NOKIA

Need for richer features in addition to affordability in entry mobile devices

Jussi Impio, Lucy Macharia, Mokeira Masita-Mwangi, Moses Sitati, Pauline Githinji
Nokia Research Africa (NoRA), Nokia International OY – Kenya, P.O. Box 29,
00502 karen, Nairobi, Kenya. Tel: +254 20 386 2243
Email: [jussi.impio, lucy.macharia, mokeira.masita-mwangi, moses.sitati,
pauline.githinji]@nokia.com

This paper is based on recent studies on informal music industry in Africa conducted at Huruma in Nairobi, Kenya. The studies focused on informal music creation and distribution in informal settlements and the role of mobile phones. Use of mobile phones, features, artist's needs in music creation and distribution, collaborative efforts and support and challenges of mobile phone use were considered. Internet services and penetration of mobile phones in developing states are growing, while social media are emerging as development tools. Music is multimedia in content, delivery and experience too. Certain requirements are necessary to support the distribution and presentation of multimedia content. According to the study, quality, marketing locally and across borders, overcoming geographic and timing differences for collaborative work, and making a living came out strongly. Use of internet services and social media was stalled by skill level and access. The willingness to go on the internet by artists was expressed. The findings suggest that basic feature demands on mobile phones are changing. More is demanded of the device, packet data service and skill acquisition process for sufficient support. Furthermore, there is need for congruence in service and device advancement and contextual feature bundles may advance affordability while still enabling the device to meet existing needs.

1. INTRODUCTION

Population estimates indicate that in 2007, the world's urban population equaled the world's rural population[1]. Developing countries, in particular, are experiencing very high urbanization rates with Africa as the most rapidly urbanizing region. Unfortunately, poverty in these urban areas is rampat and in Africa a population of 72% of the dwellers lives in slums[2].

UN-HABITAT (2003) defines a slum household as a group of individuals living under the same roof lacking one or more of: access to improved water, access to improved sanitation facilities, sufficient living area, structural quality or durability of dwellings, security of tenure. UN-HABITAT also observes trends in Africa indicating that a majority of the young people in the urban informal sector live in slum areas. In Benin, for instance, slum dwellers comprise 75% of informal sector workers, while in Burkina Faso, the Central African Republic, Chad and Ethiopia make up a staggering 90% of the informal labor force. In addition, these youth are more likely to have a child, be married or to head a household than their counterparts in non-slum areas. Across the globe, the comparative definition of 'youth' varies but generally covers young people up to the age of 35years.

---

[1] WB, 2008

[2] UN-HABITAT, 2006

NOKIA

Taking Kenya as an example, the population is estimated at 35 million persons[3] with 75% of these being below 30 years, 38% of the population as the youth aged 15 to 35 years and 76% of the youth as unemployed. Over 60% of the urban population in Kenya lives in slums[2]. Nairobi, the capital of Kenya, has a population estimate of 2.5 - 3Million, meaning 1.5 - 1.8 Million slum dwellers.

1.1 Music in Africa

Music is an integral part of African life, society and communication. The music industry in Africa is largely informal with production being largely independent, informal, small scale and domestically oriented (except for South Africa). African musicians enjoying international sales are a small fraction of the number of musicians in Africa and most of these artistes have had their recordings outside Africa. NoRA has presented a paper to the 1st International Conference on M4D, 11-12 December 2008, Karlstad University, Sweden that goes into in-depth findings on music in urban informal settlements in Africa[4].

1.2 Problem statement

This paper looks at the music creation and distribution needs of the young upcoming artists in one of Kenya's slums, Huruma. The creation and distribution needs of the artist are examined with respect to the community and an attempt is made to meet the social networking and content sharing needs over the mobile device. Findings indicate that purchasing power and the slum environment may impact on the choice of technology while need realization may influence the decision to spend extra for more income.

2. MUSIC FOR LIFE

To reiterate the findings of the music study done by NoRA and the paper presented[4], music is indeed a way of life in Africa and African slums and may present innovative sources of livelihood not only for the musically oriented but also for the economically marginalized youth of Africa. The following diagram presents a summary of the findings of that paper.

---

[3] KNBS, 2008

[4] Exploiting Mobile Technology in the African urban Low-Income Informal Music Industry, Proceedings of M4D 2008, Karlstad University, Sweden
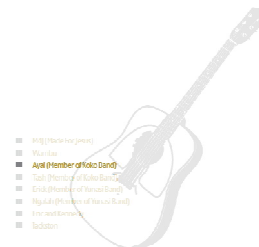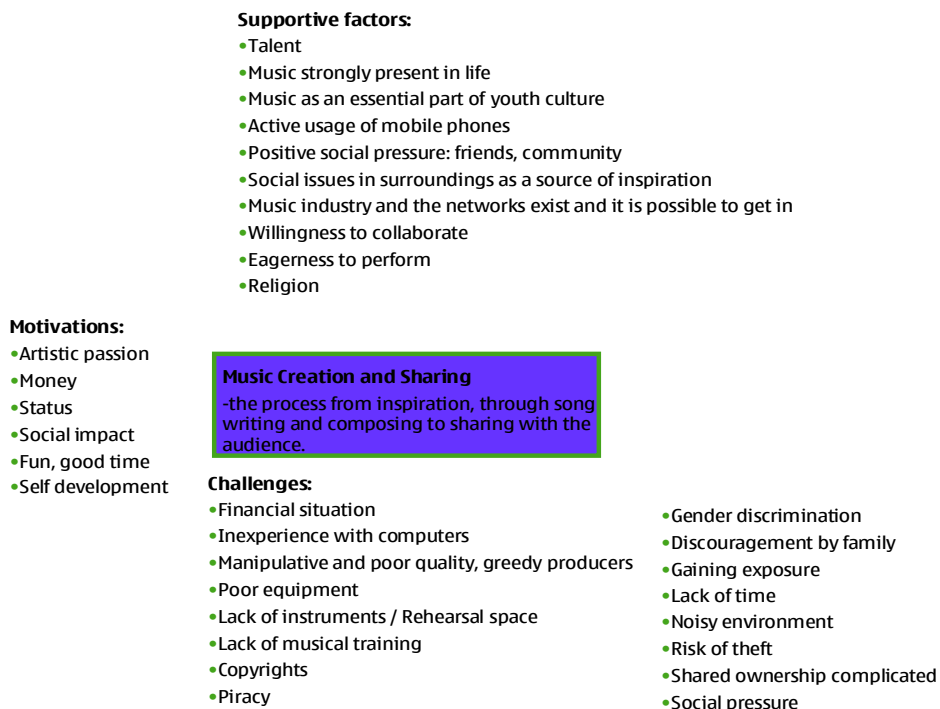
NOKIA

Fig 1: Summary of the Music Study carried out in Huruma

Supportive factors:
- Talent
- Music strongly present in life
- Music as an essential part of youth culture
- Active usage of mobile phones
- Positive social pressure: friends, community
- Social issues in surroundings as a source of inspiration
- Music industry and the networks exist and it is possible to get in
- Willingness to collaborate
- Eagerness to perform
- Religion

Motivations:
- Artistic passion
- Money
- Status
- Social impact
- Fun, good time
- Self development

Music Creation and Sharing
-the process from inspiration, through song writing and composing to sharing with the audience.

Challenges:
- Financial situation
- Inexperience with computers
- Manipulative and poor quality, greedy producers
- Poor equipment
- Lack of instruments / Rehearsal space
- Lack of musical training
- Copyrights
- Piracy
- Gender discrimination
- Discouragement by family
- Gaining exposure
- Lack of time
- Noisy environment
- Risk of theft
- Shared ownership complicated
- Social pressure

Source: NoRA interviews with young musician artists in Huruma, Nairobi

From the in-depth studies of upcoming musicians in Huruma slums (Nairobi, Kenya), monthly income earned from music ranged from €50 to €600, while monthly expenditure was €95 to €410. This was largely income from live performances at concerts, clubs and shows. The average monthly income of other slum dwellers was found to be about €50 to €70.

2.1 Sample Musician Profile: Ayal

Fig 2: Profile of Musician Samuel Juma, Ayal

Musician Profile - Ayal	
Official name	Samuel Juma
Stage name	Ayal (Member of Koko Band)
Age	28 years
Education level	College (Music Student)
Marital status	Single
Current line of work	Musician
Music History	High School – sang in various choirs, Picked to join National Mass Choir
Genre	Afro-Fusion, African or Afro Jazz
Level in industry	Member of upcoming band
Number of gigs per month	4
Songs produced	None

Samuel Juma, aka Ayal started making his own music in 1999 and later formed Koko band with his friends in 2006. KOKO is a Luo (a local Kenyan dialect) word meaning "Noise". Ayal has sung in a number of choirs since high school. It is through Koko band that he now makes music for a living. The members of Koko band have loved music from a tender age and over the years they have devoted time towards acquiring instruments and developing their playing and dancing skills. Ayal says that Koko thrives on the skills that the individual group members posses.

Table 1: Koko band Members and their roles

Member	Roles & skills
Tash Oduor	The Band Leader; a vocalist, plays Orutu, Calabash, Soft Percussions. Also a songwriter and arranger and together with George and Ayal, take charge as the lead vocalists in the group.
Sam Ayal	Rhythm guitarist, a songwriter and arranger, he plays soft percussions and is also a vocalist
Kamaich	A dancer, choreographer, soft percussionist who plays the Djembe and Calabash, he is also a vocalist
George osiro	Solo guitarist, Flutist and a Nyatiti player, also into song writing and arranging as well as vocals.
Jagas Aguoga	Plays Nyatiti, Piano, soft percussions, he is a dancer and a choreographer and a vocalist too

Source: NoRA interviews with young musician artistes in Huruma, Nairobi

### 2.1.1 Ayal's Income and Expenditure

Ayal's main source of income is from live performances by the band. Earnings are divided equally amongst the band members. This he says however is not a regular source of income since the band is still quite young and hence does not have consistent shows that they can count on; sometimes they have a lot and sometimes there is nothing. His other ways of making money are teaching music and doing odd jobs such as painting or other simple interior design jobs and repairs. None of these two sources of income are regular. For the music lessons, Ayal says that his students are not consistent because they are also from very poor backgrounds and are at times unable to raise the fees. Those who stay on may eventually be unable to pay and he ends up teaching them for free. The odd jobs are also classified under irregular income simply because Ayal is not really interested in this line of work. He only falls back to this when music has failed to pay and times are really hard otherwise he would not opt to do this.

Ayal estimates his monthly income as follows. Assuming the band is able to do 4 live performances in a month, each performance paying between EUR 200 to 250 then they are able to earn between EUR 800 and 1000 as a band. What however comes to him is much lower than that because they first save 10% of this amount for servicing the band e.g. paying for any band overheads, repair of instruments, etc. Next they allocate 20% to pay band extras as in many instances they hire some individual artistes to play with

them, and then the remaining 70% is split amongst the 6 band members. Ayal therefore ends up making approximately EUR 93 to 116 per month from the live performances of the band.   From music teaching he approximates EUR 6 per month assuming 3 students each coming twice a week at EUR 1 per lesson. This however is not included in total income earned per month since this year he has not had any students. From the odd jobs, assuming 2 odd jobs in a month which bring in between EUR 150 to EUR 200, Ayal can get EUR 60 to 80 since they normally do these odd jobs as a group and split the earnings equally. Note that most of the Koko band members have skills that are inclined towards interior design, renovation and repairs. Ayal's total monthly income therefore ranges from EUR 153 to 196. The chart below shows Ayal's monthly income based on his highest possible income.

Fig 3: Sources of Income - Ayal

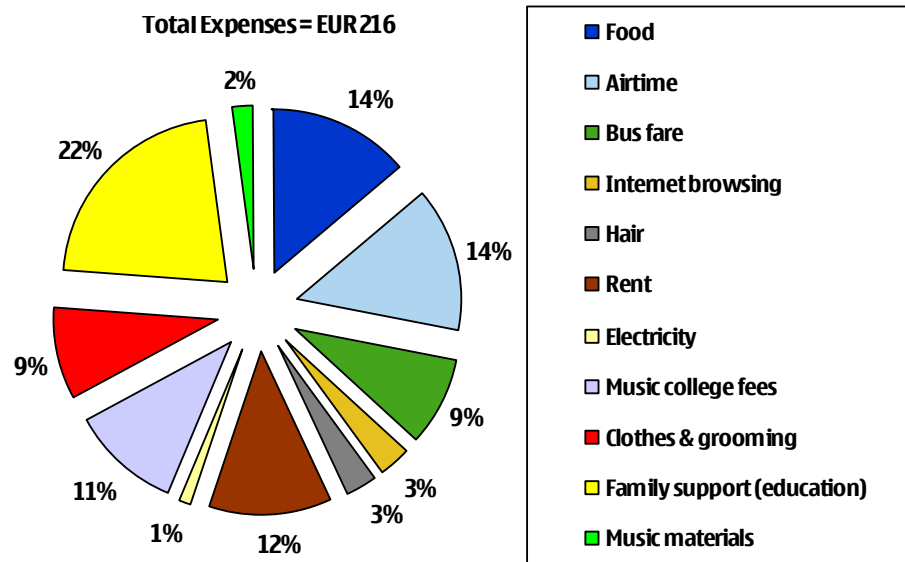**Total Income = EUR 196**

Live performances
Odd jobs
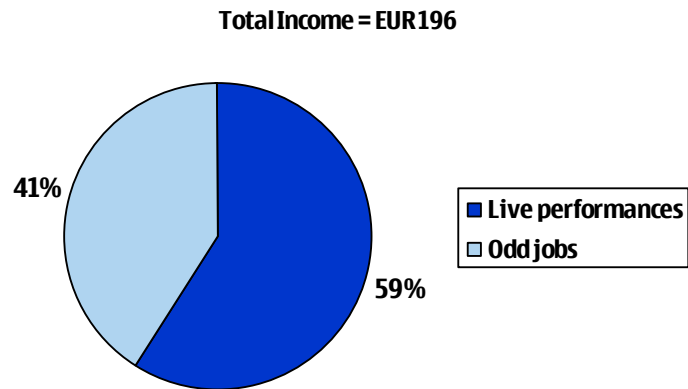
Source: NoRA interviews with young musician artists in Huruma, Nairobi

In terms of expenditure, Ayal's main expenditure items in order of priority and with corresponding amounts are: Food (EUR 30) Hair (EUR 6), Rent (EUR 25), Electricity (EUR 2) clothes and personal grooming (EUR 20) and support to family for siblings' education (EUR 48) at number one, then followed by credit i.e. airtime for his phone (EUR 30), transport (EUR 20) and Internet Browsing (EUR 60) all at number 2, then College fees for himself (student at Kenya Music Conservatoire) (EUR 24) at number 3 then finally Music materials such as books, new strings for his guitar, etc at number 4 (EUR 5). His minimum total expenses (EUR 216) are higher than his highest possible income hence prioritization must take place and sometimes not all needs are catered for. Support to family ranks high as Ayal says that his father has no stable job and his mother makes at most EUR 3 per day selling cabbages yet he has four siblings all of whom are still in school.

NOKIA

Fig 4: Expense Items – Ayal

Total Expenses = EUR 216

Legend:
- Food
- Airtime
- Bus fare
- Internet browsing
- Hair
- Rent
- Electricity
- Music college fees
- Clothes & grooming
- Family support (education)
- Music materials

Source: NoRA interviews with young musician artists in Huruma, Nairobi

Currently Ayal says that he makes an effort to save some money although this is not a regular and specific amount. The most he has ever had in savings at any one point in time is EUR 150 and the least is EUR 5. If he had more disposable income, he would purchase more musical instruments (currently owns an acoustic guitar). He would also like to invest in permanent assets such as buying or building his own home, open his own music studio and school of music which will offer reasonable or subsidized rates for people from the low income community who cannot afford what is currently being offered in the market.

3. MUSIC CREATION & DISTRIBUTION

Besides entertainment, education, personal expression and status in the community music-making is an increasingly popular means of livelihood. During the study, a number of young upcoming artistes were interviewed. Questions concerning their music creation process, collaborative efforts, community involvement, internet use, mobile phone use, distribution channels and the challenges faced in the entire process were considered.

3.1 Ayal's Music

Ayal defines his music as Afro-fusion or African or Afro-Jazz. His band, KOKO mostly plays a blend of Afro beats and Western music 'Afro Fusion', Jazz Music and a blend of Kenyan Benga rhythm, with some modern harmony in Luo, Swahili, 'Sheng' (a form of slang), English, Maasai and Kikuyu, mixing various

Kenyan indigenous dialects to pass the message across Kenya, East African communities and the world at large. Koko incorporates youth issues, language, and dance style as a way of conserving African culture. They also acknowledge that arranged noise has been used positively to champion the rights of people and to be a voice for the voiceless. He and his band make music that targets everyone and is based on social issues e.g. rape, corruption. He perceives the role of his music as educative against social ills in the community to show the community how to live better. Ayal reports an increased interest in the type of positive or 'good' music that he and his band produce from the community and in the media. He feels that this is due to an increased appreciation for meaningful music that has a message. An advantage that their group has is the ability of group members to play multiple instruments as well as sing and this enables them to step in and play each other's designated roles as and when the need arises.

Ayal also enjoys playing with other professional musicians due to the feedback and self-improvement tips that he can get from them. He feels that the community fully influences the kind of music that the group creates given that the group is part and parcel of the community but, he also feels that their music influences the community in return.
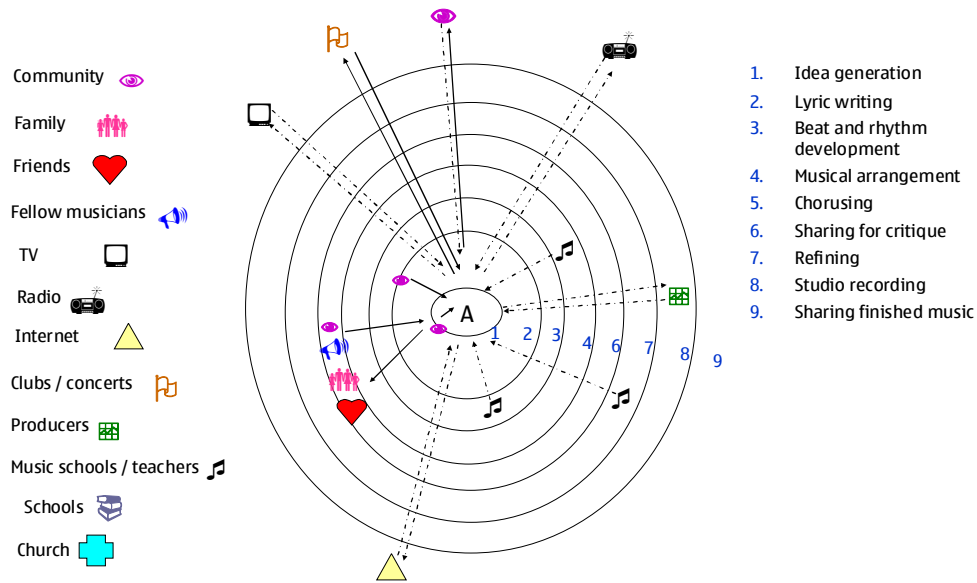
3.2 Players

Different levels of musicians emerged. These included hobbyists, upcoming artistes, event performers and established musicians. The community played different roles. There were the peers or inner circle of friends of the artist, local producers, DJs and club owners, local radio stations, mainstream media houses, event organizers, social institutions, matutus (local mini buses), CD vendors and the general audience. The church presented opportune breeding grounds, providing equipment, rehearsal space and an audience. Music content served more than entertainment with social issues and trends influencing the content and preferred genre at times. . For instance, there is gospel hip hop as hip hop is popular with the slum audience. One artist states that they make music on social issues like rape, corruption and many others and that through their music they hope to show the community how to live better. In addition, the artistes nurture each other; they help other new young upcoming artistes to start off and the latter express the willingness to do the same for others.

3.2.1 Ayal's Music Sharing

Below is a sociogram that shows circles of influence and interaction.

Fig. 5: Circles of influence and interaction in music creation – Ayal

Community 👁
Family 👪
Friends ❤
Fellow musicians 🔊
TV 📺
Radio 📻
Internet 🔺
Clubs / concerts 🏳
Producers ▦
Music schools / teachers 🎵
Schools 📚
Church ✚

1. Idea generation
2. Lyric writing
3. Beat and rhythm development
4. Musical arrangement
5. Chorusing
6. Sharing for critique
7. Refining
8. Studio recording
9. Sharing finished music

Source: NoRA interviews with young musician artists in Huruma, Nairobi

The diagram above shows the different players or individuals involved in Ayal's music creation process from idea generation up until he shares his finished music. The circles from the middle going out represent the various steps in the music creation process and within each circle the symbols that stand for the various influences at that stage have been indicated. (See key on left hand side).
According to Ayal, the main way in which Koko generates its ideas for music is from the issues in the surrounding community and they seek to address these issues through their music. The lyric writing is also very much based from community issues and influences. Beat and rhythm development is done by the band members together as a group as they all have expertise in playing various instruments. The indirect influence here (broken line) is thus of music schools / teachers since some of them are enrolled in professional music schools. Ayal says that any given band member can come up with a beat or rhythm and then ask the other band members what they can add to it and as they play along they are able to develop the beat and rhythm. They then arrange the music again without any external influences save for the indirect one from music schools and teachers that have enhanced their expertise. They then share with family, friends, fellow musicians and the community at large for critique before they finalize and share. Step 8 is not yet a reality for them but they envisage that they would need the input of a producer if they were to record their music.

Sharing channels for Koko include Internet, Radio and TV, and live performances at concerts as well as at various community forums with the latter (live performances) being the main one and out of which they mostly get paid. Radio and TV is limited as signified by the broken lines since they do not have recorded

music and any features thus have been through media coverage of live events which have then made it to the mass media. Similarly despite having made the effort to use the internet for sharing and marketing purposes, Koko is limited as the group has only one short audio clip and a video recording of a live performance which has not done much to really sell their music. Sites that they have made use of are MySpace as well as Sellaband. http://www.sellaband.com/kokoband/

3.3 Creation process

The creation process involved an iterative process and often the different processes were not done in isolation. Considered processes were idea generation, lyrics writing, beat and rhythm development, musical arrangement, chorusing, sharing for critique, refining and studio recording. Players considered in the creation process were immediate community on one hand and professionals on the other hand. The table below shows the level of involvement of each player in each process.

Table 2: Involvement of community Vs professionals in the creation process

Process	% Community Involvement	% Professional Involvement
Idea generation	100	0
Lyrics writing	71	29
Beats & rhythm generation	57	43
Musical arrangement	43	57
Sharing for critique	100	0
Refining	57	47
Studio recording	0	100
Number of artists	*8*	

Source: NoRA interviews with young musician artists in Huruma, Nairobi

With the exception of mobile devices, the majority have limited access to electronic devices. However, even with that the artistes demonstrated an effort and creativity in using them. For instance, the SMS editor was used to write lyrics and save them as drafts and the audio recorder to record oneself during audio practice. India also presents an interesting case where taxi drivers have taken to using memory cards to share videos and watch them on their mobile phones during slow hours. Inspiration for the artist came from anywhere and anything around the artiste and was often impromptu necessitating a means of recording the inspiration for later review and working. There was a willingness to spend as high as €400-500 on a mobile device that would mean better music returns.
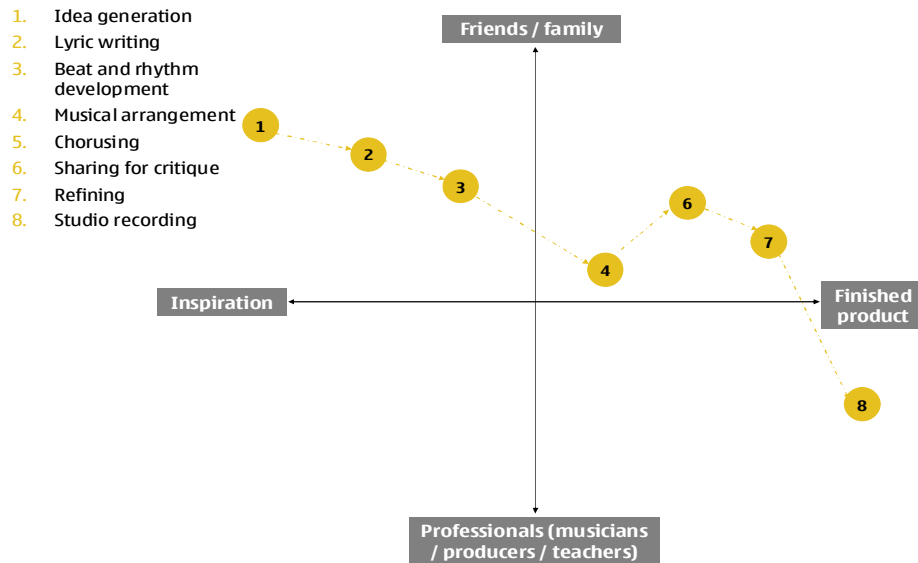
3.3.1 Ayal's Music Creation Process

The diagram below shows Ayal's music creation process from inspiration to the finished product. The specific steps he takes when creating music are not done in isolation hence there is usually the

involvement of family or friends on one hand and professionals such as other musicians and producers on the other hand. Different steps therefore fall into different quadrants of the diagram depending on which persons have more influence at that stage.

Fig 6: Music Creation Process – Ayal

1. Idea generation
2. Lyric writing
3. Beat and rhythm development
4. Musical arrangement
5. Chorusing
6. Sharing for critique
7. Refining
8. Studio recording

Friends / family

Inspiration

Finished product

Professionals (musicians / producers / teachers)

Source: NoRA interviews with young musician artists in Huruma, Nairobi

So far Koko band has not recorded their music hence step 8 is not yet a reality for them. This is due to financial constraints and also their inability to find a producer who really understands their music and their purpose and hence can really add value to the production of it. They however estimate that it would cost them about EUR 120 to record a single track.

The most expensive instrument owned by the group so far is an acoustic guitar which Ayal saved for and bought over a period of two years. Other instruments have been bought through contributions from the group.

Given the chance, Ayal would spend extra on a mobile music studio to avoid the exorbitant fees charged by producers. He says he would offer free production services to younger aspiring musicians in the community. He estimates that such a mobile phone with all the features required for music creation, it would cost more than the most expensive phone on the market given that it would be a stand-alone studio.

3.3.2 Ayal's Mobile Phone Use

Ayal has a Nokia 1100 mobile phone which he mostly uses for making and receiving calls, text messaging, and composing tunes. The composer feature is one that he likes and uses frequently as it helps him to
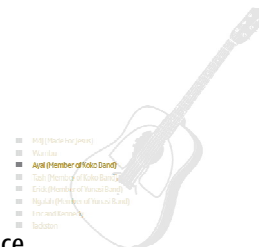
record music ideas. A phone that he would like to have in future is similar to a palmtop that he once borrowed from a friend. This phone enabled him to record his voice and play it on a PC and later add on other parts. He would like a phone that would enable him do this. In terms of learning how to use mobile phones, he taught himself to use his current phone by reading and following the instructions on the manual. He however also says that he learns how to use mobile phones from others (who also learnt from others). He recommends or prefers a phone with an internal tutorial or manual which the user can use for self instruction.

3.4 Recording and Production

Of the respondents, a young gospel artist expressed the support he was receiving from the producer since he had been nurtured by another already growing artiste. Another artiste, female, stated that there were few females in the production business and for her another challenge was gender bias and demand for sexual favors from producers. It was expressed that having the right contacts was advantageous in the recording and production process. It also emerged that producers had a great influence on the final recording through the editing process and the creativity of artists was often not realized. More musicians would record their music if they had the tools, the ability and/or resources to do so. Recordings were however found to be wanting in quality. It was found that established producers were few in number while bedroom producers were more.

Table 3: Estimated size of informal music industry - Kenya

	Established Producer	Middle Producer	"Bedroom" Producer
Approx. Number in Nairobi	10	150	500
No. of Artists Handled	> 10	4-10	< 3
Sample CDs Received Per Week	40-50	10-20	4-6
Major Genre	Mainstream: (Kapuka, Genge)	Alternative: (Afrofusion, Gospel)	Misc.
Staff No.:	>5	2-5	1
Estimated No. in other towns	3	50	150
Examples in Kenya	Calif Records, Ogopa Deejays, Samawati Productions	Kijiji Records, Ennovator Records, Jomino, Decimal Point, Ngalah	Anonymous

Source: NoRA Interviews with Key Informants, Nairobi

3.5 Distribution

Live performances at clubs, concerts, show and other social events are popular and artistes carry CDs of their music to share out after the performance. The artistes stated the need to share their audio CDs but preferred videos as the audience could also see who they were. CDs shared were at times given freely to

fans. The objective was to be known and make future sales. Other channels were matatus, DJs, club owners and local radio stations. Of the interviewed artists, few had used the internet to share and sell their music but they were aware of the possibilities. They stated the lack of know-how as a hindrance. One band, Koko band, has presence in Myspace and sellaband.com.

While mainstream media would present a wider audience, most of the recordings presented are of poor quality. Ghetto radio, a local radio station notes that it rejects about 100 CDs every 2 weeks due to poor quality of recording. The radio station also receives song requests through its facebook page. Mass media acts as the first point t of information for new music or new artistes. 63% of the respondents indicated that they learnt of new artistes from radio, TV or newspapers.

3.5.1 Piracy

Piracy is a pervasive problem and no African country has less than a 25% piracy level (in parts of W. Africa piracy is estimated up to 90%). (IIPI, 2006). In Kenya, piracy ranges from 90% for music cassettes and CDs to virtually 100% for video and DVD (IIPA, 2006). Local Kenyan music is pirated in Uganda and Tanzania and imported into Kenya for example between June 2002 and February 2003, Kenya's Customs & Excise department seized more than 100,000 music CDs coming into Nairobi and another 15,000 in Mombasa. During the same period, the industry reported legitimate sales of just 15,000 CDs. Thus, estimated annual trade losses = 13 Million US Dollars (IIPA, 2007). In Nigeria, piracy is so bad that local artists now refuse to release their latest albums and movies into the retail market (IIPA, 2008). There are a reported 15 optical disc plants in operation which have 70 production lines, capable of producing over 240 million discs per year. Reports from neighboring countries suggest that large quantities of pirate discs are being exported from these plants in Nigeria across the region. As Orrack Chabaagu, Director of EMI South Africa has observed, "It is unfortunate that after one has gone through thick and thin to produce his music, he does not live to enjoy its results because of piracy."[5]

Table 4: Nigeria Copyright Piracy Trade Losses

NIGERIA ESTIMATED TRADE LOSSES DUE TO COPYRIGHT PIRACY (IN MILLIONS OF U.S. DOLLARS) AND LEVELS OF PIRACY: 2003-2007[3]									
INDUSTRY	2007		2006		2005		2004		2003	
	Loss	Level	Loss	Level	Loss	Level	Loss	Level	Loss	Level
Records & Music	55.0	95%	52.0	95%	52.0	95%	50.0	99%	NA	NA

Source: International Intellectual Property Alliance, 2008[6]

---

[5] Nashville in Africa, International Policy network, 2008,
http://www.policynetwork.net/uploaded/pdf/0811%20IP%20Nashville%20in%20Africa.pdf

[6] 2008 Special 301 Report: Nigeria, http://www.iipa.com/pdf/IIPAAGOAfilingtoUSTRfinal102008.pdf

3.6 Challenges Ayal faces

The challenges cited by Ayal in making music include limited distribution of music leading to limited economic ability. The expectations placed on artists by family and friends are also high because of the perceived "high" status. Another challenge despite the development of the industry over the years is the low appreciation of music relative to other occupations as a profession. There is still therefore little social support for professional artists. Other challenges include bonding as a group; not knowing the individual talent level of band members, low skill level of members in playing the various instruments (mainly when they started out), and the group's internal power sharing. The problems outside his scope (in terms of solutions) include piracy. Also, the genre is Afro-fusion and the primary form of sharing is through local live performances and it is therefore difficult to reach the right audience.

4. DISCUSSION

From the findings, there is a relationship with the community by the artistes both in the creation and in the distribution process. Having the right contacts, getting input and critiques from the society, molding the content of a composition and the sharing of content emerge as social activities. Music is also an emotive and expressive art. Live performances, "matatu" culture and the use of videos in addition to audio CDs all demand a rich experience. "Matatu" is the local term for a minibus. Mass media is the distribution channel and demands quality and a rich user experiences.

4.1 The Slum Environment

Slum characteristics present an interesting perspective in formulating a solution. In Nairobi, slums are characterized by high population densities, haphazard physical layouts, horizontal rather than vertical expansion of structures, little or non-existent amenities and services (like road, electricity, water, sanitation, health, privacy), temporary structures (metal, wood, paper), room-to-room letting basis with a household per room, low or very low incomes, disease, health hazards, insecurity and semi-legal right of occupation. Interesting also is the very small granularity of locality in the slums. A locality may be as small as a few blocks in a section of the slum and as such an upcoming artist may only been known in that small physical location. The income of the dwellers is low and irregular and their assets and lifestyles suggest a need for mobility.

4.2 Resources on the Ground

There is very little or no infrastructure on the ground in the slums and the physical layout makes it difficult to erect. Additionally, mobile devices owned are low cost entry level devices. Dwellers also posses fakes and china devices which are considered to be cheap and yet with more interesting features.

Fig 7: Devices owned by respondents in the music study and in a related focus group

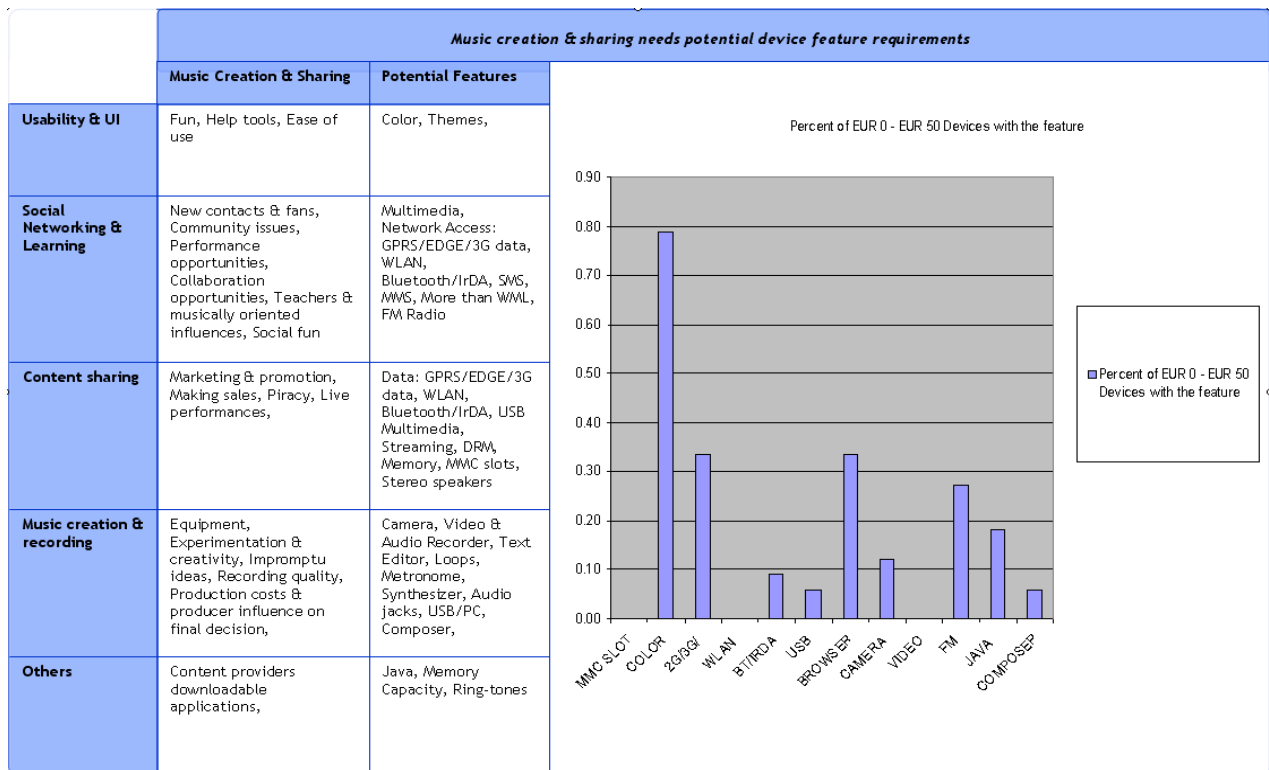|			
Nokia 2300	Nokia 1110i	Nokia 5610	
Nokia 1500	N95 fake	Motorola W205	China Nokia
Nokia 1100	Motorola C113	Nokia 1200	Nokia 1800
Nokia 1110	Nokia 3550	Nokia 6070	

4.3 Connectivity and content sharing

From a connectivity and multimedia content needs perspective, one of the challenges is keeping data traffic costs as minimal as possible while still presenting a rich user experience to further encourage returns for the young artistes to achieve their dreams. In addition, the physical set-up of slums suggests a huge market in a small closely packed community with no networking infrastructure but close enough proximity for low power, short radius direct connectivity. In Nairobi, for instance, the Adopt-A-Light project has erected towering flood lights and street lights to light up the streets, slums and estates of Nairobi. The tall posts for theses lights may present an opportunity to put up wireless access points in the slums.
Furthermore, there is a willingness to spend extra on a mobile device if it will translate to increased income and better lifestyles. It would be appealing to have mobile devices that may play the role of computer servers and gateways for other devices in proximity.

The table below lists the expressed music creation and distribution needs and potential desirable features to address these needs. The chart shows the percentage of devices with possible support for the mentioned features. A list of 33 devices from different manufacturers, with a price tag of below EUR 50[7] was assessed. These included Nokia, Motorola, Sony Ericcson, LG and Samsung.

Fig 8: A look at the potential desirable device features to address the music creation and sharing needs

	Music creation & sharing needs potential device feature requirements		
	Music Creation & Sharing	**Potential Features**	
Usability & UI	Fun, Help tools, Ease of use	Color, Themes,	
Social Networking & Learning	New contacts & fans, Community issues, Performance opportunities, Collaboration opportunities, Teachers & musically oriented influences, Social fun	Multimedia, Network Access: GPRS/EDGE/3G data, WLAN, Bluetooth/IrDA, SMS, MMS, More than WML, FM Radio	
Content sharing	Marketing & promotion, Making sales, Piracy, Live performances,	Data: GPRS/EDGE/3G data, WLAN, Bluetooth/IrDA, USB Multimedia, Streaming, DRM, Memory, MMC slots, Stereo speakers	
Music creation & recording	Equipment, Experimentation & creativity, Impromptu ideas, Recording quality, Production costs & producer influence on final decision,	Camera, Video & Audio Recorder, Text Editor, Loops, Metronome, Synthesizer, Audio jacks, USB/PC, Composer,	
Others	Content providers downloadable applications,	Java, Memory Capacity, Ring-tones	

Percent of EUR 0 - EUR 50 Devices with the feature

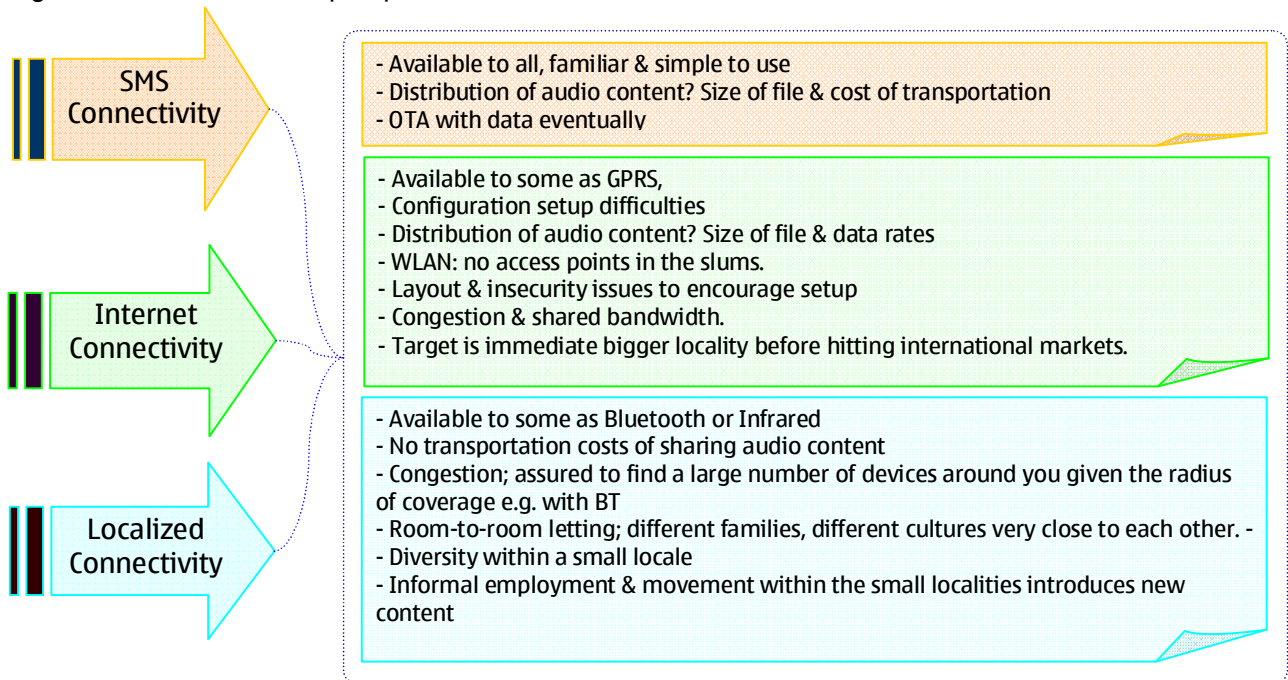
[7] www.gsmarena.com for device list

From the chart, there was no support for memory card slots, WLAN and Video. Colored screens had 65K color and browsers were 36% WAP 2.0/xHTML and 67% WAP 1.2.1. Total internal memory ranged from as little as 64K to 8MB. JAVA support was for MIDP 2.0 profile, while of the devices with Bluetooth or infrared 33% had Bluetooth and the remaining 67% supported infra-red.

For the Nokia 1XXX devices in the chart in Fig 7, screens were monochromatic; there was no support for Java or any camera or video. 50% of these devices had 65K colored screens while 16.7% had an FM radio. There was no data support in any of the devices save for SMS.

The next figure looks at the options for addressing connectivity.

Fig 9: Content distribution perspective

SMS Connectivity
- Available to all, familiar & simple to use
- Distribution of audio content? Size of file & cost of transportation
- OTA with data eventually

Internet Connectivity
- Available to some as GPRS,
- Configuration setup difficulties
- Distribution of audio content? Size of file & data rates
- WLAN: no access points in the slums.
- Layout & insecurity issues to encourage setup
- Congestion & shared bandwidth.
- Target is immediate bigger locality before hitting international markets.

Localized Connectivity
- Available to some as Bluetooth or Infrared
- No transportation costs of sharing audio content
- Congestion; assured to find a large number of devices around you given the radius of coverage e.g. with BT
- Room-to-room letting; different families, different cultures very close to each other. -
- Diversity within a small locale
- Informal employment & movement within the small localities introduces new content

5. CONCLUSION

The income level in the slum is low and as such low-end devices, which are affordable, are favored. In addition, there is low ICT and Mobile literacy thus hindering the use of ICT and Mobile services. There is also little ownership of assets in the slums and access to other electronic devices like computers and studio recording equipment for the artistes is even more difficult. Piracy is also a real issue and reduces the motivation to record.

An opportunity exists to provide a solution to the artistes through the mobile device. This is because the mobile devices are already on the ground and in numbers. Furthermore, the mobile device is a more affordable electronic device as opposed to the other electronic equipment the artist needs. However, systems for securing the musician's copyrights need to be developed and to fit the needs of the musician who lives in the slum.