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Production processes of pop music arrangers in Bamako, Mali

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ABSTRACT

Bamako, economic capital of Mali in West Africa, saw the recent multiplication of digital studios based on *Cubase 5*, *FL Studio*, cracked plugins, a MIDI keyboard and a small cabin with a cheap condenser microphone and a pop-filter. From videos and screen captures of recording sessions in three of these studios, we analyzed the creative process of four DAW practitioners from the beginning of the beat production to the mastering of the track. We also examined their interaction with the singers and rappers. Our analyses showed that young Malian DAW practitioners constantly revisit their MIDI arrangement and vocal recordings with advanced editing techniques. Locally successful, they have quickly developed a notoriety that enables them to be directive with their clients.

1 Introduction

We are conducting a digital ethnography of DAW-based studios in Bamako, a West African city that embraces a rich and diversified music culture [1] with internationally renowned touring artists such as afro-pop singer-songwriter Salif Keita, Ivorian reggae singer Tiken Jah Fakoly, traditional Wassoulou musician Oumou Sangaré, kora player and hip-hop musician Sidiki Diabaté, or rapper Iba One. These famous musicians are signed on international labels. While their tracks are recorded and edited in Bamako studios, they are mixed and mastered abroad. In this paper, we examine the studio practices of four DAW practitioners who produce their tracks with singers and rappers entirely in Bamako. Our contribution thus highlights a growing community of young studio practitioners and fills a gap in the Audio literature that has until now focused on wealthy countries.

The globalization of DAWs reached Bamako about ten years ago, more recently than in other parts of the Global South due to the nationwide economic and political challenges in Mali. Our fieldwork revealed that there is no formal audio program in the country, and that the studio workshops that used to be taught by foreign sound engineers stopped with the *coup d'État* in 2012. Therefore, the upcoming generations rely on their local networks to learn the basics of studio installation, and on YouTube tutorials to gather information on how to use their DAWs. To understand more clearly how these young professionals acquire knowledge, and how it is transferred among the local audio community, we selected four DAW practitioners in their 20s and 30s with a range of years of experience.

The lack of official studio equipment distributors also challenges the development of the local recording

industry. Productive nevertheless, this industry illustrates the ways Malians cope with restrained access to modern goods. Mostly without access to banking, Malian studio owners cannot purchase software licenses so they crack them and remain on outdated versions for years. For instance, most digital studios we have visited thus far feature a used computer with *Windows XP* and *Cubase 5*. Their family and friends might bring new sound interfaces (e.g. Motu, Edirol, Tascam) back from France or the USA, or they find MIDI keyboards (e.g. Yamaha, Medeli) and microphones by luck on used markets or through businessmen who buy them in China or Dubai. Music tracks are released through video clips available for streaming on YouTube and local platforms such as *Bamada-City*. Live music events are funded by sponsors and by the members of the audience who give bills to the performers during the show in an ostentatious way [2]. DAW practitioners charge singers and rappers for studio sessions, or they co-produce the sessions with them, in which case they attend the shows as live engineers and receive royalties from the performers' revenues. In this business paradigm, we investigate how DAW practitioners interact with their clients.

Our approach incorporates an Audio Engineering expertise into ethnographic methods. As “DAW-based engineering is a practice that first and foremost involves working with chunks of digital data known as *samples*” [3], we analyze the creative process of four DAW practitioners in layering and editing samples and vocals [4]. We complement this analysis with interviews of the studio practitioners, as well as with visits to local art institutions and organizations that contribute to the music industry of Bamako [2]. This methodology enables us to identify idiosyncratic and locally-shared studio practices in the city in keeping with Eliot Bates' report on studio practices in Istanbul [5], and to draw connections between these practices and the near absence of audio education in the country. We also compare DAW practitioners' interactions with their clients with the model of producers' artistic involvement during recording sessions used in a great variety of musical genres in Canada, France and USA [6]. Finally, we explain how in Bamako, artistic direction skills outweigh sound engineering skills in achieving a successful business, which inspires new perspectives for our industry [7].

2 Profile of four DAW practitioners

In this section we detail the background of four young Bamako-based DAW practitioners, namely arranger Aboubacar Sidibé also known as Pap **Junior** and his studio assistant **Abass** Coulibaly (Figure 1); beatmaker Issa Sanogo also known as **Backozy** Beats Design (Figure 3); and engineer Issa Traoré also known as **Ken** Lagare (Figure 6). The information below was collected in July 2018 and 2019.



Figure 1. Abass (left) assisting Junior (right)

Aboubacar Sidibé also known as Pap **Junior** (born in 1987) started his music career as a guitarist who was particularly original in his use of a multi-effect pedal. He opened his studio around 2007 when he was studying law. His project was building a *live studio* where he could record several musicians playing simultaneously. After graduating, he observed recording sessions at Bogolan, a studio funded in 2002 by French engineer Yves Werner and Malian guitarist Ali Farka Touré that used to host internationally-renowned artists such as Bjork [8]. Bogolan features a good collection of microphones, a main room and two cabins with treated acoustics, and a control room with two *Yamaha O2R* console desks. At the time of Junior's observations, the recording producer was Eliézer Oubda, a renowned producer from Burkina Faso who trained the first generation of West African DAW practitioners and live engineers. Eliézer helped Junior install his studio by treating the acoustics of his vocal cabin (Figure 2) and showed him how to install cracked software – before, Junior had to buy their installation in a Cyber. Junior had to renounce his *live studio* since the owner of the space was afraid that the noise would disturb the neighborhood, so he developed a DAW-based studio that he has maintained since working full time as a custom officer.



Figure 2. Vocal cabin with acoustic treatments in Pap Junior's studio

Abass Coulibaly (born in 1993) is finishing an engineering degree in Biology. Without any music background, he was trained as a studio assistant by Junior and took over the management of the studio since Junior has become too busy with customs. Besides observing Junior's studio sessions, Abass has mainly learned his MIDI programming, editing and mixing skills through YouTube tutorials. He explained that he compares tests of new tutorial techniques with his old mixes to see whether or not the new techniques are worth using. He recently changed the speakers of Junior's studio to have "a better input."

Issa Sanogo also known as **Backozy** Beats Design (born in 1994) opened his DAW-based studio in 2017 after graduating from a Master's in English. He quickly gained notoriety as a beatmaker and has specialized in hip-hop production although he can work in a great variety of pop genres. Baba Keita (Figure 3), another DAW-based studio owner who has a background as a radio broadcaster helped him set up his studio without any acoustic treatment. Backozy keeps observing sessions in other digital studios such as *Studio D Music* that belongs to Balla Diabaté, brother of Sidiki. He also learns a lot by *doing* as he produces one track after the other, "up to seven per day" according to him. He now makes some of his income by producing beats for Malian rappers in France.

Issa Traoré also known as **Ken** Lagare (born in 1989) studied music at the *Institut National des Arts* and at the selective *Conservatory Arts and Crafts Multimédia Balla Fasseké Kouyaté* in Bamako. He performs keyboards, djembe, balafon and tamani on

stage. He started using a DAW in a friend's studio in 2008, and he opened his own studio named *Authentique* in his living room in 2012 (Figure 6). Before graduating, he interned for a month at Bogolan with sound engineer Yaya Diarra in 2017. This internship complements the regular observations of recording sessions in many digital studios of Bamako, a training that he still pursues – he happened to assist a part of the session that we documented in Junior's studio (Figure 4). Ken recently moved his home studio to a dedicated space for music production with rudimentary acoustic treatment. He hopes to continue improving his audio engineering skills and become an important sound engineer and instructor in Mali.



Figure 3. Baba Keita (back) and Backozy (front)

3 Methods

3.1 Data collection during recording sessions

In Nov. 2017 and July 2018, we documented the creative process of three recording sessions from the first interactions between the DAW practitioner and their client to the mastering of the tracks. The sessions include 1) the recording of reggae singer Ali Badara Dembélé also known as General Ballody in Junior's studio with Abass and Ken as assistants; 2) the recording of rapper Bessé in Backozy Beat Design studio; and 3) another recording of General Ballody in Ken's *Authentique* studio. We filmed these recording sessions with two video cameras: One followed the DAW practitioners' actions and the other captured the interactions between the DAW practitioners and the performers (Figure 4). We also collected computer screen captures with *BSR Screen Recorder* that we were given by Junior's friend, but unfortunately could not use this software for the session at Backozy Beat Design studio because it was

not compatible with the operating system. The audio of the sessions was recorded with a Blumlein stereo *Royer SF12* microphone that was placed behind the DAW practitioner, directed towards the center of the speakers to represent what they heard throughout the sessions. We interviewed the four DAW practitioners before and after the recording sessions with a *Tascam DR-100* portable recorder. We collected further information in July 2019 in additional interviews to help explain what we could not understand from the analysis of the data collected previously.



Figure 4. Pap Junior (center), General Ballody (left) and Ken Lagare (right)

3.2 Data analysis and video editing

For each of the three sessions, we synchronized the video layers from cameras and screen captures on the stereo microphone audio track in a Premiere Pro project (Figure 5). Each project is organized in sequences that correspond to specific parts of the sessions, i.e. development of the instrumental (beat), recording of the chorus vocals, etc. Then, we added markers throughout all Premiere Pro sequences to identify new events in the production process and to discard the moments when nothing related to the production of the track happened, e.g. phone calls, breaks, computer crashes. An in-depth investigation of every new event enabled us to understand the DAW practitioners' arrangement, editing, mixing and mastering practices. We also analyzed transcriptions of all human interactions during the sessions to understand their coaching approaches. Finally, we edited short video versions of the complete sessions to highlight their skills and the main steps of their creative process in our conference presentations.

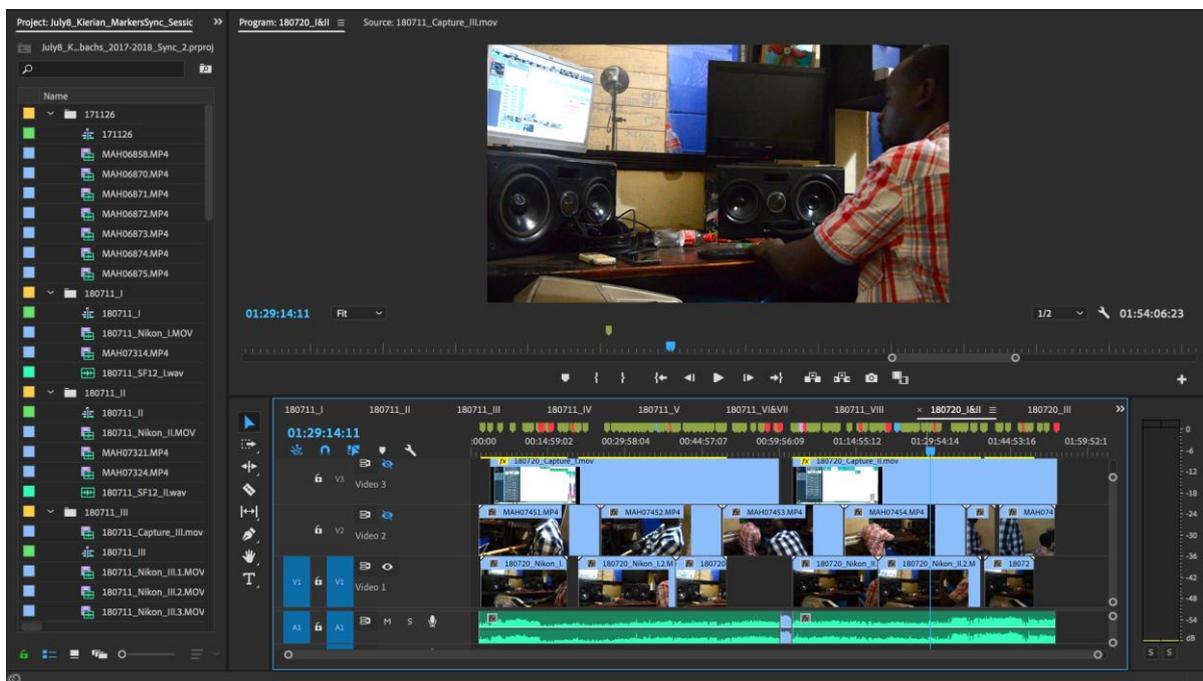


Figure 5. Synchronization of three video layers and one stereo soundtrack to analyze sessions with markers in a Premiere Pro project

4 Results

4.1 General observations

Beside Junior's recordings of his electric guitar, the instrumentals of the three tracks that we observed were made entirely of MIDI programming and vocal recordings. Overall, we noticed that the four DAW practitioners give tremendous attention to the instrumental (or beat) arrangement. For instance, they constantly change their choice of virtual instruments, edit their MIDI programming, add and remove layers of instruments, mute and unmute specific repetitions of samples. They refer to this process as *programming* before recording the vocals, and as *mixing* after recording the vocals since they revisit the instrument arrangement depending on their editing of the vocals. They rarely open the mix window of *Cubase* and they only use the automation to fade out the end of the tracks. Instead, when they hear that the vocals are not supported enough or masked by the instruments, they adjust the arrangement to draw out the vocals. We therefore refer to them as *arrangers* for the rest of the paper and we argue that their arrangement techniques partly substitute what is commonly considered *mixing*, i.e. balancing, panning, EQing and compressing multiple sound sources to create a stereo track.

The four arrangers use the *VST* acronym (Virtual Studio Technology) to designate effect plugins, and the word *plugin* to designate instrument plugins. We saw the same *VSTs* and *plugins* across the digital studios that we visited. Their sets of *VSTs* include the built-in effects of *Cubase*, a few popular Waves plugins such as the *V-series*, *API* or *SSL* hardware emulations, and outdated plugins such as the *T-Pain Effect*. Their collections of *plugins* (samplers) include *Nexus*, *Kontakt*, *Steinberg Halion One* etc. They set their DAW templates so that several *VSTs* are already active when they create a new track. Most often, they quickly adjust *VSTs* settings with factory *presets* that they like to use for specific instruments or vocals. While they sometimes open an EQ to try a different *preset* or to adjust the original *preset*, we noticed that they almost never adjust compressors, and that they spend most of their *VST actions* adjusting autotune, delay and reverberation effects. For all three sessions, the mastering process lasted only a few minutes and was based on effect settings that they always use.



Figure 6. Fanta Djeli Diabaté and Ken Lagare

The studio owners were deeply involved in the artistic direction of their tracks. All three decided on the structure of the verses and on the number of vocal layers in the choruses. While they always considered their clients' comments, they were assertive in justifying their arrangement choices, and quite directive when coaching singers and rappers between takes. For instance, they commented on the performances without holding anything back, e.g. "*It's good but do it again! Do it again!*"; "*You need to be more serious!*"; "*Well, now you need to make variations!*"; or "*Give me another one like this!*" (session of Backozy with rapper Bessé). We also noticed that the performers did not hesitate to give feedback on the arrangement ideas and on the general result of the track. Moreover, other musicians in the room felt free to provide their input on a take and how to improve it. In the next three sections, we detail the flow of the three recording sessions to identify nuances among these arrangers' practices.

4.2 Recording of Ballody at Junior's studio

The session took place within three days: Nov. 26, 2017; July 11 and 20, 2018. Abass assisted the first session (90 minutes) that mainly focused on writing and recording some of Ballody's vocals. Junior attended the entire session and served as a coach for Ballody, helping him to write his vocal lines. This session ended with the recording of a spoken word part in French that conveys a message of peace, which gave the track its name: *Mali* (not released yet). The second session (270 minutes) consisted of Junior writing and recording various electric guitar lines, mixing, editing vocal lines from the previous session, recording overdubs of Ballody's vocals for the parts

that did not turn out well, and writing and recording several MIDI instrument parts. Junior thus acted as the recording and mixing engineer as well as the arranger. For the last portion of the second session, Ken took over the engineering job to record backup vocals with Fané Bella Traoré (Figure 7). The third session (150 minutes) consisted of writing and recording more MIDI layers and electric guitar lines, mixing, and mastering. The last instrument that was added was a guitar part, only two minutes before Junior and Abass started mastering the track, which took 11 minutes. Abass assisted this final session by recording some of the MIDI instruments on the keys. He tracked the guitar lines and did the majority of the mixing and arranging, coached by Junior.



Figure 7. Fané Bella Traoré recording vocals

The mix of the track was built progressively through the recording of new layers of vocals, guitars, and MIDI instruments, with all these elements heavily intertwining. Throughout this process, effects were added and taken out. Specifically, a lot of EQs were used on the tracks, mostly with factory *presets*. However, we noticed that Abass used some EQs to change the sound of some of the tracks drastically, e.g. he boosted 20dB at 60hz and 11dB at 2khz on one of the guitar tracks. Towards the end of the third and final session, the balance of the track was constantly shifting as they were still adding new MIDI instruments, experimenting with different levels for each instrument, and changing the effect settings that they were using on pre-existing parts. Indeed, as they added in new parts, they modified certain sections to

improve the transitions between the old and new elements. Arranging is evidently the focal point throughout these sessions as it started in the first session and was present leading up to moments before the final master was bounced.

We observed that the writing and recording processes were fully collaborative between Ballody and Junior, and that the mixing and mastering processes followed a similar model with Junior coaching and providing feedback to Abass while he was operating the DAW. During the process of recording the vocals, Junior would give feedback between takes and during Ballody's improvisations of different iterations of the vocal lines. This mode of interaction then shifted with Ballody acting as a coach for Junior when he was recording guitar and MIDI instruments. Interestingly, the arranger-client business relationship seemed to disappear during this process.

4.3 Recording of Bessé at Backozy's studio

The session took place within two days: July 7 and 9, 2018. Karim Traoré also known as Bessé (*machete* in Bambara) went to Backozy Beats Design studio to record a tradi-trap track named *Djougouya*¹ (*selfishness*). While Bessé started singing the chorus line that draws from the song *Bakari Dian* that was recorded in 1970 by *Super Biton de Ségou*, one of the emblematic Malian orchestras, Backozy clapped the rhythm and took note of its tempo (Figure 8). He then setup MIDI tracks on *Cubase* and loaded instrument samples in *FL studio* that he recorded in *Cubase* using his MIDI keyboard. This technique of pairing two DAWs requires a *Rewire* plugin.

In the first session (95 minutes), Backozy layered improvisations of Afro-Beat rhythmic patterns followed by a melodic instrument that matched the vocal line. He then coached the rapper's performances for the chorus and the first verse. His artistic direction focussed on capturing the correct melody in the appropriate register. To help Bessé, he muted the instrumental parts that were difficult for the rapper to sing over. As soon as several layers of vocals were tracked, Backozy quickly adjusted the

¹ This track was released on Aug 28, 2018, on the local streaming platform *Bamada City*: <http://www.bamada-city.com/kouloula-besse-djougouya-55078>

EQ, Reverb and *T-Pain effect* autotune plugins that were already set by default on the vocal tracks. He pitch-corrected the vocal lines even further with the *Vari Audio* tool in *Cubase*. Simultaneously, he also edited and mixed the arrangement by using track groups to either trim, extend, copy and delete samples. He then added creative variations in the arrangement to keep the listener engaged, and to make the track danceable. He also removed parts that seemed to clash with the vocals.



Figure 8. Bessé (left) and Backozy (right)

Instead of settling on the initial arrangement of the instrumental, Backozy transposed some melodies to higher or lower registers and kept experimenting with different virtual instruments. For instance, the first time he recorded the main melody, he used a *marimba* sample, intended to sound like a *balafon*, which he eventually changed to a *multiple trumpets* sample. He edited vocals instantly after recording rather than waiting for the end of the session. This efficient process may explain how he is able to go through “*up to seven sessions per day*.” At the end of the first session, Backozy quickly mastered the work-in-progress to send it to Bessé via *WhatsApp* so that he could prepare the next session.

In the second session (120 minutes), Backozy coached the rapper’s performances for two more verses, and revisited his instrumental to create the final mix and master. The editing of the instrumental seemed to take up most of the time as he kept modifying rhythmic and melodic samples around the vocals. Aside from improving the arrangement, processing the vocals and adjusting levels, his mixing process consisted of opening EQs in which he automatically applied some factory *presets* such as *low cut* (50 Hz roll off) and boosted high frequencies

manually as if to achieve some clarity in the sound. This may explain why most of the song, aside from the bass, tends to sit in the high frequency range. Once the mix was complete, Backozy opened a bounce of the track in *Samplitude* for mastering. He applied the *EFX* compressor plugin with the minimum attack, maximum release, default ratio and default threshold settings, and an output gain of 16dB. Once the track was rendered, he exported the master in mp3 to send it to Bessé via *WhatsApp*, which does not accept larger files. Bessé subsequently shared this mp3 file with his sponsors and fans also through *WhatsApp*.

4.4 Recording of Ballody at Ken’s studio

The session took place in the space of two days: July 5 and 12, 2018. General Ballody arrived at *Authentique* without any lyric or composition idea. The first session (180 minutes) started with five minutes of improvisation, with Ballody singing and Ken playing the keys. Then, Ken opened a new session in *Cubase* and they started jamming on a reggae beat (Figure 9). Singer Fanta Djeli Diabaté who is also Ken’s wife joined them by singing a counterpart. Ballody came up with lyrics inspired by our presence in the studio. Named *Musoya* (*women in Bambara*), the track has not yet been released.



Figure 9. Ken Lagare and General Ballody

After recording several layers of rhythmic harmonies on his MIDI keyboard using built-in samples, Ken programmed the drums. Then, he updated his keys’ harmonies with a different rhythm. Once they both agreed on a base for the loop, they started tracking vocal performances without a predefined structure. Ken coached Ballody with detailed feedback and through sung demonstrations. Discussions about the composition and Ballody’s writing sessions for which the instrumental loop kept playing back in the studio

interrupted the vocal takes (Figure 10). Throughout the process of programming MIDI and recording vocals, Ken edited the different samples and takes, chose new virtual instruments and set some delays and reverberation on the vocals using settings that he likes for male voices. At the end of the first session, Ken and Ballody coached Fanta Djeli Diabaté's backup vocals. Finally, Ken completed the editing of what they had recorded without opening any VST plugin or mix window.



Figure 10. General Ballody writing in the studio

The second session (210 minutes) consisted only of postproduction. It started with Ken improving the arrangement, primarily by muting samples to create variations and also through subtle changes in the MIDI programming and choice of virtual instruments. Thirty minutes later, he balanced some levels in the mix window for about three minutes, alternating these level adjustments with changes in the editing and MIDI programming. Then, he kept revisiting his arrangement and adding new parts until 120 minutes into the session when he opened the mix window again for another three minutes before going back to his increasingly detailed editing.

Past 180 minutes of the second session, Ken tweaked the group of vocals by adjusting the *RVerb*, delays, and *API 500* EQ with the *Voice preset* that he would adjust manually later in the mixing process. He also added the *Cubase* built-in EQ to cut the low-end, boost 2dB at 3kHz and 4dB above 15kHz. He then worked on the reggae rhythmic base to which he applied the *Cubase* built-in multiband compressor with the *Picked Acoustic Guitar 2 preset*. For the rest of the mixing process, he used this preset as well as other presets from the same plugin on most tracks. However, he adjusted it manually for two parts of

keys, the snare and the toms. For the bass, he experimented with different presets of the built-in EQ and compressor. A bit later, he tried different presets of the *L316 Maximizer* on the Master group. Then, he tuned some parts of the vocals with *Antares* and kept revisiting the editing and arrangement, which he had not stopped doing while working with VST plugins. Finally, he used the *L3LL Ultramaximizer* to master the track in stereo in *Cubase*. Ballody was present throughout the entire postproduction process, dancing and giving feedback on the progress.

5 Discussion

Our observations show that young Malian arrangers create their tracks progressively by layering instruments and vocals, and that they keep revisiting their arrangement throughout the entire production process, until a very quick mastering. Their *mixing* practice is entangled with the writing, layering, and producing components of the track, which suggests that they focus more on the creative and musical aspects than they do on the balance and sonic aspects. Their fast, detailed and musical editing techniques allow them to achieve results within a few hours that sound fairly close to international standards. This is impressive given the fact that none of them have received formal training in audio engineering yet. Besides Junior who studied directly with a renowned sound engineer named Eliézer Oubda, these arrangers have mainly learned from observing the recording sessions of their peers, and from watching YouTube tutorials – it should be noted that they do not watch these tutorials in their native language, which means that they learn primarily by imitating DAW gestures from the tutorials. Although they have not assisted many experts before opening their own studio, their approach to learning *by observing and copying* gestures is comparable with the apprenticeship model of the analog era, which is interesting when digital audio is taught in a huge number of formal music technology programs around the world today [7].

Our session analyses reveal some limitations in these arrangers' acoustic and technical knowledge. For instance, they seem confined to the plugin factory *presets* or extreme settings when EQing and compressing vocals or instruments. We suggest that they do not enjoy the same freedom with signal processing as they do with MIDI programming and

editing. Also, some of them told us that they wished more Malian instruments would be available as samples in their *plugins*. For instance, they often use *marimba* samples to emulate *balafons*. Backozzy sampled a sound effect once, but none of them have sampled Malian acoustic instruments yet. These observations indicate the current limitations of the globalization of digital audio technology. While the arrangers we interviewed think that their outdated licenses and lack of expensive hardware prevent them from achieving the same production levels as their Western counterparts, we know that their DAW setups have a similar potential in terms of sound quality and digital creativity than most DAW-based studios elsewhere. However, the economic gap shows in terms of the near absence of technical education and a low level of general education in Mali, both playing an important role in enabling greater freedom in manipulating digital tools.

The lack of local knowledge in signal processing may explain why albums of internationally renowned Malian musicians are mixed and mastered abroad. Besides creating a humiliating situation for Malian studio practitioners, the internationalization of the mixing stage impacts the music's authenticity. For instance, Junior told us that adding reverberation on certain recordings of the traditional instrument *n'goni* could be perceived as a lack of respect for a specific spiritual music practice. However, this kind of cultural misunderstanding keeps happening as foreign mixing engineers are not aware of the meanings and traditions of Malian music practices. This example illustrates the paradox of a rich and diversified local music culture and an emergent digital studio culture that is not yet in line with the globalized but still foreign and primarily Western recording industry.

The paradox detailed above has most likely generated the advanced editing techniques that we observed in Bamako studios, with arrangers making the DAW their own to create modern Malian music. These techniques accompany their approaches to artistic direction. While detailed arrangement practices have been identified in other places, e.g. in Istanbul [3], it should be noted the young Malian arrangers we observed also manage their studios, produce and engineer their recording sessions entirely. They have

proven to be efficient as artistic directors and performance coaches. According to the model of producer's artistic involvement during recording sessions that was designed for a great variety of musical genres in Canada, France and USA [6], the level of young Malian arrangers' involvement varies from the "Direction" level that follows the client's vision to the "Artistic collaboration" level for which the client's and the producer's visions become one. These levels correspond to the highest two levels of producer's involvement, which makes the young Malian arrangers' business model close to that of the record producers' in the analog era.

In Bamako's digital studios, phones keep ringing with new clients' calls, and we saw that many performers pass by, wait inside or outside the studios, sometimes until late at night, which attest for the arrangers' local notoriety. These findings provide us with a fresh vision for the digital recording industry. The business success of Malian arrangers suggests that focusing on musical matters through a collaborative process may increase the value attributed to studio work by musician clients.

6 Conclusion and future research

This research contributes to new knowledge about recording studio practices of a young and growing community of DAW practitioners' outside of privileged areas. Our findings show that strong editing and artistic direction skills can bring studio owners to succeed, despite their limited resources and their near absence of technical education. We will enhance our first findings by analysing more sessions from Bamako studios. To address the near absence of specialized education that we identified during our fieldwork, we will conduct observations of the learning process of Ken Lagare when attending the Audio Recording Engineer Practicum at the Banff Centre in Alberta, Canada. Subsequently, we want to follow his practice and role as educator once he is back home. In a near future, we also aim to work further with Eliézer Oubda, who is playing a crucial role in developing audio engineering education in West Africa (but not in Bamako anymore). This work calls for further investigations of studio practices and access to audio education in the Global South in order to expand the perspectives on the 21st digital recording studio.

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References

- [1] R.T. Skinner, *Bamako Sounds: The Afropolitan Ethics of Malian Music*, University of Minnesota Press (2015).
- [2] E. Olivier, "Contraintes et débrouilles. Une enquête sur la musique numérique à Bamako (Mali)", in P. Le Guern (ed.), *En quête de musique. Questions de méthode à l'ère de la numérimorphose*, pp. 275—303, Hermann (2017).
- [3] E. Bates, *Digital Tradition: Arrangement and Labor in Istanbul's Recording Studio Culture*, Oxford University Press (2016).
- [4] A. P. Bell, *Dawn of the DAW: The Studio as Musical Instrument*, Oxford University Press (2018).
- [5] E. Bates, "Technological Encounters in the Interculturality of Istanbul's Recording Studios", *El Oïdo Pensante* vol. 7, no. 1, pp. 145—171 (2019).
- [6] A. Pras, C. Cance, & C. Guastavino, "Record producers' best practices for artistic direction—from light coaching to deeper collaboration with musicians", *Journal of New Music Research*, vol. 42, no. 4, pp. 381—395 (2013).
- [7] A. Pras, C. Guastavino, & M. Lavoie, "The impact of technological advances on recording studio practices", *Journal of the American Society for Information Science and Technology*, vol. 64, no. 3, pp. 612—626 (2013).
- [8] E. Olivier, "Le droit d'auteur en question. Analyse d'une situation malienne", in E. Olivier, & S. Andrieu (eds.), *Création artistique et imaginaires de la globalisation*, Paris, Hermann, pp. 227—252 (2017).