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# Research on Optimization Strategies for National Digital Music Metadata Standards in Practical Applications

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## Abstract

Abstract: Purpose/Significance With the rapid development of digital technology and Internet technology, particularly mobile technology, digital music has become the mainstream form of music. The national standard "Digital Music Metadata" released by China in 2015 provides effective guidance for the platform organization and user utilization of digital music, making research on its practical application significant. Methods/Process This study first employs web survey, case analysis, and user interview methods to investigate the organization and utilization of digital music works on China' s five major mainstream digital music platforms, revealing issues such as incomplete retrieval channels, fixed search result ranking, and inaccurate work classification. Subsequently, through comparative analysis against the "Digital Music Metadata" national standard, it identifies problems including missing metadata settings, ambiguous metadata references, unbalanced development of metadata application across platforms, and non-adoption of certain metadata elements from the national standard. Finally, metadata optimization strategies for platforms are proposed based on platform functionality, user requirements, and metadata standards. Results/Conclusions The strategies for optimizing organization and utilization functions in China's digital music platforms through metadata standards include: accommodating on-demand metadata expansion in practice, refining metadata description specifications for digital music platforms, providing user social features for digital music metadata, optimizing metadata element recording methods, establishing retrieval channels oriented toward different user groups, and integrating organizational approaches for music work metadata.

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## Full Text

# Research on Optimization Strategies for National Digital Music Metadata Standards in Practical Application

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## Abstract

[**Purpose/Significance**] With the rapid development of digital technology, internet technology, and particularly mobile technology, digital music has become the mainstream form of music consumption. The "Digital Music Metadata" national standard released in China in 2015 provides effective guidance for the organization of digital music platforms and user utilization, making research on its practical application highly significant. [**Method/Process**] This study first employs network survey methods, case analysis, and user interviews to investigate five major digital music platforms in China, revealing problems in the organization and utilization of digital music works, including imperfect retrieval channels, fixed ranking of search results, and inaccurate work classification. Then, using comparative analysis and contrasting with the "Digital Music Metadata" national standard, the study identifies issues such as missing metadata elements, unclear metadata references, unbalanced development of metadata application across platforms, and non-adoption of certain metadata elements from the national standard. Finally, based on platform functions, user needs, and metadata standards, the paper proposes optimization strategies for platform metadata. [**Result/Conclusion**] The strategies for China' s digital music platforms to optimize their organization and utilization functions using metadata standards include: meeting the demand for on-demand metadata expansion in practice, improving digital music platform metadata description specifications, providing social functions for digital music metadata users, optimizing metadata element recording methods, establishing retrieval channels for different user groups, and integrating the organizational approach of music work metadata.

**Keywords:** Music metadata; Metadata standard; Digital music platform
**Classification:** G251

## Introduction

The development of mobile internet technology has not only enriched the quantity of digital music resources but also integrated music apps into daily life, providing convenience for users to search for and access musical works. Users typically rely on basic information such as song titles, artists, and lyrics to retrieve works according to their habits, expecting optimal matching results. Metadata constitutes a set of elements that describe various characteristics of a resource object, possessing functions of identification, location, retrieval, and

acquisition [1]. Utilizing metadata to organize and manage digital music can improve the accuracy of search results from both formal and content perspectives, ensuring the discoverability and accessibility of musical works for users. In 2015, China promulgated the "Digital Music Metadata" national standard, which organizes, describes, and manages musical works by compiling their metadata based on attribute characteristics, thereby enhancing the application and practice of metadata in the digital music domain.

Developed countries in Europe and America began systematic research on music metadata as early as the late 20th century. Regarding metadata practice research, Tsekeridou et al. [2] extended the MPEG-7 metadata definition to define content-based retrieval scenarios, such as querying by music rhythm, query by example, humming-based queries using newly introduced music features, and traditional Greek music genre queries, to effectively describe the data characteristics of traditional Greek music and achieve efficient music retrieval. Concerning user needs for music metadata, CMD Barros et al. [3] studied which metadata elements are relevant for retrieval from the perspective of professional music users, finding that the most relevant metadata information relates to identification and authorship responsibility. Kanai [4] extracted actual information requests for music resources from library reference service records to construct a user-oriented music resource metadata schema, where the composite element "work title, expression title" dominated in actual user retrieval. Compared with foreign research, domestic studies on music metadata started relatively late and mainly involve two aspects. The first involves introducing research achievements on music metadata, including projects, schemes, and model construction. For instance, Hong Ying [5] constructed a work-centered music metadata model that builds metadata elements based on entities, compensating for the limitations of traditional MARC-based metadata systems that cannot adequately describe music work information. Han Shenglong [6] analyzed the current state of foreign music metadata research, systematically introducing the music metadata schemes of Indiana University Digital Music Library Project and MusicBrainz project, as well as user-oriented music metadata from MIT and the University of Twente in the Netherlands. The second aspect involves research and design of metadata for specific types of music resources. For example, Zhao Haiying et al. [7] constructed a metadata description scheme for Muqam music based on the cultural characteristics of Xinjiang Uyghur Muqam music resources, using three layers of descriptive, structural, and administrative metadata elements. Sun Hao [8] analyzed Chinese traditional music information resources from five aspects—artistic ontology information, cultural attribute information, carrier medium information, digitalization information, and record management information—to construct metadata that meets theoretical and practical requirements for Chinese traditional music resources in the digital context.

Through investigation, current research on music metadata both domestically and internationally mostly concentrates on model construction and scheme design, lacking exploration from a practical perspective on the application of metadata in musical works and digital music platforms. Therefore, based on this

gap, this paper investigates the metadata element settings of works on domestic mainstream digital music platforms, compares them with national standards to identify practical problems, and proposes strategies for optimizing platform functions using national metadata standards in China.

## 1 Development of China' s Digital Music Platforms and User Demand Investigation

This chapter selects mainstream domestic digital music platforms through investigation, analyzes their functional settings and user utilization needs, identifies discrepancies between existing functions and actual demands, summarizes problems in the design and organization of musical works on digital music platforms, and explores whether these issues relate to metadata application.

Since 2004, China has successively developed digital music platforms such as Kugou Music, QQ Music, Kuwo Music, Xiami Music, Migu Music, Baidu Music, and NetEase Cloud Music [9]. After experiencing mergers, reorganizations, renaming, and shutdowns, these platforms have ultimately formed a competitive landscape represented by Tencent Music Entertainment Group (TME) and NetEase Group. TME Group includes Kugou Music, QQ Music, and Kuwo Music, while NetEase Group includes NetEase Cloud Music. Xiami Music was discontinued in February 2021. As a music platform under China Mobile Group, Migu Music possesses substantial financial support and a large user base, along with abundant legitimate digital music resources, securing its position among numerous digital music platforms. According to online music market analysis reports released by Analysys [10] and iiMedia Research [11-12], and considering both platform influence and active user scale, Kugou Music, QQ Music, Kuwo Music, Migu Music, and NetEase Cloud Music have become China' s current mainstream digital music platforms. An investigation of the mobile terminals of these five platforms summarizes their functional settings regarding music work organization, as detailed in Table 1 .

An analysis of the mobile terminal functional settings for music work organization across the five platforms reveals several patterns. Regarding browsing functions, all five platforms concentrate their description of basic music work information on titles, albums, artists, lyricists, composers, and lyrics, while also focusing on work version ordering and access methods. Concerning classification functions, all five platforms exhibit diversified approaches to categorizing musical works, with theme, mood, language, scenario, and style (genre) serving as basic classification methods, among which Kugou Music offers the most comprehensive classification. For recommendation functions, NetEase Cloud Music places the strongest emphasis on personalized recommendations, pushing content based on user preferences. Regarding retrieval functions, all five platforms provide search methods including search box queries and searches by song title, artist, and lyrics, with humming-based recognition also widely adopted. QQ Music, NetEase Cloud Music, and Migu Music additionally offer retrieval by lyricists and composers, while Kugou Music and Kuwo Music can only access

such information indirectly through user-uploaded playlists. Concerning evaluation functions, all five platforms demonstrate interactive characteristics in commenting on and promoting musical works. The investigation reveals that whether established earlier under TME or emerging later as Migu Music and NetEase Cloud Music, the functional settings of these platforms, while distinctive, are not significantly different, resulting in homogenization—a consequence of adapting to market competition trends. Future development should see each platform improving personalized functional settings according to its role positioning to deliver better user experiences.

### 1.2 User Demand Analysis for Digital Music Platform Utilization

To investigate users' understanding of music work organization and utilization on digital music platforms and to obtain user requirements, this study invited 10 digital music platform users for interviews, including 5 males and 5 females. Age structure concentrated in the 20-30 range, accounting for 80%. Occupations included both students (60%) and other working professionals (40%). Interview content covered platform selection, problems encountered during retrieval and acquisition of musical works using platform functions, and expectations for digital music platforms. Interview results are presented in Table 2 .

Interview results indicate that among the functional settings for musical works on digital music platforms, users are most concerned with retrieval functions. Directly inputting song titles, artists, and lyrics in search boxes represents the most basic and commonly used retrieval method provided by platforms, meeting fundamental user needs. However, user-identified retrieval problems and acquisition limitations also demonstrate a satisfaction gap between platform functions and user needs. As the volume of digital music works increases, users expect to acquire target musical works in less time and through simpler methods. Yet current platform development trends focus on innovative service development to address homogenization issues, neglecting higher-level user needs for music acquisition and showing insufficient attention to feedback on retrieval method requirements. Music platforms should identify their deficiencies in music work organization and make adjustments and improvements based on user expectations.

### 1.3 Analysis of Problems in Digital Music Platform Design and Utilization

Through analysis of digital music platform functional settings and user interview results, deficiencies remain in platform design, utilization, and music work organization, specifically manifested in the following aspects:

**1.3.1 Imperfect Retrieval Channels Affect Users' Discovery of Musical Works** Musical works involve not only performers but also lyricists, composers, and other contributors who make significant contributions. Some users become interested in lyricists and composers after being attracted to a work' s

lyrics or accompaniment, hoping to access more of their works. However, using the platform-provided channels for other contributors yields inaccurate results. Additionally, besides differences in contributors, musical works also vary by language version. For example, the Cantonese version of the song "Love Transfer" is titled "Under Fuji Mountain"—the same musical work given different names due to language differences. Digital music platforms do not yet support retrieval by language; if users do not know a song' s alternative language title, discovering the work becomes difficult. The most convenient current method for discovering musical works remains retrieval by song title and artist.

**1.3.2 Fixed Ranking of Retrieval Results Affects Users' Location of Musical Works** Musical works are frequently covered by other musicians, creating new cover versions. Platform searches reveal fixed ranking configurations, with some platforms always placing original versions first when searching by song title. However, users may seek a particular artist' s more popular or widely-covered version. While this practice respecting original works' copyright is commendable, it may confuse users trying to locate target musical works. In fact, prominent original-work indicators already adequately protect copyright.

**1.3.3 Inaccurate Platform Work Classification Affects Users' Acquisition of Musical Works** Musical works can be categorized into multiple types based on content, theme, and scenario. Current platforms cannot effectively distinguish these, causing users seeking works of a particular style to find different styles mixed within the same category. Additionally, while all platforms analyze users' listening habits for personalized recommendations, interviewed users reported discrepancies between recommended content and their actual interests. Both situations indicate inadequate music work analysis and insufficiently detailed classification.

Addressing these issues, subsequent sections will comparatively analyze metadata elements between digital music platforms and the national digital music metadata standard to examine root causes and explore connections to metadata application.

## 2 Application of National Digital Music Metadata Standards on Digital Music Platforms

In 2015, China' s Standardization Administration released the "Digital Music Metadata" (GB/T 31777–2015) national standard, specifically applicable to organizing, database building, compiling, and querying digital music works in the music domain. "Digital Music Metadata" defines an information model generated by digital music works, specifying the metadata entities, metadata elements, and metadata content within digital music works [13]. The standard establishes 34 elements: (1) 10 general elements—work title, subject terms, work description, source, country/region, language, relation, creation date, genre, and identifier; (2) 6 elements specific to digital music resources—ethnicity, duration,

score edition, social function, style, and performance form; and (3) 18 elements within 4 metadata entities: contributor (performer, vocalist, conductor, lyricist, composer, arranger), recording (recordist, recording date, recording location), audio-visual attributes (format, file size, source carrier, sampling rate, resolution), and publication (version, publisher, publication date and edition, ISRC number). As a specialized digital music metadata standard, it holds significant importance for digital music organization and management and provides valuable reference for investigating metadata element settings for musical works on digital music platforms.

### 2.1 Comparative Analysis of Digital Music Works and Metadata Standard Elements

By comparing with the "Digital Music Metadata" national standard, this study analyzes the utilization of metadata elements for musical works across five digital music platforms—Kugou Music, QQ Music, Kuwo Music, NetEase Cloud Music, and Migu Music—as shown in Table 3 .

The comparison reveals that five "Digital Music Metadata" general elements are included across all five platforms to describe basic information for various music work types: (1) work title; (2) work description; (3) source; (4) language; and (5) relation (other related or similar audio-visual works). Among these, work title is a mandatory metadata element for describing digital music works. Five general elements remain unapplied in practice: first, subject terms—while platforms categorize works by theme, no subject term information describes the works themselves, preventing users from accessing thematic descriptors; second, country/region—music work origin is typically inferred from titles, artist nationality, and language, so platforms do not specifically annotate this element; third, creation date—digital music emphasizes release date rather than composition year/time; fourth, genre—defined in the standard as "category form of music work" but not explicitly marked on platforms; and fifth, identifier —though a unique identification code for digital music works, describing works with character strings proves too cumbersome and remains unadopted.

Additionally, special attention must be paid to unique metadata elements for digital music works. Two elements appear across all five platforms: (1) duration —the time length of the music work' s media carrier; and (2) performance form— the method and form of music performance, with platforms primarily describing works through four forms: solo, chorus, instrumental performance, and song-and-dance. Two unique elements are absent from all five platforms: first, score edition—referring to the score or version information a work is based on, which digital platforms do not describe as works themselves lack such specification; and second, social function—referring to music works' application in social life. Although digital music accompanies daily life, both platform descriptions and works themselves emphasize entertainment functions, focusing on digital music' s pleasure and edification rather than social function. Two elements require special attention: the "ethnicity" element is considered uncertain because some

works already exhibit clear ethnic characteristics (e.g., titles indicating ethnic songs or descriptions mentioning ethnicity in work introductions), while other cases do not directly manifest on works, requiring users to browse platforms to determine ethnic elements. The "style" element, as the most descriptive of work style among unique elements, is explicitly noted in QQ Music works, while the other four platforms allow users to infer style types through "genre/style" descriptions in categorized playlists.

Metadata entities describing digital music works also demand attention. Regarding the "contributor" entity, "performer, vocalist, lyricist, composer, and arranger" are essential and universal metadata elements present across all five platforms, while "conductor" applies only to collectively performed works like orchestras and choirs. For the "recording" entity, "recordist and recording location" correspond to "recording engineer and studio" in music works, describing digital music capture information, while "recording date" as a date-type element is less important than release date and thus not configured on platforms. Concerning the "audio-visual attributes" entity, all platforms include "file size" indicating memory space occupied on mobile devices, while QQ Music adds descriptions of "format" and "sampling rate," offering multiple quality options. For the "publication" entity, four elements– "version, publisher, publication date and edition, and ISRC number" –emphasize copyright. All five platforms apply three of these elements (except ISRC number), clearly indicating whether works are original or cover versions, the releasing record company, and release date. Kugou Music does not include the publisher element.

In summary, excluding two uncertain metadata elements, the "Digital Music Metadata" elements achieve a 62.5% application rate across the five major platforms–Kugou Music, QQ Music, Kuwo Music, NetEase Cloud Music, and Migu Music–meeting basic needs for describing musical works but showing deficiencies in reflecting digital music' s unique attributes. This indicates that the practical application relationship between metadata element configuration and platform works requires deeper analysis and research.

### 2.2 Problems in Practical Application of "Digital Music Metadata"

The practical application of "Digital Music Metadata" manifests in three aspects: digital music platform design and utilization, comparison of metadata elements for musical works across platforms, and mapping between platform works and national standards. Based on investigation and analysis results, this section identifies problems in national standard application on digital music platforms.

**2.2.1 Metadata Application Problems in Digital Music Platform Design and Utilization** China's five major digital music platforms exhibit problems in music work organization and utilization, including imperfect retrieval methods, fixed search result ranking, and inaccurate work classification. Corresponding metadata application problems manifest as: (1) incomplete metadata elements–platforms provide few contributor metadata elements for user

retrieval, typically only including vocalists, with some platforms offering lyricist and composer elements but with unsatisfactory results; insufficient attention to language metadata prevents retrieval by language to meet users' needs for acquiring songs in specific languages; (2) missing auxiliary metadata—platforms often place original but less popular works first in search results, a fixed ranking that respects copyright but inconveniences users in locating works, lacking auxiliary evaluation metadata to measure music work influence weight standards; and (3) unclear metadata references—current platform classification does not annotate subject metadata, though themes or emotions can be expressed through style, genre, and mood elements; single metadata elements covering multiple meanings create both unclear references and user retrieval difficulties.

**2.2.2 Unbalanced Metadata Application Development Across Digital Music Platforms** As digital music work volumes increase, metadata description has become fundamental for platform classification and organization. Major platforms continuously explore and develop unique metadata element systems in practice. While identical metadata element configuration across platforms is not the goal, elements describing basic music work information are essential. Comparative analysis of the five platforms reveals similar configurations for general elements, but differences in detailed element handling. QQ Music possesses the most comprehensive element configuration, followed by Kugou Music and NetEase Cloud Music. Relatively, Kuwo Music and Migu Music exhibit improper information description, such as failing to clearly distinguish between "release date" and "upload date" and not configuring the "publisher" element, indicating considerable room for improvement.

**2.2.3 Deviation Between Digital Music Platform Metadata Elements and Metadata Standards** The "Digital Music Metadata" national standard represents theoretical metadata research, while digital music platforms using metadata to describe musical works constitutes practical research. Differences exist between the standard' s professional metadata element expressions and platforms' popularized applications, as well as between the standard' s comprehensive element coverage and platforms' limited descriptive applications. Theory-practice deviations often affect users'accuracy and timeliness in discovering, retrieving, locating, and acquiring musical works through digital platforms. Specific manifestations include: (1) some metadata elements being too professional for adoption—platforms typically use common and familiar elements to describe works, sufficient for basic information and copyright; elements like score edition, source carrier, and resolution are seldom used due to strong professionalism; and (2) some metadata elements being unadopted due to uncertainty in musical works—for example, platforms describe popular and ethnic music works differently, with the former able to use "country/region" for both domestic and international popular music, while the latter can only use "ethnicity" to indicate Chinese music' s ethnic names, demonstrating that work type differences affect metadata element selection.

## 3 Optimization Strategies for Metadata Application on Digital Music Platforms

Based on the above investigations of digital music platform functional settings, music work organization and utilization analysis, user needs, and practical research on "Digital Music Metadata" application across the five platforms, this section proposes strategies for China' s digital music platforms to enhance their organization and utilization functions using metadata standards.

### 3.1 Meeting the Demand for On-Demand Metadata Expansion in Practice

Seven years have passed since the "Digital Music Metadata" release, during which digital music platforms have matured and described musical works in greater detail, creating a contradiction between using richer elements and existing elements' inability to meet needs. This presents development requirements for both sides. On one hand, "Digital Music Metadata" should expand metadata according to principles mentioned in the standard, reasonably adding metadata entities or elements based on practical needs. On the other hand, digital music platforms should continuously improve metadata organization and utilization mechanisms, updating platform metadata configuration alongside national standard development by incorporating user-frequently-used but not yet systematically organized metadata elements into work descriptions, such as configuring subject metadata and improving contributor and language metadata element sets, thereby keeping pace with the times and satisfying users' multi-channel acquisition needs.

### 3.2 Improving Digital Music Platform Metadata Description Specifications

Although China has promulgated "Digital Music Metadata" to organize and describe musical works, digital music platforms additionally require a set of metadata description specifications tailored to their own characteristics, supplementing metadata elements when national standards are inapplicable or unmentioned. "Digital Music Platform Metadata Description Specifications" could address commonly used element descriptions and supplementary element explanations. Improving metadata description specifications can make description results more consistent across different personnel and promote convergent yet distinct development in metadata element description across platforms. Platforms with more comprehensive metadata settings should play a leading role, guiding other platforms'metadata description work while following specifications, ensuring completeness of common elements and clarifying auxiliary elements to standardize and scientize metadata description work. Furthermore, platforms should unify metadata element meanings in "description specifications," explaining elements covering multiple meanings or those with similar meanings that can substitute for other metadata to resolve unclear reference problems.

### 3.3 Providing Social Functions for Digital Music Metadata Users

The expanding scale of digital music users has made platforms recognize the importance of developing social functions. NetEase Cloud Music and QQ Music pioneered music-based user social functions with significant success [14]. Digital music platforms cannot organize and describe musical works without metadata support. Building on existing user social functions, platforms can combine them with metadata from the "Digital Music Metadata" national standard to form metadata information-based user socialization: experienced music users can interact in real-time on platforms through topic groups, sharing, and commenting, jointly discussing problems encountered during retrieval and acquisition and seeking solutions; platforms should equip professional staff to answer questions arising during users' metadata-based music socialization; and platforms should advocate User-Generated Content (UGC), improving digital music metadata content from a user perspective and attaching examples for deeper element revelation to clarify element connotations.

### 3.4 Optimizing Metadata Element Recording Methods

When referencing the "Digital Music Metadata" national standard to organize and describe musical works, digital music platforms can categorize metadata recording by detail level into brief recording and full recording. Brief recording satisfies user needs by documenting frequently used and important metadata elements, while full recording meets platform needs for organization, management, and recommendation by comprehensively documenting metadata information. For users, brief recording enables quick understanding of musical works and acquisition through various metadata retrieval points. For platforms, full recording enables clearer classification and organization of musical works and more accurate music recommendation services based on user preferences, satisfying personalized needs.

### 3.5 Establishing Retrieval Channels for Different User Groups

Addressing the issue that certain metadata elements in the "Digital Music Metadata" standard possess professional characteristics and are infrequently used in practice, this paper recommends that digital music platforms divide retrieval channels into general retrieval and professional retrieval according to different user groups. General retrieval targets ordinary public users who typically use common metadata elements like work titles and vocalists, so platform configuration for general retrieval channels should emphasize simplicity and popularization. Professional retrieval targets musician users who often have higher professional requirements for music work metadata description, paying greater attention to elements like creation date and audio-visual attributes mentioned in "Digital Music Metadata," so platform configuration for professional retrieval channels can be more professional and standardized. Retrieval channels oriented toward different user groups satisfy most users' needs while compensating

for minority users' special retrieval requirements, enabling platforms to provide higher-quality services.

### 3.6 Integrating the Organizational Approach of Music Work Metadata

Digital music platforms do not reuse all elements from the "Digital Music Metadata"standard when describing works, instead selecting according to needs. This paper recommends establishing a music metadata column to integrate elements describing musical works, enabling more precise work location. First, classify musical works by style using unique elements "ethnicity" and "style" to resolve uncertainty problems in element reuse. Second, conduct secondary metadata linking for works under each style, describing relevant information from content, intellectual property, and format perspectives, highlighting general elements and copyright-related elements. Third, metadata integration pages should follow user-friendly principles, with platforms providing jump links to other platforms holding work copyrights for direct user acquisition. Finally, metadata element design should satisfy basic retrieval needs while maintaining good interactivity to further enhance work discoverability on digital music platforms.

In recent years, China' s digital music platforms have developed rapidly, becoming important components of the digital music industry. As products of the smart terminal development wave, digital music works uploaded to platforms are organized and stored according to certain methods, with metadata application in the music domain becoming increasingly widespread. The emergence of the "Digital Music Metadata"national standard provides a theoretical foundation for researching metadata element application in practice, while platforms' work description processes directly or indirectly influence music metadata development. Therefore, this paper investigates users' understanding of digital music platform work organization and utilization, compares "Digital Music Metadata" national standard application across platforms, identifies practical problems, and proposes optimization strategies for platform development. The aim is to improve user efficiency in retrieving and acquiring digital music works, enhance user satisfaction with digital music platform experiences, and consistently ground the application of national "Digital Music Metadata" standards and digital music platform development in serving users.

## References

[1] Jiyuan Ye. Information Organization [M]. 2nd ed. Beijing: Publishing House of Electronics Industry, 2015: 177-183.
[2] Tsekeridou S, Kokonozi A, Stavroglou K, et al. MPEG-7 based music metadata extensions for traditional Greek music retrieval [C]//International Workshop on Multimedia Content Representation, Classification and Security (MRCS 2006). Int Assoc Pattern Recognit, Istanbul Tech Univ: TUBITAK, 2006.
[3] CMD Barros, LMA Café. The relevance of music information representation metadata from the perspective of expert users [J]. Transinformao, 2013, 25(3):

213-223.
[4] Kanai K. Differentiation of metadata elements based on users' music information needs: Focusing on FRBR, FRAD and Variations [J]. library & information science, 2013.
[5] Ying Hong. Research on Music Information Metadata Standards [J]. Library Work and Research, 2007(01): 26-30. DOI:10.16384/j.cnki.lwas.2007.01.009.
[6] Shenglong Han. Current Status of Music Metadata Research [J]. Journal of Academic Libraries, 2007(02): 67-72.
[7] Haiying Zhao, Gengyun Jia, Hong Chen. Research on Xinjiang Uyghur Muqam Music Metadata [J]. Journal of Library Science, 2016, 38(02): 38-41. DOI:10.14037/j.cnki.tsgxk.2016.02.012.
[8] Hao Sun. Analysis of Chinese Traditional Music Information Resources under Digitalization [J]. Library and Information Service, 2018, 62(16): 112-118.
[9] China Press, Publication, Radio, Film and Television Network. Whither the Development of Digital Music Platforms [EB/OL].[2022-06-22]. https://www.chinaxwcb.com/info/569556
[10] Analysys. China Mobile Music Market Annual Analysis 2020 [EB/OL].[2022-06-04]. http://m.analysys.cn/article/detail/20019735
[11] iiMedia Research. Monthly Active Users of Major Chinese Online Music Platforms (January-March 2020) [EB/OL].[2022-06-04]. https://baijiahao.baidu.com/s?id=1675318281467869
[12] iiMedia Research. China 5G+New Cultural and Creative Industry Research Report 2021 [EB/OL].[2022-06-04]. https://www.iimedia.cn/c400/78789.html
[13] Digital Music Metadata [EB/OL].[2022-06-04]. http://www.csres.com/detail/270812.html
[14] Na Liu, Qian Zhan. Research on the Influence of "Music Socialization" on User Stickiness of Mobile Music Platforms [J]. Southeast Communication, 2020(07): 119-122. DOI:10.13556/j.cnki.dncb.cn35-1274/j.2020.07.038.

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*Note: Figure translations are in progress. See original paper for figures.*

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