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*The influence of technical innovation on the
production process of electronic music in the
decade 1997 to 2007*

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I'm the operator with a laptop in my hand!?! The influence of technical innovation on the production process of electronic music in the decade 1997 to 2007

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Abstract: This study explores how technical innovations influenced the production process of electronic music in the decade 1997 to 2007. In a survey seeking answers to this question in 2008, seventeen problem-focused interviews were conducted with developers of technical innovations, expert authors, performers, academics and researchers from the field of electronic music. Along the lines of grounded theory, this investigation also served the objective of identifying and systematising technical innovations in electronic music production and their influence on the production process. It became apparent that the key innovations were virtualising of recording studios (native processing) and digital networking (including peer production, democratising of distribution, linking of supply and demand).

1 Introduction

The production of (electronic) music and the associated production processes and costs have changed under the influence of technical innovations¹ (not only) in the last decade (see e.g. Emes, 2004; Sperlich, 2007; Tschmuck, 2006). To assess this change brought on by digitising in the broader sense in any meaningful way under the aspects of media economy and methodology, it is necessary to observe and critically reflect on both the production and reproduction sides of the media product music². Many interdisciplinary, multiple-perspective studies are necessary to provide

¹ For a definition and systematisation of the concept of innovation see Kondrat'ev & Oparin, 1928; Schumpeter, 1939; Rogers, 1962; Christensen, 1997; Moore, 2005; Vogt, 2011

² See e.g. the communication chain composer-public (Meyer-Eppler, 1955, p. 136) and the modularised production model (Grau & Hess, 2007, p. 32)

a (data)base for this. A first step in this direction was taken in the study by Vogt (2011). This focuses on the search for answers to the question of how technical innovations influenced the production process of electronic music³ in the years 1997 to 2007. To this end developers of technical innovations, (technical) authors, artists and academics from the field of electronic music throughout Germany were questioned in the year 2008 with the aid of 17 problem-focussed interviews (Witzel, 1982, 2000; Lamnek, 2008). This was connected with the goal of identifying technical innovations in the production of electronic music and their influence on the production process along the lines of grounded theory (Muckel, 2007) and systematising them. The central innovations turned out to be the virtualising of the recording studio and digital networking (including peer production, democratising of distribution, linking of supply and demand) in the meaning of Anderson's Long Tail Theory (2006). Selected results of the study are presented below.

2 Virtualising the recording studio – Democratising the means of production

The native generation and processing of audio material in computers (native processing) makes it possible to virtualise recording studios on standard PCs – the recording studio in the computer. Starting in the 1990s, a large number of technical developments laid the foundations for the virtual recording studio. These include high-performance computer chips in standard PCs on which DSP algorithms can be mapped (basic innovation). The innovation drivers of these computer chips were (and are) the multimedia and games industry. This is a collateral effect and it were pioneers such as, for instance, Karl Steinberg⁴ who recognised and exploited its potential for music production.

“I think that a very important point for me was the PowerPC [Note: Apple Power Macintosh 6100 from the year 1994]. For the first time we had a machine that was fast enough to be able to map DSP algorithms.” (Steinberg, 2008)

Karl Steinberg recognised in particular the significance of standardised interfaces as a platform innovation at an early stage. He developed the Virtual Studio Technology (VST). This plug-in standard is an open platform enabling the development of virtual hardware and its integration into software-based production environments (VST Hosts in the form of MIDI and audio sequencers and

³ Under the concept of electronic music Vogt (2011) understands primarily a music production measure that is executed electronically (or digitally) and is applied in various music styles and music genres.

⁴ Karl “Charlie” Steinberg was head developer in the Steinberg company that he founded together with Manfred Rürup in 1984. He was a pioneer in developing e.g. timeline-oriented MIDI-sequencer- programs, the integration of audio and MIDI in digital audio workstations (DAW) and Virtual Studio Technology (VST) standards, which step by step – looking back over three decades – made the virtual recording studios in a computer possible for everyone.

digital audio workstations) via a simple and released interface for which no DSP programming skills are necessary. In 1997 Steinberg officially opened VST for third parties with the VST SDK in order to allow development not only of effects, but also of virtual instruments (VSTi) (Open Innovation Approach).

“One very important step was to allow the integration of instruments into VST. At the time we got this going together with Steinberg. We said, ‘please expand your VST interface so that you can plug instruments in too’. The Pro-Five [Synthesizer]⁵ was the first instrument to be taken seriously that was then displayed everywhere as a VST instrument too. [...] Putting it abstractly, you could say whatever instrument you want, it is available in the plug-in interface. And if you have enough CPU, hard disk or memory, you can simply produce your stuff on your laptop.” (Schmitt, 2008)⁶

Today, VST is one plug-in standard among many for native virtual recording studios.

Using standard IT hardware converts the recording studio from a collection of specialised hardware equipment to a universal tool whose (not only) musical task and purpose is defined solely by software⁷.

“I now have a machine (note: Apple Laptop, see Figure 1) that I am working with. It’s the size of a GEO magazine. I just open it up and then I have 50 tracks in 24-bit-wave quality as well as processing and automation at my fingertips.” (Richter, 2008)⁸

⁵ Native Instruments Pro-Five - Emulation of the Prophet-5 Synthesizer from Sequential Circuits

⁶ Stephan Schmitt founded Native Instruments together with Volker Hinz in 1996. The firm made the fascinating opportunities of computer-based sound synthesis available to a wide public.

⁷ “The computer programmer, however, is a creator of universes for which he alone is the lawgiver [...] But universes of unlimited complexity can be created in the form of computer programs [...] No playwright, no stage director, no emperor, however powerful, has ever exercised such absolute authority to arrange a stage or a field of battle and to command such unswervingly dutiful actors or troops.” (Weizenbaum, 1976, p. 155)

⁸ Manuel Richter (artist name xabec) is song writer, producer and remixer for various (inter-)national artists (incl. Anne Clark). He stands for a generation of music-makers who as all-rounders make professional productions from the composition right through to mixing themselves, chiefly in a home-recording approach.



Figure 1: Manuel Richter's production set-up in 2008 (Source: Sebastian Vogt)

Up to the mid-1990s the production means for analog, semi-digital and digital production of electronic music were not ubiquitous due to the investment costs involved. Virtualising the recording studio in the form of e.g. software-based sequencers, performance tools, modular recording studios, effects and instruments reduces (musical) market entry barriers as regards equipment investment costs.

“Today nobody in the western world can seriously claim that his music making fails because of production means. This is an enormous step. It is a genuine breakthrough for mankind.” (Behles, 2008)⁹

In line with the long tail theory, virtualising the recording studio at macro level leads to democratising of access to the means of music production. The recording studio becomes a technical environment inside the computer that is available to music-makers individually during all phases of music production, flexible in space and time, with apparently boundless structuring options for the music.

⁹ Gerhard Behles is CEO of Ableton AG and co-developer of the native music production environment Ableton live. He was part of the musical project “monolake”.

"I have a complete range of sound available here on the spot [in the computer] and can play it to [film] producers and [film] directors in what is now an extremely good quality for the average consumer. It sounds like it should sound. Even the orchestral bits, if it is done properly. Very orchestral, or like an orchestra, sometimes even more like an orchestra than an orchestra recording. All because it is possible to stitch the things together that are difficult for a mediocre orchestra to play [...] It wasn't possible to do this 15 years ago. In those days a good mock-up orchestra called for a great deal of technical outlay [...] and even then it wasn't as good as you can manage today." (Brüse, 2008)¹⁰

The knowledge, qualification and expertise of the actors involved in the production process continue to be the elementary production factors deciding on content and quality of the musical output. The blurring of the production process of (electronic) music as proposed by Wölbling and Keuper (2009) remains. Andy McCluskey, member of the British electronic pioneer band "OMD" describes this phenomenon in the context of electronic (pop) music in the BBC documentation "Synth Britannia" (Whalley, 2009). If synthesizers or drum computers had a knob marked "Hit Single", he would have pressed this button more often than other people.

3 Digital networking

Alongside virtualising of the recording studio, digital networking is another key innovation that influenced the production process of electronic music in the years 1997 to 2007. Judging by the data surveyed, effects connected with this are located for instance at the levels of peer production, democratising of distribution and linking of supply and demand.

3.1 Peer production

Digitally networked music production systems allow the innovation of collaborative music making (peer production). Barbosa (2003, 2006) devised a classification of networked music production systems based on the dimensions of interaction (synchronous/asynchronous) and location (local/remote) by analogy with the Computer Supported Cooperation Work (CSCW) model of Rodden (1991). Musical peer production in the long tail can be shown by way of example in the Co-Located Musical Networks and the Music Composition Support Systems from the Barbosa

¹⁰ Claudius Brüse is a film composer and sound designer. He worked together with Hans Zimmer for instance on the sound track to "The Dark Knight" and "Pirates of the Caribbean 2/3".

classification.

3.1.1 Co-Located Musical Networks

Co-Located Musical Networks are multi-user instruments that are played live by at least two persons in a room. They are live performance systems that allow the musicians to influence, shape and divide their music mutually and synchronously in time. Locally networkable, virtualised music instruments, represented by portable computers, allow a specific form of (music) production.

“After all, we have these new forms of laptop music or notebook music in which we can meet and network everywhere. Networking like this is already living reality. We come and say let’s network our two notebooks and sit together on the sofa and jam a little.” (Großmann, 2008)¹¹

The audio-visual live performance (see Figure 2) – as exclusive reception of the original and not as a (mass) media copy through the public – is becoming important (again), not only as a significant source of income, but also as an artistic means of expression for music makers.



Figure 2: Audio-visual live performance “AudioVision” by Karl Bartos and Mathias Black (Malmö, 16.03.2012; Source: <http://www.karlbartos.com>)

¹¹ Rolf Großmann is apl. Professor at the Institut für Kultur und Ästhetik digitaler Medien at Leuphana Universität Lüneburg.

“[The] convergence of image and sound. Now that is really [...] what interests me now [...] and this is what I now spend most time on when we have a gig [...] I do the visuals. This means that I rhythmise intuitively to the images [...] It’s a bit like the way John Coltrane played saxophone, I just do it.” (Bartos, 2008)¹²

3.1.2 Music Composition Support Systems

Music Composition Support Systems allow music makers to produce music across the internet (a)synchronously. They share for instance MIDI, audio or project data via email during the production process.

“Depending on the production, I work for instance with instrumentalists in Los Angeles. During the day I knock up the working playback and then email it as an mp3 to the musicians [...] then when I get back to the studio the next morning the instruments have already been recorded, are waiting in my mailbox as a wave file, sound good, and all I have to do is insert them in the session.” (Zier, 2008)¹³

Ideally, only metadata that set geographically separate, homogenous music production systems in the same condition and allow further working on the composition will be transported.

“My partner [Mathias Black] has a studio in Düsseldorf that looks rather like mine [...] We exchange our songs as a logic project via email.” (Bartos, 2008)

The potential of internet communities, such as for example the Chain Tape (CT) Collective, is that not only pieces of music but also thematic albums can evolve in an asynchronous, collaborative process (Peters, 2008a).

“Two years ago I carried out my own CT project with film music. The task was to write film music for genuinely existing or imaginary films [...] I would find perhaps at most two people in Cologne and surroundings or among my own friends who are interested in something like this. But on the internet you can find people who share relatively specialised interests [...] They are a live collective. And it is much, much easier to find collaborators for certain things and then to push

¹² Karl Bartos was member and songwriter of the electronic pioneers “Kraftwerk”. He writes and produces for international artists and publishes under his own name as well.

¹³ Harry Zier is producer, musician and owner of a recording studio. He produced and made remixes for e.g. Chaka Khan and the No Angels.

through with them [...] You can exchange ideas and experience. You can inspire each other. We don't earn anything with this.” (Peters, 2008b)¹⁴

In cyberspace, online music recording studios offer a platform for working collaboratively exogenously or endogenously on pieces of music.¹⁵ Online music recording studios such as for example the Digital Musician Net make bio-musicians available for productions across the internet.

“I can play saxophone phrases quite well on my keyboard. In the meantime there are enough samples that sound rather like a saxophone. But if I take a real saxophonist via Digital Musician, my synthesiser-emulated saxophone playing sounds silly by comparison [...] Through this internet venture story it is now possible to find real musicians again and include them in your productions or to play with other people yourself. I find this really good. It takes you out of the isolation of home-recording which was an issue for thirty years.” (Rürup, 2008)¹⁶

¹⁴ Michael Peters has been hunting for new sounds for more than thirty years. He published ambient, computer, experimental and live-looping music.

¹⁵ Res Rocket was a pioneer in this field with Res Rocket Surfer published in 1995 (Res Rocket Surfer, 1997). Res Rocket Surfer was a virtual recording studio in which geographically separate musicians (performers) could work together asynchronously without any time limitations on MIDI projects or jam on a MIDI-base. Chat functionalities were integrated into the virtual recording studio. The asynchronous internet-wide recording of MIDI and digital audio data was professionalised and turned into an industry standard by the Rocket Network that became established during 1999 (Rocket Network, 1999). One of the first commercial projects recorded via the Rocket Network was the song “Me Belly Full (But We Hungry)” by Bob Marley for the “Warchild project”. The spatially separate performances by e.g. Sinéad O'Connor (vocals, London), Brinsley Forde (vocals, London), Lucky Dube (vocals, South Africa) and Thomas Dolby (Keyboards, San Francisco) were recorded live in London for the song by Matt Black and Jonathan More (Coldcut) and by Tim Bran (Dreadzone) on 17 March 1999 via the Rocket Network. The music production process (recording of the performances and mixing of the song) was broadcast live to a public of millions during the BBC1 TV programme “Tomorrow's World called Megalab 99” (BBC News, 1999; O'Connor, 1999).

¹⁶ Manfred Rürup was studio and live keyboarder for various (new german wave) bands and projects. He is co-founder of Steinberg and Managing Director of Digital Musician.



Figure 3: The online music recording studio – Digital Musician Net

(Source: <http://www.digitalmusician.net/>)

An open source tool like NINJAM (Network Jamming Architecture for Music) allows musicians to make music across the internet synchronously with other musicians. The system consists of servers and clients that stream compressed audio material between the various musicians during the performance. The performance can also be recorded in uncompressed form for subsequent processing or publication. The innovative factor of NINJAM is the way in which the system handles the emerging latency of musical communication. The musicians here only hear completed musical intervals of the networked partner continuously. They respond to and interact with musical contents that NINJAM shifts tempo-synched in a constant musical-time interval. This cannot compensate the latency between the various performance locations. Instead, the latency is expediently integrated into the musical performance. Michael Peters appeared via NINJAM at the Y2K6 International Live Looping Festival in Santa Cruz, California, in 2006 and describes his experiences as follows:

“I was invited to the Live Looping Festival in Santa Cruz, but did not travel out. There was a possibility of internet jamming that was also live. Mr Boysen, a flute player from Stockholm, was there at the scene. He played live to the public with loops [...] and then I practically sat here in my pyjamas at midnight – the concert was in the afternoon there – and jammed with the help of NINJAM¹⁷ [...] I could hear what he was playing. And the people in the room over there could hear

¹⁷ For further information see and hear Peters (2007)

what I was playing. The concert was practically on the other side of the earth.” (Peters, 2008b)

3.2 Democratising of distribution

The classic physical recording market is a reproduction process designed for mass copies because of the costs of material and tools. Micro runs of less than 1000 units are not worthwhile. It is also questionable whether niche music with a product range restricted to a few articles will find its place in shops and recording distributors.

“In classic music business, if x sales are not achieved in a time y, then the article is deleted in the computer and not listed anymore. And then no trader can order it any more either.” (Becker, 2008)¹⁸

The virtual long tail markets do not experience the limitations of classic markets. Millions of pieces of music are available at low cost on servers ready for online distribution. The demand is no longer limited in geographical terms, but extends out into cyberspace. Mass satisfying of demand for non-hits in micro quantities is becoming an important business sector in which long tail aggregators have specialised. These are portals for virtual distribution of music titles such as for example BeatPort, Amazon, iTunes, Bleep, musicload and MP3.de and burn-on-demand services, for example the Burning Shed Label. The distribution channels are seldom occupied by gatekeepers because in the long tail sector providers are interested in the business with hits and niche products.

“I used to pity the artists for whom I used to play and arrange when they then went to some record company or other. The typical rubbish answer was always, ‘Make this and that louder and then come again, then it will be a hit’. Thanks to online options you no longer to have to deal with anything like this again at all.” (Gorges, 2008)¹⁹

The services of specialist intermediaries are becoming increasingly significant for positioning the virtual goods on the various music portals, negotiating and settling remuneration levels per download, and keeping metadata up to date.

¹⁸ Matthias Becker has been engaged in electronic music and electronic sound production since 1976. He is the author of a number of standard works and operates the independent label “Originalton West”.

¹⁹ Peter Gorges has developed a large number of commercially successful virtual synthesising and sampling tools. For many years he worked as an author for specialist journals, sound programmer and studio keyboarder.

“I have a wholesaler, Zebralution, who do all that. This is run by Kurt Thielen who used to be with Rough Trade and than went on to Zomba. And he said at a relatively early stage that the labels cannot work with all the portals themselves [...] I give them things. And they then make the metadata and do the trading and settle the accounts with all these portals. Then they pay me and get a certain percentage for themselves. And I find this a good deal. Having to do all this work yourself involves a great deal of bureaucracy and business management that I as a label operator quite simply do not want to deal with.” (Dommert, 2008)²⁰

3.3 Linking of supply and demand

Social networks are “do it yourself” tools for music makers enabling them to build up and cultivate virtual communities.

“MySpace is naturally a fantastic platform for musicians that lets them reach the fans directly and I notice that if you are active there as a musician, you can really achieve a great deal. Quite simply you can establish contacts there. People can get right up close to the musicians and you can promote your stuff very specifically.” (Dommert, 2008)

In the age of long tail, musicians do not exist if they are not present in social networks where music makers present and market themselves and their product portfolio.

“In the meantime even the total sceptics that I know have a MySpace account. And they are forced to keep it updated. This is now somehow all part of the game.” (Catani, 2008)²¹

One important goal connected with using social networks is to generate reputations. These are measured in the form of attention and can be converted as a non-monetary value into monetary values. This is becoming increasingly significant, as music making and the livelihood of the artist can hardly be financed in long tail markets with the distribution of niche music. Instead, for instance live gigs and work for and in the media and culture industry are important sources of income (alongside the generally non-musical main occupations). Reputation is the key that opens up access to these sources.

²⁰ Frank Dommert operates the “Sonig” and “Entenpfuhl” labels. He works at a-Musik, a record shop in Cologne and as a radio author and DJ.

²¹ Patric Catani has been producing Hardcore-Techno, Gabba and Breakbeat since the beginning of the 1990s with great international success. Sounds from home-computers of the 1980s, steered by tracker programs, are an important element of his aesthetic strategy.

“At the end of 2006 we had an enquiry from Italy asking whether they could use one of our songs for a Ford Fiesta advertising spot [...] We did indeed get a quite considerable sum for this. But these are things that it is difficult to force, especially in our [semi-professional] field. Either people like what we do, or they don't.” (Münch, 2008)²²

Recommendation services, such as for example last.fm, that draw conclusions from the collective to the individual music interests on the basis of documented navigation of people in virtual space, (collective) search engine and taxonomies (Vogt & Kiefner, 2009) support music suppliers and music seekers in finding their way among the ever more discriminating musical niches.

Furthermore, musicians also use social networks to obtain not only textual but also audio-visual information about other (competing) music makers.

“When I stumble over MySpace pages, I note many colleagues working in the same circle as I do. And then I can gather information on their MySpace pages about what they are doing right now, how they sound, and about the status of their composition.” (Bartos, 2008)

Despite the growing efficiency of (human-supported) (long tail)-filter algorithms that are integrated, for instance, in platforms and search engines, it is not possible to uncover everything that seekers find interesting as a musical niche and is present in cyberspace. Information in a defined (interest) spectrum is only perceived when it passes a pre-defined threshold value. As machines lack human intuition, and as humans are not capable of analysing large data quantities in very short times, musical niches can remain hidden in the shadow of (niche) hits in real as well as virtual worlds.

“The Internet is like a great discount/clearance. Most of the things are somewhere down at the bottom. They only become visible when they make their way up to the top.” (Brüse, 2008)

4 Summary

This paper focused on selected results of the study by Vogt (2011) seeking answers to the question of how technical innovations influenced the production process of electronic music in the years 1997 to 2007. The aim was to identify and systematise technical innovations in the production of electronic music and their influence on the production process. It became apparent that in the

²² Philipp Münch is a musical chameleon and sound design expert. He produces impressive musical structures and sound worlds in a one-room apartment studio.

opinion of the seventeen experts questioned, virtualising of the recording studio and digital networking were the key innovations. The associated effects can be classified in the long tail theory of Anderson (2006). Virtualising of the recording studio leads to democratising of access to the means of music production that are available flexibly in space and time during all phases of electronic music production. Digital networking makes it possible to collaborate flexibly without space and time constraints in the process of producing electronic music (peer production). Various forms of (a)synchronous cooperation were presented with the help of practical examples. Further effects of digital networking include democratised access to the distribution channels and the function of long tail filters that link supply and demand in the electronic music production process with each other at the various levels in cyberspace too. The study by Vogt (2011) was designed as an exploration. In line with Wittgenstein (1993, p. XXIII), the findings are to be considered as markers in a research landscape that was partly unknown and required greater differentiation at the time of the data survey in the year 2008. These markers should and can serve as starting points for further interdisciplinary analyses, for instance in research into the music business.

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