Journal of Humanities, Music and Dance
ISSN: 2799-1180
Vol: 02, No. 04, June-July 2022
http://journal.hmjournals.com/index.php/JHMD
DOI: https://doi.org/10.55529/jhmd24.14.24

Music and Audio Recording Technology: An Overview

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Received: 05 April 2022 **Accepted:** 23 June 2022 **Published:** 28 July 2022

Abstract: ***The coalescence of music and technology form the base of audio production. This study offers a brief account of technological transformations that have shaped the modern audio industry. It takes into consideration the changes in audio recording equipment and audio distribution formats throughout the years up to contemporary time. The study attempts to emphasize the necessary prerequisites for quality audio recording and production in the digital age of today. The study draws its arguments from various secondary sources. This study adds an extra dimension to the already existing knowledge of audio production by blending conceptual and essential practical aspects of audio production. The simplified contour of audio production presented by this study will allow novice musicians and producers to grasp the basics of digital audio recording technology before venturing into the vast ocean of audio technology.***

Keywords: Audio Production, Music, Recordings, Sound, Technological Changes.

1. INTRODUCTION

Music was present in nature itself, even before the advent of any human civilization on earth. The waves of the sea, the motion of winds, thunderstorms, and several other sounds were the sources of music in nature. With time, many musical instruments were developed by humans, and they started playing these instruments during the singing and musical performances. Music progressively took the form of entertainment, and hence music over time became a significant indispensable part of society. As ancient civilizations slowly evolved into modern-day culture and civilization, several technological advancements were made by man in different areas to ease the hardship of life. The technology was about to have a drastic impact on music. In an attempt to capture music, man became successful. This led to the start of a musical journey by man and laid the foundation for a new form of musical consumption. Music listening during leisure time, work, studying, and other occasions became a part of daily life.

Over the years, several technology-driven developments and transformations in music productions have occurred. These included changes and improvements in recording devices, sound engines, audio coding algorithms, instruments, and software packages used in music production. All these have made music production, distribution, and consumption very much affordable (Lerch, 2018).

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This paper presents a brief discussion of the technological developments in the field of audio recording through the ages, with emphasis on recording and related pieces of equipment, editing, mixing and mastering of audio in the present digital age. The changes in music distribution formats that followed such developments in the audio industry have also found a place in the current discussion. The study is primarily based on secondary sources such as journals, books, online articles, websites, videos, and others.

Concept of Sound, Music, and Noise

Sounds are vibrations or oscillations that traverses through the air or other mediums as audible mechanical waves. The amplitude of the sound is expressed in decibels (dB), which is the unit of sound. The frequency of sound is the number of waves that travel a definite point in a given amount of time. The unit of sound frequency is hertz (Hz). When the wave frequency reaches a thousand cycles per second then the frequency is called kilohertz (kHz). The frequency range that is audible to the human ear is 20 Hz to 20 kHz (Dittmar, 2012).
Music is the portraying of ideas, thoughts and emotions through eloquent expressive sounds generated either by an instrument, voices, or both following the grammar of melody and rhythm, thereby maintaining musical harmony. (Chatterjee and Mukherjee, 2020). **Noise** is unwanted sounds or disturbances (Basner and Babisch et al., 2014). Noise is almost inevitable in different forms during audio recording. It is minimized to a great extent by employing acoustic and technical means.

Significant Developments in Audio Technology

The invention of the **phonograph** (1877), a mechanical recording, and playback device by Thomas Edison marked the start of music being listened by the public from the comfort of their home. After that, music was made available in the audio market for listeners. However, much before Thomas Edison, in the 1850s, a French Parisian typesetter was successful in capturing sound with his invented device '**phonautograph**,' which consisted of a cylinder-shaped horn attached to a stylus. The phonograph took several forms, and in the year 1881 was modified and improved by Alexander Graham Bell. This improved phonautograph was known as the **Graphophone.** It had wax cylinders as an information storage/ recording medium instead of a tin foil wrapped on the cylinder, which was seen in the phonautograph. In 1887, Emile Berliner of Germany invented the **Gramophone,** an analogue recording and sound processing device, which was based on a new disc recording technology, and flat discs started to be easily produced in masses employing only a single master disc, this was a marked advancement since earlier recording methods on cylinders relied on one by one recording method. Flat discs were released in the market had various speeds of recording, and their sizes also varied, but after 1912 these discs primarily had a speed of 78 round-per minutes (RPM), and their sizes ranged from 10 inches to 12 inches. However, these discs had a time limit of only 3.5 minutes. Shellac became the standard material for making these discs, from among various raw materials available such as Ebonite (a vulcanized variety of rubber) and others. Graphophone was recorded by cutting grooves into the wax and did not depend on embossing. Gramphone ultimately evolved into **Vinyl records** (1948). The Long Play (LP) records (33 1/3 RPM) made by Columbia records first hit the market in 1931, and in 1948, 45 (RPM) record was introduced by the same company. Simultaneously, the Extended Play (EP) discs were also introduced in the audio market. Almost throughout the 20th Century, Vinyl records were the prime format in which recorded music was available. It

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needs to be pointed out that the time of 1877-1925 was the acoustical era, as mechanical means were employed for sound recording and playback. From 1925 onwards up to 1947, although the physical format of the recordings remained almost similar to that produced in the acoustical era, electronic devices such as microphones and amplifiers were used to make the recordings; hence, this period came to be known as the electrical era. 1947 witnessed the next technological advancement in the music industry. This advancement was in the form of the introduction of **magnetic tape/cassette tape**. It was a much smaller and portable device in comparison to the LPs. It rose to popularity when car manufacturers added the option to have a cassette tape playing device in the car itself. In the 1960s, nearly all cars featured eight-track players. It should be mentioned that, in 1954, the **transistor radio** was introduced. Eventually, the radio broadcasting industry employed advancements made in the recording industry throughout nearly all of its history, to broadcast and even preserve the broadcasting into relevant audio format. The manual of All India Radio states that as per the directive of the Ministry of Information and Broadcasting, a log of what was aired, along with the broadcasting date, is to be maintained by All India Radio; hence they record whatever they broadcast. It is also a common trend in radios to telecast pre-recorded programs. The broadcasting of musical programs holds a vital place in the radios. In 1981, Sony company introduced the Walkman. This device allowed the listeners to enjoy wherever and whenever they desired. Then came the digital era with the arrival of the **Compact Disc (CD)** in 1982. The sale of this format of music achieved its peak in the late 90s. Then with the usage of the internet becoming more common, music started to be shared on the internet. Such time also witnessed the availability of MP3 players and iPods in the market, and people began downloading the music files shared on the internet for enjoying them later from their music listening devices. **Music streaming** was the next big thing that had an impact on the music industry. Companies started offering limited music libraries on a subscription basis, and some even acted as **internet audio broadcasting station**s. In 2011, Spotify, a Swedish company, provided access to listen to a vast library of music in exchange for monthly fees or listening to advertisements. Such access did not require to purchase the songs or music anymore to enjoy listening to them. Several such services came into existence over the years in every corner of the world. This form of music distribution continues to be the predominant form of music distribution even today. Sound recording in the form of a podcast (digital audio file made available on the web for downloading) has also become fairly common in this age of the internet (Frayne, 1985; Chanan, 1995; Mudge and Hoek, 2001; Foti and Orban, 2001; Morton, 2006a; Morton, 2006b; Gordon, 2007; Wilkinson, 2008; Wall Street Journal, 2018; Science Jrank, n.d.).

Gramaphone, Vinyls, Cassettes and CDs: Scenario in the audio market of India

The Gramophone was at its peak from the early part of the 1930s up to the middle of the 1980s. At Sealdah factory, Calcutta, the production of gramophone records started in 1908. Later in 1928, this manufacturing hub was superseded by a new factory located at Dum Dum, Calcutta. During the period between 1902-1908, all recordings done in India were published into gramophone records by Germany based Deutsche Grammophon, AG factory. **His Master's Voice** (**HMV**) label founded by the Gramophone Company Limited performed notably well in the sales of audio products such as vinyl, cassettes, and CDs in India. This was despite the existence of several other recording companies (Morcom, 2017) until the rise of internet-based audio listening in the form of music streaming platforms and social media

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platforms such as YouTube and others in India eclipsed the HMV label. It warrants mention that HMV retailed its audio product as **Saregama India Limited** from the year 2000.

Intricacies of Recording and Audio Production

The earliest sound recording device, phonograph recorded imprints of sound wave vibrations by a stylus/needle, making grooves onto a spinning cylinder. Gramophone introduced later on was basically like a superior graphophone, newly designed for recording sounds on the subtle spiral groove from the outer region of a flat disk to the center (Sound Recording History, n.d.). Both phonograph and Gramophone relied on channelizing the sound through a recording horn to do the recording. Microphones were initially not there to record on Gramophones. However, later it was introduced, and it became a standard for recording audios.

The tape machines recorded signals on magnetic tapes by transforming electrical audio signals into magnetic energy. During playback, the recorded imprints of the signal were converted into electrical energy for further amplification (Fumo, 2018). Magnetic tapes had the capacity to record two to sixteen audio tracks and provided scope to be creative in editing. The manipulation of the audio to create loops, remove noise, change the speed, duration, volume, adding effects of such as echo, delay, and others depending on creative instincts of the music producer may be referred to as editing. In editing a magnetic tape, the splicing method was employed in which sounds present at one location of a recording were shifted to a different desired location by cutting and joining by the help of a razor blade, ruler, glue, and other tools. The tape machines allowed recordists /sound engineers to route separate microphones to different tracks and select any desired track or tracks for multitrack recording in around 1940s (Holmes, 2008).

Recording sounds on separate tracks provided the ability to adjust the volume level and add effects to all the individual tracks and mix as necessary to achieve the final audio. Multitrack recording also made it possible to record music pieces at different points of time, depending on the convenience of the artists. After that, in the course of time, "Digital Audio Work Stations" (DAW) was introduced and became highly popular. This technology has significantly evolved over the years and is presently employed for audio recording and production.

Near to 1970s, the digital technology made it possible to record tracks by a hybrid analogue/ digital system, which was referred to as integrated DAWs. It consisted of hardware units such as mixing console, a device to store data, and analogue to digital audio converter. These have almost been replaced by Software-based DAWs installed onto a computer (Morton,2006a; Huber and Runstein, 2013). DAWs had made it possible to record and edit several tracks, unlike tape and tape machines, which were limited to a much lower number of tracks. There are DAW software packages suited for Macintosh and Windows systems. Some of the widely used DAWs include Avid Pro Tools, Logic Pro X, Steinberg Cubase, Steinberg Nuendo, Abelton Live, Fruity loops, and many others. DAWs have the ability to playback the recorded audio and midi signals and offer various editing options towards the finalization of the audio.
The requisite for running digital DAW are a computer, sound card, input devices like a microphone for recording audio and MIDI Keyboard (MIDI- Musical Instrument Digital

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Interface) for adding musical notes in the DAW (Sunny, 2020). Moreover, a pair of studio monitors or at least headphones are essential for mixing purposes. All these gadgets are connected to the work station by employing quality wires and jacks.

Computer

For speeding up the workflow, a computer with a proper configuration is the mandatory requirement for music production in today's digital age. Laptops are preferred by those who travel much and require a portable music-making device. Since personal computers (PCs) are customizable and Macs are not, many users prefer using PC for music-making. Therefore, a discussion on the crucial components of a PC for music production is as follows (Armandary, n.d.; Sound Track Academy, 2019) –

The processor of a computer sends and receives every instruction for the computer, just like the brain of the human body. The rate at which the processor receives translates and imparts commands is known as clock speed, which is expressed in Ghz. Faster clock speed is preferred for music-making. Modern and latest processor (i5/ i7/ i9 Intel processors/ Advanced Micro Devices (AMD) processors) with multiple cores are ideal for music production as it distributes the workload of the computer to the multiple cores available. Moreover, even the DAWs can be optimized by the user for workload distribution across multiple cores. The data which the computer needs to access very fast is stored in the RAM (Random Access Memory). 8 to 16 Giga Byte (GB) RAM is the minimum basic requirement for a music production PC. At professional setup at least 64-128 GB RAM. The sample libraries that are used in music production are stored in the RAM during working in the DAW. For long term storage, hard drives are necessary. The computer should have a prime storage device. Hard Disk, Solid State, and Hybrid storage devices are available for usage as a main storage device. The hard disc consists of a small spinning disc inside on which data is written and read from, and they are slow to run programs and software packages. Solid State has no movable components inside it, and the data is stored on a chip, and they are fast in running programs and software packages. Hybrid storage devices are the combination of both the form of storage devices. A user may choose from these storage devices as per his budget and requirements. Nowadays, most users use an internal hard disk (7200RPM) along with a small capacity 120-240 GB solid-state drive in the system. This is often supplemented with the external hard disk for more storage.

Audio interface

It translates the analogue signals from microphones and instruments into digital signals and feeds it into the computer for processing by the computer and changes digital signals received from the DAW or computer back to analogue signals, thus providing a sound output through a pair of monitors/speakers or headphones. All audio interfaces are equipped with +48V phantom power switch on it. The switch needs to be engaged to deliver voltage to power condenser microphones only. Audio interfaces depend on a preamp to amplify low-level audio signals and keep a check on the noise floor. The preamp may be inbuilt or external. A combination of good quality preamp and good analog-to-digital converter is essential to record high quality sounds. The analog-to-digital converter converts the analogue signal received by a microphone, into a digital signal. Some audio interfaces meant for home studios inherits the same analog-to-digital converter found in their bigger consoles for professional studios. It is always nice to opt for such audio interfaces for home studios when there is

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budget restriction. The difference between the peak signal and quiet signal the audio interface can handle is the dynamic range of the interface. The greater the difference is, greater will be the dynamic range. Typically, anything more than 100 dB dynamic range with less amount of noise and distortion (Total Harmonic Distortion + Noise or THD + N), and a frequency response between 20Hz – 20kHhz would be fine. However, the greater this dynamic range the better. If one needs to get more microphone inputs in future, then one should go for audio interfaces with ADAT inputs, that allows to connect extra microphone preamps with the interface. External preamps are used by professional studios and often come equipped with compression and equalization features. Some audio interfaces also allow sending midi signals into the computer. The top brands which manufacture audio interfaces include MOTU, Audient, Universal Audio, Apogee, Antelope, Focusrite, Presonus, Tascam, Alesis, Behringer, MAudio, Avid, Steinberg and many others. Higher-end audio interfaces with more channels are used in professional studios (Audio Interfaces, n.d.; Music Radar, 2020; Sunny, 2020). Nowadays, 96kHz or above sampling frequency is preferred for recording. 44.1kHz or 48kHz sampling frequency is common. Audio interfaces allow users to choose the sampling frequency before recording.

Microphones

They serve as an input device and changes sound energy into electrical energy. The most common types of microphone used in today's time are as follows (Desai, 2018; A Beginner's introduction to microphone polar patterns, n.d.)-

Dynamic Microphones: They are governed by the principle of electromagnetic induction. A coil linked to the diaphragm is found in a dynamic microphone. The coil is vibrated by the diaphragm when sound waves strike the diaphragm. A magnetic field is generated by a magnet located inside the coil. The movement of the coil in the magnetic field produces electrical signals, which in proportion to the sound picked up by the microphone. The signal is directed to an amplifier for the production of sound. It is used to capture sounds in a live setting where there are other sounds in the environment. Dynamic mics are best suited for live performances and even for recording in an uncontrolled environment.

Condenser Microphones: They are governed by the principle of varying capacitance. There are two metallic plates in this type of microphone. One of the metallic plate fixed to the diaphragm and is movable. The other metallic plate is immobile. When sound strikes the diaphragm, the diaphragm vibrates, and the movable plate is set to motion and generates electrical signals proportional to the sound picked up by the microphone. The signal is sent to an amplifier for amplification and generation of sound. These microphones capture high-frequency sounds and sounds of delicate nature and are used mainly in acoustically treated studios for recording and live performances.

Neumann, Shure microphones, Rode, AKG, Audio-Technica, Sennheiser, are some of the leading manufacturers of microphones. For getting clean recording with negligible noise, it is good to choose microphones with 16 dB maximum self-noise.

Earlier, **ribbon microphones** gained popularity in the field of radio broadcasting, and they responded to the air velocity, setting into motion a little element hanging in a higher magnetic field.

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Microphones differ in capturing frequency ranges. This means that every microphone is sensitive only to a particular frequency range. It's on the part of the recordist to choose the correct microphone which suits the purpose.

The three basic polar patterns, that is, the directional response of microphones are as follows-

Cardioid: They are most sensitive to the sounds striking it from the front side, and it does not pick up sounds from the rear as well as the sides. These microphones are suitable for almost all applications, including live performances, recordings in an untreated room, and even with multiple such mics placed at appropriate spots, recording of closely placed sound sources may be done. When carotid microphones are even more less sensitive to the sounds coming from the rear and sides, then they are known as **hypercarotid microphones**. Microphones with tighter pickup angle and greater side rejection are known as **supercardioid microphones**.

Omnidirectional: They can gather sound equally from all different directions and are suitable for recording choir, orchestra, room sound.

Figure 8: They pick up sound equally from the front and back while rejecting sounds from the sides. These mics are suitable for isolating sound sources that are existing close to each other. Most ribbon mics make use of figure 8 polar pattern.

Studio monitors

The monitors used for mixing generally have two separate speakers/ drivers. A tweeter is placed vertically at the top end and produces high frequencies of about 2 kHz. Vertically below the tweeter lies the **woofer,** which delivers low and mid-range frequencies. Sometimes a third midrange speaker may be present. Monitors may be passive or active monitors. A **passive monitor** depends on an external amplifier for amplifying the signal input before it enters the monitor to generate sound frequencies. An a**ctive monitor** does not depend on an external amplifier since it has an inbuilt amplifier system. Again the monitors may be either near field or far-field monitors. **Near field, monitors** possess smaller drivers and must be positioned close to the listener at a distance of about two to three feet. These monitors are kept on the desk or on stands with isolation pads placed under them, and these monitors are suitable for smaller rooms/home studio. They are placed in such a way that an equilateral triangle is formed between the ears and the monitors, that is, they project inward while the head of the sound engineer lies in the middle. **Far-Field Monitors** possess large drivers, and they are usually mounted on the walls behind the workstation. They lie at around 10 feet away from the listener and are suitable for large professional studios. The audible frequency spectrum of the monitors, as well as the woofer sizes, vary depending on the budget and requirement (Senior, 2011; Become Singers, 2020). Popular brands manufacturing monitors include ADAM Audio, Yamaha, Genelec, JBL, KRK, MAudio, Presonus, and more.

Headphones

When the room acoustics is poor, the use of good headphones for mixing is necessary to cut down reflected sounds. Closed-back headphones provide isolation from the ambient noise, whereas the perforations present on open-back headphones do not. Closed-back headphones

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are mostly used during recording as they prevent the leaking out of sounds from the headphones and ending up on the recording. They are also best for mixing in a noisy environment. Open-back headphones are lightweight and do not limit the leaking out of sounds. They may be used during mixing in a quiet environment (Senior, 2011; The ultimate guide to studio headphones for home recording, n.d.). Headphones of Audio-Technica, Sennheiser, and other companies are preferred by many. The headphone amp of the audio interface drives the headphones when the later is connected to the headphone outputs of the audio interface. A high impedance professional headphone requires an external separate headphone amp to drive it. However, headphones with impedance of 80 Ohms run decently when connected to most of the audio interfaces. Some popular headphone brands are Audiotechnica, Beyerdynamic, Sennheiser and others.

MIDI controllers

They are keyboards without a sound engine. They act as a command generator and participates in the exchange of MIDI data to and from the device and the DAW via a USB connection. They are in use from around the early 1980s, developed by Dave Smith and Ikutaru Kakehashi. Intensity, the pitch of played musical notes, vibrato, volume, panning, and tempo of notes can be controlled by it. In the present times, the live recording of instruments has been reduced to the bare minimum, and midi keyboards are used to program instrument tracks by playing varieties of virtual instruments (Virtual Studio Technology (VST) plugins) into an audio recording (Midi Keyboards, n.d.; Weekhout H. 2019). Some popular midi controller brands are Arturia, MAudio, Native-instruments Komplete Kontrol, Nectar, Alesis and others.

Mixer Consoles

These are hardware devices serving as a middle man between the audio interface and the computer and blends multiple sounds into a combined audio signal. They are either of digital or analogue type. The inbuilt digital sound processing system present in **digital mixers** may even allow recording and manipulation of the audio without using external computers. The analogue mixers lack such features and functions, but are user friendly because of dedicated controls for all functions. Their work depends on analogue circuitry. Mixers consist of many inputs and outputs for plugging in microphones, instrument-level source, and studio monitors (Mixers, n.d.; Sunny,2020). Every input is routed via a series of control knobs and faders for altering the volume/ gain, panning, dynamics, timbre, adjusting the equalization, and several other characteristics of the input audio signal. Mixers can control even the volume of the sound projecting from the monitors. They may also have an onboard audio interface.

In contemporary music production, just a quadcore PC or laptop with a decent RAM, a microphone, a single or dual-channel audio interface with an inbuilt mic preamp, an entry-level midi controller keyboard, and a mixing headphone are sufficient to start quality music production at home. Even the computer keyboard may be used to send midi signals to the DAW if dedicated midi controllers are not available. Thus many musicians prefer to make music themselves from the comfort of their home studio. This cuts down the cost of hiring a professional studio for music-making.

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Editing, Mixing and Mastering Process in the Digital Age

The essentials of these process are as follows (Music Production 101: The 4 steps to recording a song, n.d.; Senior, 2011) –

Editing process: It involves comping, arrangement, reduction of noise, time editing, pitch editing, and adding other audio effects. All these editings are mostly done in the DAW itself. Some of the basics of the editing process are discussed below-

Comping is the process in which the duplicate takes of the track are compared, and the best bits or even phrases from them are combined to get the best composite performance.

During arrangement, sections of the track that do not add value or clutter the mix may be removed. Moreover, parts of the track may be moved to fit a new place.

Then noise reduction is done by removing any unwanted sounds present before the start, after the end, and in between every portion of the recorded audio. The unwanted sounds may be hissing, breath sounds, background noises, and others.

During time editing, the offbeat notes are brought into the right place in the timeline by merely cutting and pasting or by time-stretching. Lastly, pitch editing is done when out of pitch notes are placed on the correct pitch.

Mixing: It is the process of blending of the multiple layers of audio or tracks into a single cohesive unit. It may be done employing either the virtual mixer in the DAW software or by a mixer console hardware. Mixing involves but is not limited to the following-

Balancing of the tracks - It ensures that no sounds are much higher or lower in relation to each other. The mix should be build up considering one sound at a time, in order of importance of them in the track.

Panning - It ensures that every sound is given individual space in the stereo image, similar to the space given to every musician in a stage.

Equalization - Increasing or attenuating the level of different frequencies to provide a harmonious space in the frequency spectrum for every sound to ensure that sounds do not occupy the same frequency sections or bands. This prevents muddiness in the mix, restricting frequency masking, and providing the best possible sounds.

Compression - It is the leveling of the dynamic range of the recorded sounds. This lowers the difference between the loud and quiet sections of the track to make every note prominently audible and increase the overall loudness of the mix.

Reverb and Delay - It is used for adding a sense of depth and three-dimensional acoustic environment in the mix, making the sound to feel as if it was recorded in a big room than in which it was actually recorded. Delay is used to generate an audio signal for a set period of time at the end of the original signal. Delays may also be tempo-synced. Pre-delay which is the time duration before the start of the reverberant field also needs to be adjusted to obtain a good sounding reverb.

Automation - It is used to provide a sense of fluidity at different sections of a track by manipulating sound characteristics and effects. To retain more dynamics in the tracks, automation is done to the instrument or audio tracks, along with the use of transient designers, expanders, manipulation of note velocities and use of less amount of compression.

Mastering: It refers to the finishing touch that is given to the overall mix to optimize the overall sound. It is primarily targetted towards maximizing the loudness levels by further compressing or limiting, without losing the dynamics. Different frequencies are balanced

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further by equalization of individual frequency bands. Ultimately, stereo widening is achieved in the mix to provide wideness to higher frequencies by using various plugins.
The mixing and mastering process represents the ultimate challenge in producing high-quality music/audio. There are hundred of mixing and mastering techniques available for advanced music producers. Several add-on software plugins available, which may expedite the process of mixing and mastering within the DAW. The art of blending editing, mixing, and mastering techniques with one's own creativity can transform an audio track into a beautiful, unique musical masterpiece. These editing techniques have been made possible by cutting edge developments in audio technology.

2. CONCLUSION

Throughout the past decades, audio production has been affected by many game-changing technologies. The main innovations were the digitalization of the sound recording and audio production process. This was followed by the distribution of audios in digital format to listeners, which massively changed the economics as well as the dynamics of the audio industry. Economical audio production equipment has become readily available for musicians and producers. Music streaming platforms and social media platforms such as YouTube are mainly responsible for the distribution of digital music nowadays. It needs to be pointed out that music production companies adapted successfully to the new recording format from time to time. In today's world of the unrestricted computing power of computers and inexpensive audio production gadgets, there is enough scope of exhibiting one's musical knowledge, creativity, and vibrancy in music production. Moreover, the improvements and developments in the internet connectivity facility have made it possible to transmit digital audio over networks to reach the masses, to be heard by the peoples at their comfort. The music industry would not have existed in the absence of audio recording technologies. The mixing and mastering process can be carried out using mixing consoles supplemented with software plugins in the DAW. Music production has become vastly dependant on digital equipment and gadgets. All audio recording and distribution technologies occupied the spotlight until more newer and more efficient technologies took their place. These changes are a part of the progress and development of the audio industry. Thus it may be said that the future awaits the introduction of much more efficient audio technologies that may further revolutionize the audio industry.

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Journal of Humanities, Music and Dance
ISSN: 2799-1180
Vol: 02, No. 04, June-July 2022
http://journal.hmjournals.com/index.php/JHMD
DOI: https://doi.org/10.55529/jhmd24.14.24

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