



Impact of science and technology on music : A comprehensive study

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Abstract

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Science and technology had a great impact on music. This influenced the way of music listening, music sharing, music performance and music production. Science and technology helped musicians to understand sound and acoustics. Various new musical instruments, scientific equipments, hardwares, VSTs and softwares are developed these days with which overhauled the whole scenario and totally changed the way how we perceive music. Science and technology broadened the scope of music and opened various new dimensions in inter-disciplinary fields. Technicians, Scientists and musicians are working together to make musical instruments which can benefit society in various ways. This paper covers the impact of science and technology on music and its further scope.

Keywords: Science & Technology, Musical Instruments, Law of Physics, Virtual studio technology, Recording

Research Paper

Science & Technology are ubiquitous. Thus it is hardly surprising that it has had a profound influence on the art of music. It has changed how music is transmitted, preserved, heard, performed and composed. Science & Technology is involved in the development of concert halls, the recording and broadcast of music and the design and construction of musical instruments.[¹] Innovation drives music, so it's no wonder that inventions and discoveries also have had an impact on the way we arrange sounds. New technology has changed the way we think about and approach music. It has changed the accessibility of music for artists, and every new invention gives a different type of person a different approach to music.[²] Digital and online technologies have resulted in the most revolutionary change in music. The analysis reveals that technology has played an important role in changing the commercial and creative dynamics of music and performance over hundreds of years.[³] In fact changes in technology have constantly shaped the course of music and musical performance. In order to understand the role of technology in music and its performance, a review of the history of technological developments in musical

instruments and other electronic devices directly or indirectly associated with music, is necessary.

Jeremy Montagu, author of "Musical Instruments: History, technology, and performance of instruments of Western music," documents the role of technology in creating new instruments, either through original invention or through refinements to previous instruments. All technological changes have helped in improving acoustical dynamics like tone, volume, texture and timber of musical instruments.[⁴] For example, electric guitar pickups, guitar processors and equalizers have helped immensely in improving tonal quality of guitars. Science and technology also paved the way for collaboration between inventors, manufacturers, musicians, musical directors and composers which resulted in new improved musical instruments as well as electronic gadgets. Using laws of physics and laws of electronics, a lot of new gadgets are invented like synthesizers, drum machines, groove boxes, samplers, electronic drum kits, amplifiers, microphones, mixers, interfaces, sound cards, various types of cables and speakers which help in producing high quality sound and provide greater variety in the musical elements which

contributes to a more dramatic and powerful musical performance. These days Indian Classical music is also being influenced a lot by science and technology. These days there are various electronic instruments like *electric tanpura*, *electric tabla*, *electric nagma player*, *electric violin*, *electric hawaii guitar*, *electric sitar (zitar)* and mobile applications (apps) like *iTanpura*, *iTabla* and *tanpura droid* which are very common during music practice and music performances as well. These days we see vocalists doing practice with bluetooth speakers and mobile and *tabla* players doing riyaz with bluetooth speakers and headphones along with mobile app of *nagma*. This gives artists freedom to do practice anywhere anytime without any external help. These days use of *electric tanpura* or *tanpura mobile app* is very common during performances as well.

Science and technology has influenced the way of music creation and sound recording to a large extent as well. Today there are very sophisticated and precise instruments which can record crystal clear sound easily at a very low cost. The invention of loop machines, and software such as *Reason*, *Ableton Live*, *Cubase* and *Pro Tools* provide multi-track facility and now its possible for one man to play all the music that previously took a whole band. With the help of *pre-recorded sound loops*, *samplers*, *drum kits*, *Virtual studio Technology (VSTs)* and *MIDI* technology we can create sounds of any instrument virtually through our digital audio workstation. Advanced interfaces, condenser, ribbon, super-cardioid dynamic microphones help in crystal clear recordings. New synthesizers and sample manipulations, simply having new sounds that we've never heard before, have a massive impact on how one writes music.[5]

Science and technology have helped artists to collaborate with other artists across the world. With the invention of the internet and high-speed data transfer, we now have some incredible new options when working with music. One can now collaborate with someone across the globe who has a completely different culture, background or musical style. This immediately puts them at a distinct advantage when it comes to creating new sounds and feelings. They can find other's music through social networks such as Soundcloud, YouTube listens to what they have to offer, and then decide to work with them.[6] There are numerous examples of creative impacts of

science & technology on music and performance. The evolution of various styles of jazz occurred as a result of the commercial distribution of jazz recordings, leading to much more rapid changes within the genre. Musicians listening to others in the same genre would be prompted by slight variations to build upon these variations, resulting in change. Perhaps most important from the commercial aspect, rhythm and blues music from the African American community was revised by white musicians to create rock and roll. Since these two communities lacked social integration, recording technology was crucial in this musical development.[7] For example Coke studio Pakistan is a platform where artists across the globe sit at one place to mix their musical styles to produce a new kind of music. We see artists of Asian origin collaborating with foreign artists in a beautiful manner here. Folk Artist like Arif Lohar, Sufi Artist like Sayi Zahoor are performing with foreign artists with Asian, Western and electronic instruments, which paves the way towards a new kind of music never heard before. New sounds, new techniques are being developed here at Coke studio Pakistan, giving new direction to music. Asian classical instruments and folk instruments, Western traditional instruments are blended with electronic equipment so well that nobody imagined before. Similar effect is created at *Kappa TV* and *The Muse Room (Web YouTube Channels)* combining Carnatic Classical music with other musical forms using classical, Western as well as electronic equipments so as to produce new kind of music like Carnatic progressive Rock and other Fusion forms, which is a wonderful thing for Indian art forms, which head towards more popularity of good music in youth.

Science and technology have also helped young artists to record their art and share it on internet worldwide. Earlier it was a costly deal due to which lots of artists were unable to get their art recorded and now that a professional-quality home studio can be assembled virtually, anyone can make a recording. Now with programs like *Audacity*, *Logic Pro*, *Reason*, *Pro Tools*, *Abelton Live* and *Cubase* available, anybody can make good quality music with simple equipment at their home and share their art with the world. All of these developments in the history of technology in music and musical performance are evident in recent years in the advent of digital and online technologies. Digital and online technologies have

revolutionized individual interactions with music, social experiences of music, creative aspects of music, and commercial aspects of music. The development of hardware and software technologies that produced MP3 players and online downloading services are perhaps the most influential in the course of music in the commercial context. Regis Rossi Faria, in “Profiling new paradigms in sound and music technologies,” documents the rise of these technologies in allowing individuals to share music in a manner unlike previous recording technologies. A digitalized version of a song could be copied and distributed between listeners in a much easier way than previous tape recording technology.

The music industry has partnered with online music services such as *Apple's iTunes* in an attempt to provide a legally and commercially viable use of this technology. Some recording companies have developed their own online products and services intended to harness this technology in a commercially viable manner. Services like *soundcloud*, *wynk music*, *hungama*, and lot more are providing online music services. Online streaming involves the distribution of music in an online format that is similar to radio distribution. Online streaming services, such as *Pandora*, *Amazon Prime*, and *Rdio*, allow consumers to both online streaming and sharing technologies have had important impacts on creative production and performance as well. Audiences today have access to more musical performances than any other time in history, and these performances can be accessed free of charge and in a much more convenient manner than recording technologies provided in the past. Musical performances that have been recorded in audio and video formats allow access by audiences around the world.

Online streaming has recently revolutionized musical performances by allowing audiences to participate in recorded or live performances despite geographic distance. Many musical acts and venues now provide live performances to be streamed for commercial distribution. This is one area where new technology has created a potentially new source of revenue for artists and the industry. A band performing in a small club can greatly increase revenues due to live streaming audiences. Some of the larger companies can increase their audiences many times greater than the audience in the concert hall.

At the very least, our schools and universities must train their music students to understand and respect technology, not to fear it. A young artist may still spend countless hours alone in a practice room, improving his/her skill. But how often will that sound be heard without the intervention of recording, broadcasting, or acoustic-reinforcement technology? That artist need not become a technological expert, but at least must learn what technology is capable of doing and how to communicate with engineers. Any musician who does not know the meaning of words like equalization, digital editing, sampling, reverberation, mixing, etc., is out of touch with his/her art and is, in a real sense, illiterate.^[8] Hence we see that science & technology has become an integral part of most aspects of our lives, including the ways we hear, compose, and perform music.

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