). However, in 2007, the system upgraded and started broadcasting in the HA-AAC v2 (AAC+) format when DAB changed to DAB+.

Internet radio dates back to 1993 when a man named Carl Malamud started the first internet one-on-one communication, which he called 'internet talk radio.' The internet talk media used to hold at least one talk in a week to interview a computer expert. In 1994, an Irish media called the first radio to air news online, which continued broadcasting until 1998, when the station became outdated. In 1994, a US-based station named WXYC, which used to operate in FM through frequency 89.3, became the first one to air all its programs via the web.

In the same year, a radio station called WREK, which used to broadcast on frequency 91.1 via FM media streamed online using their software by the name cyberradio1. Radio stations that used FM and AM systems started streaming their programs online in 1994. Scott Bourne formed the first internet-only radio station in 1995 and called it NetRadio.com, which formed the base for internet radio development (Devlin, 2018). Virgin radio became the first European radio to broadcast all programs via the internet in 1996.

In 1997, Canada launched an internet-only radio station called Radio306.com, which later changed the name to purerockradio.net. The station celebrated 20 years of existence in 2017 and is the longest-serving online radio station. In 1999, a group of professional broadcasters raised capital through crowdfunding and started a radio station called Zero24-7. The station was the first internet radio media to start through crowdsourcing of finance. Internet radio grew very significantly in the 1990s. In 1998 broadcast.com offered the most significant amount of IPO for a radio station in the US.

Broadcasting through the internet made it easy for radio stations to air various programs through the net. By the year 2000, the quality of the audio that radio stations broadcast had greatly improved. Radio stations were able to transmit quality audio as high as 64kbps/s and 128kbps/s. By 2017 the number of radio stations that broadcast online had increased to over 8,000. The internet audio had also increased significantly by the same year. Most radio stations have also developed applications from where listeners can

stream programs that the radio stations transmit. Other stations operate online through their websites.

However, most radio operates through both wave transmission and streaming. The improved technology has allowed people to stream their favorite radio stations even using their smartphones. Improvement of the internet radio has also resulted in the possibility of a station sending very high-quality sound (Ferencak, 2018). Other stations operate only via the internet and have never used the FM and AM media to transmit the programs. Some of the most famous stream only stations are Spotify, Tunein, and others. Streaming has now made it easy for radio stations to economize on data as it is possible to compress the files into smaller but quality formats.

3. Internet Radio

Internet radio first appeared in the year 1993. Carl Malamud is the person who introduced the first internet talk radio by starting a computer radio show where he used to interview one computer expert every week. The first radio show that appeared online was the Severe Tire Damage, which appeared in June 1993. In 1994, an Irish radio started a re-post of the radio news through the internet (Ferencak, 2018). However, the internet program ran up to 1998 when the internet show became out-of-date. In the US, the first traditional radio media broadcast online was WXYC, which used to transmit via the FM system.

In 1995 a man named Scott Bourne started the first internet-only radio, which he gave the name NetRadio.com (Priestman, 2004). NetRadio was the pioneer of online communication. In 1996, an English radio called Virgin Radio emerged and became the first radio in Europe to run its programs online. Internet radio continued growing broadly throughout the 1990s (Ferencak, 2018). Since the year 2000, most of the radio stations broadcast either purely online or both online and through FM and AM. The quality of audio that the radio stations broadcast has kept on improving throughout the last three decades.

Radio mass communication used to be the only means of broadcasting before the 21st century. However, many radio stations can now broadcast through live streaming on the internet (Priestman, 2004). The most significant advantage of programming via the internet is that radio stations reach a wider audience. The method of transmitting radio messages also allows the public to interact freely with the broadcasters.

Listeners can use a stand-alone device that uses the internet to receive the transmission of the message from the station that sends the message using the internet. Alternatively, one can use a computer with an internet radio software that allows them to access the internet radio service (Heuberger, 2019). Internet radio uses streaming media to send messages to people who have access to a continuous presentation of audio signals from the radio

media. The streaming process works almost like the traditional amplitude modulation (AM) and the Frequency Modulation (FM) in terms of the consistency of receiving the radio messages.

The content that internet radios broadcast is just similar to the traditional broadcast. Web radios mostly present music, sports events, and news. Most of the communications which offer internet radio also provide the standard terrestrial radio service (Heuberger, 2019). There are only a few start-up radios broadcast over the internet, although it requires only a small amount of money to start and run. Some radio station prefers to operate through the internet because the radio service allows the station to present anything that they will with little limitations (Ferencak, 2018).

The popularity of online radio services is increasing daily. By 2003, the online radio service had resulted in total revenue of around US\$49 million. By the year 2006, the income had already increased to US\$500 million. A survey that researchers did in 2007 revealed that around 20% of the respondents had access to online radio media platforms. In 2008 a similar study showed that one out of every seven US citizens listens to the internet radio stations. A significant number of US citizens now have online radio receivers or software that can allow them to listen to the radio online using their PC.

Over 47% of all Americans above the age of 12 have listened to the radio through the internet. Additionally, the time the American citizens spend on internet radio services increased from around 12 hours in 2013 to about 14 hours per week in 2014 (Ferencak, 2018). the most significant number of listeners of the online radio is among the teenagers and younger ages.

The most significant advantage of online radio is that it can reach the audience from almost all parts of the world. For example, one can listen to an American radio station while they are in Malawi, which has made the internet radio service to get more popular. The web radio service is also advantageous for people with special needs since they can select a channel from a large number available. The use of smartphones has also made internet radio services have a high number of listeners. Additionally, carmakers are now making vehicles that can access radio services through the internet, making the internet radio have a wider audience.

To start an internet radio station, you will only need to have a computer, a microphone, and other accessories. Some internet broadcasters use a broadcasting desk, but it is not a must to have it for a station to stream. Airing radio programs' financial requirements are affordable since one only needs to pay a small fee to get permission to use the cloud radio broadcasting service. The cost of running the stations online is also low. The operation of online radio stations through the web does not need one to use a lot of personnel.

Another advantage of using online radio is that it has made running of radio stations to become comfortable. To broadcast online, you need only a

little effort and time because the process uses automatic processes to transmit messages. Automation has even made it easy for a station to run for a long time without anyone running the station.

Through listening to online radios, it is easy for listeners to discover new radio stations. The fact that listeners listen to radios that they have never heard before makes the new stations that broadcast online to get new listeners online. Additionally, radio stations have the advantage of interacting with the audience when they run via the internet and are also able to know the total number of people who are listening.

However, the biggest challenge of the online radio is the struggle of getting new listeners. The majority of people still listen to the analog FM and AM radio stations, which poses a challenge to the internet radio on how to get a new audience. In developing countries, stand-alone internet radio receivers are not available, and most people cannot afford computers. However, the challenge of getting online listeners is not very big since radio stations are now creating applications that allow the listeners to listen using smartphones.

Another challenge of the online radio service is that the internet is not always available for use to the public. For instance, in developing countries where the majority of the citizens are poor, accessing internet connectivity is a big challenge. In these countries, people concentrate on getting basic needs and other essential services like health-care and education. Additionally, listening to internet radios is a costly thing, and not everyone can afford the service. However, internet radio has solved the problem of the terrestrial radios' network inability to cover a wide area.

Although starting an internet radio does not need the station to acquire a license from the authority, the stations must pay to get permission to play commercial music. The necessity of having to pay royalties makes the broadcasting process to become expensive for start-up stations. Since online radios do not have large fan-base, it is difficult for them to have advertisers and sponsors. Advertisers go for the media with a significant command of listeners or viewers, so the station might have problems getting funds to finance their operations.

Despite the challenge of getting new listeners and the inability to widen the fan base, online radio stations can join ad programs online. The ad network works like the Google AdSense program, and the advertiser pays according to the number of people that the advert reaches. However, the absence of ads or the presence of fewer ads makes the listeners enjoy unlimited entertainment and education on internet radios. While advertisements are a nuisance to the radio fans, it is possible to listen to a radio station without hearing any advert on online communication.

4. The Economy of Digital Radio

Radios have invested in digital to maintain current and future relevance. This investment has economic implications worldwide as the digital era is rolling up in every corner of the world. It is estimated that 75% of the world population can access information through radio. This accessibility creates a clear picture of how digital radio disseminates information (Popov, 2018). Broadcasting is essential because it helps in information spreading, which leads to improved government and economy and makes it possible for the public to access the new content and communicate more effectively.

Since the launch of digital radio, there has been a significant rise in the amount of income that radio stations raise. With the increase in the number of radio listeners, most advertisers have continued to use radio stations to promote their products. For instance, there are over 300 commercial radio stations in the UK. The country also has over 33% of the nationals listen to the radio. In 1994, the commercial radio sector raised about 200 pounds in Revenue Management (Barefoot et al., 2018). With the increased use of digital broadcasting media, the amount had risen to around 300 pounds by the year 1996. the revenue that kept increasing such that by the year 2000, commercial radio stations were earning about 600 pounds for the year (Pandey et al., 2017). However, the amount reduced between 2000 and 2015, possibly due to increased competition.

Since digital radios are cheap to start and operate, many radio stations have erupted since digital radio began working around the globe (Pandey et al., 2017). The economic effect of the increase in radio stations is that many people have got jobs. A study of the UK economy shows that radio stations had created jobs for over 12000 citizens by 2015. The sector has also increased the amount of revenue that the government earns (Scott, 2017). The study also reveals that the British government gained about 592 pounds from the radio sector. The amount has been increasing since the digital radio came into operation.

Broadcast operations have been proven sustainable, even in rural areas that have low income. They have played an essential role in a range of developments-including interactive radio instructions, where they are cost-effective (Scott, 2017). Access to governance services has correlated well with broadcast technologies.

In the US, the popularity of digital radio has significantly increased over the last decade. In 2003 the revenue that the state earned from broadcasting activities totaled to around \$49 million. By 2006 the amount had risen over ten times and was about \$500 million (Scott, 2017). The amount of money that different countries make from digital broadcasting keeps increasing as different online radio stations continue to erupt. In contrast, the present ones keep growing in terms of the scale of operations.

Digital radio is playing an essential role in eradicating poverty, especially in third-world states. The broadcasting sector is a source of employment and output itself (Barefoot et al., 2018). There are scores of individuals involved the digital radio as employees who play very crucial roles, ensuring timely information dissemination.

Digital radio has also impacted the UK economy, improving and developing it consequently. Due to the higher consumption of digital broadcasting, the radio industry is sequentially registering profits year after year (Popov, 2018). researchers estimate that by 2025, the radio industry will generate around 450 million euros. The listening of radios in vehicles has increased significantly in the UK, making digital radio the most reliable source of information. The gross value addition of radio broadcasting in 2012 was approximately 600 million euros predominantly from BBC Radio and Commercial Radio.

5. Forms of Digital Radios

Digital radios are of various types depending on the means they use to transmit the audio communications. The digital radio systems include the internet radio, Spotify radio, digital audio broadcasting (DAB), Digital Radio Mondiale (DRM), HD radio, integrated service digital broadcasting (ISDB), and the In-Band on the channel.

Internet radio, also known as internet protocol radio, web radio, online radio, streaming radio E-radio, or net radio, is the means of listening to audio radio service through the internet. This type of communication transmits messages through wireless means through the internet from a definite source and is called webcasting. One can access a streaming radio station from any part of the world. However, some online radio platforms restrict listeners to the domestic country only to avoid international transmission.

Listeners of the internet radio stations can use personal computers or other computerized devices to listen to online radio stations. Recently, companies have designed dedicated machines to serve the purpose of listening to internet radio. Internet radio devices work like traditional radio receivers but use the internet to perform the task.

A station that offers online radio service uses a technique called streaming to send audio format information to the listeners. The method allows the radio to send messages in formats like MP3, windows mega Audio, RealAudio, and other audio formats. Streaming involves sending the data serially through the local network or over the internet (Priestman, 2001). The streaming media records the message then sends it seconds later to the listeners.

Some radio stations solely use streaming to transmit the message to their listeners instead of the traditional AM and FM modes. The advantage of using the internet to broadcast without using the wave modulation system is

that it does not have to comply with government regulations. Internet radio stations offer services like sports, talks, news, and music to the listeners.

Some internet radio stations also broadcast through terrestrial transmission, while others prefer to use the internet as the only means of broadcasting. The main advantage of running an internet-only radio station is that it is relatively economical. Some of the most famous internet protocol radio stations are Tunein Radio, Iheart Radio, and Sirius XM.

Digital Audio Broadcasting (DAB) is a modern way of broadcasting that different countries use to transmit radio services (Moorhead, 2019). This service is universal in most developed countries. This radio transmission system has first erupted in European countries in the 1980s. The DAB radio transmission system is more efficient than the traditional analog radio, which uses AM and FM systems to broadcast. This radio transmission system can use the same bandwidth to transmit various radio stations (Hoeg & Lauterbach, 2004). However, the radio transmits sound quality relies on the bit-rate that you supply to the radio programs.

Although the quality of DAB radio reduces when the strength of the signal falls below the critical threshold, it produces more quality audio in noise and multipath fading. Originally, DAB radio service transmitted in MP2 and codec audio formats (Moorhead, 2019). In 2007, the system upgraded to DAB+ and started sending its signal in HE-AAC v2 (AAC) audio codec. In radio spectrum management, some bands belong to DAB, and the public is free to access them. The DAB band spectrum for the people is the T-DAB. By the year 2019, only 41 countries ran the DAB radio system, with most of them using DAB+. We expect that countries that are still using FM and AM to transmit messages will eventually switch to the DAB and DAB+ (Hoeg & Lauterbach, 2004).

DAB uses vast broadband to broadcast, referred to as band III and L Band III, which use 174-240 MHz and 1.452-1.492. However, DAB allows radio transmission between the frequency of 30-300 MHz. DAB initially allowed transmission of radio through four modes (I, II, III, and IV) (Hoeg & Lauterbach, 2004). in mode I, the transfer happens through band III, where transmission is on earth. Mode II allows transmission of radio messages through L-band, and the transfer occurs both on land and through satellite. Mode III uses both ground and satellite to translate using bandwidth below 3 GHz while mode IV transmits L-Band using both satellite and through earth transmission. However, since 2007, DAB stopped using all the other modes of communication and only uses mode I.

HD Radio (HDR) is a radio transmission service whose name is a trademark for In-Band On-Channel (IBOC). The radio system is most prevalent in North American countries like the USA, Mexico, and Canada (Moorhead, 2019). The HDR system transmits audio messages using digital signals embedded around standard analog signals. The system allows the

public to listen to various radio programs via the HD system, which usually produces less noise. Alternatively, people can listen to the radio programs using a standard broadcast system, which gives the standard quality audio message.

HD system also allows one station to broadcast one or more programs simultaneously with the one program running on the radio analog channel. The US selected the HDR mode to transmit radio programs within the country in 2002 (Hoeg & Lauterbach, 2004). HD allows all-digital means of broadcasting. Only one radio station is free to use AM in the HD radio system for the experiment.

When a radio station uses Frequency modulation to transmit in the HD system, it can send through both digital and analog means. The stations in the HD radio system are also free to add new FM radio and text channels. HDR mode operates based on free to air. However, radio listeners must have HD radio receivers to be able to enjoy the services. By 2018 HD service had over 3500 functions in the US, which was higher than the DAB (2200). HD radio stations must have to pay a one-time license fee for the authority to convert the audio format from audio to IBiquity HD. Additionally, the government requires HD channels to pay 3% of revenue for any additional channel that they offer.

The Digital Radio Mondiale (DRM) is a means of digital radio broadcasting that uses both AM and FM media to broadcast in an advanced manner. The quality of the audio voice is usually higher than the traditional FM and AM. The audio formats that the DRM system broadcasts are xHE-AAC audio coding, MPEG-4, and Opus codecs. However, the most standard audio format that DRM radio transmits is the xHE-AAC. DRM can deliver quality audio, which is similar to the FM at low frequencies of about 30 MHz for long waves, medium waves, and short waves.

DRM system can also transmit other formats of messages apart from the audio. The DRM system is usually a free-to-air service and serves a larger area than the traditional radio that used AM and FM analog systems. DRM requires users to have a decoding means, which is mainly a computer. However, manufacturers are working to produce stand-alone DRM receivers would fill the available gap of an economical way of listening to the DRM radio.

Another familiar digital radio that is operating in the modern world is the Spotify radio. This type of digital radio allows users to stream different kinds of music and other media through the internet (Priestman, 2001). The Spotify system uses DRM podcasts from record labels to allow listeners to enjoy music and free advertisement if they subscribe to Spotify premium service. Subscribers of the premium service can listen to free commercial music via the Spotify app. Non-subscribers can also stream music using the Spotify app. The steaming media allows you to access entertainment through android

apps, windows, MacOS, IOS, and other applications on computers, tablets, and smartphones. The app first appeared on 7th October 2007.

The Spotify media has over 60 million songs ready for listeners to stream. Spotify allows users to search songs by features like an artist, genre, album, and other parameters. The service is currently available in Europe, Australia, Africa, and the Americas. The digital music streaming media compensates artists according to the number of people who stream the song and not per song or album like other media.

Spotify started in Sweden in 2006, but the corporate headquarters of the media are in the USA. In the year 2009, Spotify opened free public registration in the UK. In 2011 the press started recruiting artists in the US and allowed the citizen to stream for free, a service that lasted until January 2012. the users of Spotify increase every year (Priestman, 2001). By March 2011, the media had 1 million subscribers of the Spotify premium, which increased to 2 million in 2012. However, the number of active streamers was over 15 million by the year august 2012 and increased to 20 million by December the same year. The number of active users increased to 24 million by March 2013, and the subscribers grew to 6 million by that time. The numbers keep growing, and in April 2020, Spotify had a fan base of over 133 million subscribed to the company's premium service.

The main advantage of Spotify is that it is easy to use. Using Spotify only requires you to register a free account in the app. Initially, one could only access the media through invitation by a member. However, Spotify has now allowed every interested person to join by creating a new account. If one has a problem with creating the account, they can use the Facebook username since Spotify acts in partnership with Facebook to make the use easy.

Another advantage of this streaming media is that one can access it through a variety of devices. Whether you are using an android mobile phone, a computer with windows, an iPhone, or a Mac, you can install the Spotify application and start streaming music online. Spotify also allows free music to listeners throughout the world. The media do not pay only media, and therefore people can enjoy entertainment free to air. The streaming media is also accessible as it allows features like shuffle, which allows the user to skip up to six songs.

If you want to download music through this media, you can do it with ease as the media makes it possible to listen or download the music that the listeners wish to get. If you are a premium user of the media, you can freely download up to 10, 000 songs. Another advantage of using premium Spotify service is that it adds free, and therefore, the listeners enjoy entertainment without any interruption. The media also allows you to listen to any song when you wish to use your device. Spotify also allows users to access radio through their devices, such as smartphones.

Spotify also offers high-quality music. Free listeners can enjoy up to 160kbps while premium subscribers enjoy higher quality entertainment. As a premium subscriber, you can listen and enjoy 320kbps quality music. Spotify also allows users to share music, especially if they have linked their accounts with Facebook.

However, Spotify lacks the lyrics of songs, unlike other streaming mediums like Shazam. People who would like to read the lyrics of songs as they listen may not get them if they are using Spotify. The media is also not available in all countries, and therefore it has limited coverage, unlike other mediums. People also criticize Spotify saying that streaming media is costly. Another critic of Spotify is that the media offers limited services for free users.

6. The Differences that Digital Radios Brought to the Traditional Radio

As a result of technological advancement, radio transmission has changed from the use of short and medium waves to the current usage of the internet in broadcasting. Stations have also changed from AM and FM in the traditional radio and are now using digital radio transmissions like DAB and DRM. The primary effect of analog, digital migration by radio stations is that listeners get high-quality sound compared to traditional analog radio. Listeners can also get other content apart from audio radio messages without necessarily having to pay a lot of money for the service when they use the internet to listen.

Digital radio broadcasting also makes it easier for a station to get a broad audience as it allows transmission of the audios through a large area. The digital radio system allows the media house to air more than one program at a time, especially when they air through the internet. The use of online broadcasting allows listeners and broadcasters to interact, unlike the traditional radio, where the transmission had to go one way. For instance, the use of data service journaling allows the listeners to read the news and other updates online and give their feedback over the internet.

The use of digital radio transmission results in a more effective and economical means of broadcasting. Radio stations can minimize the cost of operating through choosing to stream online. Digital broadcasting helps in complimenting the FM. Therefore, radio stations can now use the streaming method to reach listeners in places where the analog waves cannot reach. The internet radio is now able to reach the entire world.

Digital means of broadcasting also allow radio fans to get high-quality entertainment. For example, users of Spotify can enjoy unlimited and high-quality music through streaming online. DAB and DRM also offer high-quality broadcasting services. The radio services are also easy to access with the use of digital radio since one can even listen to broadcast using a smartphone.

Another effect of using digital media is that it has allowed two-way transmission of messages through internet use. Additionally, radio stations are now able to send many forms of files through digital media, unlike the analog radio, which only broadcasts audio. The efficiency of broadcasting has increased as digital media allows stations to send a high rate of bits/s. The digital radio messages can be more secure since it is easy to encrypt the messages before posting them.

Through error correction coding, digital audio broadcasting can send high-quality audio within different signal strengths. ECC makes it easy to broadcast a high amount of message, even when the signal is weak. Through digital broadcasting, radio stations can now equalization which radios achieve by Orthogonal Frequency-Division Multiplexing (OFDM) and Phase-Shift Keying techniques. DAB's use has also made it possible for listeners to enjoy very high-quality audio since DAB allows transmission of sound up to 1184kb/s through multiplexing.

Digital audio broadcasting and digital audio module also widen a variety of radio stations which listeners can enjoy. The digital radio systems also allow listeners to get radio services without interference of unlicensed radio stations, which was common in analog radio. However, some digital modes of transmission are expensive to operate. For instance, running a radio station through DAB is more than twice as expensive as using the FM system. One of the negative impacts of using DAB is that the radio reception may not work if the network signal is down or if the waves get interference. However, the problem of interference and weak signal ended when DAB upgraded to DAB+.

7. Development of the Global Radio Networks

There are various internet radio stations which are famous in the globe. One of the most popular online media is IHeart Radio, which first appeared in April 2008. In 2011 the radio announced the new development of an all-in-one radio broadcasting service. In 2012, IHeart radio signed a deal with Yahoo, which saw the two cooperate in providing online radio service (Priestman, 2001). In the same year, IHeart expanded its operations and covered over 20 states in the US. In 2013, IHeart added new radio stations outside us, including CHUM-FM and CFBT-FM in Canada and Virgin Radio, which operates in Dubai in UAE. In 2015 the IHeart radio station launched an app that made it easy for people to listen to the radio station through their mobile devices.

In 2016, IHeart launched an On-demand radio app called 'IHeartRadio plus,' which was compatible with both android and iOS devices. By 2017, the application was consistent with even PCs after the media house launched the advanced application. The ownership of the international radio station is the IHeartmedia.inc, based in the US. IHeart radio can transmit to many people,

and one can easily access the media using any of over 250 types of devices. The station is now more than 12 decades old and has over 20 companies, which are shareholders or are affiliated to the radio station. In 2018, IHeart media acquired the stuff media, the leading commercial entertainment, and news media.

Today, IHeart media is one of the leading media stations in terms of advertising podcasts, for it has access to over 250,000 advertising podcasts. The IHeart radio operates as an international media. The radio media has stations in countries like Australia and New Zealand, Canada, the USA, and many others. I heart currently has a market value of around \$539 million and an outstanding share value of \$59.1 Million.

Based in the US and owned by TuneIn.inc, tune in streaming media is another popular online global radio network. The media offers services like news, sports, music, and advertising podcasts. By the year 2019, this global radio network had over 60 million monthly listeners. This media first appeared in the world in 2002 and currently works through iOS, android, blackberry, windows, and PlayStation apps. By 2015, Tunein was also available in 55 different car models. Throughout 2013, Tunein raised about US\$50 million from its operations. TuneIn is currently available in various countries and broadcasts in 22 different languages.

TuneIn is one of the world's most significant radio media and has over 100,000 airing through various means worldwide. Amazingly, Tunein provides over 5.7 million on-demand radio programs. In 2015, Tunein launched a live-streaming app called 'Tunein radio pro,' which provided content like sport and audio-books in link with other popular media like Al Jazeera, MSBC, and many others.

In 2018, tune in launched an app by the name Tunein live, which facilitated broadcasting of sports events, talk shows, and other audio contents through the web. In the same year, Tunein launched commercial-free news in its premium services in link with media houses like FOX News, CNBC, and MSNBC. The global radio network kept growing and had a market value of about \$500 million by 2017.

BBC radio is also a big player in the digital radio market in the world. This global radio station is based in the UK and has many radio stations around the globe. BBC has been in operation since the year 1927 and operates all over the world. This media uses both analog and digital means to broadcast. The media has five national radio stations and numerous others all over the world. BBC broadcasts in 27 different languages in many parts of the world and uses analog, digital waves, and the internet (Hendy, 2018).

8. Conclusion: The Future of Digital Media and Radio

Predicting the future of digital media and radio is always tricky with the fast-changing technological advancements. However, looking at what the

future will look like in some years, there are likely to be massive changes. Traditional media has not died, and it is not dying. The majority of the people above 50 years use traditional media while their counterparts below that age are significant digital media users and radio users. Looking at how things will be in about 20 years when all these young people will be aged in society is interesting.

With the daily influx of listeners worldwide and the traditional AM and FM radio systems, they could become unable to broadcast. Therefore, there will be a need for a radio station to adopt a means that can make it easy to support large listeners (Craglia et al., 2012). Additionally, radio stations have been trying to reach their fans who are located all around the globe. The solution to these challenges can only be available if radio all radio stations shift from the analog transmission to digital broadcasting. Therefore the analog radio transmission may entirely collapse, and the station will use only digital media.

TVs as hardware devices are becoming smart TVs. Unlike some years ago, it is now even hard to buy a TV that is not digital (Priestman, 2004). These are easing up the access and consumption of content. In the future, there is a likelihood of most people having smart TVs that will have installed applications like Netflix. For example, Netflix and Disney have invested heavily to ensure the content they deliver is of high-quality, thus out smashing traditional TVs (Hendy, 2018). Most users want to control the content they watch and the time to listen. Watching linear programs is becoming outdated, and this will be very minimal soon. In the future, the only thing that will be left to watch inline will be sports. Mobile phones can stream sports live, and this is making TVs lose slowly. TVs cannot compete with Netflix and Disney in terms of the quality of their content, and this trend will likely continue.

Similarly, radio media is likely to take the same direction and adopt the use means to allow users to control the programs they watch. Some digital radio programs like Spotify multiply since they make selecting what one wishes to view possible (Hand, 2014). In the future, the majority of the world population may be using flexible audio media.

Radio has not changed that much except the sizes. Services like Spotify, Deezer, Apple Music, Google Music, and YouTube are now available to most content consumers. All these contain a large number of the music of different varieties that users can access anytime they want with the internet's facilitation, which is available twenty-four hours a day. Linear radio shows will still be listened to in the future, but by a tiny proportion of the global population (Hendy, 2018). Radios have also improved their content quality to remain relevant, and they will keep growing. Radios in vehicles are getting connected to the internet, and this is the way going forward. The progressive

improvement in radio content quality shows that the future of digital radio will make them able to send very high-quality audio.

Newspapers are another medium of communication. Years back, many people were reading hard copies of publications, which used to be costly. Today the number of people reading newspaper hard copies has drastically reduced and will keep going down. This decrease is attributed to the availability of soft copies of these materials (Hendy, 2018). Radio media are also sending content in text and soft copies over the internet in addition to the audio, unlike traditional radios. Newspaper information is easily accessible over the internet since radio stations have also integrated the written news in their contents. The young population will soon be old; they will still rely on the internet to receive information. The young people in the future will barely use hard copies. Radio media could, in the future, transmitting all forms of media.

Another change that is very likely to occur in the field of radio is that radio media might become more reliable and accessible. The extensive use of the internet to broadcast radio content has made it easy for people to access radio using their computers, smartphones, and other devices (Hand, 2014). DAB has also made it easy for people to access broadcasts since one can even listen to the radio from a device that is usually fixed in a car or a stand-alone DAB receiver. If the media keeps the trend, we may see the radio increasing in popularity in the future.

The AM and FM traditional radio are in danger of extinction. In some countries like the UK, only less than 10% of listeners use FM receivers. Therefore, one can predict that the British government will soon shut down the FM transmission system (Priestman, 2001). Most countries have already switched from traditional analog TV transmission, and we can predict that the radio media might also follow the same route. In most developed countries, switching the analog radio systems seem the next big step since the AM and FM broadcasting now appears uneconomical. We can predict that anytime the British will announce the date for analog-digital switch-over.

All around the world, radio is getting very resilient. There are vast increases in the number of people listening to TuneIn and other online media platforms every year. We can predict that online radio might replace the traditional ones (Hand, 2014). A study of radio consumption behavior in the US revealed that many listeners listen to on-demand radio programs. Only a small fraction of people like listening to live radio program. Therefore, the behavior tells that it is possible that in future people will change to on-demand radio means.

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