

From Composition to Production: How Digital Audio Reshapes the Music-Making Workflow

Junhao Yu

School of Central Conservatory of Music, Beijing 100000, China

Abstract: Digitalisation of music production tools has completely reorganised the process for developing musical ideas, recording them, arranging them and delivering them to audiences from a traditional reliance on specialised facilities, professionals as intermediaries and large sums of capital, to an individual creator engaging in such activities within their own domestic space using consumer-grade devices. Examine how digital audio technology, primarily digital audio workstations (DAWs), MIDI-based virtual instrumentations, and AI-assisted mixing and mastering software/tools have changed the music-creation process from creation to production by referring to the materialist technological paradigm, creative labour theories, and recording-as-composition viewpoint as the basic theoretical support for this study. Three intertwined arguments are presented below: Digital tools did not merely speed up existing work procedures but reshaped the cognitive and creative activities by means of which music was produced and performed; The mass media's prevailing portrayal of digital music production as a democratic process conceals substantial continuity concerning who gets access to such works and on what basis; And the incorporation of AI-assisted production tools and Streaming Platform technical standards into the production process has become a new stage of Algorithmic control over Musical decisions whose impact on Creative Independence remains unexplored. Based on this, several recommendations for music Industry governance, creative labour policy and the Future development of musical Craft are put forward in this conclusion section.

Keywords: Digital audio workstation; Music production; Creative labor; Democratization; MIDI; Streaming standards; Algorithmic production.

1. Introduction

The history of recorded music is closely associated with the Development of production technology; None has exerted such an impact as much as recent changes over the past forty years from analog to digital recording technologies. In the mid-20th century, where the recording studio of this era was an intensive capital-intense institution requiring high-level professional skills such as specialised technical equipment, costly hardware and organisational support for accessing record labels, compared with today's music production environment that can be realised in a notebook computer running digital audio software; With more affordable virtual instrument technology capable of accurately recreating the sound of various musical instruments; And distributed platforms enabling users to download final versions within minutes globally. As a result, this change has been hailed as an emancipation of musical creation by making it more accessible for general people through the means usually reserved exclusively for industry professionals up until now.

Democratisation, as a form of reality for changes in the access to music production, does not always fail to capture; however, this transformation is often accompanied by other types of restrictions on production that were previously absent due to technological advancements. Watson analysed the world-wide music industry revenue based on the data from Statista; It can be concluded that although there is a large number of digital production devices and a huge increase in self-produced music globally, due to their low quality and weak influence among audiences at present, it still shows a high concentration trend as compared with before when independent musicians first began releasing works [9]. Why has it become like this needs to be understood by looking at not only the instruments for producing digital music but also

the work processes, standards, and platform architecture leading them to appear and take effect.

This paper investigates how digital audio technology has transformed three core directions in the flow of music creation at present: The transformation of composers' concepts and methods under a DAW Environment; The rebuilding of Production-Mixing-Masterising processes after introducing Digital/Artificial Intelligence assistance tools; And Incorporating streaming platform technical standards into production plans to create another kind of algorithmic impact on music creativity. By means of theoretical supports through technologies of technological-materiality creation labour and recording as composition, this paper examines contributions from all angles to explore no deficiencies exist among different aspects of their effects on music production technology.

2. Theoretical Foundations

Theoretical bases for the conceptual framework of analysis in this paper are three. The first point proposed by Zuboff regarding the materialisation of technologies holds that it is not a tool where people choose whether to effectuate these outcomes; rather, such actors are entities that alter how work happens due to their influence on how labour occurs [3]. Zuboff's classification of Technologies, namely those that replace human effort directly with machines (automation) and those that change the essence of jobs by increasing transparency through information technology, also fits digital audio editing as described in this study. In DAW, audio does not merely record automatically like tapes and mixing equipment before; fundamentally it changes how music is composed and produced: It becomes an undulating graph on the display screen when a sound appears; Thus, composing or performing things in the future will certainly be completely

different compared with yesterday's experience. The technology is not an independent means to realise creative ideas, but rather part of these aims themselves.

According to Hesmondhalgh and Baker's theory on creative labour, the first theoretical foundation for studying creative activities is: under what circumstances do cultural workers create new works? And how do these situations affect not only the content or form of creation but also people's experiences when producing such work [2]. Through analysis, there is an obvious lack of balance in the intrinsic satisfactions resulting from creative labor, such as pleasure derived from creating, freedom to express oneself and sense of identity building - all suppressed or denied within the system set up for the creative industry by other sectors that excludes workers who engage in similar activities. Applied to Digital Music Production, this Framework highlights that the spread of production tools has increased the number of people who can participate as creators within the scope of creative activities for content whose economic value mainly belongs to platforms and copyright owners but not those producing it.

Théberge's fundamental account of the connection between music technology and musical practice serves as a third theoretical basis; That is, through this link, the technologies by means of which music is created no longer remain outside of musical culture, but become part of it —that is, what constitutes musical practice at any particular time reflects the capabilities provided by the production technology for its practitioners [1]. Théberge's analysis was developed during the MIDI revolution of the 1980s, but his main argument that technological affordances determine musical imagination rather than serve it applies equally well to the DAW era; In this time, the Grid-like temporal organisation structure of most DAW interface, Quantisation tools that fix rhythm deviations, and extensive sample-and-loop libraries provided by commercial DAW packages all bear aesthetic orientation expectations that sculpt the music made under their influence.

3. Digital Tools and the Restructuring of Music Composition

Digital audio workstations have been incorporated into the organising technologies of music production for some time now; They cannot provide new means or methods to assist composers and musicians in bringing their planned sounds into reality; On the contrary, they will change how we perceive and produce music. The non-linear editing environment of the DAW - In this environment, any part of a piece can be edited freely without disrupting others; at the same time, it is possible to maintain several different drafts of one's music arrangements simultaneously - promotes an organised form of thinking based on repeated experiments compared with the original serialisation model driven by design output in earlier times.

MIDI-based virtual instruments have expanded the sound world within reach of composers composing away from professional recording studios to include all kinds of orchestras, electronics and World music sounds; It eliminates the instrument accessibility limitations that previously formed composer's artistic imagination in resource-limited conditions. TobyBerge believed that technology is neither merely a tool nor an originator of music culture; however, his view presents stronger evidence in the MIDI environment; at this point, time entries have been set in MIDI data, and rhythm quantization has been used to alter its rhythm

according to a predetermined grid; Also, every note in the musical piece can be adjusted via velocity modification anywhere within the corresponding MIDI playback track[1]. As a result, the music often has an aesthetic mark left by the MIDI production environment that the creators themselves are unlikely to perceive; It is rather the characteristics brought about by technological limitations at the time of creation.

Leyshon's study on the Software Transformation of Music Production explored how recording, editing and Mixing Functions moved from special Hardware to Consumers' software reorganised neither the Economics of Music Production nor their Spatial Layout and Social Relations [10]. Recording studios, which had been simultaneously technical facilities and platforms for musicians, producers and engineers to collaborate, gradually gave way to home-studio; This relocation has reshaped the relationships among participants at a concert from a collective of colleagues collaborating on-site to solitary creators working independently. Borns' analysis of institutional culture in the context of music production locates this transformation at an extended period during which individual creative autonomy has clashed with institutions organised to govern professional music-making [5].

4. Production Workflows in the Digital Era

Reorganising music production work flows through digital technologies has extended far into post-composition stages such as mixing, mastering and distributing works so that people can enjoy these musical works after their release. The following three developments of the digital production workflow are worth focusing on for analysis: The emergence of the home studio as a site of professional production; The integration of AI-assisted mixers and masters into regular work practices; Streaming platforms' implementation of loudness normalisation norms affecting production decisions.

The appearance of home Recording Studios as a real place for professional Music Production demonstrates one of the more obvious manifestations of how Digital Audio Technologies have promoted democratisation. Hracs's study on digitally self-sufficient music producers showed that with the affordability of digital audio workstations (DAW) software and high-end audio interfaces, more people can produce commercially viable recordings independently, bypassing professional studios altogether - thus changing the economy of music production and artist career paths [7]. According to Statista's statistics, the proportion of independent and self-released music in the world market for registered sound recordings has increased significantly as overall market concentration remained unchanged [9].

AI-assisted mixers and masters, including the products iZotope's Ozone masterise suite and Landr's cloud-based automatic mastering service, represent an even more advanced stage in the streamlining process; at present it has yet to be systematically studied on how they affect creative labour in music production. Using machines trained by huge amounts of professional music recordings will adjust the levels in our sound equipment according to this information without requiring us to use manual adjustment methods or rely heavily on a technician's judgment. According to Burgess' description of the art of music production, it is argued that these decisions belong to the field of production Craft; That is, technological selection when producing songs

for release is no longer just about meeting functions but carries some degree of expression - it becomes an artistic means which can only be expressed through humans [4] . Therefore, the relocation of this decision to algorithms implies that it may also raise issues beyond just an economic assessment of production skills - whether they are creative authors in recorded music or whose expression is distributed by means of machines?

The loudness normalisation standard for the streaming platform is a third-party examination that has yet to be examined. According to Spotify's implementation of loudness normalization at -14 LUFS in its technical guidelines for artists, it has directly affected the mastering decision-making process by eliminating the competitive pressure among louder recordings from the era of the loudness wars in the late 1990s and early 2000s; At this point, there is also some technical restriction on how producers deal with music production at the last stage. According to Meier, there is no direct connection; that is to say, he believes it should be understood within its own technical context: Platform technological standardisation does not refer to the actual state of listeners' experiences, nor can it determine what kind of aesthetic effect will result from it[6].

5. Discussion

Across this paper's analysis, it can be said that the picture of digital music production technology is not as straightforward as both the democratisation narrative and the technological deterministic theory suggest. Digital audio technology has really opened up an audience for making music according to high standards of professionalism worldwide; It has also changed how music is created and perceived from its conception until distribution across different regions of the world due to the rise in independent musicians able to access international markets on their own merits.

In addition, at this time, the theoretical frameworks of creative labour and technological materiality together reveal how these freedoms enabled by digital production tools come with restrictions that the democratisation narrative tends to ignore consistently. According to Hesmondhalgh and Baker's analysis of creative labour, there is a rise in competition among music producers because of an increase in the number of them; Thus making it harder for those from major record labels to maintain their advantage in playlist placement, algorithm-based promotion, and marketing support compared with other participants [2]. The problem of the lack of production equipment cannot solve the blockage at this time point, and a home-studio producer creating high-quality technical works without formal assistance to achieve algorithmic recognition is in a structurally similar place as a talented but isolated musician before digital technology.

Zuboff's division of automation from informing can help clarify what is truly novel in the present stage of Digital Music Production Technology [3]. AI-assisted mixed and master processing has already entered most mainstream production environments; although initially designed merely for streamlining routine operations of the craftsman's workshop, these algorithms now have access to a wealth of knowledge about patterns behind these workshops. Is such change considering an elevation of creative power or merely a restatement of human expertise with the compensation from productivity improvement is still under debate based on current data; However, it deserves extended critical

observation because it pervades various domains of professional music composition software more and more frequently.

6. Conclusion

Digital audio technology has transformed the music-creation process into a networked system: Composition, production, distribution... All of these links now rely on computer networks to link up. The DAW-based production environment has rearranged musical ideas; MIDI virtual instruments have expanded the sonic range available to independent musicians; AI-aided production tools have replaced some tasks that needed professional training earlier; Streaming platform technical specifications have brought about a new form of algorithm-driven impact at the end of the music preparation process. These Developments together represent a thorough-going Transformation in the Music-making Workflow whose full implications for Creative Practice, Labour Conditions and Industry Power Relations remain to be explored.

The theoretical backgrounds underlying this research include technology materiality, creative labour and recording as composition; Therefore, we must avoid uncritically endorsing the rosy picture of digital democratisation or the dystopian vision of technical determinism. The reshaping of the music-making workflow due to digital audio technology has taken place; however, this reshaping is also an asymmetric movement: The creator's intention, practice and resistance towards these tools constitute a constitutive link with them rather than being determined by it alone.

Future research should be carried out along with long-term Qualitative Investigation into how Working Music Producers Experience and Navigate the Integration of AI-assisted Tools into their Creation Process, as well as examine its range of Application and results under different market Conditions. The building of this empirical basis will help provide a detailed explanation of digital music production in future research, which currently lacks such details.

References

- [1] Théberge P. *Any Sound You Can Imagine: Making Music/Consuming Technology*. Wesleyan University Press; 1997.
- [2] Hesmondhalgh D, Baker S. *Creative Labour: Media Industries and the Cultural Politics of Work*. Routledge; 2011.
- [3] Zuboff S. *In the Age of the Smart Machine: The Future of Work and Power*. Basic Books; 1988.
- [4] Burgess RJ. *The Art of Music Production: The Theory and Practice*. 4th ed. Oxford University Press; 2013.
- [5] Born G. *Rationalizing Culture: IRCAM, Boulez, and the Institutionalization of the Musical Avant-Garde*. University of California Press; 1995.
- [6] Meier LM. *Popular Music as Promotion: Music and Branding in the Digital Age*. Polity Press; 2017.
- [7] Hraes BJ. A creative industry in transition: The rise of digitally self-sufficient music producers. *Growth and Change*. 2012;43(3):442–461.
- [8] Spotify for Artists. Loudness normalization and audio quality guidelines. Spotify; 2023. Available from: <https://artists.spotify.com/en/help/article/loudness-normalization>

- [9] Watson A. Global recorded music industry revenues 1999–2022. Statista; 2023. Available from: <https://www.statista.com/statistics/272305/global-revenue-of-the-music-industry>
- [10] Leyshon A. The software slump: Digital music, the democratization of technology, and the decline of the recording studio sector within the musical economy. *Environment and Planning A*. 2009;41(6):1309–1331.