

A Conceptual Article on Digital Technology in Broadcasting

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ABSTRACT

The conceptual article discusses digital technology in the field of the broadcasting industry. Rice (2003) stated that the term digital technologies refers to a wide variety of technologies, tools, services, and applications that make use of different kinds of computer hardware and computer software. The digitalization of the broadcasting system comprises three types of vibrant elements in production equipment, transmission equipment, and reception equipment. The broadcasting chain consists of a set of television and radio stations to transmit the same program at the same time to a huge geographical area in a way that anyone can receive via audio-video material. It is of the greatest importance to prevent troublesome issues from occurring inside the broadcasting series. In a radio broadcast, Tan et al. (2019) explained that there is a distinction between the traditional radio and the digital connections, stating that the traditional radio is over the air and is not dependent on the digital connections and that it is able to be received during power outages without a bandwidth limit. In the digital age, countries with inadequate internet access have a comparatively low penetration level due to the limited availability of the internet.

Keywords: Digital technology, broadcasting, television, radio, live streaming

INTRODUCTION

We lived in a modern world that uses digital technology in our generations. What is Digital Technology? The term "digital technologies" refers to a wide variety of technologies, tools, services, and applications that make use of different kinds of computer hardware and computer software (Rice 2003). They make it easier to carry out tasks or provide services by making it possible to create, store, process, transfer, and display information through electronic means. According to Vuorikari et al. (2016), digital technologies encompass a wide range of applications, including but not limited to the usage of personal computers, digital television and radio, mobile phones, robotics, and so on (Rice 2003).

Back to the history in 1898, Guglielmo Marconi, an Italian who was only 24 years old at the time, launched the first radio broadcasting service in the world. Not only did radio and, subsequently, television bring an abundance of entertainment and information to the people living in the United States, but they also brought about a multitude of legal concerns concerning the implementation and control of these new technologies. In the early days of radio, all stations used the same frequency to transmit their signals. This presented several challenges, as some stations were willing to share their airtime with other stations, while others endeavored to broadcast stronger signals than those of their rivals. Even after stations started transmitting on different frequencies, the issues were not resolved. Because the transmission of broadcasting signals requires the use of the airwaves, and because the airwaves can only carry a certain number of signals at one time, it became clear very quickly that some kind of regulation was required.

Despite this, the industry of broadcasting is seeing a great deal of change as we go into the new era of the 21st century. The traditional services of television, wireless radio communications, and computers that gradually been overtaken by new services that are commonly known as advanced TV, interactive media, and multimedia. It has been made feasible by the production of genuine digital technology, which was launched precisely at the point where "traditional" broadcast technologies had reached their apex (Tadashi & Mitsutoshi, 2017). What has made this possible is the realization of genuine digital technology? In the following discussion, we will explore the history of broadcasting, beginning with the first radio technology and progressing up to the most recent digital broadcasting techniques.

Digitalization Process

According to Tadashi and Mitsutoshi 2017, the digitalization of the broadcasting system consists of three types of vital elements: production equipment, transmission equipment, and reception equipment. Tadashi and Mitsutoshi 2017 state that these three types of equipment are equally important. This fundamental framework is utilized in both analog and digital broadcasting; the only difference between the two is the underlying operational philosophy of the modulators and demodulators. The production equipment consists of the devices and facilities that are required to produce the programming.

This includes the studio, videotape recorders (VTR), the films and tapes required for recording, storage, and playback, as well as the portable production equipment used for on-

scene reporting. While the functions of the transmission equipment were to modulate the carrier with signals produced by the production equipment and then transmit the modulated signals from the facility antenna, the transmission equipment was responsible for modulating the carrier with the signals produced by the production equipment.

The height of the transmitter antenna, the amount of transmission power, and the broadcast frequency in terrestrial broadcasting are all controlled by regulation, to make the best possible use of the radio spectrum. Next, the equipment used for reception includes an antenna, which is responsible for picking up the broadcast signal, a demodulator, which is responsible for restoring the modulated signal, and a monitor, which includes speakers for viewing visuals and hearing audio.

The most vital aspect of stability, as well as significant maintenance expenses of this industry, is associated with transmission (Oliver & Chetrit 2017). The broadcasting chain consists of a set of television and radio stations to transmit the same program at the same time to a huge geographical area in a way that anyone can receive audio/video material. It is of the utmost importance to prevent troublesome issues from occurring inside the broadcasting chain. This chain deals with a variety of equipment for receiving contribution signals and broadcasting high-power transmitters in the spread-out transmitting stations throughout a vast country. Due to the conditions and distance of these inaccessible stations, the employment of human workers and spare parts of different equipment in each station are not affordable (ITU, 2016).

In addition, there is a flow of signals between the transmitter system and the receiver system in a digital broadcasting system. The analog information found in the picture and the accompanying sound transformed into its digital equivalent in a digital system. The high-efficiency coding procedures are used to digitally compress certain parts of the signal, and multiplexing is used to combine several different sections of the compressed data. Both of these processes are utilized in conjunction with each other.

The signal is then digitally modulated to make the most efficient use of the frequency spectrum over which it is broadcast and forward error correction codes are then added to the signal to rectify any errors that may have occurred while the signal was being transmitted. This process is then reversed at the receiver end when the signal is subjected to digital demodulation, error correction, multiplexing, and decoding to restore the visual and audio signals as they were originally transmitted. The encoding and multiplexing processes are the same across all forms of transmission, including ground waves, terrestrial transmissions, satellite transmissions, and cable transmissions. Standards are now being created to cover these common areas. On the other hand, FEC and digital modulation systems are tailored to the requirements of a particular mode of transmission and system to ensure that they function in the manner that is most beneficial to the application that is currently being developed using these technologies (Tadashi & Mitsutoshi 2017).

Transformation of Traditional Radio to Digital Radio

Traditional radios, as described by Tan et al. (2019: 492), typically come equipped with antennas that can cover certain regions. The primary stations are installed in regions that are beyond the coverage area of the secondary, smaller rebroadcast stations. On the other hand,

smaller local stations such as Studio FM105.4 are relatively constricted around their transmitters to a limited area. As people have become more accustomed to using the internet and have a greater propensity to spend a great deal of time doing so, conventional radio has given way to the more advanced medium of digital radio.

Traditional radio has been elevated to a new level. There are several radio directory websites, such as Tune In, My Community Radio, and I Heart, among many more, that each has thousands of digital radio stations from all over the world. Tan et al. (2019) explained that there is a distinction between the traditional radio and the digital connections, stating that the traditional radio is over the air and is not dependent on the digital connections and that it is able to be received during power outages without a bandwidth limit. Tan, Guo, and Wang (2019) found that the material could be relevant to listeners, which gives the impression that it is local as well. Some examples of this are advertisements, traffic reports, and news.

Tan, Guo, and Wang (2019) concluded that conventional radios couldn't be utilized in every environment due to the long wavelength of radio stations. This was a significant finding. This is the issue that the person is having, as it is completely dependent on the location that they are using as well as the fact that they cannot get into every channel.

Currently, analog radio is being replaced by digital radio in terms of its practicality, accessibility, and overall quality of experience for listeners. Digital radio can be heard all over the world, however before its transformation into digital radio, traditional radio broadcasts were limited to a single channel that was only available in a single geographic region.

Individuals need only have a connection to the internet to access digital radio and stream the music of their choosing, allowing them to listen to their preferred genre or performer. On the other hand, Tan, Guo, and Wang (2019:490) have hypothesized that FM (frequency modulation) radio channels have a relatively limited coverage area. In addition, Tan et al. (2019) state that traditional radio cannot afford to be as specialized or eclectic as digital radio can, which allows digital radio to be both more specialized and eclectic. Because it is not restricted geographically, therefore, it can appeal to the audience internationally with more specialized interests and does not have to try to please every individual all the time as traditional radio stations do typically. This makes it possible for it to appeal to the audience internationally. According to Nielsen and Kreutzfeldt (2016: 170), eight factors contribute to the establishment of an essential framework for the transformation of radio broadcasting in the digital age. One of the required pieces of apparatus for radio receivers that have only one digital interface is regulation for smart radio. The creation of the rule ensures the analog transformation capacity released by public radio broadcasters is unavailable for use by other or new analog radio service providers.

Nielsen and Kreutzfeldt, 2016 stated that the transition from analog radio to digital radio helps to support high-speed broadband networks by providing the necessary transmission capacity through the establishment of a second nationwide DAB plus multiplex by network agencies. In addition, the creation of measuring methods for the application of radio in collaboration with the games includes the use of digital terrestrial broadcasting. According to Jianjie et al. (2016:27), radio programs first began to be aired on medium wave in the early 1920s. Following the conclusion of World War II, Germany became the birthplace of FM

transmission. On February 28 of that same year (1949), Bavarian Radio became the very first broadcasting station in Europe to begin running a transmitter.

Because of this, it was believed that traditional radio transmission is a linear medium that is also time-based, meaning that listeners are required to have their radios tuned in to specific stations at specific times. They are required to adhere to the schedule to obtain the content that they desire, and the broadcaster is the one who is responsible for designing the timetable. It was hypothesized that the future digital platforms for radio will feature user sovereignty and a greater number of listeners as two of their distinguishing qualities.

As a consequence of this, there is an increase in the number of channels (terrestrial and satellite digital radio, as well as the Internet), as well as in the availability of nonlinear content distribution and consumption (podcasting, downloading, and listening to audio files that have been recorded) (Nielsen and Kreutzfeldt, 2016:170). According to Jianjie et al. (2016), in addition to keeping to a schedule, listening to programs that have been recorded or downloaded while traveling is an effective way to compensate for difficulties with signal reception. Even though longwave and mediumwave transmissions are more common, the medium wave is still used as a transmission mode for radio, particularly in areas where programs are not aired using long wave or medium wave. The publicly-owned broadcaster in Germany was responsible for operating the country's lone and final mediumwave transmitter, which stopped broadcasting in the year 2015.

A significant portion of the earnings came from the back catalog, which also offers the significance that grows along with the age of the podcasts library and the location of the podcasts. As a result, the transition to digital radio poses significant challenges to the conventional radio broadcasting industry while also creating new opportunities in this space. The consumption of media is currently becoming convergent, and non-linear audio offers are continuously expanding in popularity; as a result, individual voices are beginning to question whether linear programming will still have a place in the future.

The media industry's current catchphrase is "radio convergence." Jianjie et al. (2016) investigate does it imply in the radio sector because the most significant obstacle has been brought about as a result of disruption brought about by technology. The United Kingdom is considered one of the most digitally advanced countries in the entire world because it has a digital television, an ownership rate of about 78 percent for smartphones, and nearly comprehensive digital broadband.

According to the findings of Jianjie et al. (2016: 27), a sizeable percentage of the public uses digital radio, and this demographic claims to listen to roughly 50 minutes of radio daily. Jianjie et al. (2016) state that radio is undergoing a transition into a novel form of media due to the rapid advancement of digital technology. This new form of media will include visual materials and convergence applications. This does not imply that listeners are unable to have an aural experience but rather indicates a layer of content that enables users to enhance that experience in the online realm.

Jianjie et al. (2016: 22) came concluded stations are at the forefront of the media convergence phenomenon. This is because radio listeners have a propensity to look for the content that they want to actually consume. As long as the user is connected to the internet,

they will be able to listen to any of the channels or stations regardless of where they are in the world. On the other hand, to use the particular internet-based service that is required to listen to digital radio, a person must at all times be connected to the internet.

Importantly, radio stations now have no choice except to produce audio-visual material, which requires viewers to navigate visually rather than by reading text. This motivates stations to create websites that feature several huge visuals and icons. Broadcasters are required to think carefully and invest in various narrative techniques to tell compelling stories. The radio shows are not successful on their own; rather, they are successful because they make the most of the relevant platforms available to them. It is no longer possible to consider mobile phones, television, radio, the internet, and social media as discrete entities.

According to Nielsen and Kreutzfeldt (2016: 164), it is evident from the convergence of technology and radio that smartphones are developing into the new radio in addition to developing into the new laptop computer. Although we are unsure as to whether or not we are genuine "front and center" on devices, we are significantly expanding the connection with our customers and listeners using virtual lives.

CONCLUSION

Live streaming technology is currently one of the newer forms of online media that are developing at one of the quickest rates, making it one of the most promising new mediums for the dissemination of writers' works. In a relatively short amount of time, it has greatly penetrated various parts of the world, notably the nations that are most advanced in terms of their technological infrastructure. Countries with inadequate internet access have a comparatively low penetration level due to the limited availability of the internet.

This is supported by the fact that as and when a new technology is widely used for the commercial exploitation of copyright works, the same has been recognized expressly. In this context, the present problem facing the copyright system is to accommodate the economic exploitation of copyright works through the growing technology of live streaming. This is the challenge that is currently facing the copyright system.

It has been discovered, via the process of tracing the development of the right of communication to the public, that its beginnings may be traced back to the expansion of technologies related to broadcasting. For example, the proliferation of radio broadcasting led to the unauthorized use of copyrighted works, most notably songs, by organizations that were responsible for radio transmission. As a direct consequence of this, worldwide standards for the protection of author rights in broadcasting have come into existence.

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