

THE MUSICAL NETWORK 2.0 & 3.0

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Abstract

This paper examines the changes brought to the musical network by Web 2.0 and a reflection at which changes we can expect from Web 3.0. After introducing Andrew Leyshon's concept of the musical network and the key concepts of Web 2.0 and Web 3.0, different networks of the musical network – creativity, reproduction, distribution and consumption – will be explored with particular attention to the role of the user, the developments of Web 2.0 and the possibilities of Web 3.0. Leyshon discusses various geographical and organisational consequences of the emergence of new technologies within the music industry and uses networks of creativity, reproduction, distribution and consumption to complete his scheme of the musical network. Web 2.0 is seen as the current phase of the World Wide Web and online applications, with interactive and dynamic content. Web 3.0 will comprise the following opportunities: a hybrid, semantic and intelligent web made possible by the convergence of several new technologies, which will make personalised data and content more usable and accessible. In the musical network the consumer plays a large role, since the Web 3.0-applications continue to build on the already present Web 2.0 applications. The future of the Web will not only consist of data mining, but also of analysing and processing this data, completed with metadata, to provide the user with personalised content and recommendations. In that way users can be more involved online, adding more content and metadata on the one hand and getting more and better content on the other hand.

Keywords

Musical network, music industry, Web 2.0, Web 3.0, hybrid spaces, semantic web, creativity, reproduction, distribution, consumption.

1 INTRODUCTION

In this paper I will examine some changes brought to the musical network by Web 2.0 and which changes we expect from Web 3.0 and to what extent the user of the Internet and the consumer of music is actively involved in those changes. This paper presents a theoretical reflection and literature review (1) and is concerned with the relationship between users, Internet, technological innovation and the music industry.

First the musical network and the transition from Web 2.0 to Web 3.0 will be further explored. Second, the four musical networks are examined in detail and with relation to the development of Web 2.0 and Web 3.0. To what extent are the different actors influenced by those changes and do the power relations within the musical network shift? The paper explains the changes brought to the musical network by Web 2.0 and which changes we can expect from Web 3.0.

2 THE MUSICAL NETWORK

In "Time – space (and digital) compression: software formats, musical networks, and the reorganisation of the music industry", Andrew Leyshon discusses various geographical and organisational consequences of the emergence of a new technological assemblage within the music industry [19]. He distinguishes four networks inside the musical network of the music industry: networks of creativity, reproduction, distribution and consumption, as can be seen in figure 1. He derives his notion of the musical network from the theories of Attali

(1) The literature research was done partly for the Dutch media company Veronica and their Medialab and partly for IBBT-SMIT, VUB and their CUPID research project.

and Scott. Attali introduces the musical network by explaining how the economy of music operates through networks based upon the composition, representation, and repetition of musical forms [3]. Next to this Leyshon notes that Scott's idea – distribution, consumption and above all production are all bound to physical spaces [25] – is not true anymore, because of the digital music culture.

The network of creativity in Leyshon's musical network contains the creation of music. Besides the artist, other actors are involved in the creation of music, such as the fans and the recording company. The recording company establishes the links to the network of reproduction and distribution and the fans establish the links to the network of consumption. The musical network thus consists of four overlapping networks with interrelationships among the different networks, as can be seen in figure 1.

Leyshon's approach of the musical network can be read in view of the Actor-Network Theory (ANT). ANT departs from networks of relationships and interactions between actors (material and semiotic) and networks (coming together to act as a whole). The actors influence each other (agency) and together these actors are able to make a change or create an idea or technology. Leyshon uses digital technologies to explain new possibilities in the musical network and sees this development not merely as a physical one. An outlook also phrased by Bruno Latour when explaining ANT:

The notion of network, in its barest topological outline, allows us already to reshuffle spatial metaphors that have rendered the study of society-nature so difficult: close and far, up and down, local and global, inside and outside. They are replaced by associations and connections (...). [18]

Leyshon considers this connection between the musical network and new technologies too, since the industry has evolved in lock step with, although not determined by, several technological advances. The advances addressed in this paper are Web 2.0 and Web 3.0 and these concepts will be enunciated in the following section.

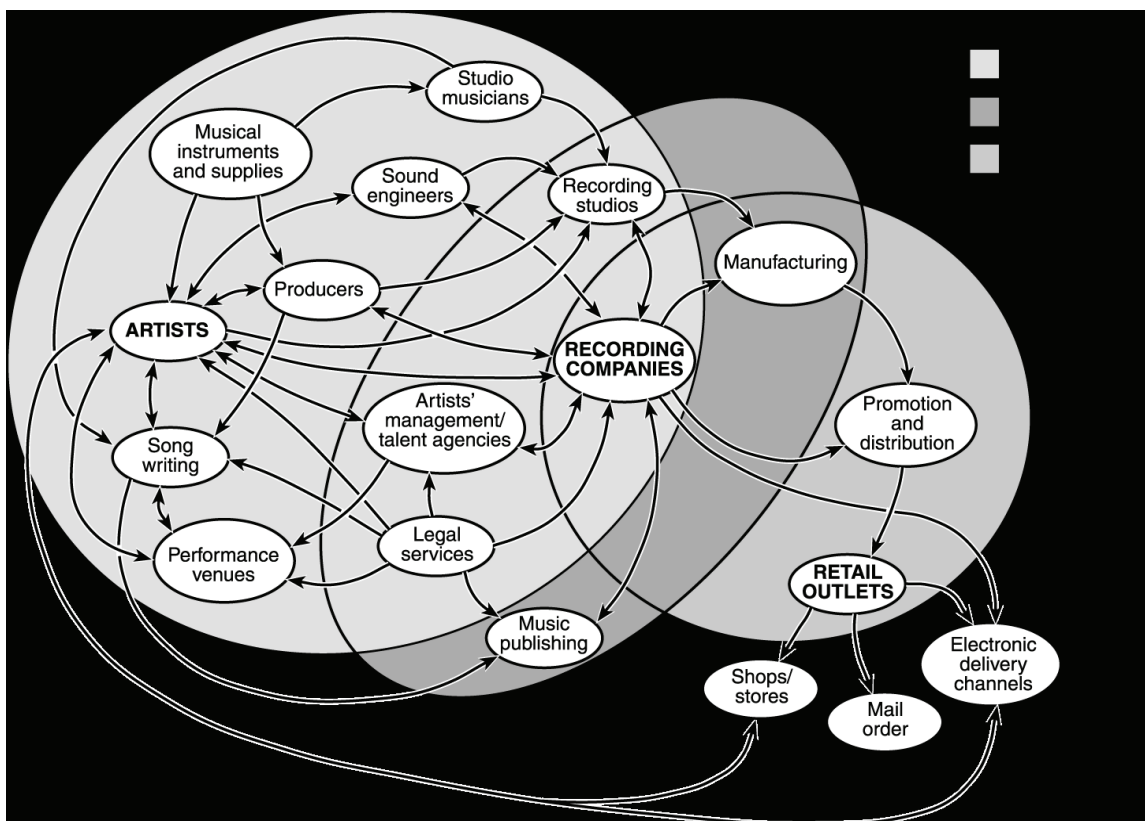


Figure 1: The musical network [19]

3 FROM WEB 2.0 TO WEB 3.0

The term Web 2.0 is used to describe the evolution [16, 26] from a 'read-only' World Wide Web towards web sites and web services based on participation, collaboration and sharing between users [23, 24]. These concepts transcend the former dichotomy of creators and consumers of content. Content is now based on the harnessing of data and outputs of users. Web 2.0 applications allow users and websites to consume and remix data from multiple sources. These applications and websites emphasize interaction, community and openness [22]. Examples include applications such as weblogs and wikis, technologies such as social tagging and social networking and websites such as YouTube, MySpace and Flickr.

Inventor of the World Wide Web Tim Berners-Lee saw the web not only as a common information source, but also as a place to "work and play and socialize" and where computers can "help us analyse it, make sense of what we are doing, where we individually fit in, and how we can better work together" [5]. With coining the term Web 2.0, the future of the World Wide Web is also widely discussed. The World Wide Web seems to evolve further. To what extent can a Web 3.0 arise and what does it signify?

To analyse the web and make sense of what the users are doing, Berners-Lee et al. see a semantic web as the future of the web:

The Semantic Web will bring structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users. [6]

The semantic environment will make use of data and metadata, i.e. data on data, the semantics of information and services on the web. The web will become more intelligent and will be able to satisfy and fulfil the requests of users. Adding content and metadata to Web 2.0-applications and organising and processing these data in a Web 3.0 application should make the Internet easier to use [8].

Although Web 3.0 is seen as the symbiosis of web technologies and knowledge, some theorists are more critical. Among others Lassila and Hendler:

Although many aspects of the Semantic Web are yet to be explored, and much research remains to be done, this technology is clearly transitioning into a serious player in the modern Web universe. We might not like the term "Web 3.0," but we enthusiastically embrace the technologies it is bringing to the field. [17]

Mike Evans foresees several practical problems with Web 3.0 too [12]. Firstly, the semantic web becomes more and more complex and machines cannot understand everything the user puts in. Secondly, the democratised production of content by the users is being ignored by processing data and generating metadata and thus content in a Web 3.0-application. And finally, Evans indicates that a forced pursuit of the semantic web prevents the dynamics of the World Wide Web. He thinks the Internet will evolve to a more hybrid web – he already speaks of Web 4.0 –, provided by mobile technologies and using physical objects. Something Berners-Lee et al. also forecasted, when "the Semantic Web will break out of the virtual realm and extend into our physical world" [6]. This means a hybrid web, spun from a number of technological threads, all helping to make data more accessible and more useful [8] and a web about recommendation and personalisation [15].

This paper will define Web 3.0 as the future of the World Wide Web, in the course of which a hybrid world originates by applying several technological developments. This will happen, assuming that recommended and personalised data and content will be made more accessible and useful for the users. In what follows, the four musical networks will be explored, explaining the changes, brought to the musical network by Web 2.0 and 3.0.

4 CREATIVITY

The networks of creativity occur between "a relatively large number of actors, institutions, and technologies" [19]. On the one hand they comprehend the artist's side and its surrounding actors like musicians, producers, venues and instruments. On the other hand they consist of the record company's side and its surrounding actors such as Artist & Repertoire (A&R) managers, producers, studio engineers and recording studios. In between these two sides representatives such as booking agents or managers are also involved. New digital technologies and especially the Internet change the musical network and new connections have become available for new actors and new networks. Examples are Internet companies that assert new and unsigned acts and music portals that introduce music and specific genres.

These portals are often artist platforms aimed at creating an online representation or social network for the artist. Web 2.0 applications such as MySpace, Facebook and SonicBids make it possible for artists to present themselves in a professional way to audience and record companies. The artist is able to create a profile and upload the home-recorded music as an MP3 file to the Internet. This fits in with the 'prosumer' principle, since new media easily facilitate amateurs or consumers to produce professional content themselves:

Digital technologies have made possible a dispersal and diffusion of music production that has fundamentally changed the nature of popular music market. The apparatus of analogue music production, orchestral studios, 20-foot sound desks and 2-inch rolls of tape can all now be collapsed into a sampling keyboard, a couple of effect units, and a computer. (...) The PC itself is in many ways the ultimate figure of media 'prosumer' technology. It is a technology of distribution, of consumption, as well as a technology of production. [20]

Both the networks of creativity, reproduction, distribution and consumption contain prosumers and their input and this validates the importance of the user in the musical network 2.0. In accordance with the Web 2.0 concept of 'the long tail' – a large number of unique items, each in relatively small quantities [2] – the musical network 2.0 makes it possible to create an online platform for these niches, in contrast with the future absolute musical uniformity, foretold by Adorno and Horkheimer [1].

Coming back to Web 3.0 - the future of the World Wide Web, in the course of which a hybrid world originates by applying several technological developments – the networks of creativity can witness some interesting innovations. The artist platforms and social networks will be elaborated in the light of the prosumer concept. On the one hand the semantic web can be unified in the existing Web 2.0 applications and on the other hand the actual moment of creativity, composing music, can become hybrid, by combining the physical and virtual spaces.

Artist platforms usually miss a direct or clear link to the music industry, but with the semantic web the artist platforms can address A & R managers and other people of the music industry. Now the Web will think on behalf of the users and the user can easily search for and find suitable artists for a record company or booking office. Because of the semantic metadata, facets as style, genre and life span can be defined and used in the search. With the Web 2.0 'remixability' concept – information of various websites can be recombined to gather new information – it will be possible to comb several artist platforms for appropriate artists.

As yet, the networks of creativity were discussed by means of shifting relationships between artists, consumers and record companies, but proceeding the purely creative aspect, the prosumer concept gives new possibilities to artists through Web 3.0. Musicians are able to easily and affordably record professional productions and because of that new enterprises are started at the Internet. Artist platforms like Sellaband, where artists have to earn \$ 50.000 by selling parts to their fans to record and release an album, or online collaborative and jamming applications like Kompoz, Ninjam or Kalabo bring the physical world into the virtual. This merger can be explained on the basis of hybridity.

Hybrid spaces emerge when it is not necessary anymore to step out the physical space to have contact in a digital environment. The border between both worlds blur and the spaces, separated before, are hard to disperse. A hybrid space is a conceptual space where the borders have disappeared. These borders fade away by means of the use of mobile or digital technologies as an instrument. Hybrid spaces however, are no products of technology. They are constructed by mobility and communication and are shaped in social networks that surface concurrently in the digital and physical world [11]. These spaces are not longer bound to a specific location, but they are the result of the alliance with the mutual spaces. Within, it is possible to perceive the physical space and simultaneously feel the connected digital network. Technologies drift away and become invisible, because the connection feels so naturally, people forget to think about them [10]. When interactions take place in media spaces, they take place in hybrid spaces and "in action is framed simultaneously by the physical space, the virtual space and the relationship between the two" [13].

Georgina Born gives an outline of the changing forms of musical creativity through the theories of Adorno, DeNora, Hennion and Gell. Sellaband, Kompoz, Ninjam and Kalabo also change the forms of musical creativity in the light of Born's findings. She poses that collaborating on the creation of music will improve the compositions and that collaboration creates ideal conditions. Digital music media like the above mentioned web applications give surplus values, since "digital music media both extend these potentials and afford entirely new modes of collaborative authorship. Through their capacity to 'decompose' aural and visual objects into basic binary representations, digital media re-open creative agency" [9].

The possibilities of digital music media and collaboration are being put in the light of ANT by Gavin Kendall,

when he indicates “as cultural and creative animals, we are locked into hybridity”, since “the human and the nonhuman (...), are constantly in dialogue” [14]. Kendall declares how technology had produced and changed the music practice. Musicians and music technology are part of a complex web of interests, actions and many more actors according to Kendall.

Web 2.0 and Web 3.0 change the relations between the artists and the fans to that degree that on the one hand both artists and fans are more involved as users with the creation of content in Web 2.0 and 3.0 applications and on the other hand the traditional actors of the music industry, such as record companies, recording studios and their staff and managements, are left aside. Hybrid Web 3.0 applications create a direct connection between fans and artists and as prosumers, artists are able to produce their own albums. The prosumer seems to be an important actor in the other networks too.

5 REPRODUCTION

Influenced by the ‘prosumer’ principle, the networks of reproduction changed too. The introduction of the MP3-format in 1992 as audio compression standard implied the possibility to store musical sounds as computer files, to copy and reproduce them on personal computers, and to transmit them over the Internet. This development had profound effects on all participants in the musical network, from the artist and recording companies through to the ultimate consumer [27]. Again, this trend is not limited to the networks of reproduction:

Since the mid to late 1990s, we have witnessed a period of change where the traditional models of music production, distribution and consumption have been profoundly challenged on an unprecedented scale. (...) Production tools have been democratised to the point that many musicians are now producing music with desktop tools in domestic environments. This has seen an explosion in content from both music professionals and ‘prosumers’, i.e. those whose online activities are located somewhere between the professional musician and the consumer. Ultimately, we have moved from an economy of scarcity, controlled by a finite array of publishers, to a theoretically limitless economy of abundance. [16]

The MP3-format means that there is no physical sound carrier for music and thus, the physical aspect is transferred to music players like the PC, notebook or portable MP3 player. Philip Auslander speaks of “the disappearance of specific physical objects and the consumption of music as pure digital information” and next to that “musical sound becomes a commodity in itself, unmoored from physical support in a way that was never previously possible” [4].

With regard to the possibilities of Web 3.0 in the networks of reproduction Knowles mention an interesting problem, since Web 2.0 concepts made users generate content, but “we now need tools to filter, navigate and establish relationships between elements in this vast field of content” [16]. Web 3.0 technologies of all times should be able to bring relieve and solve this problem. After all, the semantic web is able to make data and content more accessible and usable. Essentially this is already possible at the moment an MP3 is produced. This partly happens by means of ID3. ID3 is a table of metadata, included in an MP3 file, where data such as song title, artist, track number, file format and classification are given. Under the influence of the Web 2.0 concept ‘Users add value’ several applications also provide the possibility to add key words or ‘tags’ to music, which create ‘folksonomies’ and ‘tag clouds’. The semantic web leaps onto these possibilities and combines the data and metadata from tags provided by the user. On the one hand this requires an immense form of data mining to gather content. On the other hand complicated programs and algorithms are necessary to create new data and metadata and add these to existing content. Nowadays, research projects are already far advanced with respect to machine listening to and analysing of music and high-level parametric control of musical information (2). This makes it, for example, possible for a computer to describe which variations Brian May played on the riff in Tie Your Mother Down and how they diverged or how several pianists interpret Bach’s Goldberg Variations. It is only a matter of time applications with these capacities will be publicly accessible.

As already argued, Web 2.0 allows both fans and artists to create the online data. The only drawback is that consumers cannot see the wood for the trees with this huge amount of user-generated content. At this point Web 3.0 developments bring relief. Machine-generated semantic metadata combined with better search capabilities allow the user to get better search results. Still, at this point the user has less control of the generation of content,

(2) For example: OMRAS2 (Online Music Recognition And Searching) will develop a virtual research environment that is investigating new methods for navigating through large collections of music.
<http://www.omras2.com>

as Evans already foresaw. Now, the user has not completely control anymore of the content creation, something that also has consequences for the networks of distribution.

6 DISTRIBUTION

Because music can be spread digitally and non-physically, the most important new actor within the networks of distribution is the Internet and the “Internet distribution channels may help to support traditional networks as much as undermine them” [19]. Those Internet distribution channels include both legal distribution, such as online MP3 sales through iTunes Store, and illegal distribution, through for instance P2P networks. Next to that, within these networks a growing amount of ‘prosumer’-weblogs can be found. According to the ‘long tail’ [2] every musical genre or style is represented online and websites promote and distribute music in their own way. Furthermore social networking sites such as MySpace, Facebook, Last.Fm and Hyves make use of social tagging and other commenting systems to allow users to show their appreciation for certain songs or artists. Users and artists collaborate to promote and distribute new music and new artists by taking part in social networking sites.

Influenced by the latest developments such as the MP3 format and the prosumer-principle, record companies do not have monopoly power anymore in the networks of creativity, reproduction and distribution [21]. Within the networks of distribution Knowles sees Web 2.0 as an actor with a lot of agency:

The cost of distribution has been reduced to free, or near-free levels through digital distribution services, file sharing, peer-to-peer and social media networks. New large-scale web services have emerged which link music producers to consumers via artist similarity, taste profiling and recommendation data as well as linking listeners with shared tastes and interests. [16]

From 1999 (Napster) there was an increase of P2P-networks and social networks. According to Peter Biddle et al. in “The Darknet and the Future of Content Distribution” this provided the development of many small networks independent of each other and the assembly of these networks should lead to one new coordinated network:

In the absence of a global database, small-worlds networks could again become the prevalent form of the darknet. However, these small-worlds will be more powerful than they were in the past. With the widespread availability of cheap CD and DVD readers and writers as well as large hard disks, the bandwidth of the sneaker net has increased dramatically, the cost of object storage has become negligible and object injection tools have become ubiquitous. Furthermore, the Internet is available as a distribution mechanism that is adequate for audio for most users, and is becoming increasingly adequate for video and computer programs. [7]

Not only is this a matter of the unification of a number of networks, but also on of the integration of physical products, such as external storage units or MP3 players, into the new network. Once again this points to the hybrid space of Web 3.0. This hybrid prospect with physical products corresponds to Evans’ concept of Web 4.0, even surpassing Web 3.0 [12]. This integration of physical products into the musical network leads to an ‘Internet-of-things’:

The Web is on the verge of experiencing a massive evolution. From an Internet of nearly one hundred million computers, the Web is soon to become an Internet of nearly 100 *trillion* things. Devices such as PCs, PDAs, phones, beepers, sensors, switches, wearable computers, telemetry sensors, and tracking agents are expected to connect to the Internet, flooding it with all kinds of information. [28]

This integration of physical products within the musical network and the Internet could for instance get the user’s listening behaviour not only from the Last.Fm player, but also from an MP3 player or include music videos and radio stations, CD’s and vinyl listened to analyse. This combination of Web 2.0, Web 3.0 and Evans’ prophecy of a Web 4.0 should lead to an infinite offer of music and should recommend unknown music to the user. Off course, personal taste and emotion are hard to include in this analysis and it’s questionable whether an application will ever approach the human choice for a certain kind of music or artist. On the other hand, as already stated, Web 3.0 will make data and content more accessible and usable. This could also offer new feasibilities for social networking sites like MySpace, Facebook or Last.Fm. Facebook already works with recommended friends, as does Last.Fm with artists and events. At this very moment these recommendations are based on cluster analysis of data, but with the addition of metadata these results could be improved. For instance, Last.Fm could combine their cluster analysis of user-generated content and tags with machine created musical information, like genre, tempo, song key and strength, to give even more definite results.

The huge amount of user-generated content of Web 2.0 will be distributed even better because of the Web 3.0 filtering techniques to recommend data. The user, although not completely in control of the content creation, does well by this development, as the data and content will be recommended and personalised and this more accessible and useful.

7 CONSUMPTION

The networks of consumption cover those places in which musical products are purchased. Actors in these networks are organisations, shops, delivery systems and consumers. Since music is created, reproduced, promoted and distributed in the other networks, they have a large influence on the networks of consumption. Combined with the user-driven Web 2.0 applications the users, the main actors in the networks of consumption also influence the other networks more and more. The physical space of the networks of consumption – Leyshon mentions the record shop – is replaced by the virtual space, the Internet. Web 2.0 sites make it possible for users to get acquainted with new music, to discuss artists with each other, to buy new albums and to look for concerts. Since Web 2.0 applications anticipate user input, music related Web 2.0 sites instigate a lot of interaction between artists and music fans. More and more artists concur in the possibilities of Web 2.0 and ask their fans to create a music video for their new single or to design artwork for a new album, completely on the strength of the prosumer (3).

Compared to Leyshon's conception of the musical network, where networks of consumption are only barely linked to networks of distribution and creativity, gives the introduction of Web 2.0 and its concepts a reconsideration of the musical network. The consumer not only influences the networks of consumption as user, but also influences networks of creativity as prosumer, networks of reproduction, at the moment MP3's are created, and networks of distribution, at the moment music is promoted and distributed through Web 2.0 applications. The democratisation of producing tools and the growing professionalisation as a result, center the prosumer in the musical network and make the networks of consumption affect all other networks. However, it remains to be seen to what extent the user keeps the same role in the emerging Web 3.0 technologies.

In particular the user seems to take advantage of Web 3.0, yet the user is not the only one to add value to the web application. Complex algorithms process data, generate metadata and add content to the Web. Combined with the content obtained via Web 2.0 applications, this will influence the networks of consumption. The connection between large amounts of structured information and user and context related indicators will lead to the enrichment of the information. Enrichment refers to relations between similar information (text, video, audio, ...), facilitating content (public transport, parking facilities, restaurants, ...) and user generated content, but also relations between data, metadata, user profiles and contexts. Web 3.0 applications will combine Web 2.0 concepts, which let users generate content and create and update appropriate profiles, and Web 3.0 concepts to create personalised and enriched content for the user. In real terms this means that the user will create a personal profile and update it with data such as personal interests, musical preferences and visited concerts and events. Through hybrid filtering algorithms, meaning content-based and collaborative filtering are combined, metadata will be created for the content and the user will be provided with personalised, enriched content and the application recommends certain concerts, artist or events. For the artists this means that their music will reach the appropriate fans and users will easily find their favourite artists and music.

8 CONCLUSION

In this paper Leyshon's idea of the musical network is examined in combination with the changes brought to the Internet by Web 2.0 and the possibilities Web 3.0 has to offer to the overlapping networks of creativity, reproduction, distribution and consumption in the musical network. Besides that, I examined how the role of the users changes, in which manner they are influenced by the developments of Web 2.0 and 3.0, and to what extent the user could be more involved online, adding more content and metadata on the one hand and getting more and better content on the other.

Within the networks of creativity 2.0 online artist platforms, social networks and the 'prosumer' principle are offered a chance. The prosumer plays an important part with respect to creativity in the musical network. Next to that artist platforms offer more possibilities for artists to get in touch with interesting and important actors of the music industry and vice versa. Web 3.0 and the semantic web offer artist platforms and social networks better

(3) For example: DJ Shadow, The Hives, KoRn and many more.

search results and usability of the websites. The interactive creative process is able to become hybrid, since the Internet makes it possible to compose collaboratively online. The most important development in the networks of reproduction is the arrival of the MP3 format and the changes it brought about. Again, the prosumer is able to produce its own MP3's. Given that Web 3.0 is also about creating and processing metadata and adding this to existing content, MP3's will also be supplemented with metadata and tags, not only user-generated, but also automated by algorithms and automated processes. The advent of MP3 influenced the networks of distribution too. Both P2P networks and social networks are the most important actors, given that the user is able to promote and distribute music easily, fast and roughly.

Web 2.0 made it possible for the user to influence the musical network as a whole. The networks of consumption were suddenly connected to all the other networks. Before, record companies and other actors of the music industry influenced every network, now the World Wide Web user influences these networks. The same developments can be seen with the advent of Web 3.0. However, not only user-generated content will emerge at Web 3.0-application, data and metadata are also created by the applications themselves to provide the user with personalised and enriched content. Since Web 3.0 applications build on existing Web 2.0 applications and concepts, the user still has influence on the musical network. Both the consumers and the artists will create content online and use the existing Web 2.0 applications. The future will nevertheless not only show the gathering of as much user content as possible, new Web 3.0 applications will analyse and process these data, replenish it with metadata, enabling the consumer to use the Internet even better. Web 2.0 and Web 3.0 concepts are brought together and within the musical network the consumer and artist obtained more agency as users of the World Wide Web. Conversely, the record companies and other actors of the music industry in the musical network saw their power and agency within the networks decreasing. For one thing user profiles and user-generated content are accumulated and for another thing these profiles and content are processed to generate personalised and enriched recommended information, to make the Internet more accessible and useful for the user. In conclusion we can say that however the user lost part of the online content generation possibilities, the user, being consumer or artist, will benefit the most of the upcoming Web 3.0 developments, but that also other actors, who will provide the Web 3.0 applications and programs, will have a more important role at the World Wide Web.

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