Definition Of The Radio And Development History

From its birth early in the 20th century, Radio astonished and delighted the public by providing news and entertainment with an immediacy never before thought possible.

From 1920 to 1945, radio became the first electronic mass medium, monopolizing 'the airwaves' and defining a whole generation of mass culture, with newspapers, magazines. From 1945 the appearance of television began to transform the content and role of radio, and it turns to become the technology used for enjoying music home. The launching of the walkman in the 80s changed worlds relation with music. The possibility to listen to music privately outside, and on a journey, gave freedom to users and changed the relation to radio. In the 20st century, its importance in modern life did not match that of television, and in the early 21st century it faced yet more competitive pressure from digital satellite- and Internet-based audio services.

Even though, the radio and the Walkman impacted the music market, and the social evolution. It changed our relation to music, our lifestyle and our expectations, as well as it highly paved the way for technological progress.

I. Radio

1. What is the Radio?

FM radio, invented in 1933 by Edwin Armstrong, is a method of broadcasting radio programs using frequency modulation (or FM for Frequency modulation) in the very high frequency range. But the invention of radio began before the creation of the first radio station. It began in the 80s’, with the development of communication waves.

A radio is a machine that is producing waves, that the human being can hear. The range of the band is from 87.5 to 108 MHz. It is intended to be received directly by the public and applies to both individual and community reception.

How does it works ? The radio link is possible thanks to a transmitter and a receiver which are both connected to an antenna. It is a communication system that works based on the spatial distribution of electromagnetic waves.

In the 1930s, the first mainstream radio stations emerged around the world, notably with the birth of Radio Tour Eiffel in 1921. Consumer radio receivers were also beginning to appear, the first stations being rectangular boxes made of more or less precious wood decorated with various types of marquetry.

The evolution of radio led us to digital station display, and digital radio to arrive at podcasts and internet radio in the 2000s. Today there are thousands of web radio stations with a wide range of programming available and on demand online radio that now accompany the radio landscape in addition to the pioneering radio stations that still use the AM and FM bands.

2. The history of the radio

Birth of the radio (1890 – 1919)

Although development of the first radio wave communication system is attributed to Guglielmo Marconi, it was the practical application of more than 80 years of scientific advancement in the field of wireless telegraphy.

This includes the experimental work of:

- Michael Faraday who discovered the principles underlying electromagnetic induction, diamagnetism and electrolysis
- James Clerk Maxwell whom most notable achievement was to formulate the classical theory of electromagnetic radiation, bringing together for the first time electricity, magnetism, and light as different manifestations of the same phenomenon
- and Heinrich Rudolf Hertz who first conclusively proved the existence of the electromagnetic waves predicted by James Clerk Maxwell's equations of electromagnetism, also known as the “second great unification in physics”.

After the discovery of these 'Hertzian waves', named after Heinrich Rudolf Hertz, many scientists and inventors experimented wireless transmission. Among them, the inventor Nikola Tesla began proposed in 1893, before the Franklin Institute in Philadelphia and the National Electric Light Association, that this wireless power technology could incorporate a system for the telecommunication of information.

In the same time, the young Italian inventor Guglielmo Marconi built the first engineering complete, commercially successful wireless telegraphy system based on airborne Hertzian waves. After a succession of complaints and debates about the use of different patents with Tesla, the United States Supreme Court stated that Marconi was “the man who first achieved successful radio transmission”. Then, on December 12, 1901, Marconi for the first time transmitted and received signals across the Atlantic Ocean.

Golden age of radio (1919 – 1950)

From 1901 to 1920, radio waves were used exclusively for person-to-person text communication for commercial, diplomatic and military purposes. Broadcasting did not exist until the birth of the first radio news program in the 1920s (first broadcast on August 31, 1920 by station 8MK in Detroit, Michigan). It was the beginning of the Golden Age of Radio with the radio as the dominant electronic home entertainment medium (music, comedy show, adaptation from comic strips, soap opera, radio drama…)

Beyond this aspect, radio waves were also used in diverse sectors of activity. For instance:

- In the early 20th century aircraft and ship used commercial AM radio stations for navigation.
- In 1947 AT&T commercialized the Mobile Telephone Service to 100 towns and corridors. At that time, it was a rarity with few radio channels and expensive costs.

Radio and space age (1950 – 1990)

This era lasted through the 1950s, when television gradually superseded radio as the medium

of choice for scripted programming, variety and dramatic shows (radio was used to transmit pictures visible as television in the 20s, and commercial television transmissions started in North America and Europe in the 1940s.)

Radio had to reinvent itself with the development of the transistor radio and the introduction in 1954 of the pocket TR-1 of Regency. But it was the Sony TR-63 (small enough to fit in a vest pocket, durable, powered by a small battery) that led to the mass-market penetration of transistors radio in 1957. Contextually, it also benefited from the baby boom post-World War II, a period of prosperity and the growing popularity of rock 'n' roll music.

New uses were found especially in the field of navigation system in the 1960s with Transit whose operation was based on the Doppler effect (the satellites travelled on well-known paths and broadcast their signals on a well-known radio frequency). In 1987, the Global Positioning System (GPS) constellation of satellites was launched.

Internet radio (1990 – 2020)

With the evolution of the digital world and the growing trends towards online technology, the company WXYC launched in 1994 the first internet radio station. Almost the same year, Scott Bourne founded the site NetRadio.com, which became the first radio network that broadcast on the internet alone.

By the late 1990s, the potential of internet radio had already attracted a considerable amount of attention from potential marketing teams and investors. Companies were keen to see how they could expand their reach by getting involved with internet broadcasting, just as they had invested in FM/AM channels before. As a symbol of this expansion, the first version of iTunes, promotionally dubbed 'World’s Best and Easiest To Use Jukebox Software' was announced on January 9, 2001 and released in 2003.

3. Radio introduced new business models around music

To summarize, today, radio has become much more than Tesla or Marconi could have ever imagined: the traditional radio broadcasting disappeared but, it has evolved towards satellite uses, internet streaming station or advanced mobile communication.

Prior to the 1920s, the radio was a critical tool in the military field to contact ships through radiotelegraphy, to coordinate armed forces in real time and to quickly exchange information. Following the war, radio, mainly as a new source of entertainment, became a common technology present in most households. Gradually after the WWII and TV spread, it began to focus more playing the music of the time with the famous “Top-40”. Radio adapted by offering more community and niche stations, which could not be found on television. Radio became a daytime medium targeting women, while TV took over families in the evening.

Radio history has completely changed the world and the notions of connection & distance.

From one-to-one to one-to-many

Radio has had different purposes throughout time. In this report though, we will only focus on

how it became a source of musical entertainment and how it deeply transformed the music industry. It all started in the early 1900s with amateur radios, also known as “ham radios”. They were referred to as such by professional radiotelegraph operators by extension to the term “Ham”, which was used to qualify incompetent actors. Yet, the amateur radio community rapidly accepted the term and started using it to describe itself. At that time, radio was a one-to-one communication mean. It was private in the sense that messages were not meant to be heard by mere listeners. The goal for these amateurs was to have fun communicating in a completely new manner. As a matter of fact, playing with radios was not a very common hobby. Users had to build their own receptors, and try to communicate using Morse code or listen to experimental voice-sending with very poor reception. But in 1906 Reginald Fessenden marked the history. The man was a very prolific inventor in the United States and has played a major role in the early development of radio. He is the first person to have used continuous waves to transmit speak and music as early as 1902, but without major change to the role of radio. Before that, radio transmitters used spark gaps. Without going through the details, spark gaps only enabled the transmission of short signals over a large bandwidth, which led to recurring interferences and poor signal transmission. What continuous waves enabled was the reduction of the bandwidth needed to transmit signals. With this new technique, Fessenden was able to send much clearer radio signals, such as music. Yet, the breakthrough he originated was true broadcasting. Indeed, in 1906 and for the first time in history, Fessenden broadcasted music for people to listen to. The goal was not communication but entertainment through music. It was the beginning of one-to-many radio.

The introduction of monetization

Of course the development of radio took time, and World War I did not help its spread for entertainment purpose in Europe. Another technological breakthrough that radically changed the reach of radio was the invention of the super heterodyne receiver. It allowed cleaned reception of the signal, which could then be amplified and drive a loudspeaker. Other technologies have followed but we can consider the super heterodyne receiver as the enabler of radio as a family-oriented device. This technologies were really put in applications after 1918, even in the United States, due to a total prohibition to send radio signals during the time the country was involved in World War I. The radio slowly democratized by incrementally becoming cheaper and easier to use. The number of radio stations rapidly multiplied, and advertisement made its way to the airwaves as soon as 1922. At the time, radios were bulky and occupied a privileged place in people’s homes. A lot of businesses even had their own radio stations, broadcasting music but also news, sports etc. Only a few years later, hungry American businessmen saw an opportunity to reach scale effects by creating radio networks. In 1926, the Radio Corporation of America launched the National Broadcasting Network, soon followed by its competitor: Columbia Broadcasting System. Local radios would be affiliated to them to get the right to broadcast music but also internally produced variety shows, dramas and comedies. It is estimated that in the US, more than half of the radio stations were owned by business owners, and a third by non-profit organizations such as churches and schools. After the Radio act in 1927, aiming at allocating the radio frequencies to station in order to reduce interferences, the networks gained considerable market share over non-profits. Ultimately, the radio frequencies ended up being a quasi-complete oligopoly of businesses, dominated by networks. Around that time the usage of radio skyrocketed, with over 60% of households owning one in 1936. For many families hit by the Great Depression, radio was a one-time investment for unlimited entertainment. The content continued to diversify to meet listeners’ needs, sponsored by

businesses. The ads became more and more targeted, promoting household products during daytime when the audience is predominantly composed of women. The early 1950s marked a turning point for the content broadcasted on the airwaves. Indeed, the arrival of televisions on the market hit radio shows very hard. Most of the drama and comedy shows transferred to TV, leaving radio with the only content it could broadcast better than TV: Music. The Golden Age of radio had come to an end, but the music-only radio was born.

The individualization of radio

In order to explain why radio shifted from a family-owned product to an individual possession, it is necessary to mention the arrival of Frequency Modulation (FM) radio. This new way of transmitting audio signal wirelessly brought two things: For one, a whole new bandwidth was available, even though most stations simply used it to broadcast the same content as on the previously available Amplitude Modulation (AM) range. For two, it allowed the transmission of higher fidelity signals, as well as stereo sound. A key technological breakthrough enabled the rapid spread of FM radio all over the world, the use of transistors. Indeed, the transistor radio, abbreviated to transistor, rapidly made its way into people’s lives. With it came a new way of listening to music. After the first mass marketed TR-1 transistor radio in 1954, Sony released the first true popular portable radio: the TR-63 in 1957. This new technology-enabled product was lightweight, “pocketable” and battery powered. For the first time, people could bring their radio anywhere, inside but also outside of their houses. Thanks to the portability of the device, people started listening to music outside of their usual time and place. This brought a radical change in the range of music offering. Indeed, radio stations started segmenting the population. On one side, young people discovered the world of rock ’n’ roll and listen almost exclusively to music. On the other, their parents tended to be more attracted towards news and talk shows. The listeners’ behavior also changes in term of schedule. Whereas the prime time was around diner time in the 1940s, it completely shifted to the early morning with the advent of car radios. From a familial activity, listening to radio became something people did on their own. This transition is well illustrated by the number of radios reaching almost 3 per household in the United States around 1970. Europe lagged behind but attained similar statistics in the 1980s.