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Digitalization Music Ecosystem As an Impact of COVID-19 in Medan

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ABSTRACT

This study examines the digitalization of the music ecosystem as an impact of the COVID-19 pandemic in Medan. The research aims to identify the transformation of music production, distribution, and consumption from analog systems to digital practices within local music communities. In addition, it analyzes the role of digital platforms and music aggregators in shaping new patterns within the music industry in North Sumatra. The research employs a library research method, utilizing secondary data sources such as academic journals, books, media articles, and statistical reports. The findings indicate that, in the aspect of music production, there has been a significant shift from conventional systems to technology-based digital production. The emergence of home recording practices and the use of Digital Audio Workstations (DAWs) have enabled musicians to independently produce music at relatively lower costs, thereby increasing the number of independent musicians and expanding access to music creation. In terms of distribution, digital platforms such as YouTube, Spotify, and other streaming services have become the primary channels for disseminating musical works. Furthermore, the presence of digital platforms and music aggregators has facilitated artists—particularly musicians and composers—in distributing their works more efficiently. This transformation reflects a broader cultural shift toward modernization, where digital publication and independent production practices have become essential, ultimately providing greater creative freedom for musicians to produce and distribute their own works.

Keywords: Digitalization; Music Ecosystem; COVID-19

ABSTRAK

Penelitian ini mengkaji digitalisasi ekosistem musik sebagai dampak dari pandemi COVID-19 di Medan. Penelitian ini bertujuan untuk mengidentifikasi transformasi dalam produksi, distribusi, dan konsumsi musik—dari sistem analog menuju praktik digital—di kalangan komunitas musik lokal. Selain itu, penelitian ini menganalisis peran platform digital dan agregator musik dalam membentuk pola-pola baru di industri musik Sumatra Utara. Metode yang digunakan adalah studi pustaka dengan memanfaatkan sumber data sekunder seperti jurnal akademik, buku, artikel media, dan laporan statistik. Temuan penelitian menunjukkan adanya pergeseran signifikan dalam aspek produksi musik, yakni dari sistem konvensional menuju produksi digital berbasis teknologi. Munculnya praktik rekaman rumahan dan penggunaan Digital Audio Workstation (DAW) memungkinkan musisi memproduksi musik secara mandiri dengan biaya yang relatif lebih rendah; hal ini meningkatkan jumlah musisi independen serta memperluas akses terhadap penciptaan musik. Dari segi distribusi, platform digital seperti YouTube, Spotify, dan layanan streaming lainnya telah menjadi saluran utama penyebaran karya musik. Lebih jauh lagi, kehadiran platform digital dan agregator musik memfasilitasi para seniman—khususnya musisi dan komposer—untuk mendistribusikan karya mereka secara lebih efisien. Transformasi ini mencerminkan pergeseran budaya yang lebih luas menuju modernisasi, di mana praktik publikasi digital dan produksi independen menjadi hal yang esensial, yang pada akhirnya memberikan kebebasan kreatif lebih besar bagi musisi untuk memproduksi dan mendistribusikan karya mereka sendiri.

Kata kunci: Digitalisasi; Ekosistem Musik; COVID-19



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1. Introduction

In Indonesia, the first confirmed cases of COVID-19 in early 2020 prompted the government to implement a series of preventive policies aimed at reducing the transmission of the virus. Among the most significant measures was the implementation of Large-Scale Social Restrictions (Pembatasan Sosial Berskala Besar—PSBB), which officially began in April 2020. These restrictions limited public mobility, prohibited mass gatherings, and required people to maintain physical distancing. While these policies were essential for protecting public health, they also had substantial consequences for the sustainability of cultural and creative activities, particularly musical performances that traditionally depend on face-to-face interaction between performers and audiences [1].

The cancellation and postponement of concerts, music festivals, cultural celebrations, and other live entertainment events significantly affected musicians, event organizers, sound engineers, venue operators, and numerous other stakeholders involved in the music ecosystem. For many musicians, especially independent artists who depend on live performances as their primary source of income, the pandemic created severe financial challenges. Performance opportunities disappeared almost overnight, forcing musicians to reconsider their professional strategies and explore alternative methods of sustaining their artistic careers. Consequently, the pandemic became a catalyst for accelerating the digital transformation of the music industry, encouraging musicians to adopt new technologies for music production, promotion, distribution, and audience engagement [2].

One of the most visible transformations during this period was the migration of musical performances from physical venues to digital platforms. Live concerts were replaced by virtual performances conducted through social media platforms, video-sharing websites, and live-streaming services. Applications such as YouTube, Instagram Live, Facebook Live, Zoom, and other digital communication platforms became important media for musicians to maintain contact with their audiences despite the restrictions on physical gatherings. Although virtual performances enabled artists to continue sharing their music, the experience differed considerably from traditional concerts. The absence of direct audience interaction, spontaneous emotional responses, and shared physical spaces created a new form of social distance that influenced both artistic expression and audience participation. The digital environment redefined the relationship between performers and listeners, replacing immediate emotional feedback with virtual interactions such as comments, likes, and online donations [3].

The economic consequences of the pandemic further accelerated this transformation. Rising unemployment, declining household incomes, and the closure of entertainment venues compelled many musicians to diversify their professional activities and seek alternative revenue streams through digital media. Online concerts with ticketing systems, crowdfunding campaigns, digital merchandise, subscription-based platforms, and monetized streaming services emerged as viable alternatives for generating income. These developments demonstrated the resilience of musicians in adapting to rapidly changing circumstances while simultaneously highlighting the growing importance of digital entrepreneurship within the creative economy [4].

Digitalization has therefore emerged not merely as a temporary response to the pandemic but as a long-term transformation reshaping the structure of the contemporary music industry. Advances in digital technology have enabled musicians to become increasingly independent from traditional gatekeepers such as major record labels and commercial studios. The widespread availability of digital music aggregators, including services that distribute music to global streaming platforms such as Spotify, Apple Music, YouTube Music, Deezer, and Amazon Music, has significantly democratized music distribution. Independent musicians are now able to release their works globally with relatively low production and distribution costs, allowing them to reach wider audiences without relying on conventional recording contracts [5].

Similarly, the development of affordable Digital Audio Workstations (DAWs), virtual instruments, audio interfaces, and home recording equipment has revolutionized music production practices. Musicians can now compose, record, edit, mix, and master their works from home studios with professional-quality software and hardware. This technological accessibility has encouraged the emergence of a growing number of independent musicians, producers, and content creators who possess greater artistic autonomy and creative control over their musical products. Consequently, the digital era has shifted the music industry from a centralized production model toward a more decentralized and participatory ecosystem where creativity, technological competence, and digital literacy have become essential professional skills [6].

Within this broader national and global transformation, the city of Medan provides a particularly compelling context for examining how local music communities have adapted to digitalization during the COVID-19 pandemic. As one of Indonesia's largest metropolitan cities and a multicultural center in North Sumatra,

Medan possesses a vibrant music scene characterized by diverse genres, cultural influences, and active community organizations. The existence of numerous music communities demonstrates the importance of collective networks in sustaining local musical activities, fostering artistic collaboration, and preserving cultural identity. These communities function not only as spaces for artistic expression but also as social institutions that strengthen interpersonal relationships, facilitate knowledge sharing, and support creative development among their members [7].

Among these communities, the Rockers Community represents an important example of collective adaptation during the pandemic. Consisting of musicians, performers, music enthusiasts, and rock fans from various generations, the community has played a significant role in maintaining musical activities despite severe social restrictions. During the pandemic, the Rockers Community organized virtual concerts, online music-sharing sessions, digital discussions, collaborative recording projects, and fundraising initiatives to support members facing economic hardship. These activities illustrate how community-based organizations can foster solidarity, mutual assistance, and collective resilience during periods of crisis. Rather than allowing physical distancing to weaken social cohesion, digital communication technologies enabled members to maintain interpersonal connections and continue expressing their shared musical identity [6].

Nevertheless, the rapid digital transformation of the music industry has generated both opportunities and significant challenges. On one hand, digital platforms provide musicians with greater accessibility to global audiences, more flexible production processes, and new economic opportunities through streaming services, digital marketing, and online collaborations. Musicians are increasingly able to build personal brands, interact directly with audiences, and monetize their creative works through various digital channels. On the other hand, the digital environment has become increasingly competitive due to the enormous volume of musical content uploaded daily [8]. The democratization of music production means that barriers to entry have decreased considerably, making it more difficult for individual artists to distinguish themselves within an overcrowded marketplace. Consequently, musicians must continuously develop creative innovation, digital marketing strategies, entrepreneurial skills, and technological literacy to remain competitive in the evolving digital ecosystem.

Although previous studies have extensively discussed digital transformation within the global music industry, research specifically examining the dynamics of local music ecosystems in Indonesia, particularly at the community level, remains relatively limited [9]. Existing literature has generally focused on technological innovation, streaming services, consumer behavior, or the economic dimensions of digital music distribution. Comparatively fewer studies have explored how local music communities adapt socially, culturally, and economically to rapid digitalization during times of crisis. Furthermore, empirical research investigating the experiences of music communities in Medan and their contribution to the development of the music industry in North Sumatra is still scarce.

Therefore, this study seeks to address this research gap by providing a comprehensive analysis of how digitalization, accelerated by the COVID-19 pandemic, has transformed the local music ecosystem in Medan. Particular attention is given to the Rockers Community as a representative case of community resilience, digital adaptation, and cultural sustainability. By examining changes in music production, distribution, performance practices, social interaction, and economic strategies, this study aims to contribute to a deeper understanding of the evolving relationship between digital technology and local music communities. Ultimately, the findings are expected to enrich scholarly discussions on digital transformation in the creative industries while offering practical insights for musicians, community organizations, policymakers, and cultural institutions seeking to strengthen the sustainability and competitiveness of the music industry in North Sumatra in the post-pandemic [10].

2. Literature Review

Research on the digitalization of the music ecosystem and its transformation following the COVID-19 pandemic in the city of Medan cannot be separated from previous scholarly works that have explored the relationship between technological development, cultural change, and the music industry. A comprehensive literature review is essential to establish the theoretical and empirical foundation of this study while identifying the research gap that distinguishes the present research from earlier investigations. Previous studies have primarily discussed the cultural impact of the pandemic on music performances, the adoption of digital technology in music production, and the broader transformation of the music industry. However, limited attention has been given to the integration of these issues within the local context of Medan, where the music ecosystem is characterized by diverse cultural traditions, independent musicians, creative communities, and rapidly expanding digital platforms [11].

The COVID-19 pandemic has fundamentally altered the global music industry, forcing musicians, producers, promoters, and audiences to adapt to unprecedented social restrictions. Lockdowns and physical distancing regulations significantly reduced opportunities for conventional live performances, concerts, festivals, and community-based music events. Consequently, digital technologies became the primary means through which musical activities continued [12]. This transition accelerated the adoption of digital platforms for music production, promotion, distribution, and performance, ultimately reshaping the entire music ecosystem. Rather than serving merely as temporary alternatives during the pandemic, digital technologies have become integral components of contemporary musical practices that continue to influence the post-pandemic era.

According to Septiyan (2020), the COVID-19 pandemic has triggered fundamental changes in music culture, particularly in patterns of interaction and performance practices. Government policies regarding social restrictions have compelled musicians to replace conventional face-to-face performances with virtual concerts, live streaming events, and various forms of online musical interaction. Platforms such as YouTube Live, Instagram Live, Facebook Live, Zoom, and other streaming services became essential spaces for artistic expression and audience engagement [13]. These technological adaptations enabled musicians to maintain visibility and continue performing despite severe limitations on public gatherings.

Septiyan further argues that the transition from physical performances to digital performances extends beyond technical adjustments and represents a profound transformation of music as a social and cultural practice. Traditional musical performances are characterized by direct interaction between performers and audiences, where emotional communication, spontaneous responses, and shared experiences create a unique artistic atmosphere. In contrast, digital performances often reduce these interpersonal dimensions because communication occurs through screens and mediated technologies. Audience reactions become delayed, fragmented, or represented merely through comments, emojis, and virtual interactions. Consequently, the emotional intimacy and communal atmosphere commonly associated with live performances are significantly diminished [14].

This phenomenon has led to what Septiyan describes as the dehumanization of musical practices. In this context, music is no longer perceived solely as a collective artistic expression rooted in social interaction but increasingly becomes an individualized form of digital consumption. Audiences consume music independently through personal devices, while musicians perform without experiencing the immediate emotional feedback traditionally provided by live audiences. As a result, musical experiences become more fragmented, mediated, and technologically dependent. Nevertheless, Septiyan emphasizes that the pandemic should also be understood as a catalyst that accelerated the inevitable transition toward a digital music ecosystem. Rather than replacing conventional musical values entirely, digitalization has introduced new forms of creativity, communication, and audience engagement that continue to evolve in the post-pandemic era [15].

The implications of this transformation extend beyond performance practices into broader aspects of the music industry, including production, distribution, marketing, and audience participation. Digital platforms have enabled musicians to reach geographically dispersed audiences without requiring physical venues, thereby expanding opportunities for artistic exposure. Simultaneously, audiences have become more actively involved in content creation through social media interactions, online communities, and user-generated content, illustrating the increasingly participatory nature of digital music culture [16].

The technological transformation occurring within music production processes, the rapid development of digital technology, has significantly revolutionized the way music is produced through the emergence of Digital Audio Workstations (DAWs). DAWs integrate recording, editing, mixing, and mastering processes into a single computer-based environment, allowing musicians to complete professional-quality productions using relatively affordable equipment. Software applications such as Pro Tools, Logic Pro, Cubase, FL Studio, Ableton Live, and Reaper have become essential tools for contemporary musicians, replacing many functions previously available only in professional recording studios.

The adoption of DAWs has facilitated the rapid growth of home recording practices. Musicians no longer depend exclusively on expensive commercial studios because they can establish personal recording spaces equipped with computers, audio interfaces, microphones, headphones, and digital software. This transformation substantially reduces production costs while providing greater creative flexibility. Artists can record multiple takes, experiment with different arrangements, modify compositions, and refine recordings without the time constraints typically associated with traditional studio sessions.

DAWs offer advanced technological features, including non-linear recording, non-destructive editing, virtual instruments, MIDI programming, automation, and an extensive range of digital plugins. These capabilities enable musicians to manipulate audio efficiently without permanently altering original recordings, encouraging experimentation throughout the creative process. Such technological flexibility enhances artistic innovation while allowing musicians to maintain high production quality despite limited financial resources [17].

The democratization of music production represents one of the most significant consequences of these technological developments. Previously, professional music production was largely controlled by major record labels that possessed the financial resources and infrastructure required for high-quality recording. Digital technology has substantially reduced these barriers by enabling independent musicians to produce, distribute, and promote their work autonomously [18]. Streaming platforms, digital distributors, and social media have further expanded these opportunities, allowing artists to connect directly with audiences without relying heavily on conventional music industry gatekeepers.

This transformation has contributed to a more inclusive and accessible music industry, where creative success increasingly depends on artistic quality, digital literacy, and audience engagement rather than institutional affiliation alone. Independent musicians can establish sustainable careers by combining digital production technologies with online marketing strategies, crowdfunding initiatives, merchandise sales, and virtual performances [19]. Consequently, the balance of power within the music industry has shifted from centralized institutions toward more decentralized and community-driven creative networks.

Although previous studies have comprehensively discussed digital transformation from cultural and technological perspectives, relatively few investigations have examined how these changes influence local music ecosystems in Indonesian cities such as Medan. As one of Indonesia's major cultural and economic centers, Medan possesses a dynamic music scene involving traditional musicians, contemporary performers, independent artists, recording studios, event organizers, educational institutions, and digital content creators. Understanding how these stakeholders adapt to digital transformation following the COVID-19 pandemic is therefore essential for explaining the evolution of local creative industries.

Based on the reviewed literature, it can be concluded that the COVID-19 pandemic accelerated digital transformation across the music ecosystem by reshaping performance practices, production methods, audience interaction, and industry structures. Septiyan (2020) highlights the cultural implications of digital performances and the changing social meaning of musical interaction, whereas Fadly (2025) emphasizes the technological innovations that democratize music production through Digital Audio Workstations and home recording practices. Building upon these perspectives, the present study seeks to analyze how digitalization has transformed the music ecosystem in Medan after the pandemic, focusing on the adaptation strategies of musicians, the utilization of digital technologies, and the sustainability of local creative industries within an increasingly digital cultural environment.

3. Method

This study employs a library research method, in which the primary sources of data consist of a wide range of published literature, including peer-reviewed academic journals, scholarly books, conference proceedings, government reports, statistical publications, mass media articles, and relevant online documents. These sources are selected based on their relevance, credibility, and contribution to understanding the transformation of the music ecosystem in the era of digitalization following the COVID-19 pandemic. Library research is considered appropriate because it enables the researcher to examine existing theories, empirical findings, and policy documents without conducting direct field observations.

The study adopts a descriptive-analytical approach to provide a comprehensive explanation of the phenomenon under investigation. The descriptive component focuses on identifying and describing the significant changes that have occurred within the music industry, including shifts in production, distribution, performance practices, audience engagement, and digital consumption patterns. Meanwhile, the analytical component interprets these changes by connecting them with relevant theoretical perspectives on digital transformation, cultural industries, and media technology.

The data used in this research are entirely secondary data, obtained from previously published and publicly accessible sources. Data collection involves identifying, reviewing, classifying, and synthesizing literature that discusses the impact of the COVID-19 pandemic on the music sector, particularly the accelerated adoption of digital technologies. The collected materials are critically evaluated to ensure their validity and relevance to the research objectives.

Data analysis is conducted through qualitative content analysis, which involves organizing information into thematic categories and identifying recurring patterns, relationships, and trends across different sources. This analytical process enables the researcher to compare diverse perspectives and generate a comprehensive interpretation of how digitalization has reshaped the music ecosystem during and after the COVID-19 pandemic. Ultimately, this method provides a solid theoretical foundation for understanding the long-term implications of digital transformation for musicians, audiences, and the broader creative industry.

4. Result and Discussion

The COVID-19 pandemic represents one of the most transformative events in contemporary history, profoundly reshaping social, cultural, and economic life across the globe. Among the sectors most affected was the creative industry, particularly music, where restrictions on mobility, public gatherings, and live performances fundamentally altered traditional modes of artistic production and audience engagement. In Indonesia, including the city of Medan, musicians were compelled to rethink their creative processes, distribution strategies, and economic survival. The findings of this study demonstrate that the post-pandemic music ecosystem has become increasingly digitalized, characterized by technological adaptation, new business models, and evolving patterns of cultural consumption.

The rapid transformation experienced during the pandemic reflects broader theories of social and cultural change. Culture is dynamic and continuously adapts to changing environmental, technological, and economic conditions. Although cultural evolution is generally considered gradual, the COVID-19 crisis accelerated changes that might otherwise have taken decades to occur. Bohannon (1963, cited in Septiyan, 2020) argues that social change emerges as a response to new social needs and environmental conditions rather than through deliberate planning. The pandemic perfectly illustrates this process, as musicians, audiences, producers, and industry stakeholders collectively adopted new digital practices in response to unprecedented restrictions. Consequently, digital transformation became not merely an alternative but an essential mechanism for sustaining creative activities.

One of the most significant findings concerns the transformation of music production practices. Before the pandemic, professional recording studios remained the primary space for producing commercial music. However, social distancing regulations and lockdown policies limited access to these facilities, encouraging musicians to establish home recording studios. Supported by increasingly affordable recording equipment and software, musicians began producing songs independently from their homes. This transition was made possible through the widespread adoption of Digital Audio Workstations (DAWs), including software such as Pro Tools, Cubase, Logic Pro, Ableton Live, FL Studio, and Reaper. These platforms integrate recording, editing, mixing, and mastering processes within a single digital environment, allowing musicians to complete entire production cycles without requiring expensive studio facilities.

The findings indicate that DAWs have fundamentally transformed music production by providing greater flexibility, affordability, and creative control. Unlike analog recording systems, digital platforms allow non-linear recording, unlimited editing, virtual instruments, software synthesizers, and digital signal processing plugins. These technological innovations significantly reduce production costs while improving accessibility for independent musicians. Leonard et al. (2012) emphasize that digital recording technology democratizes music production by reducing barriers to entry previously imposed by expensive studio infrastructure. Similarly, Fadly (2025) argues that digital technologies have weakened the dominance of major record labels by enabling musicians to independently produce and distribute high-quality recordings. This democratization has expanded opportunities for emerging artists in Medan who previously lacked financial resources to access professional production facilities.

Another important finding concerns the rapid digitalization of music distribution. The pandemic accelerated the migration from physical distribution channels toward online streaming services and social media platforms. Interviews and secondary data indicate that musicians increasingly relied on platforms such as Spotify, YouTube, Apple Music, TikTok, Instagram, and SoundCloud to disseminate their works and maintain interaction with audiences. Rather than releasing physical albums, many artists shifted toward releasing singles, digital EPs, and continuous online content designed to maintain audience engagement. This transformation reflects broader global trends in digital music consumption, where streaming services have become the dominant mode of accessing music.

Digital aggregators also emerged as important intermediaries within the post-pandemic music ecosystem. These companies facilitate music distribution by delivering recordings simultaneously to multiple streaming platforms while handling metadata, royalty collection, and licensing processes. Their services enable

independent musicians to compete within digital marketplaces without signing contracts with major record labels. The growing importance of aggregators demonstrates how digital infrastructure has decentralized the music industry by reducing dependence on traditional gatekeepers.

The findings further reveal that platformization has substantially altered patterns of music consumption. According to Resmadi (2024), digital platforms increasingly influence not only music distribution but also listening behavior through algorithmic recommendations, curated playlists, and personalized content feeds. Audiences no longer search for albums in conventional ways but instead discover music through recommendation algorithms, viral TikTok videos, YouTube suggestions, and editorial playlists. Consequently, platform algorithms play a crucial role in determining the visibility and commercial success of musical works. This shift has encouraged musicians to adapt their production strategies by prioritizing shorter songs, frequent releases, and promotional campaigns optimized for social media engagement.

The digital transformation has also significantly expanded opportunities for musicians in Medan to reach broader audiences. Previously, local artists often depended on regional concerts, local radio stations, or physical album sales to gain recognition. Today, digital platforms enable musicians to distribute their works nationally and internationally with minimal financial investment. Geographic boundaries have become increasingly irrelevant as audiences can access music from anywhere in the world through internet-connected devices. This increased accessibility has contributed to greater cultural exchange while simultaneously providing local musicians with opportunities to build international fan communities.

Beyond artistic visibility, digitalization has generated substantial economic opportunities. The findings indicate that musicians increasingly diversify their sources of income through multiple digital revenue streams. In addition to streaming royalties, artists generate earnings from YouTube monetization, digital advertising, crowdfunding platforms, online merchandise sales, virtual concerts, brand collaborations, sponsored content, and subscription-based fan communities. During the pandemic, live-streaming performances became particularly important as substitutes for cancelled concerts. Although virtual concerts generally generated lower revenues than conventional performances, they enabled musicians to maintain audience engagement while experimenting with innovative performance formats.

Furthermore, the expansion of the digital ecosystem has created entirely new professional occupations within the music industry. Independent producers, freelance sound engineers, digital marketers, social media managers, playlist curators, video editors, graphic designers, content creators, and music consultants now play increasingly important roles within music production networks. These emerging professions contribute to the development of North Sumatra's creative economy by fostering flexible collaboration between musicians, technology specialists, and digital entrepreneurs. The decentralization of production networks also enables small creative businesses to participate in the broader music ecosystem without requiring substantial financial capital.

Nevertheless, the findings also highlight several challenges associated with digital transformation. One of the most significant concerns is the increasing intensity of competition within digital platforms. Because recording and distribution technologies have become highly accessible, thousands of new songs are uploaded daily across streaming services. This oversupply of content creates difficulties for independent musicians attempting to attract audience attention. Success is no longer determined solely by musical quality but also by branding, digital marketing strategies, social media engagement, search engine optimization, playlist placement, and algorithmic visibility. Musicians lacking adequate digital literacy may struggle to compete despite possessing considerable artistic talent.

Another challenge concerns the quality of music production. While affordable recording technologies democratize access, they also increase the likelihood of inconsistent production standards. Professional recording studios traditionally provide experienced engineers responsible for maintaining technical excellence throughout recording, mixing, and mastering processes. Home studios, however, often rely on self-taught musicians who may possess limited technical expertise. As a result, some independently produced recordings suffer from poor sound quality, inadequate mixing balance, excessive compression, or inconsistent mastering. These technical shortcomings may reduce audience satisfaction and limit commercial competitiveness despite strong artistic content.

The findings further suggest that digital transformation should not be interpreted as a threat to cultural preservation. On the contrary, digital technologies provide unprecedented opportunities for documenting, archiving, and promoting Indonesia's rich musical heritage. Traditional musical performances, local instruments, indigenous songs, and regional musical practices can now be digitally recorded, preserved, and

disseminated through online platforms. Digital archives also facilitate educational access for younger generations who increasingly consume cultural content through smartphones and internet-based media. Consequently, digitalization may strengthen rather than weaken cultural sustainability when combined with conscious preservation strategies.

This observation aligns with broader discussions regarding the relationship between technology and cultural continuity. Rather than replacing traditional artistic expressions, digital platforms provide new channels through which cultural heritage can be reinterpreted, revitalized, and introduced to global audiences. For musicians in Medan, integrating local musical traditions with contemporary digital production techniques creates opportunities to preserve regional identity while remaining relevant within competitive global markets.

The evolution of digital music consumption further supports Vickery's (2005) argument regarding the dematerialization of music. Over the past three decades, music has gradually shifted from physical formats such as vinyl records, cassette tapes, and compact discs toward entirely digital streaming services. This transformation has fundamentally altered consumer behavior, emphasizing access rather than ownership. Contemporary listeners increasingly subscribe to streaming platforms instead of purchasing physical albums, thereby changing revenue structures throughout the music industry. For musicians, this requires continuous engagement with audiences rather than relying solely on periodic album releases.

Finally, the study emphasizes the indispensable role of government in supporting the sustainability of Indonesia's digital music ecosystem. Effective public policies concerning copyright protection, royalty distribution, intellectual property rights, digital licensing, and fair compensation remain essential for ensuring equitable benefits for musicians. The increasing frequency of public performances involving copyrighted works also highlights the need for transparent royalty management systems that fairly compensate creators while minimizing legal disputes. Additionally, government investment in digital literacy programs, creative entrepreneurship training, infrastructure development, and financial support for independent musicians would further strengthen the resilience of Indonesia's creative industries.

Overall, the findings demonstrate that the COVID-19 pandemic accelerated a structural transformation that was already underway within the global music industry. Digitalization has become the defining characteristic of the post-pandemic music ecosystem, reshaping production methods, distribution channels, audience engagement, business models, and cultural preservation strategies. While significant challenges remain—including market saturation, technological inequality, and quality control—the opportunities created by digital technologies substantially outweigh their limitations. Future development of Indonesia's music industry will depend upon balancing technological innovation with cultural sustainability, artistic excellence, digital literacy, and supportive public policy. Such an integrated approach will enable local music communities, including those in Medan, to thrive within an increasingly interconnected global digital environment.

5. Conclusion

The COVID-19 pandemic has accelerated the digital transformation of the music ecosystem, fundamentally reshaping music production, distribution, performance practices, and audience engagement. In Medan, musicians and local music communities demonstrated remarkable resilience by adopting digital technologies, establishing home recording studios, utilizing streaming platforms, and developing innovative business models to sustain their creative activities. Digitalization has democratized access to music production and global distribution while creating new economic opportunities through online performances, digital marketing, and content monetization. However, this transformation has also intensified competition, increased the demand for digital literacy, and introduced challenges related to production quality and algorithm-driven visibility. Despite these obstacles, digital technologies provide valuable opportunities to preserve and promote local musical heritage, ensuring cultural continuity in the digital era. Therefore, the long-term sustainability of the music industry requires collaboration among musicians, communities, policymakers, and cultural institutions to strengthen digital competencies, protect intellectual property rights, and foster an inclusive, innovative, and culturally sustainable creative ecosystem in the post-pandemic era.

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