The digital archiving of music at the Danish Broadcasting Corporation

History, ideals, taxonomy

Andreas Helles Pedersen

In this article I offer a history of the digital music archive at the Danish Broadcasting Corporation (DR). Within the last decade, DR has complemented their music archive with an in-house digital music platform called */Diskoteket*,[1] on which I see not only a lively and educational space for making contextualized searches in regard to recorded and commercially released music, but also a determinative discourse on music information. As a conceptual point of departure I investigate the supposition that DR has an institutionalized understanding of music history, and building on this supposition I aim to throw light on the following question: how can an institutionalized music history at DR be traced in online music presentations?

The article's definition of music history pertains to the history of recorded music, in that DR's communication of music history is to a large extent rooted in how music history is reflected in historical recordings. When it comes to music history, the institutional discourse at DR is entrenched in a conventional idea of linear progress at the same time as the digital music archive echoes non-chronological ordering and heterogeneous narratives. Where the institutional discourse trickles down into the communication to the public, the non-causal rendering is only accessible to DR employees. The digital music archive is riddled with potentiality, but in terms of production ends it is only functional internally within DR. Like the physical music archive, the digital music archive is reserved for the few and inaccessible to the public. It makes you wonder: what, then, is the difference between the digital music archive and the physical music archive?[2]

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[1] Throughout the article I will juggle with two almost identical names: *Diskoteket* and */Diskoteket*. Diskoteket is the name of the central music archive at DR in the years 1952–2017, whereas /Diskoteket is the name of DR's in-house digital music platform. Confusion might arise due to the fact that the central music archive as a department is responsible for the launch of the digital music platform, and thus Diskoteket manages /Diskoteket. This coexistence of almost identical names took place during three years, 2014–2017 (in 2017 the central music archive's name was changed to *DR Musiktjenester*).

[2] DR's music archive consists of a physical collection of CDs, LPs, shellacs and other formats as well as a digital collection of music directly acquired as sound files or digitized from the physical formats. Today, the majority of the CD collection is digitized, whereas the LPs and shellacs are digitized sporadically. Daily, CDs are ripped and entered into the database by student employees with the overall goal of getting everything digitized. When it comes to the other formats, single tracks are only digitized when requested by a user for production and broadcasting purposes. This dispersal of digitization is taking place because of the time-consuming task of readying records, gramophones and recording software for a digitization process in real-time. As of February 1, 2022, the collection consists of 447,725 unique

Until now, research into music on the platforms of DR has not explored the nexus of archiving, music history and cultural policies and viewed this interconnection in the light of DR's historical commitment to public education.[3] I do not deceive myself, pretending to unearth a direct connection welding shifting political climates and strategies of music archiving together, but I believe that it is valuable to consider the correlation between a contemporary understanding of music history at DR and the original ideals of education and public service.

The sources for this article are mainly based on 39 internal documents from DR's own archives, covering the years 1998–2002 and 2011–2014 and comprising 159 pages. The documents concern the database underlying /Diskoteket, which is called *MUSA*, and the plans and goals for the development of a digital music platform. I have been granted access to these documents by DR's juridical department. It is important to note that access is only partly granted since some information in the documents is deemed to concern economic and business-related dimensions and thus might interfere with DR's strategic planning and editorial processes if revealed. Therefore, large portions of the text in the documents are censored, crossed out, and classified as confidential. These redacted documents have provided me with exclusive knowledge of the sequential development of DR's digital music archive.

In addition, I have obtained unique insights into the ideas and visions as well as the processes of strategic decision-making behind the digital music archive from Thomas Dose, who is currently responsible for DR's music archive. In early spring 2021 I conducted three comprehensive interviews with him about developments, aims and thoughts concerning the music archive and /Diskoteket, and this article is greatly indebted to his benevolence. He is one of the main contributors to the development of the digital music archive, so our talks have had significant impact on the comprehension I have gained.[4]

While treating the interviews critically, I also regard them as a sort of collaborative process. In order to obtain an inside perspective on the digital music

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records distributed between 24,192 shellac records, 152,792 LP records, 180,868 CD records, 52,435 sound file records, and 37,438 other formats. Additionally, many records have been acquired with duplicates, making the actual physical collection comprise between 700,000 and 800,000 records. The collection includes 3.5 million tracks of which 1.3 million have been digitized, there are thus still 2.2 million non-digitized tracks in the collection.

[3] In the current public service contract for the years 2019–2023 it is stated that a clear communication of Danish culture and Danish cultural heritage is an overall goal for DR's work. This is in keeping with Radio- og fjernsynsloven §10 [Radio and TV Act, §10] stating that the collective public service enterprises must secure that the Danish population gets a 'wide offering of programs and services comprising news broadcasting, public information, education, art and entertainment'. Since the 1980s, this balancing of information and entertainment has been referred to as the public service commitment, which historically plays into an ideal of underpinning the national democratic processes. In this logic, mass media are to take part in a general education of the population that follows the mandatory school attendance.

[4] Quotes and references from documents and interviews are in my translation.

archive I had to follow through on these interviews, and I am fully aware how that makes the article dependent on one man's interpretation, but I also acknowledge the necessity of taking this path for the sake of acquiring any detailed insight into the everyday implementation of the functionalities of /Diskoteket.

Another important note is that I used to be employed as a *musikregistrator* [music registrar] in the music archive at DR, from 2015 until 2018, and I am still affiliated to the department on a freelance basis. Therefore, I have been granted full access to the music archive, both physically and digitally, meaning that I know how /Diskoteket functions and also have insight into the process of registering music in the database beneath the platform. It is primarily on these accounts that my conclusions are grounded: interpretations of information from the archival documents; the interviews with Dose; and firsthand experience with DR's music archive and the different software platforms used.

I open with a short overview of recent music radio research, highlighting some non-illuminated areas within studies concerning music on Danish radio that have been published over the last five years. I then describe the development of the music archive at DR with a focus on the years leading to digital registering and archiving of music. This leads me to do a thick description of some of the functionalities in /Diskoteket in order to demonstrate how these make for different experiences due to the setting in motion of metadata. Via this analysis I accentuate the supposition of DR having an institutionalized understanding of music history in its contemporary approach to music archiving and communication. As a concluding perspective, I relate my analyses to the intimate connection between archives and history with the aim of problematizing how different concepts of time make for different ideals of history. It becomes evident that the digital music archive implies a chimerical understanding of music history that does not necessarily correspond to the institutional discourse of music history. This final perspective problematizes the concept of history as a relational means of communication, and it accentuates how DR's use of music history balances between causality and nonlinearity.

Music-related radio research

Research into music and radio can take many guises and be part of a wide array of agendas. Interestingly, most of the seminal publications have not been issued until the 1980s, even though the valve technology underlying radio broadcasting is more than a hundred years old. There is, of course, the pioneering work of thinkers from the Frankfurt School who turned to new technologies and tried to create understanding of their direct impact on media cultures and practices, leading to critical readings of the radio's influence on music in the 1930s and 1940s. Most likely due to the advent of television and the position of this medium in people's lives, we do not see a serious academic interest in radio until around 1980, when a renewed attention to the medium, from both media studies and musicology at large, takes off, rooted in social and cultural historiography. To take

a few examples, Paddy Scannell (1981) looks into music policies in the early years of the BBC, whereas Jody Berland (1990) discusses how the relationship of radio and music industry can broaden the musical worldview of local listeners. In a Scandinavian context, Per Drud Nielsen (1981) takes an early sociological approach and argues for the impact of popular music radio on the formation of peoples' everyday.

In the late 1990s Alf Björnberg provides a seminal study of music genre and radio programming at the Swedish Radio (SR; until 1957 Radiotjänst) from 1925 to 1995. His study oscillates between musicology and media studies and he operates with the premise that music is never 'just music' (Björnberg, 1998, p. 15). Björnberg describes his methodological approach as 'institutional ethnography' (p. 18), which shows clear affinities with Georgina Born's work at IRCAM (Born, 1995) – an attitude towards ethnographic research that Born further refines in her work at the BBC, in which she applies an insistent methodology to find openings in the impenetrable structure of the BBC by outlining and analyzing institutional and personal dynamics (Born, 2005a).

In recent years, Patrick Burkart and Susanna Leijonhufvud have made the critically infused claim that SR due to policy making and media laws in Sweden merges with Spotify's business model in what they call a 'Spotification of public service media' (Burkart and Leijonhufvud, 2019). They analyze how governmental strings are pulled so that Spotify is instated as a 'digital librarian for all public media' (ibid., p. 178). This development coincides with a downscaling of employees at SR's gramophone archive, lessening the archival memory of this archive and, in fact, lessening the archive itself; the process of creating, and maintaining, distinctive metadata is reduced (ibid., pp. 179–180; Leijonhufvud, 2018, p. 156) and the material collection is dwindling.[5]

Over the last ten years two extensive research projects on Danish radio history have been conducted: the *LARM Audio Research Archive* (2010–2014, funded by *The National Programme for Research Infrastructure* under the Ministry of Higher Education and Science), and *A Century of Radio and Music in Denmark: Music Genres, Radio Genres, and Mediatisation* (RAMUND) (2013–2018, funded by the Danish Council for Independent Research). The first project resulted in a research infrastructure for digitization and archiving of broadcasted radio, meaning that researchers now have the opportunity to make qualified

[5] When comparing official statements from an extensive report on media by the Swedish Department of Education issued in 1987 with statements January 2013 by the program director of SR, Björn Löfdahl, in defence of harsh strategies of digitization, we see an interesting contradiction: in the official report from 1987 it is assessed that SR's Gramophone archive contains about 600,000 records, which must be understood to include all types of vinyl, CDs and 78 rpm records (Andersson, 1987, pp. 114–115), and in 2013 Löfdahl states that SR's gramophone archive contains 220,000 CDs, 145,000 LPs, 75,000 EPs and 65,000 78 rpm records, totalling 505,000 records (Löfdahl, 2013). The contradiction lies in Löfdahl's attempt to ensure that the digitization process does not influence the physical collection; surely, the 'missing' 100,000 records might have been lost or discarded at an earlier point in time, but it is not a comforting incongruity.

searches and open new perspectives for Danish radio research. This archive is called *LARM.fm*, and the initial idea for this project can be argued to grow out of Ib Poulsen's groundbreaking work on the Danish radio montage as a genre-specific format for radio documentaries, which also tells a history of Danish radio (Poulsen, 2006). The LARM project bodes well for interesting radio research to come that can take a lot of different cultural historical guises (Jensen et al., 2015, p. 10), and the project in fact spawned a number of exciting doctoral theses (e.g. Abildgaard, 2014; Lawaetz, 2014; Mortensen, 2014; for a widened introduction to the project, see the printed matter published by the research group: Andersen et al., 2013).

Whereas the LARM project is directed towards a concrete material outcome, a digital infrastructure, the RAMUND project seeks to understand the convergence of music (as an aesthetic category) and radio (as a medium and a specific format for listening to music). Broadly speaking, the RAMUND project is conceptual, in that it aims at detaching and analyzing the assemblage of music radio, that is, the different agents and practices of a complex mediation of genre cultures and social structures. But the project tells a specific national media history as well. In that regard the project creates valuable insight into the workings of the Danish state radio and it further makes comprehensive analyses of the ways in which DR has influenced, and still influences, Danish musical life as well as Danish musical cultures and listeners (for an introductory overview, see the website of the project: https://cc.au.dk/ramund/).

Much of the recent research concerning music radio production at DR analyzes DR's organization by investigating programming and related undertakings as parts of a complex assemblage of human-nonhuman agency. A common feature of this research is a scrutiny of production practices ranging from the implementation of radio formats, over the performance of control and hierarchy in music scheduling, to the discursive framings of the aural products reaching the public's ears (Krogh, 2018; Michelsen, 2018b; Wallevik, 2018; Have, 2018). Although the research takes its point of departure in either cultural analysis or new materialism, it tends not to highlight all levels of complexity of the assemblage of music radio mentioned in the paragraph above.

An example can be found in then doctoral student Katrine Wallevik's ethnography of music scheduling and the work processes of the Head of Music at DR's radio channel P3, in which she emphasizes the need for better understanding of how technologies exercise agency and how algorithms are entwined in culture production (such as radio production) without herself trying to understand said technologies and algorithms (Wallevik, 2018, p. 119). Wallevik delivers a thorough description of how the Head of Music at P3 utilizes a piece of music scheduling software called Selector (see Table 2 below) in order to centralize the selection and encoding of tracks, of music as digital files, which automatizes the configuration of the daily playlists to be broadcasted. Unfortunately, she avoids looking into the technological, and digital, parts of the

networks she is analyzing, which could have led her to do further research into Diskoteket's [the Discotheque] work processes, showing the entanglements of this department's work with the production of music metadata and Selector's and the editing and broadcasting software Dalet's functionalities. In this context, the concept of metadata is understood as all annotated information in relation to a track, an artist, a release or a composition.[6] Further, the description of Diskoteket as having 'mainly one man keeping the digital database in order' could have been avoided (ibid., p. 105); in 2015, when Wallevik's ethnography was conducted, the department had seven full-time employees (myself included) and the same amount of student workers, handling the digitization process but also, and more crucially, executing the production of new metadata for the database – as this is a premise for understanding the meshwork, or assemblage, of radio production at P3, the ethnography ought to have opened the door to Diskoteket due to the fact that /Diskoteket was launched the year before, meaning that the Head of Music at P3 had to go through this platform in order to get his desired music on to the Dalet server and thereafter into Selector.

The influence of new materialist thinking also manifests itself in inspiration from assemblage theory. As stated above, the RAMUND project aims at analyzing music radio as different agents and practices of a complex mediation of genre cultures and social structures; the project thus wants to analyze music radio as an assemblage. I applaud this idea, but the fact that a lot of the research is deeply ingrained in sociologically informed (cultural) analysis leads to overlooking some of the nuances of the assemblage as a concept. For instance, when Mads Krogh briefly discusses the concept with reference to Georgina Born's definition (Born, 2011, p. 377; Krogh, 2018, pp. 78–79) the philosophical weight of Gilles Deleuze's and Félix Guattari's ontological framework developed in *A Thousand Plateaus* (1980) is not specifically addressed. In my reading, Born's and Krogh's definition of the assemblage focuses on how a combination of things, of mediations, provides a certain ontological presentation. Deleuze and Guattari agree on this, but they discuss the assemblage as having yet another dimension, which is to be a force field keeping very heterogeneous elements together. They

[6] For this research, the concept of metadata covers annotated information in several categories: information about songwriters, musicians, technicians and similar roles on any given track; information about the relations between different tracks in the history of recorded music; information about the aliases and pseudonyms of artists; information about artist constellations and affiliations; information about recording dates and recording locations of any given track; and information about relations between releases. This sort of metadata is deployed and operationalized in the MUSA database, meaning that the user of /Diskoteket can move around in the digital music archive via hyperlinked interrelations. Besides this type of metadata, a wide array of meta-tagging on track level is installed. These meta-tags explicate a sorting in terms of categories such as genres (e.g. rock) and styles (e.g. shoegaze), periods (e.g. the baroque), ensemble sizes (e.g. quartet), types (e.g. only instrumental), and a multitude of keywords (amongst others, a country, a year, a political context, an event, gender, sexual orientations). The meta-tagging has not yet been operationalized (even though specialized searches on /Diskoteket reveal some of meta-tags).

speak of plateaus as an assemblatic continuity between otherwise inconsistent elements. Taking this approach can help problematizing how the digital realm, from computing to infrastructural logic, forms and informs the contemporary production of music radio. Born's and Krogh's approach stems from Born's idea of a 'musical assemblage', which she defines as a 'particular combination of mediations [...] characteristic of a certain musical culture and historical period' (Born, 2005b, p. 8) and as bound together in four planes of social mediation irreducible to one another (Born, 2011). Understandably, there is a social focus in the research when describing DR and music radio as an assemblage, but this concentration entails, with Wallevik's research as an example, a less refined understanding of the digital functioning in the production of music radio today.

Informed by the LARM and RAMUND projects I want to make an incision into a modest yet structural and formative part of the assemblage of radio and broadcasting practices at DR: the music archive, and specifically the digital music archive.[7] When I speak of the user perspective of DR's music archive in all its historical guises I refer to the staff at DR; employees have always been able to use the music archive for programme planning, production ends and broadcasting, whereas the public do not have any access to the music archive at all. This must be explicated in order to avoid a misreading of the article's scope.

With this article I contribute to the fields of research dealing with archives and music radio by providing a nuanced perspective into the practices and strategies behind the archiving of music at DR. This gives insight into an under-illuminated part of the history of DR as a public service institution, shedding light on the intimate connection between practices of registering music on one side, and programming and principles of rotation on the other. Further, this insight can be broadened beyond a Danish public service context, in that it highlights the determinative power of archival processes on digital music searching and listening, and connects these processes to institutional music communication.

From shellac to server

It is a widely known story that *Statsradiofonien*[8] [State Radio Broadcasting] was in conflict with the record industry in the first decades of its lifetime. During the

[7] To clarify, when I speak of the music archive of DR I exclusively refer to the archive of commercially released music. DR also has an archive of live music produced in-house as well as a number of externally recorded concerts (that DR has been granted the rights to broadcast and/or archive). This archive is integrated in the digital music archive, /Diskoteket, as an enclave called */Diskoteket/ep* (with 'ep' standing for *Egenproduktion*, which loosely can be translated 'in-house production'), but even though both archives are built on the same infrastructure within the same database, they are separated and do not refer or lead to each other. As a user you need to be approved and granted access to /Diskoteket/ep, whereas all employees at DR have access to /Diskoteket.

[8] During its lifetime DR has had several names. As a media company owned by the state, DR started on a trial basis in 1925 under the name *Radioordningen* [the radio arrangement]. In 1926 this arrangement for broadcasting of radio was made permanent due to *Lov nr. 45 af 13.3.1926 om Radiospredning* (Act No. 45 on Radio Dissemination), and from 1926 to 1959 the public service company was called

1930s it was unclear how Statsradiofonien should reimburse the record industry for the replay of music. The laws and rules were not yet defined, so it was decided that Statsradiofonien had to compensate for each replay *unless* they already owned the records they were broadcasting from. Due to this dispute it was decided that Statsradiofonien was not to institute a music archive; instead the institution had to rent the records from the record companies (Michelsen et al., 2018, p. 147). The law of rights for authors and artists of 26 April 1933 granted the manufacturer of records the same rights as the author of a literary work (Anon., 1965, pp. 2–3), which put the then administrator of mechanical music, Gramo, in a decisive position. In 1946 the arrangement with Gramo was renegotiated, and from this point Statsradiofonien was allowed to build a collection of commercially released music – to build up a music archive.

Nascent collection and index cards as systematization

Inspired by SR and the BBC, DR launched their central music archive in 1949, *Grammofonarkivet* [the Gramophone Archive]. Prior to this, DR employees had to privately acquire the music themselves if they wanted to air something outside the limited collection owned by DR (cf. the abovementioned settlement between DR and the record industry), which led to an unstructured storing of shellac discs in people's offices and, more arbitrarily, on windowsills around the Radio House in Rosenørns Allé, Copenhagen (where DR was located from 1941 until 2007, when DR relocated to DR Byen in the Ørestad area of Copenhagen). After a few formative years, the legendary radio and TV host, Otto Leisner, was appointed general manager of Grammofonarkivet in March 1952.

Name	Description
Grammofonarkivet	DR's central music archive 1949–1952
Diskoteket	DR's central music archive 1952–2017
DR Musiktjenester	DR's central music archive since 2017

Table 1. Historical overview of the organizations of DR's central music archive. Descriptions are based on Dose (2021a) and Michelsen et al. (2018).

Shortly after his appointment he changed the department's name to Diskoteket (cf. Table 1) and a more systematized acquisition of music was established. Over the next handful of years the collection of phonograms more than doubled.[9] One of Leisner's most important marks on the collection was the gradual expansion of genre specificities; a browsing through the shelves of music acquired during the 1950s will reveal that the music profile changes from being focused on (so-called)

Statsradiofonien. In 1959 the Act on Radio Dissemination was reassessed, and DR was from then established as an independent public institution. At this point the name was changed to *Danmarks Radio* [Danish Broadcasting Corporation]. In 1996 the name was abbreviated *DR*, which coincided with the launch of DRs first version of the website *dr.dk*.

[9] In 1952 the collection consisted of around 16,000 records and in 1959 the collection had grown to around 40,000 records (Michelsen et al., 2018, p. 148).

classical music to embracing entertainment music as well.[10] The fact that the constellation is rather problematic, due to Leisner's dual interests in both Statsradiofonien and the record industry, of course plays a role in this development (for more on this, see Michelsen et al., 2018, pp. 147–149), but the impact that this change had on Danish musical cultures still has to be acknowledged. Leisner's expansion of Diskoteket's music profile paved the way for a new aesthetics of radio that differed from the usual flow radio; programmes with hosts speaking in between the aired music became more common, and in 1963 DR launched the channel P3,[11] which was, and still is, directed at younger listeners and therefore airs popular music.

Figure 1. Index card for Johnny Green's composition *Body and Soul* from Charlie Mingus' 1964 LP *Mingus Plays Piano.* Source: DR.

Leisner did not only transfigure the music profile, and contents, of the music archive. He also designed the first steps of the archive's infrastructure and instituted the ways in which music was to be registered and archived. He took an approach to taxonomy that we know from Carl Linnaeus' botanical and zoological writings from the 18th century, and from this he developed a complex index card system not only including the physical releases but also tracks, artists and

[10] It should be noted that DR despite its politically ordained educational ideal actually not only broadcasted classical music in the first decades. An early finding by the RAMUND project, via the larm.fm infrastructure, is that DR from the very beginning gave a dominating amount of airtime to popular music genres (Michelsen, 2013, p. 23).

[11] In spring 2022, P3 was rebranded as a cross-medial product in order to ensure a stronger offer for the youth segment.

compositions, so that every single release was described on up to eight different cross-referencing index cards (Michelsen et al., 2018, p. 148; Dose, 2021a).

Figure 1 displays an index card showing side one of Charlie Mingus' 1964 album *Mingus Plays Piano* as retrieved through the compositional index. The index card specifies that the composition *Body and Soul* is to be found as a track on this album, and similar index cards are present in the compositional index for the other compositions used for tracks on this album. The music archive operates with four primary entities (compositions, tracks, releases, artists) that in terms of taxonomy can be regarded as overarching species described in a strict syntax, which makes it possible to navigate the collection and see connections between tracks and releases via a compositional layer. This was the frail beginnings of the taxonomic arrangement of interrelated music metadata that today is systematized in a digital database and manifested on /Diskoteket, embodying Leisner's archival visions.

Electronic search systems as the path to digitization

This sophisticated search system was a necessity in order for users of the archive not to get lost in the ever-growing amassment of music releases that quickly occupied shelf after shelf. It is a dizzying and awe-infusing experience to set foot in a music archive the size of DR's; it is by no means possible to get an intelligible experience by reading titles on the spines of the records, so to navigate in a collection that is structured after acquirement and not after genre, artist or year would be hopeless without a system of strict syntax and cross-reference. The index card system functioned well and was used for 26 years, until 1978 when the first electronic search system, DISØ, was developed.

Name	Description
DISØ	DR's first electronic search system for the music archive. Launched in 1978.
MUSA	DR's second electronic search system for the music archive and the name of the digital database. Launched in 2000.
MUSA Søg	The search system for the MUSA database. It closed down in late 2021.
MUSA Reg	Software for registering music in the MUSA database. It is set to close down in late 2022.
/Diskoteket	DR's in-house digital music platform for searching the music archive. Launched in 2014.
Dalet	Software system for editing and live-broadcasting sound.
MusicMaster	A 1983 music scheduling software in use from 1996 to 2003.
Selector	A 1979 music scheduling software in use since 2003.

Table 2. Overview of music search systems and software for registering music, editing music and scheduling music. Descriptions are based on Dose (2021a) and Krogh (2018).

DISØ was an electronic database for searching in DR's music archive, which built on the same attributes as the index cards. But it also added a lot, such as keywords and genres and styles (cf. footnote 6 on meta-tagging) (Dose, 2021b). Besides the obvious advantage of enabling a quicker finding of releases, DISØ also

implemented, and actualized, the opportunities for in-depth research for, and planning of, programs. On top of that, a certain level of integration between DISØ and the music reporting system matured and this of course broadened the user purposes of the archive.[12] Until that point, the reporting of credits came from liner notes and was done solely by hand, but DISØ's infrastructure introduced the first important steps in an automatized reporting process (see Table 3 for organizations reported to). Still, there was a setback in moving to the electronic search system: the launch of this system signified a cut-off date, meaning that not all metadata from the vast amount of index cards were migrated to the electronic system. All releases have a unique ID called a Diskotek number,[13] and the numbers created prior to DISØ would come up without any information if one searched for them in the electronic system. This clear cut occurred as a result of an early round of rationalization and optimization of work processes in the music department, and today it still has ramifications due to the fact that /Diskoteket on a basic level operates from the same baseline as DISØ did (Dose, 2021b). The ramifications are critical, in that a release acquired before the inauguration of DISØ will appear empty in /Diskoteket if no music registrar has added and verified the metadata since the migration of search systems.

Name	Description
Gramo	A Danish organization administered by KODA handling payments in relation to 'the Gramophone industry'. Established in 1935 and disbanded at the creation of Gramex.
Gramex	A Danish non-profit organization handling payments for performing artists and record companies and labels. Established in 1963.
KODA	A Danish organization handling payments for composers and songwriters. Established in 1926.

Table 3. Overview of external organizations handling payments and rights. Descriptions are based on the websites of Gramex and KODA (www.gramex.dk and www.koda.dk).

At the turn of the millennium, in 2000, an upgraded electronic search system was launched – the MUSA database (cf. Table 2). The search system for this database, MUSA Søg [MUSA search], improved the opportunities for making specialized searches, and it did so because of the ways the database's registering system, MUSA Reg (see Figure 2), can operationalize its metadata. The specialized searches could start from an artist but also from a release, a track or a composition and these entities could be combined, meaning that it was possible to contextualize searches, e.g. based on a composition in order to see how many tracks, spanning time and genres, were registered in the database and

[12] DR is tax funded and pays a fixed sum to the organizations handling the financial rights of songwriters, performing artists and record companies, who apportion the payments to the holders of the rights based on DR's music reporting.

[13] Colloquially, most DR employees due to DISØ's successor MUSA call this a MUSA number.

taxonomically subordinated to said composition. In addition to the obvious strength in the MUSA database's potential for searching and contextualization, as well as a smoother process for reporting aired music to the organizations handling the financial rights of songwriters, performing artists and record companies, this upgraded database was a critical life support to the music archive. After Google was founded in 1998 and the logic of the Internet 2.0 began to spread, physical, and institutionalized, archives got into bad standing as old-fashioned and redundant. It is believed by people working at Diskoteket at the time that without MUSA's linkage to the music reporting system of DR, making sure artists got paid via a somewhat automatized functionality, the music archive would not be in existence today (Dose, 2021a). That belief probably only tells half of the story – but the reporting system, without a doubt, had an impact on the strategic and economic reasons for keeping the archive and the department maintaining it. I will argue that MUSA's clear presentation and, more importantly, operationalization of metadata plays an equally important role. If it was the wish to eliminate Diskoteket under the assertion of it being an excess capacity, it most likely would have been possible to develop a reporting system linked to the replaying of music from online commercial streaming services, thus giving the commercial actors all rights on how to use the music.

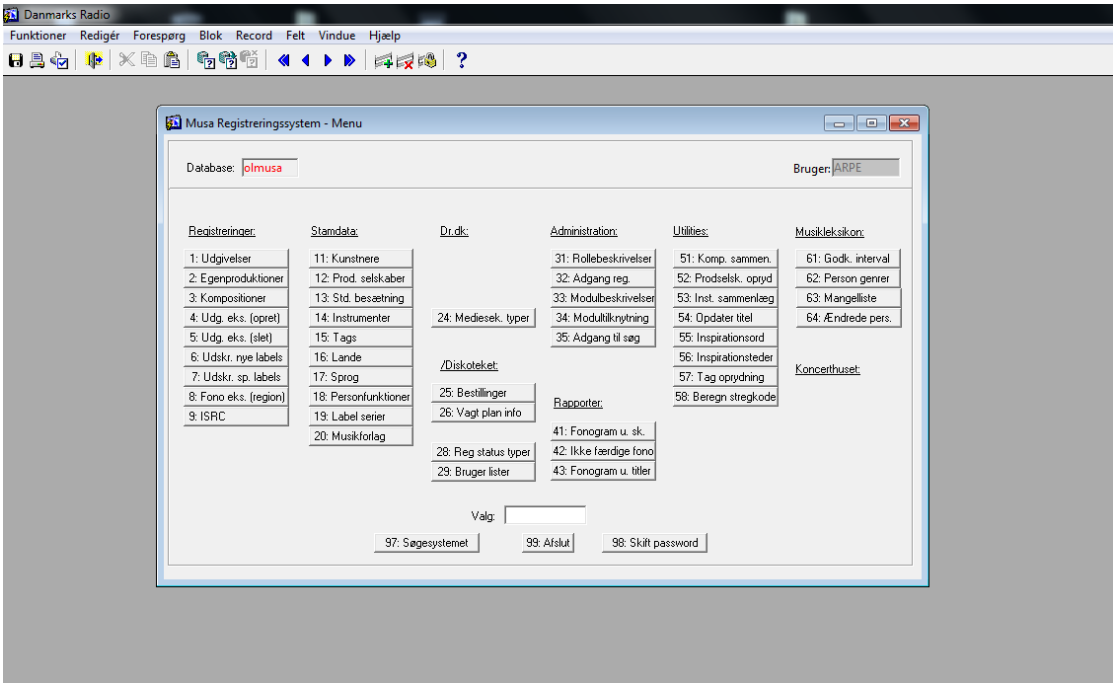

Figure 2. Front page of the software MUSA Reg showing access points into the database. The four primary entities of the digital music archive are located in module 1: Releases (including Tracks), module 3: Compositions, and module 11: Artists. With this software the music registrars can add and alter metadata in the database. The sound quality, which is defined to at least have a bitrate of 1,411 kbps at 16 bit, can also be checked here after music files have been uploaded to the database. Source: DR.

But this did not happen. Instead the profile of Diskoteket changed from solely supporting DR employees in planning and broadcasting to having strategic ambitions in the online sphere. Within the archive lay a slumbering force: the sophisticated potential in its metadata, which throughout the years had been refined in practices of registering. MUSA was intended to improve the experience of searching, broadcasting and reporting, but it revealed a general logic for how to approach music in the future as well, and, due to chance progressions in the department, people 'who believed in digitization and online possibilities' (Dose, 2021a) were hired during the 2000s, which made for a strategic conversion towards ever-improved metadata that, on the one side, should be embedded in services made for the public and, on the other side, could create more advanced editorial solutions internally in DR (ibid.; Dose, 2021c).

It is important to note that a small-scale digitization was taking place already in the mid-1990s. As Krogh points out, several of the radio channels driven by popular music genres were subject to automatized music scheduling practices and a standardized approach to music selection; with the introduction of the music scheduling software *MusicMaster* in 1996 (see Table 2 above) predetermined playlists could run more or less by themselves, thus reforming broadcasting as a case of linearity (Krogh, 2018, p. 71). Another music scheduling software, Selector, mentioned above, was later introduced as a more advanced control management of music at, especially, P3. With this piece of software a thorough centralization of music was deployed due to rigid categorizations, and Selector was (and still is) coupled directly to Dalet, which, as mentioned, is the software for editing and live-broadcasting sound. In Dalet the digitized, and edited, music is stored on large servers. When this process was introduced, music was 'ripped' and uploaded without taking advantage of MUSA's metadata – instead radio hosts and other employees had to manually type in information as metadata on each music file in Dalet, sometimes resulting in duplicates of the same tracks with deviating, and conflicting, information. On top of that, this practice put radio hosts in a position where they manually had to report most aired music.

After the implementation of MUSA, the employees at Diskoteket (most of whom work under the job title music registrar) had a lot to do because the migration from DISØ had several flaws. For example, all registered tracks in DISØ had been carefully catalogued with recording dates, but this information was arbitrarily deleted in the migration process; instead, in the new database all tracks on a given phonogram were annotated with the phonogram's release date as their recording dates, resulting in a shattering display of imprecise data (especially appalling was the case of compilations). The practices of registering new releases directly in MUSA was, and is, more precise and nuanced than in DISØ, but the merger of databases brought with it problematic situations, such as that mentioned above. Besides these challenging situations, the opportunities in the new systems were manifold; two internal documents about the implementation of MUSA Søg show priorities for ways to improve search results

as well as the reporting of music to the organizations handling rights when compared to DISØ, which reveal an early focus on, and insight into, user-friendliness and user experience.[14] It is interesting to see the attention to details in terms of functionality at this early point. The strategic ambitions clearly contained thoughts on how to make the music archive more than an archive. At this point, around 2000, no one had envisioned /Diskoteket yet, but the insistence found in the early internal software development can be seen as the harbinger of a digital search system and portal for listening made for DR employees that brings annotated information into play.

Database and opportunity for new experiences

MUSA is placed on a server called UNIX 11 and evolves in a digital environment building on Oracle, an American management system for databases. This sort of server makes it possible to 'associate' the different music scheduling software that DR uses, as it says in a status report on MUSA from September 1999 (MUSA status 14/9 -99). The significance for DR of this association is noticeable, as the possibility of a streamlined communication of music with less contradictory information being broadcasted among the different radio channels becomes manifest, which further emphasizes the improvement of metadata as a necessity. And since Diskoteket's conversion towards a dedicated improvement of metadata in the first half of the 2000s, as mentioned earlier, the department has rebranded itself towards a future to come in which operationalization and experience of music information would be of great importance. According to Dose, the department has been devoted to metadata in the last 15 years (Dose, 2021a).[15] As I read this, this devotion was first of all introduced as an effort to make the department an indispensable element in the assemblage of DR's radio production, in a media landscape otherwise moving into the digital sphere, but, as time has passed, the work has further been a continuous effort in readying DR for playing an active role in Danish music cultures even though commercial music streaming giants such as Spotify and Apple Music have come to dominate the

[14] In the two documents simply entitled 'MUSA SØG' and 'MUSA søgesystemet' [MUSA search system] we find a rather large overview of priorities meant for the improvement of the user experience in the new search system. An example can be found in the latter of the two documents. Here we see that priority 9 (out of 54) is assessed to be a category A (on a scale from A to C), meaning it is imperative to look at right away. It states: 'All phonograms that have been converted from DISØ have obtained the status of an original album, even if they are not. As an example, any compilation or soundtrack registered in DISØ [will now figure with this status]. Defined rules of programming for segregating phonograms that *should not* be marked as original albums are needed. In the case of soundtracks, all releases have the genre-keyword "soundtrack", which can be used for [developing a code for] sorting'.

[15] 'What we started to focus on in the 2000s was the potentials in our metadata. Big steps were taken in the usage of MUSA for reporting, but for us the headline centered on how to get the data out and be alive in the public space as well as to develop more advanced editorial solutions internally [in DR]. The promise that we, in the department, made was that we could build digital products for the license payers' (Dose, 2021a).

field. By diving into specificities surrounding each track and artist and making that information interrelated, the department has been able to uphold a prominent position within DR's music communication by living up to the overall educational ideals of the institution, as well as highlighting the importance of a music archive as a part of common cultural heritage for a public service institution (and convinced DR's administration that it is so). Today, much of the information found on DR's music pages on the website www.dr.dk (notably playlist pages and artist pages) draws on the information in the MUSA database. Though much of DR Musiktjenester's work supports functions internally in DR, this is what meets the public eye. The many years of believing in a future for metadata, for annotated information, is, I will argue, the very thing that has made DR avoid a Spotification model, such as Burkart and Leijonhufvud uncover in relation to SR (Burkart and Leijonhufvud, 2019).

The visions of a digital music platform crystallize and gain speed due to the continuing furtherance and sophistication of metadata in the data model. The infrastructure of MUSA reveals a potentiality of interconnected music experiences that resemble a general network aesthetics of online life worlds, and with an anchorage in the MUSA database ideas about how to open up a participatory space for music searching and listening begin to flicker. Patrick Jagoda speaks of a contemporary logic of networks as mediating constructions that have both affective and sensual implications (Jagoda, 2016), and, I will say, /Diskoteket lives up to that as a space not just to be known but also sensed and inhabited.

In May 2010, an analysis of the possibilities of implementing a digital music archive in DR is ordered, and in February 2012 a comprehensive project description[16] is handed in to DR's administration, in which it is concluded that an activation of the MUSA database as the foundation for an in-house digital music platform not only is the cheapest solution, but also safeguards the future of the music archive. The project description clearly states that an operationalization of the metadata in the database is an advantageous resource utilization not only in regard to music reporting but also to research, discovery and programme planning (Anon., 2012). For this to be effected it must be possible to get into dialogue with the information in the database, hence my alluding to a network aesthetics – a digital music platform that lets metadata highlight release-related interconnections in the database, thus making a participatory space with affective dimensions

[16] The background of the project description is formulated in its introduction: 'There are several strategic arguments for a digital music archive in DR (DMA in DR). For instance, the record and CD collection is the only part of the processes for programme production that is not supported by digital workflows. Moreover, the use of external digital services, such as iTunes, Spotify, Wikipedia and YouTube, is, when it comes to listening, research and information seeking, still getting more central to the employees working with music in DR today. On top of that, the record industry is to an ever-larger degree releasing phonograms as singular sound files instead of CD's.' (Projektbeskrivelse: Digitalt Musikarkiv i DR 2012, 4).

appear, is needed. And so it is decided to develop *Digitalt musikarkiv i DR* (DMA).

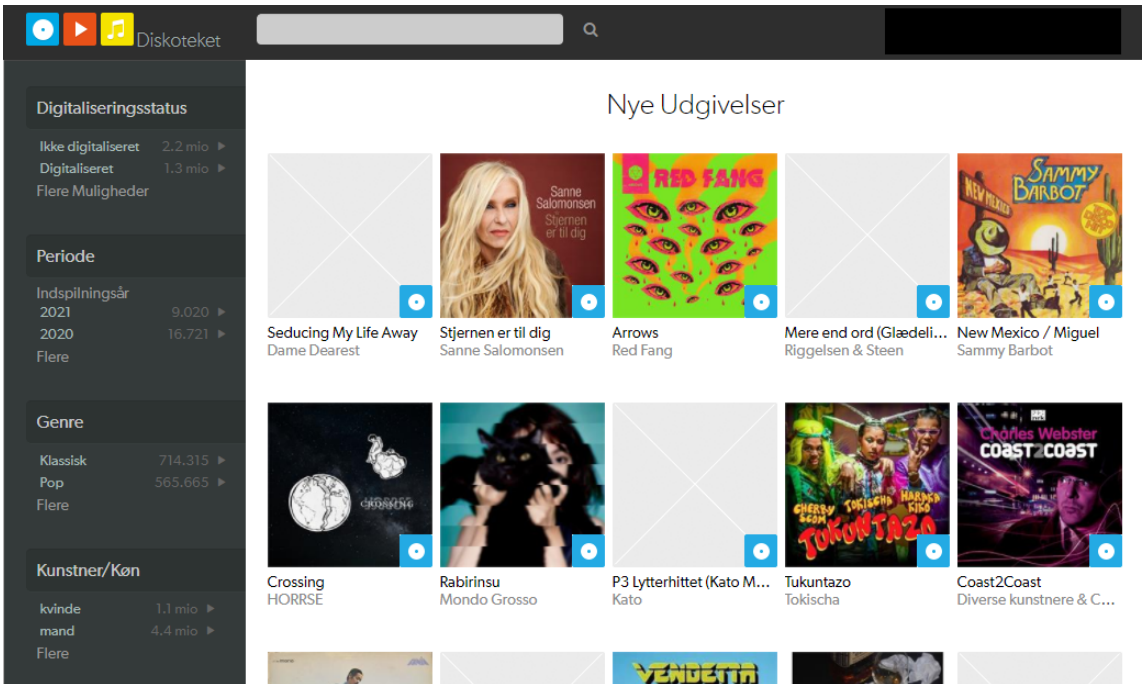

Figure 3. The front page of /Diskoteket (screenshot is taken in the afternoon of November 9, 2021). The front page is in sync with the database and changes every time a new release is added. Source: DR.

DMA (cf. Table 4) is the working title for what ends up being launched as /Diskoteket in the fall of 2014 (the front page of the platform can be seen in Figure 3). The main wish for pursuing this project can quite simply be found in a rationalization of programme production. The very essence is that users should be able to navigate in the collection and access music virtually, thereby saving time and costs. Prior to the initiation of DMA, Diskoteket's employees act as superusers handling the music's road to the Dalet servers. At this point Diskoteket is a gatekeeper for all music that a radio host needs to be in contact with in order to make new music appear on the Dalet servers. The goal is to blur Diskoteket's role as gatekeeper and make users of DMA experience and handle the music and its road to a server themselves – as Dose recalls the time before DMA: 'we were a Dalet resource for the entire house [DR-Byen] as well as we were the ones registering and digitizing the music to be transferred to the Dalet servers in the first place' (Dose, 2021b).

Name	Description
DMA (Digital Musikarkiv i DR)	The working title for the project of creating a digital music archive at DR. The project was launched in 2012 and finished with /Diskoteket in 2014.
LARM	An external research project (2010–2014) aiming at developing a research infrastructure for the digitization and archiving of broadcasted radio in Denmark.
RAMUND	An external research project (2013–2018) aiming at understanding the convergence of music and radio in a Danish context.

Table 4. Overview of DR projects and research projects. The description of DMA is based on Anon. (2012).

For this to change, as much music as possible should be digitized and made ready to be transferred from a DMA server to the Dalet servers, and, for this to work, that same music should be registered correctly according to taxonomical ideals with a strict syntax for annotated information (ibid.). From around 2007 the department funnels its resources towards digitizing music (mainly CDs) and obtaining new music as digital sound files as well as making sure that the level of metadata on this music lives up to standards agreed upon (ibid.). Interestingly, this coalesces with the move to DR-Byen; an architectural project that infamously exceeded its budget by 34% (1.7 billion Danish kroner more than estimated). /Diskoteket, then, can be said to be a necessary evil due to substantial efficiency improvements and mass-layoffs in the wake of a scandalous situation heavily covered by the media. But, instead of crafting a rigid construction with a bare minimum of functionality, DMA's steering group and software developers decide to operationalize the metadata in the MUSA database and create a high level of mobility on the platform that works because of interrelations. This platform, /Diskoteket, is moreover intended to be open for further development. As is stated as a goal in the project description of 2012:

> [A criterion for success is] that DMA is open for further development. For example that the system can support the use of new means of production as well as external music services, if juridical or business relations allow so. Or that DMA in an expansion can make external users (license payers and record labels) capable of delivering music to DR for the purpose of an efficiency improvement of music acquisition as well as the establishing of the possibility for user-generated music content. (Anon., 2012, p. 8)

A thought-provoking addendum to the story of the development of a digital music archive in DR lies in the fact that the inspiration for cultivating a digital system for searching and streaming came in part from the outside. In 2008 DR's music department, some digital developers and Diskoteket were contacted by the

Norwegian Broadcasting Corporation (NRK), who reached out concerning a common Nordic solution for the digital archiving of music (Anon., 2012, p. 4). After a couple of months of writing back and forth, a team from DR travelled to Oslo and discussed this prospect in depth for days. It was NRK's wish that DR become the co-sponsor of a digital music archive building primarily on their archive, and in turn DR were to be able to access this digital infrastructure and thus save resources and capacity. The premise for this discussion was the so-called 'Madonna argument': both public service institutions spend time and money on registering the same record by Madonna, so why not have a shared system and distribute the resources to registering more music (Dose, 2021b)? But, after doing some quantitative analyses of NRK's and DR's registering patterns, respectively, it became clear that they were actually only sharing around 25% of their acquisitions. All major label[17] releases, such as Madonna's music, are of course procured and registered by both NRK and DR, but the remaining 75% acquisitions are not the same. As Thomas Dose recalls:

> The Norwegians had a lot of folk music that we would never acquire, just as we had a lot of Danish music and music from small indie-labels and the like. So, there was a very large part on each end that we [DR and NRK] did not have in common. (Dose, 2021b)[18]

Besides this discrepancy, NRK's plans for how to build a technical solution were not convincing to DR's developers, so the idea of a common digital music archive was not pursued for both practical and technical reasons. This is not, however, the place for pondering why only DR was contacted by NRK; it is indeed an interesting fact when considering SR's present ties to Spotify. As Burkart and Leijonhufvud point out, the consequence of this political shift by SR is that the gramophone archive stagnates due to fewer hands creating and maintaining a useful level of music metadata, meaning that archival memory is gradually reduced (Burkart and Leijonhufvud, 2019). It might be that SR has a seemingly smoother basis for user experiences due to Spotification, but due to this fact they connect to the market forces and, accordingly, they renounce their singular status as a public service archive, which is lessened and losing value in terms of public heritage, and, on top of that, they have no immediate prospects for developing different digital solutions for music experience in the future. The model of SR appears to be an open access digital archive, but the fact that it relies on Spotify makes it an uncertain archive (Thylstrup et al., 2021). The digital music archive of DR might be in a continual struggle in terms of up-to-dateness, but it does have

[17] Since 2012 it has been commonly agreed that there are three major labels: Sony Music, Universal Music Group and Warner Music Group. When NRK and DR were discussing the prospects of a shared digital music archive there still was a fourth label, EMI, that was referred to as a major label, but during 2012 and 2013 it went through a distributed merging with the other three labels. As of 2020, the three major labels are estimated to have a collective global market share of more than 65%.

[18] This reflection aligns with the latest IFPI report concerning global markets and local scenes (IFPI Global Music Report 2021).

the possibilities for getting at new digital solutions that they own the rights to themselves.

/Diskoteket differs from the commercial streaming services that it is up against. And it *is* up against actors such as Spotify, not commercially, of course, but in terms of production ends. I touched upon this earlier; /Diskoteket, and DR Musiktjenester, would very likely be cancelled if it becomes possible to replace the services with Spotify.[19] But, this, or similar scenarios, is not imminent due to, mainly, three things: first, the integration of sound files and metadata from /Diskoteket to Dalet; second, the automatized reporting system for royalties building on metadata in the MUSA database; and third, the swift manner of obtaining information connected to tracks, releases and artists without leaving the platform. This last point can easily be underestimated, but the reality is that the fact that the metadata are interrelated and can be interacted with potentiates the platform as a space for producing new knowledge. According to Dose, the model for metadata is developed in this way partly due to an eagerness to 'know how everything is connected', and partly due to a business intelligence logic that tries to foresee the necessities in future radio production and develop digital solutions for that (Dose, 2021b). With /Diskoteket, Diskoteket goes further than the initial aim ordered by the administration, which, to me, shows a rigorous belief in operationalized metadata as the future battleground for music communication:

> Not everything we did was necessary. I will say that we went quite a bit further than we were asked. It would have been possible to create a digital music archive capable of doing what we were asked to do without orchestrating all the metadata in the way we did (Dose, 2021b).

In the following section I will give two examples of how metadata are set in motion on /Diskoteket, and woven into these analyses I discuss how the MUSA database presents options for understanding music history that might be determinative for the user's experience.

Operationalization of metadata: implying an institutionalized music history?

With the launch of /Diskoteket, Diskoteket has managed to put the taxonomical order of Leisner's far-sighted organization in motion, and for DR Musiktjenester it is a work of pride to create new opportunities for searching, contextualizing and listening at the same time as making the user experience as smooth as possible (Dose, 2021c).

[19] 'We are, to a small extent, competing with Spotify – a small extent, because it is not a prospect to replace us with Spotify, but if it *were possible* [my italics] to do so, it most definitely would be an option. There is some sort of struggle for survival going on and we need to, banally, move with the times and try to service the users where they are and all that...' (Dose, 2021a).

Two compositions to rule them all

Already the index card system was structured to enable searching via compositions, meaning that one could find releases of interest based on songwriter credits. This feature is also incorporated in /Diskoteket, and its prospects are quite remarkable. First of all, when the music registrars have made sure that a certain composition, let us say Johnny Green's 1930 jazz standard *Body and Soul*, appears as foundation for a track on a release, they fixate said track to the composition in the database (see example in Figure 4). They do this with all instances of tracks using this composition, and this makes for a precise and correct reporting to KODA[20] every time a track with a recorded version of *Body and Soul* is aired. Second, this practice of registering tracks on top of a single composition makes it possible to visualize how the life of a composition has evolved throughout the history of recorded music, at least ideally. Due to changing and very differing registering practices, compositions have not gone through strict care until recent years. After the implementation of DISØ, music registrars created new examples of the same composition more or less every time they created new tracks on a new release using said composition. Because of this, some compositions exist in a lot of examples in the MUSA database. In the case of jazz standards, such as *Body and Soul*, it can be dozens, even hundreds (see Figure 5).

Besides the problem with duplicates, the issue with incorrect recording dates, which I alluded to earlier, can also hinder the overview of a composition's whereabouts in the history of recorded music that the platform might be capable of presenting. In many instances the recording year of a track using a composition corresponds with the release year of the release it appears on, but the opposite scenario is equally common, meaning that a faultily executed registration might disrupt the strain of events for the composition in question.

If a track that uses a certain composition is registered as recorded several years later than it actually was, the composition's journey gets opaque when one tries to create an overview, especially if one wants to create a visual overview in list form, which is possible in /Diskoteket. Let me exemplify with Charlie Mingus' piano version of *Body and Soul* from his 1964 *Mingus Plays Piano*; this release contains tracks that were all recorded on July 30, 1963, but these could easily be registered as recorded in 1964 (interestingly, if one looks at Spotify one can see that they have made an error the other way around – in their system the record seems to have been released in 1963[21]).

[20] KODA is the organization in Denmark that works for the rights of composers/songwriters. KODA's main task is to make sure that composers/songwriters are paid when their music is played in public spaces. For more, see KODA's website www.koda.dk.

[21] I have made this observation twice: on 8 September 2021 and on 11 April 2022.

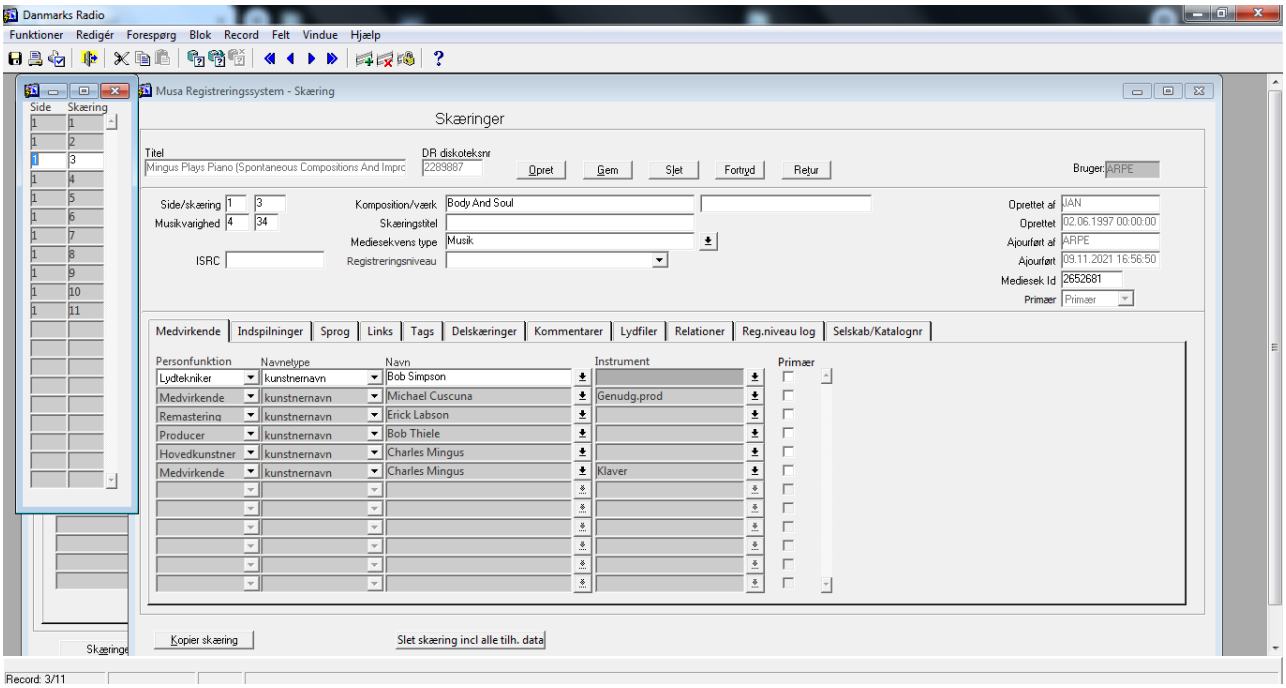

Figure 4. This screenshot from MUSA Reg shows the track level of Charlie Mingus' Body and Soul from the album Mingus Plays Piano. As can be seen in the line Komposition/værk [Composition/work], Body and Soul is fixated on track 3. Source: DR.

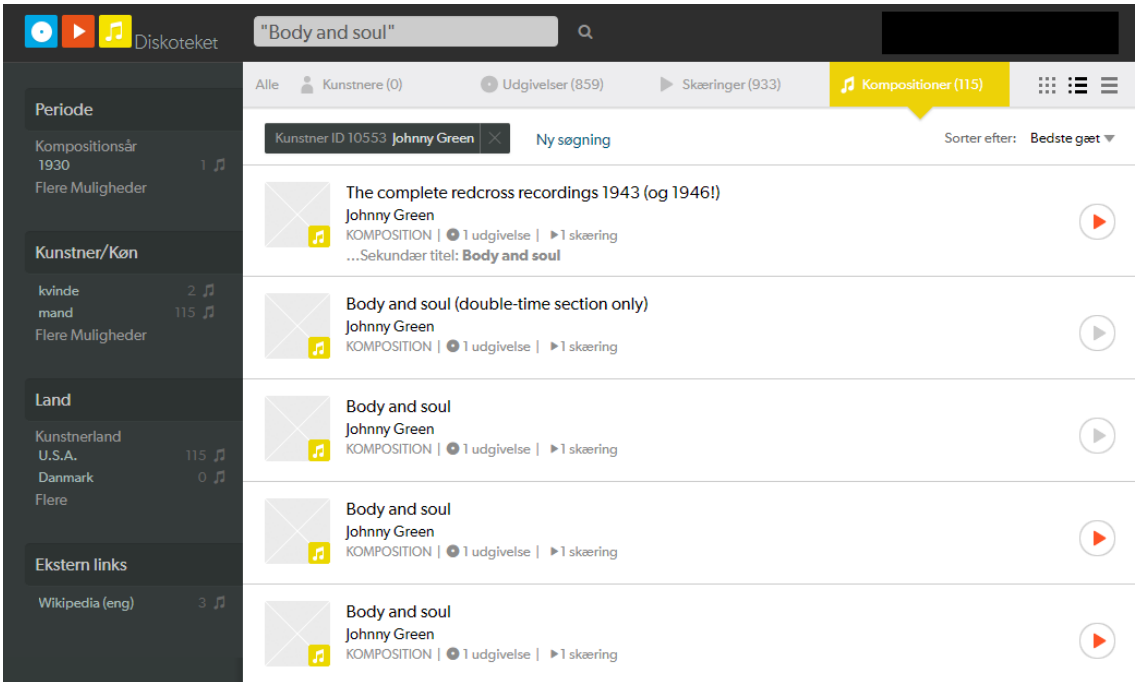

Figure 5. Here one gets a small peak into the search for Johnny Green's composition Body and Soul. /Diskoteket tells the user that there are 115 Body and Soul compositions in the database, meaning that a 'cleaning up' of this composition has not been done. This makes it difficult for the user to navigate in the system and get a clear overview. Source: DR.

Further, the track could be registered even more wrongly, say, as having been recorded decades later. In 2006, a compilation telling the history of Mingus' years with record label Impulse named *The Impulse Story* is released, and here the

piano version of *Body and Soul* is featured. If a music registrar is sloppy, the piano version, on this release, could very easily end up appearing as having been recorded 43 years later than it actually was (which is the case with commercial platforms such as Spotify that do not work with recording dates, confusing users who do not already possess the information themselves). In an oeuvre such as Mingus', recording dates are crucial; Mingus has recorded several different versions of *Body and Soul* and, again, if one wants to create an overview, the recording dates are the very thing that makes distinctions.

Imprecision with compositions can have a further level. Sometimes several versions of a composition might exist. Let me go on with the case of *Body and Soul*. It was originally written as a song with lyrics by Edward Heyman, Robert Sour and Frank Eyton, but it has been very common to record instrumental versions of it. So, in order to make clear registrations in the database two different compositions are needed, which do not get mixed up with each other. Then, if a proper 'cleaning up' in the compositions has been done, it is possible to get two distinct overviews based on the *instrumental version* and the *vocal version*. This means, of course, that it is not possible to see all tracks, both vocal and instrumental, at the same time. Still, /Diskoteket offers a long and winding road to it all: one starts by accessing the Johnny Green artist interface; here, it is possible to choose to make a search related to Johnny Green that only shows tracks, and after choosing the track tab one should search for *Body and Soul*, placing the song title within quotation marks. Then, every track with the two versions of the composition should be shown. To make this search, it is of course required that the music registrars have been narrowing down the amount of *Body and Soul* compositions to two examples and that they have made sure that the correct songwriters appear on these. Further, to distinguish between instrumental and vocal versions, all tracks using one of the two compositions need to have been annotated with the keywords 'kun instrumental' [only instrumental] or 'vokal og instrumental' [vocal and instrumental] as meta-tags.[22] If all these requirements are fulfilled, it then will be possible to make a concise overview showing all tracks from recording dates (there are numerous tag-categories, though many are not operationalized so far, cf. footnote 6 on meta-tagging).

The relationship of relations

In the MUSA database, one can find another remarkable example of how a strict taxonomy for metadata subordinated to the four primary entities of the database can create instantaneous opportunities for experiencing music. In 2015, when I first got acquainted with the department, Diskoteket implemented a model for

[22] It should be noted that the contemporary registering practice allows for not annotating versions that are both vocal and instrumental. When it comes to so-called rhythmical music this omission signals that a given track is both vocal and instrumental; here, the music registrar is asked just to annotate an only instrumental or an only vocal track. The registering practice is different when it comes to so-called classical music; here, annotations are always expected.

relations on track level that we all are familiar with and typically use when discoursing about popular music releases; over the years this model has become more complex and today it holds a plenitude of functionalities. In the vernacular of the music registrars this model is known as *super-relations*. The super-relations connect different verified data by two variations, each leading in its own direction. This module for relations in MUSA is put to use in cases of cover versions, remixes and instrumental versions, just as it can be used in situations where a track is part of a mix or a mashup. Further, super-relations can show when a track is a '*versionering*' (a different version, a rewrite) of another track, e.g. when a track implements new lyrics, just as they can show when a track is either using *samples* or is being used as a sample. Concerning the super-relations, Dose explains that the addition of the module in the data model is quite simple, unlike the conceptual ramifications of being able to relate between tracks (Dose, 2021c). In the MUSA database there are, as stated earlier, four primary entities (composition, track, release, artist) and within each category it is possible to create relations – both to expand knowledge as well as to minimize noise. Common to all relations on track level is an ability for interaction with the digital music archive as a space of knowledge production and sensuality. With super-relations, /Diskoteket goes together with the users of the platform and establishes a mediating network of instant experience and historical dimensionality that accentuates how the history of recorded music was always nonlinear and prone to be participatory, which I see as an intersection of the participatory and the improvisational types of network aesthetics in Jagoda's analytical framework (Jagoda, 2016). This kind of aesthetics allows listening across multiple spheres of the digital music archive, leading to a historicized listening (Pedersen, 2020). In the following I will demonstrate how a sampling of super-relations is manifested in /Diskoteket, using Drake's 2015 *Hotline Bling* (single version) as illustration.

On the track interface of *Hotline Bling* from the 2016 album *Views* in /Diskoteket, three different super-relations are at play (see Figure 6). First of all, one sees that the track contains a sample of Timmy Thomas's 1972 *Why Can't We Live Together*, whose unmistakable beat consisting of a drum machine bossa nova groove and a Lowrey organ is sped up and creates the fabric of Drake's track. In addition, one can see that there is a cover version by Judith Owen and that Erykah Badu has made a rewrite on her track *Cel U Lar Device*.

All this information to be found on the track interface is more than just information. On /Diskoteket it is a mantra to operationalize, more or less, all metadata, which means that all three tracks alluded to can be accessed directly from here due to (the network aesthetics of) hyperlink qualities.

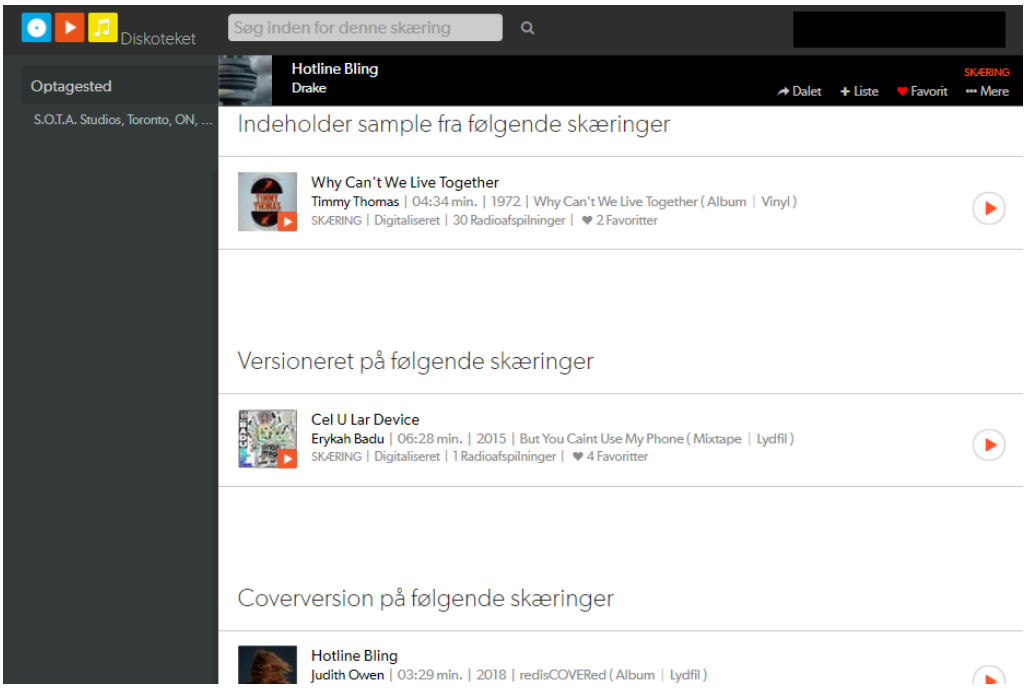

Figure 6. A segment of the track interface of Drake's *Hotline Bling*, in which one sees three types of super-relations. All metadata are operationalized and open for other interfaces and music to listen to. Source: DR.

But one can do more than go to the interfaces of the tracks in question. If we take Erykah Badu's rewrite, one can click on the track title *Cel U Lar Device* and go to the track interface of this track (from the 2015 mixtape album *But You Caint Use My Phone*), but one can also click on the album title *But You Caint Use My Phone* and get to this album's interface as well as one can click on Erykah Badu's name and be transported to her artist interface. On top of that, one can press 'play' on the orange play button on the right side and listen to *Cel U Lar Device* from here, from the interface of *Hotline Bling*. In this way the platform creates the illusion that one can discover all and everything related to this track, across time and space, across history. For instance, if one moves to the track interface of *Why Can't We Live Together* one sees the super-relation to *Hotline Bling*, three different tracks by Erykah Badu from the aforementioned mixtape album, and a cover version by Sade.

It is very easy to get impressed by the fact that /Diskoteket works in this way, as some sort of mixture of Spotify on one side and Musicbrainz, Discogs, Wikipedia and WhoSampled on the other side. But it is important to remember that /Diskoteket only shows information registered in the database. Like all other digital music platforms, /Diskoteket only showcases a sampling of the history of recorded music, just as it is in full control of how the users might get at that sampling. /Diskoteket very cleverly induces the feeling of both vastness and exactitude, but the fact that there is only one cover version of *Hotline Bling* present discloses the limited size of the archive. In order to reflect completeness there should be numerous cover versions.

The model of super-relations has a different outcome as well – that of 'cleaning up' in the digital archive. On track level in MUSA Reg, the music registrars can go to a tab entitled 'relations' and create the abovementioned relations (see Figure 7). But, there are more possibilities for relations: the so-called 'primær-sekundær' relations [primary-secondary relations].

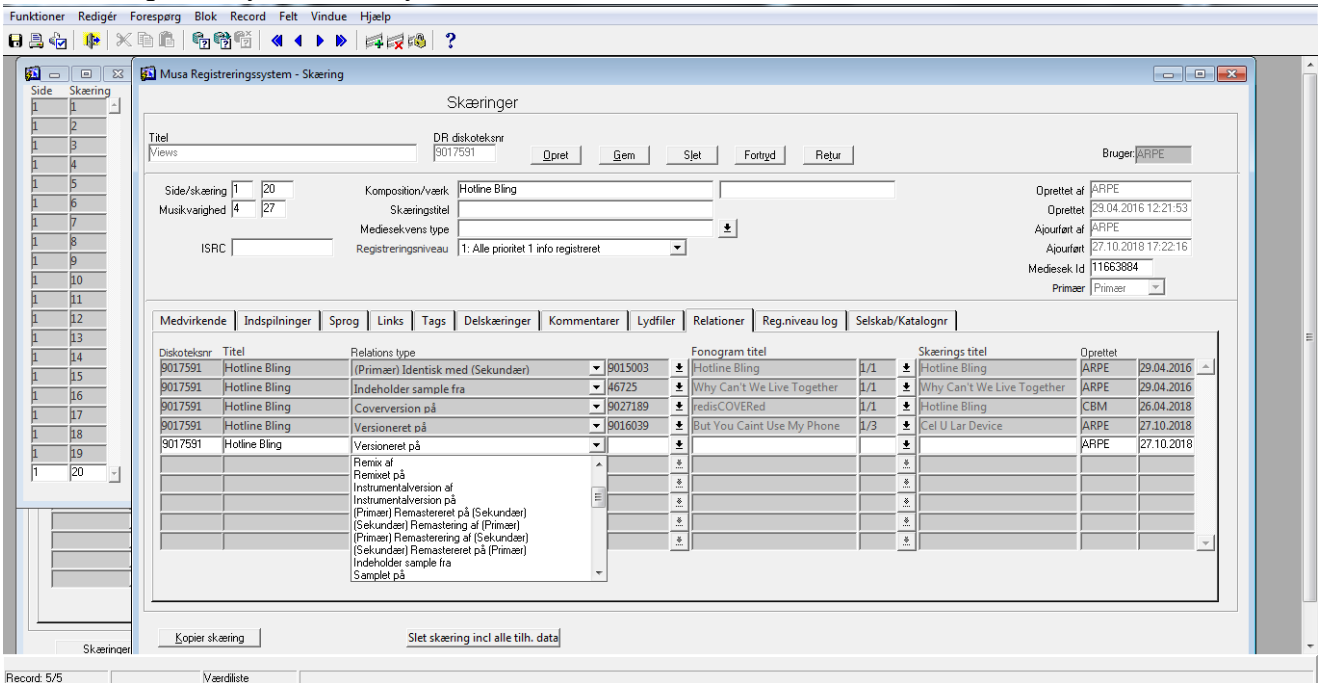

Figure 7. This screenshot shows the relation module on the track level of *Hotline Bling* from Views in MUSA Reg. Several relation types are being used and one can see a segment of the types to choose from. Source: DR.

For instance, music registrars can choose the relation type '(Primær) Identisk med (Sekundær)' [(Primary) Identical with (Secondary)], which is used for situations with two or more tracks being aurally the same, and this action will hide the track(s) deemed secondary in search results. The most straightforward example is a single release of a track and an album release containing the same track; here, according to current registering practice, the track on the single release is considered secondary to the track on the album release (if the two releases are released within the timeframe of a year). This is a political decision agreed upon in DR Musiktjenester: the album is primary, even though a track, as a single, is released as a precursor months earlier.

The logic behind this decision makes a lot of sense from a user-experience perspective and the module is implemented in MUSA Reg in order to focus the search results and create the possibility of getting overviews only containing unique recordings of a given track. This function really shines when it comes to tracks that are released on many different releases, such as singles, albums, rereleased albums, remastered albums, and compilations. If we look at the track interface for *Yesterday* by The Beatles in /Diskoteket, we can see a heading called 'other versions of this track' at the very bottom of the track interface, and here

tracks that are registered as secondary to *Yesterday* from the 1965 album *Help!* are shown. Users are made aware of the fact that these 'other versions' exist in the database, but if one clicks on, for example, the version from the compilation *The Beatles 1962–1966* one is led onto the same interface, onto *Yesterday* from *Help!* (the only thing that is different is the URL, in which the Diskoteks number is changed to the one designating the compilation). A rather problematic issue in this case is the fact that the different master recordings and remastered versions in existence in the archive are hidden and very difficult to retrieve. The different options for super-relations were added to the database shortly after the launch of /Diskoteket, based on the argument that a reduction in visible duplicates would improve the editorial processes (Dose, 2021c). Dose recalls this to be the argument that gave a green light to implementing the module:

> I remember that I argued for them [the super-relations] in connection with the launch of /Diskoteket by explaining that search results, editorially speaking, would be more efficient if the noise of duplicates were minimized. But it was obviously on the official face of DR, in utilizing metadata on www.dr.dk and in apps that I saw the biggest opportunities, because I believed and thought that it is self-evident that we have some interesting metadata that no one else has – but the issue of duplicates was too big a hurdle to even begin to operationalize anything. So, if we were to take advantage of our metadata in order to enrich the digital music experiences, we had to approach this issue radically (ibid.).

Next, I will round off by bringing a few perspectives concerning the steering of data and music history.

Music history and data directing

As part of the preparations for the research done for this article I did an ethnography of DR employees working in radio production, which targeted music history in a digital age and how /Diskoteket suggests certain narratives over others. During winter 2019/2020 I conducted ten qualitative interviews that revealed (thoughts about) an institutional discourse of certain ways to understand and disseminate music history. I will not analyze these interviews here, but in order to widen the responses to the hypothesis of this article, let me just pick out a couple of statements. The interviews were semi-structured, thus they covered a range of topics. While talking about how classical movement-based compositions ought to be presented on digital music platforms, one informant suddenly interrupts himself and states that 'there is a DR consensus about a lot of things'. We are discussing the experience of validity in music metadata, and this spurs him to underline to me how important it is that employees at DR refer to a given musical work in the same way every time: 'We say things in certain ways ... This sort of verified information [that comes from strict syntax] is a way of me and my way of thinking [about music history]'.

The statements of this informant concern the taxonomical order of registering in the MUSA database, which can mean two things: either the taxonomy of the music archive has always been subject to a limiting discourse of right and wrong,

of music history as equalling a catalogue of facts that tells narratives as universalist chains of events; or, the archival taxonomy has, over the years, seeped into the editorial and broadcasting discourse as a common ground of reference that all may not agree on but comply to anyway. Both explanations are probably equally 'correct'. Nowhere is it written that music history must be communicated in a specific way, it just is so and this mechanism can most likely be traced back to the original ideals of education and public service, meaning that noble intentions perhaps result in uncritical approaches to how unilateral narratives might influence the public.

Another informant speaks of the problematic act of tracks being hidden, which I accounted for in my analysis of super-relations above. She says:

> A track can, for instance, be put into a compilation context focusing on the evolvement of punk music, but the identical relations [primary-secondary relations] make you see the so-called primary release of a track, always. Hereby, the context of punk history is hidden to the user. ... Your options of discovery are limited. In the punk music example you are limited in discovering other music of relevance, or in discovering music that at least has been curated as relevant to the given track. The same logic limits you in finding and listening to edited versions of the track and this restricts the [experience of the] breadth of the system.

This illustrates the same DR consensus of right and wrong as the aforementioned example, but this time it unmistakably comes from within the digital music archive. Most people will probably agree that the implementation of primary-secondary relations is a helping hand for the user of the platform, and, as I have accounted for in the preceding paragraph, it is a strategic and necessary tool for being in a position to create digital music experiences for the future. Still, one should be aware that this functionality inscribes itself into a history of standardization at DR – a standardization of radio production as well as a standardization of music historical narratives.

No matter the perspective, the digital music archive of DR ordains, as all other archives, a certain power structure, and with the case of primary–secondary relations implemented in order to 'clean up' in the archive we are witnessing a somewhat heavy example of omitting what is viewed as redundant. The user is given opportunities to understand and interpret tracks within a certain scope, and by this the archive establishes the framework that the user can produce knowledge from. Read through a critical lens one should be aware that the infrastructure behind /Diskoteket, the MUSA database, might determine how one perceives the history of recorded music. The question is whether or not it makes sense to view the infrastructure solely as the representation of control; is it not as much a representation of potentiality?

The possibilities of new contextualizations, of new knowledge, of new ways of attuning one's ears, ought to mean something more than just to be examples of governmentality. Jussi Parikka, speaking through the voice of Michel Foucault, speaks of the archive as a 'guiding principle for the potential actions a machine

might take' (Parikka, 2012, p. 132), which is a concurrent reading of Foucault's concepts of the archive and the diagram, a reading for the present time. And this concomitant approach seems fitting to me. Infrastructures are closer to diagrams than to apparatuses; the diagram is in its essence nomadic – it does not map out, but experiments, with the world.

Actually, the database as a concept might make more sense than the archive; the coding of MUSA manifests itself in interfaces on /Diskoteket as representations of ideas and world views in a flat structure, or what Lev Manovich would call a non-hierarchical network of hyperlinks (Manovich, 2001, p. 16). Looking at /Diskoteket I tend to agree with Manovich that we behold a different order of archiving; the MUSA database is a collection that does not in itself tell a story, that does not have a beginning or an end. The logic of the database tells us how to see things. The more we clean up data, organize data, index data and describe data via different logics of metadata, the more data beyond the pre-existing data we create. And the fact that the database behind the archive is open to editions and changes begs the question: what actually *is* a digital music collection, a digital music archive? In the final section I will discuss how different concepts of time lead to differing ideals of history, and I will emphasize the use of history as the mechanism of DR's simultaneous, and opposing, approaches to music history.

Communication is music history is communication

In navigating an archive of any sort one will inevitably ponder on history: how did the archive in question come about; what does it preserve; and what narratives does it aim to tell? These questions are not weakened or getting less important with digital archives. The prospects of reading an archive are widened with the addition of a digital counterpart. The question of an archive's ontological status in the move from physical assortment to digital storage is intimately connected to the concept of history carried by the perceiver, the user, of the archive: is the intention to use the archive found in a reinforcing of a repeated foundational process pointing towards 'new ideas' (the belief in linearity, in modernization), or is the purpose rather to reconfigure the possible historical sensibilities of the archived material by engaging the archive with a disinterest in historicity (that is, reading the archive non-chronologically, as a heterogeneous entity)? In this final section I will relate the understanding(s) of music history in DR's digital music archive to a relational perspective on the concept of history. To scrutinize this archive is to realize that it is not just asserting a taxonomical knowledge system of musical facts; to scrutinize this archive is to realize that music history is not necessarily about being but always about relations and communication.

In considering book collecting, Walter Benjamin reflects on the meaning of ownership of objects, arguing that objects can let one come alive within them and not vice versa (Benjamin, 2015 [1931], pp. 68–69); consequently, he believes a public collection to be pointless (ibid.). Without a personal relationship between

collection and collector, the collection gets void of meaning. Benjamin finds the very essence of collecting to be a physical portal to 'the spring tide of memories' that lies in acquiring and endless sorting (ibid., p. 61). The public collection is per definition an archive and therefore it is bound to eradicate confusion and chaos. The meeting with an archive, or a library, is one of immediate disorder, but its instantaneous pleasure of chance is negated by the 'dialectical tension' between the archive and the order of its catalogue (ibid., p. 62).

As I read Benjamin's text, part of his mission is to shed light on modernity's quest for installing a homogenous time, or, a framework of chronological time: the institutionalized amassment of objects robs the objects of the potential for being anything else than points in a grid that chains things together in succession.

If one reads /Diskoteket in this way, one sees a digital music archive whose entire epistemology is sculpted around years and dates, omission and noise-cancelling, uniqueness and factuality. When 'there is a DR consensus' about how things must come through to the perceiver (of both the archive and the swinging airwaves of information), there is also a DR consensus about right and wrong, about the original and the authentic, that places works over experiences. Music history is reduced to narratives in chronological time that, probably, can be argued to stem from an institutionalized lust for rationalization and optimization of work processes; to ensure progress in radio production, music history has to be viewed as progress as well. To use another famous metaphor from Benjamin, music history is caught in the institutional storm of progress that keeps open the angel of history's wings and 'propels him into the future to which his back is turned' (Benjamin, 2015 [1940], p. 249).

Music history in a chronological frame does not account for the oddities, potentialities and reiterations that a nonlinear frame might illuminate. To understand music history in terms of progress is, as Benjamin states, to meet its future with one's back turned against it. Interestingly, one can just as easily read /Diskoteket as going against the grain of a common concept of history, that is, going against linear or homogenous, chronological time. As my analysis of super-relations shows, the digital music archive wants to unveil and include connections as much as it wants to hide and occlude, thus /Diskoteket purports a heterogeneous narrative that 'destabilize[s] change as a linear description of becoming' (Tanaka, 2019, p. 114).

Recently, historian Stefan Tanaka has made a convincing contribution to historical methodology, in which he advocates a concept of history that displays how multiple units of time relate and make historical change an immeasurable movement in chronological time (ibid., p. 146). In /Diskoteket, sound files and related metadata are flung into a participatory space due to a taxonomy initiated with the system of index cards, which has a built-in potential for non-chronological ordering. The *Hotline Bling* example, with its manifold relations cutting through different spheres of the digital music archive, casts light on how a digital music platform might represent several pasts of a track. All pasts *are there*, but they

cannot be experienced simultaneously, making them subdued to an interdependence of memory and forgetting, to speak with the hermeneutic phenomenology of Paul Ricœur (Ricœur, 2004).

Deleuze and Guattari, on the other hand, will state that the pasts of a track take part in an assemblage of searching and listening via /Diskoteket, in which the pasts are singular plateaus that bind otherwise heterogeneous elements of the digital music archive together, thus all pasts *are a part* of what is experienced. For Benjamin, /Diskoteket will exhibit the nonlinearity of the history of recorded music by enabling all pasts of a track as the 'differentials of time' (Benjamin, 1999, p. 456). The user of the platform, looking at all the relations on the track interface, sees a dehistoricized view, or a 'contemporary configuration' (Tanaka, 2019, p. 19). Methodologically, Tanaka will call the user's dehistoricized view to use 'the situatedness of things' (ibid.) in order to unfold layered interactions 'that help us see the myriad influences on people, ideas, and things as they interact and transform' (ibid.), and in the continual insistence on operationalizing its metadata, DR Musiktjenester, I will argue, inoculates /Diskoteket with an attention to historical relationality and emergence side by side with the institutional strive for consensual factuality.

Music history, according to the institutional discourse at DR, seems to be ingrained with a conventional idea of linear progress and of right and wrong. This is of course not DR's own invention, but a logical result of the chronological reckoning of the Enlightenment and the institutionalization of history in the 19th century. A consistent array of statements from the briefly mentioned qualitative interviews circles around concepts such as musical works and canonized releases (within genres), ascribing a rationale of historical common sense to the institutional narratives of music. There might be 'a DR consensus about a lot of things', but this consensus in many ways affirms the institutionalized music history as an imaginary museum of musical works, as Lydia Goehr has theorized (Goehr, 2007 [1992]). Read alongside Tanaka's historiographical diagnosis, music history at DR falls under the schism of modernity that 'turns relational conditions into fixed temporal positions' (Tanaka, 2019, p. 42), which feeds, and fits perfectly, into the overall educational ideals of DR as a public service institution. Thus, the communication of music history at DR might be claimed to have as its task to reaffirm (the development of) a national ideal for, and understanding of, *Bildung*, which functions in close proximity to the constructed, and historical, space of the Danish nation-state.[23]

But the digital music archive at DR, and especially its embodiment in /Diskoteket, shows that the picture is more complex and that music history institutionally is encouraged to be understood as a framework for knowledge production that is always already changing as well. The digital music archive works

[23] Here, I am inspired by Henri Lefebvre's analysis of how historical time is creating the space of a nation-state, while time, dialectically, is being 'solidified and fixed within the rationality immanent to space' (Lefebvre, 1991, p. 21).

under the condition of feedback memories making its storage processes subject to a dynamic memory (Ernst, 2013, pp. 95–101) of music historical 'facts'. The digital music archive *is* the MUSA database, and by understanding the archive as a database music history can be perceived (visualized, interpreted and understood) as Manovich's non-hierarchical network – of hyperlinks, yes, and also of non-causal events merging in the eyes of the beholder (and in the ears of the listener).

The only real difference between the two opposing understandings of music history is that the former is defining of DR's communication to the public, whereas the latter lives a life confined to laptops with singular ID's ascribed to DR employees. And that is a significant difference which tells us something about institutional power birthed in the idealism of modernity, with ties back to a post-Enlightenment frame of national history. The digital music archive reflects, of course, an incomplete picture of the history of recorded music, created due to changing politics of acquisition, and it carves out the user's options for engagement as well. Still, it shows the first steps towards a promise of an institutional rethinking, or thinking anew, of recorded music's pasts.

As a digital music platform, /Diskoteket drives a wedge between the algorithmically infused variability of Spotify's model and the variability-as-premise models of Discogs and WhoSampled (and also YouTube), thus creating (at least the preconditions for) a communication of music history focused on relations and experiences. If DR wishes to play an active part in sketching out the field of music communication in Denmark in the future, the process of operationalizing music metadata ought to be strengthened just as the participatory space of super-relations has to be widened and made public in one way or other.

Inspired by Tanaka, I subscribe to the idea that our music historical consciousness is shaped by levels of communication merging in a nonlinear use of music historical culture available to us. Thus, I see the use of history as the reason for several (and/or opposing) chronologies that provide possibilities for manifold understandings. Each understanding depends on the willingness to follow a relational perspective. As I have accounted for with this article, DR does not operate with *one* understanding of music history across all platforms and communicative outlets, but they do tend to lay out a straightforward and causal (or should I say chronological and almost universalist) approach to how music history ought to be comprehended. There seems to be a consensual understanding as well as a striving for factuality, which probably can be traced diachronically as the result of a modernist principle of the use of history. As a public service institution, DR has followed a trail of public education in its conceptualization of music history, because this trail makes it clear what they can do with music history. This use of history makes for what I in this article have called an institutionalized music history, which, I will claim, can be seen in DR's practices of music scheduling, standardization and archiving. Therefore, it is striking to see how /Diskoteket, as the embodiment of the MUSA database, produces this sort of music history alongside nonlinear chronologies.

Concluding remarks

With this article I have provided a history of the digital music archive of DR. This history is by no means exhaustive and it could have been approached differently. A central aim of the article has been to shed light on the fact that the history of a public service institution such as DR is multifarious and complex, and that such an institution might tell many different, and opposing, histories of all sorts of matters. I have looked into the strategies and politics of archiving commercial music at DR, and from this I see a gradually evolving focus on possibilities for searching and experiencing music and music history that builds on the operationalization of annotated data. At the same time, I also see a digital music archive that is somewhat restricting in how it shows tracks and releases, which might be emblematic of a standardized attitude towards what music information and music history ought to be.

The modern-day media landscape is ever-shifting, often in unpredictable ways. This an be observed in commercial streaming services such as Spotify, but it goes for DR's approach to music archiving as well. The platforms of Spotify are constantly changing and more than once a year the defining traits of their interfaces are altered. When it comes to /Diskoteket, progress is considerably slower, but, nonetheless, progress is a defining factor of the platform, too. It is difficult to see where either Spotify or DR's music archive are in five years; perhaps a different financial situation will have forced Spotify into a narrower field of genres, or, if the three major labels see new opportunities on other sorts of platforms, it might be gone altogether, and similarly DR's music archive might end up as redundant if some sort of Spotification model proves to be feasible to implement. /Diskoteket and the MUSA database provide a clear example of what a digital music archive is and what it can be, just as they showcase the intricate conditions that digital music archives work under. At DR, the digital music archive has to balance a fulfilment of certain ideals at the same time as it must gratify the contemporary political directions, and, furthermore, it must convert to the digital spheres and continually gain actuality as an alternative to commercial streaming services.

When prophesizing about the future for DR's digital music archive (and also Spotify's platforms), Benjamin's angel of history becomes ever more relevant. Technology and economy decree options for searching, listening and experiencing, thus dictating the tales to be told about music history, and if one wants to grasp histories beyond the storm of progress one has to read the digital music archive against the grain. It is a difficult process to do research into these matters because of the levels of politics involved – politics of archiving, politics of standardization, politics of production, politics of broadcasting, and politics of applicable legislation. For this article I chose to read archival documents and do analyses of the database and the interface of the digital music archive alongside conducting an ethnography of the archive encompassing interviews and observations inspired by auto-ethnography, all of which I viewed through an

aesthetic and cultural theoretical lens. This I did in order to examine the role and the conceptualizations of music history at DR from within the digital music archive. Other routes could have been taken and different narratives could have been told, that goes without saying. Still, in order to put forth a qualified analysis of DR's digital music archive, and in order to offer a history of it, a multi-method research design ought to be, at least, contemplated.

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Interviews

Dose, T. 2021a. Personal interview, Copenhagen, 9 February.

Dose, T. 2021b. Personal interview, Copenhagen, 10 March.

Dose, T. 2021c. Personal interview, Copenhagen, 30 March.

Ten anonymized qualitative interviews with DR employees. Personal interviews, Copenhagen, winter 2019/2020.

Abstract

This article offers a history of the digital music archive at the Danish Broadcasting Corporation (DR). By looking into archival documents, reviewing interviews and analyzing interfaces, the article examines visions and strategies behind the digital music archive and its in-house platform, */Diskoteket*, and based on this the article assesses whether or not DR's archival strategies play an active role in creating an institutionalized understanding of music history. The article considers how music metadata are operationalized in the digital music archive's database, and from this it casts light on the ways that /Diskoteket balances several, and somewhat opposing, music histories. The processes of music archiving at DR are viewed as a continuous production of a causal history side by side with non-linear chronologies that follow a relational perspective, and it is argued that the digital music archive hints at a promise of thinking anew of recorded music's pasts. In conclusion, the article speculates on DR's options for carving out a position of relevance in the field of music communication in the future that relies on a strengthening of the operationalized metadata, which ought to be made available to the public.

Keywords: Digital music archives, The Danish Broadcasting Corporation, music history, metadata, taxonomy, music platforms, chronologies, public service

The author

Andreas Helles Pedersen is a PhD student in musicology at Lund University. His research interests span from music historiography and listening practices, over cultural theory and aesthetics, to media philosophy and sound in film. He is currently working on an interdisciplinary project that examines music historical understanding in a world of streaming and digital music archives.