

Research Article

Uses of Mobile Phones in Post-Conflict Liberia

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Abstract

Liberia is a country emerging from years of protracted and devastating civil conflict. Left without any fixed-line telephone infrastructure, it relies solely on the mobile phone for telephony. This study investigates the usage of mobile phones in this immediate post-conflict setting. In particular, we adopt the uses and gratifications approach to media research, giving focus to both instrumental and intrinsic motivations for use. We surveyed 85 mobile phone users in both the capital city of Monrovia and various rural areas, as well as interviewing experts from two major service providers and the industry regulator. Users were interviewed using the Q methodology, which identified distinct perspectives within these urban and rural groups. These identified perspectives included sets of users who saw their phones as productivity enhancers, means of connectivity to family and friends, essential business tools, technological curiosities, and sources of personal security. The idea of a phone as a stylish object was markedly rejected, especially in rural areas. Expert interviews confirmed and supplemented these findings. We contrast these results from Liberia with previous work from Kigali, Rwanda, finding differences especially as related to security.

Introduction

Considerable attention has been given to the role of information and communication technologies as tools for development within Africa, and increasing levels of excitement have concentrated on the use of mobile phones. With some fanfare, *The Economist* ("The Real Digital Divide," 2005) announced that the "real digital divide" was in terms of the differential access to mobile telephones, while computers and the Internet were of less use. Many writers have disagreed with their pessimistic assessment of computers and the Internet (e.g., Wilson, Best, & Kleine, 2005). Nonetheless, it is clear that mobile telephones are playing a substantial and important role in development within the Global South. Indeed, compelling evidence of the macro and microeconomic effect of mobile phones in low-income countries has been mounting (Best et al., 2007).

For instance, Waverman et al. (2005) find that mobile phones offer a significant macroeconomic growth dividend—one that is "twice as large in developing countries compared to developed countries." Microeconomic benefit is also evident. For instance, Jensen (2001) shows that mobile phone use by farmers in Southern India increases productivity,

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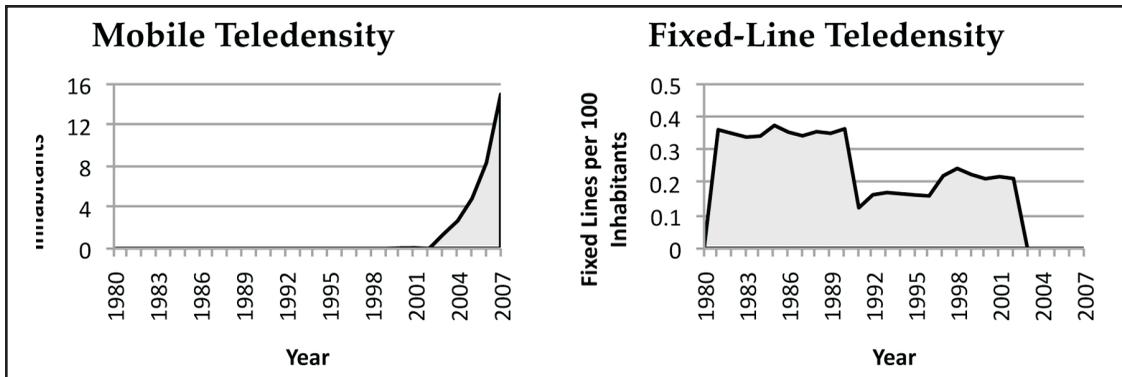


Figure 1. Fixed-line and mobile teledensity in Liberia from 1980–2007. Steep drops in fixed lines are evident in 1991 and 2003. Introduction of competing mobile carriers in the mid 2000s produced a soaring number of mobile subscribers. Note the difference in vertical scale between the two charts.

enhances revenues, reduces waste, and lowers consumer prices.

Mobile Phones in Africa

Mobile phone penetration growth rates are today highest in Africa, compared to all other continents (Gray, 2006). The ITU reports that the average year-on-year growth rate for mobile phone subscribers in Sub-Saharan Africa from 1999–2004 was double what it was in Europe. Indeed, Sub-Saharan Africa is a continent driven by mobile telephony, and in 2001, the total number of mobile subscribers exceeded the number of fixed line subscribers (ibid.). In 2004, the mobile teledensity across all of Africa was 9.1, with the vast majority, 87%, making use of prepaid cards. Considering only Sub-Saharan Africa, the mobile teledensity is best approximated at 6.2% (James & Versteeg, 2007). And while this number describes subscriber penetration, it does not give an adequate sense of overall access and usage, due to widespread sharing of phone subscriptions. Clearly, mobile telephony is the central communication technology for much of Sub-Saharan Africa.

Mobile Phones in Liberia

Liberia, established as a state in 1847 by freed African slaves from the United States, is situated on the Atlantic coast of West Africa, with Sierra Leone, Guinea, and Cote d'Ivoire as bordering countries. A relatively small country with approximately 3.3 million inhabitants, it is attempting to right itself after decades of civil conflict.

Unrest has been a staple within Liberia for more than 15 years, with two major civil wars (1989–1996 and 1999–2003) in this time period. These

years of conflict have seen nearly one-third of the population displaced, as well as having taken the lives of approximately 250,000 people. A peace was brokered and transitional government was established in 2003. A UN peacekeeping mission was positioned to keep this peace, and democratic elections were held in the fall of 2005. This resulted in the selection of Africa's first elected female head of state, President Ellen Johnson-Sirleaf.

One outcome of these years of civil conflict was the complete destruction of the fixed-line telephone infrastructure. The copper network was wholly destroyed or looted, and all but one switch was destroyed (Best et al., 2007). The steady decline in mainline penetration, starting from a very low level to begin with, is clear from Figure 1. The precipitous drops evident in 1991 and 2003 are the outcome of the two major civil wars, such that, by the time of the establishment of peace, all mainlines were gone.

On the other hand, mobile telephone adoption in Liberia has recently been growing at a staggering rate, as also displayed in Figure 1. It has been shown that teledensity phone penetration rates are likely to over-count the number of actual subscribers (due to purchased but inactive accounts) and, as already mentioned, significantly undercount the number of actual users (due to sharing) (James & Versteeg, 2007). In Liberia, we estimate the subscribers-to-users ratio to be as high as one to five. Competition within the Liberian mobile phone sector is also robust, with four active operators. Indeed, usage costs are reportedly the lowest in West Africa (Southwood, 2007). All county capitals and most

other population centers currently receive signal from at least one of the mobile providers' services, and two providers currently offer GPRS mobile Internet services. Operators are actively extending both their networks and services.

The striking success of Liberia's mobile sector, which continues to develop at a feverish pace, even in such a resource-strapped country, is a cause for optimism.

Mobile Phone Usage in Post-Conflict Settings

Regrettably, civil conflicts such as those experienced in Liberia are not unusual in contemporary times. Indeed, while interstate wars are increasingly less common, the incidence of civil conflict is on the rise (Long & Brecke, 2003). Thus, the study of ICTs within countries emerging from civil conflict is an area of considerable importance, though we do note a paucity of work in this area (Thakur & Best, 2008).

Furthermore, retrospective empirical scholarship has demonstrated the critical nature of communication amongst the people of a nation if there is to be a lasting peace instead of an all-too-frequent return to civil conflict (Long & Brecke, 2003). Modern information and communication technologies can therefore, on their face, serve as tools in this process of national reconciliation if they are ably applied to these communication activities. However, to understand what it would mean to "ably" apply modern ICTs, including mobile telephony, to the process of post-conflict development requires, at a minimum, an adequate understanding of the current uses and meanings of mobile telephony in that environment. Such was the motivation for this study.

Uses and Gratifications

In seeking to uncover the everyday, micro-level motivations for mobile phone use among Liberians, this study draws inspiration from the uses and gratifications (U&G) research tradition. U&G as an approach originated in communications research in the mid-1970s (Blumler & Katz, 1974), advancing the view that consumers of mass media make active choices and selectively consume media in order to satisfy specific needs. More tersely, U&G can be said to focus on what people do with media, as opposed to what media does to people (Chigona, Kankwenda, & Manjoo, 2008). More recently, the U&G approach

has been applied to study adoption and use of new media technologies, including telephones (Dimmick, Sikand, & Patterson, 1994), the Internet (Eighmey & McCord, 1998), and mobile phones (Donner, 2004). Also notable about the U&G tradition is the attention paid to a broad range of motivations, including those which go beyond the purely instrumental or utilitarian (such as increased productivity or personal safety) to the intrinsic, social, or to quote McClatchey (2006), "hedonic" motivations for use.

A typical U&G-based study proceeds in one of two ways: either by starting with a hypothetical set of possible uses and seeking to confirm or deny each one, or in a more exploratory fashion, starting off with no such initial set. As will be seen, our study walks a line between these two alternatives. However, it must be noted that U&G in itself is not a method. Indeed, previous studies have employed a variety of different methods to investigate uses, including surveys (Aoki & Downes, 2003), semi-structured interviews (Dimmick et al., 1994), and focus groups (Williams, Dordick, & Jesuale, 1985).

A recent investigation of mobile phone usage among microentrepreneurs in Kigali, Rwanda (Donner, 2004), also drew upon the U&G approach. In using the Q-sort methodology (also used in this study and described in the next section), Donner identified four archetypal "factors" which speak to predominant uses of mobile phones in Kigali. They were: convenient, intrinsic, indispensable, and productive. Donner remarked on the diverse nature of those factors, saying that they "suggest numerous paths for future research."

Our research is intended as an extension of this body of research on uses of mobile phones to an immediate post-conflict context. To our knowledge, ours is the first study of mobile phone uses and gratifications in such an environment. We believe that this context may give rise to unique motivations for use, especially given the vibrancy of Liberia's mobile sector as described above, and the obvious importance of communication to the task of rebuilding a nation.

Methods

The Q-Sort Methodology

The Q-sort method was employed to gain insight into the nature of mobile phone use in post-conflict Liberia. In this section, the concept of the Q-sort

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Table 1. Q-Sort Statements.

Concept	Statement
Connectivity	<p>I use my mobile phone to stay in touch with my customers.</p> <p>I use my mobile phone to stay in touch with my suppliers.</p> <p>My phone gives me access to new customers.</p> <p>I use my mobile phone to stay in touch with my family.</p> <p>My mobile phone helps me come and go without worrying about missing calls.</p> <p>I use my mobile phone to stay in touch with my friends.</p>
Information	<p>My mobile phone helps me find work.</p> <p>My mobile phone helps me keep informed about prices in my business.</p>
Intrinsic	<p>Having a mobile phone makes me feel more important.</p> <p>Having a mobile phone makes me feel more connected to the world.</p> <p>I like customizing my mobile phone with accessories like special sounds and carrying cases.</p> <p>I enjoy talking to my friends and family on my mobile.*</p> <p>Having a mobile phone makes me happy.</p> <p>My mobile phone is stylish.</p>
Productivity	<p>My business is easier now that I have a mobile phone.</p> <p>My family is better off because I have a mobile phone.</p> <p>My mobile phone saves me time.</p> <p>My mobile phone lets me get more done during the day.</p> <p>My mobile phone helps my business save money.</p> <p>My mobile phone helps me make more money in a day.</p>
Security	<p>I use my mobile phone for emergency calls.</p> <p>My mobile phone makes me feel more secure.</p>
Other	<p>Getting a mobile phone changed the way I do business.</p> <p>I am interested in learning about new features or mobile phone models.</p> <p>I can't do business without my mobile phone.</p> <p>I was among the first of my friends and business associates.</p> <p>I give my mobile phone number to many people.</p> <p>I share my mobile phone with my family or friends.</p> <p>I keep my mobile phone with me at all times.</p> <p>My mobile phone gives me more control over who I talk to, and how/when I talk to them.</p> <p>I use my phone more for business than for social calls.</p>

(*Due to a miscommunication in the urban study, this statement was replaced with "I bought my mobile phone for business." This change was incorporated into the analysis that follows.)

methodology is briefly explained. However, this paper does not present an in-depth treatment, as many relevant and well-written expositions and examples of the Q-sort methodology are available elsewhere. The Q-sort methodology, which evolved from factor theory, was originally developed by the British physicist William Stephenson for psychological studies (Stephenson, 1953). Despite earlier criti-

cism of the technique in the academic community, the technique has gained increasing attention and acceptance as a tool for research in many areas, from psychology (Brownlie, 2006) to medicine (Risdon, Eccleston, Crombez, & McCracken, 2003), communication (Kramer & Pier, 1999), social sciences (Van Exel, De Graaf, & Brouwer, 2006), and education (Szente, Hoot, & Ernest, 2002).

Describes Me Least		Neutral					Describes Me Best	
-4	-3	-2	-1	0	1	2	3	4
2	30	1	19	29	21	20	23	16
17	31	6	14	27	5	9	25	11
	28	22	13	15	3	4	24	
		8	18	12	26	10		
				7				

Figure 2. An example Q-Sort, demonstrating the quasi-normal pattern into which statement cards are sorted. In practice, the full statement is printed on the front of the card, while a reference number is printed on the back. When the sort is complete, the cards are flipped and the pattern is recorded.

In a Q-sort study, a subject is asked to arrange a set of statements (such as those shown in Table 1), pictures, or sounds, according to some perceptual metric. In most Q-sorts, the individual is requested to place a statement into one of the slots in a grid akin to the one shown in Figure 2. This grid is designed to describe a quasi-normal distribution. Each column along the grid is given a relative position along some semantic differential—for instance, from strongly disagree to strongly agree. The ordering of the statements in each column is irrelevant; only the lateral ordering carries meaningful information. Some studies use a rectangular grid pattern, as opposed to a quasi-normal one. We chose the latter, as we believe it forces the participant to think deeply in choosing the strongest points of agreement and disagreement.

Data analysis in the Q-methodology establishes groups of individuals who sort particular traits in common places within the distribution. For example, consider a group of teenage mobile phone users in Tokyo who place great weight on their connections with friends and the stylish elements of their phone, but who sort customer and work connections as low in importance; this group of people might be detected as a “factor” within the Q-sort methodology. Thus, Q-sort is said to be a person-oriented approach, as opposed to a trait-oriented tool (McKenna, 1974).

Previous work by Jonathan Donner (2004) applied the Q-methodology to the study of mobile

phone use among microentrepreneurs in Kigali, Rwanda. The present study is intended as an extension of that work, studying the case of mobile phone use in Liberia. In order to enable comparisons between the two studies, we have used the same set of statements as was used in Rwanda (with only minor modifications). Both Rwanda and Liberia have emerged from recent civil conflict, with Rwanda embarking on a path to peace starting in 1994, while Liberia saw conflict through till 2003. This study, therefore, examines how people perceive their mobile phones after only a few years of peace. And when we compare those perceptions to Donner’s study from Rwanda, it is helpful to recall that they have enjoyed an additional nine years of relative peace. Do those additional years explain some of the interstate variation we have observed?

Protocol

The study required that participants arrange a set of statements, listed in Table 1, according to how these statements best describe their use of mobile phones. The statements were printed on flash cards for easy handling. The participants were advised to arrange the statements initially into three piles—“Describes me best,” “Neutral,” and “Describes me least”—and then to sort the piles into the appropriate categories in a quasi-normal format similar to the one shown in Figure 2. In addition to the statements, demographic information was requested from the respondents. The time taken for the exercise ranged from 30 to 60 minutes per participant. The statements were in English.

Participant Selection

Unlike traditional quantitative survey techniques, Q-sorts can be carried out with a relatively small number of participants from a population space. We sought participants both from Monrovia, Liberia’s capital, and from various rural areas throughout the country. This is in contrast to Donner’s study, which focused entirely on the capital of Kigali. In total, 63 participants were interviewed in Monrovia. Participants were chosen at random from passers-by on a

street corner in downtown Monrovia. Fourteen responses were discarded due to incompleteness, leaving a total of 49. Outside Monrovia, a total of 36 participants were selected, also at random from busy areas. In total, we visited 13 towns and villages in several Liberian counties. The age of the respondents ranged from 19 to 62 years. Participants were given a US\$5 mobile phone scratch card for their efforts, whether or not they completed the sort.

Print literacy was a requirement for participation. In questionable cases, prospective participants were asked to read one of the statements from a flash card and describe its meaning before they were admitted to the study.

Analysis Methods

Q-analysis is usually performed using PQMETHOD, a software package developed specifically for the task. A typical Q-analysis involves several steps. Initially, a large correlation matrix is created, describing the similarities between the Q-sorts of all pairs of participants. We then look for ways to reduce the information in this matrix into an interpretable form, a process which is both iterative and partially subjective. There are several routes to this goal, a review of which goes beyond the scope of this work. In our analysis, we chose a procedure similar to Donner (2004); we performed a principal components analysis to identify initial factors within the data, followed by a varimax rotation to arrive at the final set of factors.

Each such factor can be thought of as an archetypal perspective; a sorting of the statements that defines one group of subjects against the others. Once these factors have been identified, a loading score is computed for each participant/factor combination, which measures the similarity of that participant's perspective to the archetypal perspective of that factor. A participant is said to load on or define a factor if their loading score for that factor crosses a certain threshold. As a result of this process, each factor is associated with a set of participants defining it. In a sense, the set of participants has now been clustered into a small number of factors (we find four factors in our study), with each participant assigned to that factor that best represents them.

In the final step, the statement rankings for each participant are weighted according to that participant's loading score for the factor to which they are

assigned (therefore, if they define the factor more closely, their ranking will have more weight). Then, all of these weighted ranks are combined among the participants assigned to each factor, such that each factor is then described by a list of single Z-scores, one per statement, along with a *p*-value assessing the value's statistical significance. Finally, these Z-scores are re-projected back into the original space of values from -4 to +4 (from "describes me least" to "describes me best"), as shown in Figure 2. And as an aid to comparison between the groups, each set of Z-scores are projected into the space described by the other factors, as well.

PQMETHOD also determines for each a factor a set of "distinguishing statements" which differentiate the factor from the others. These statements are of special importance, as they are most representative of the differences between the factors. It is in examining these representative statements that insight into the meaning of each factor can finally be gained.

Tables 3 and 4, which we will go on to study below, show these sets of factors and their most distinguishing statements, along with those statements' Z-scores and the -4 to +4 values associated with them.

Expert Interviews

As a follow-up to our user surveys, we conducted interviews with industry experts. We endeavored to contact all four mobile phone operators and were able to arrange interviews with the two largest, Lonestar and Cellcom. We also interviewed a commissioner from the Liberia Telecommunications Authority, the country's communications regulator. Interview participants were recruited through cold-calling each of the organizations in which we were interested. Interviews followed a semi-structured format, guided by a prepared list of questions.

Results

Demographic Data

As stated, 85 participants were surveyed in total—49 urban and 36 rural. The average age of participants was 32 years, and did not differ significantly between the urban and rural participant groups. About 29% of participants had not completed secondary school, 43% had finished high school but not gone on to further studies, and 29% had attained a bachelor's degree or certificate. One par-

Table 2. Factor Characteristics.

Location	Statistic	F1	F2	F3	F4
Urban	# of Defining Participants	9	13	12	4
	% of Variance Explained	20%	12%	11%	12%

ticipant had attained a master's degree. The mean time of phone ownership as of May 2008 was 3.5 years (s.d. 1.7 years), which also did not vary significantly between urban and rural areas.

This demographic data suggest that our participant population was, on average, more educated than most Liberians. While we do not have data on the educational attainment of mobile phone users disaggregated from the general Liberian population, we would intuitively expect that those who have a phone would be more highly educated, as they come from economically stronger positions. However, we also note that the average period of time of phone ownership for our participants is high for Liberia, making the respondents, on average, early adopters of this technology. According to ITU data (2009), the average mobile phone user took up the technology in 2006, whereas our population, on average, has been using mobile phones since 2005.

No data were collected regarding cost of access; however, we note that mobile service prices in Liberia are among the cheapest in the region (Southwood, 2007). We do not know if the low prices in Liberia directly follow from it being post-conflict, but we hope to further study this question.

Q-Sort

The Q-sort data we obtained from urban and rural participants in Liberia have been analyzed separately. This has allowed us to examine differences in mobile phone use and perception between these populations.

Following the procedures described above, PQMETHOD was used to perform our analysis. After the principal component analysis, several factor rotations were computed and examined. For both data sets, a set of four factors was found to provide the best balance between explanatory power and succinctness.

Table 2 displays the number of participants found to load on each factor, as well as the percentage of initial variance that each explains. Each factor can be

taken to represent an archetypal perspective regarding phone use among Liberians. The explained variance proportions we obtained are similar to those obtained in previous studies.

Tables 3 and 4 show the commonalities across factors for both datasets, along with the statements distinguishing each factor, ordered by Z-score. The computed ranks for each factor are also shown for each statement (F1, F2, F3, and F4). Statements with ranks for the present factor of interest of +3 or +4, or -3 or -4, are placed under the headings "Describes Me Best" and "Describes Me Least," respectively. Other distinguishing statements with a high (or low) rank for the present factor relative to the other factors are placed under the heading "Relatively High" (or "Relatively Low").

Below, we review the distinguishing statements for each factor in an effort to interpret the nature of the archetypal perspectives they represent. We also review commonalities across factors for the urban and rural groups. These commonalities are statements which are consistently ranked positively or negatively for each of the four factors, and thus indicate agreement across most participants.

Urban

Commonalities Across Factors

The urban group exhibited few points of commonality across factors. The only statement which was ranked positively for all four factors was "I use my mobile phone for emergency calls," which was rated +2, +1, +2, and +4. No statements received consistently negative rankings for all four factors. This lack of consensus could be due to the varied sample of participants and their divergent viewpoints.

Factor 1: Productivity

The group of nine participants defining this factor was comprised mainly of business owners with less than 12 employees, except for a computer technology facility owner, who had 30 employees.

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Table 3. Urban Factors

Commonalities					
Statement		F1	F2	F3	F4
I use my mobile phone for emergency calls.		2	1	2	4
Factor 1: Productivity					
Statement	Z	F1	F2	F3	F4
Describes Me Best					
**My mobile phone helps me make more money in a day.	1.57	3	-4	0	-4
Other Distinguishing (Relatively High) Statements					
**I use my mobile phone to stay in touch with my friends.	0.8	2	4	-3	-4
**My mobile phone lets me get more done during the day.	0.49	1	-4	-2	3
*My mobile phone helps me keep informed about prices in my business.	0.19	1	-2	2	-1
**My family is better off because I have a mobile phone.	-0.08	0	1	-2	-2
Other Distinguishing (Relatively Low) Statements					
**Having a mobile phone makes me feel more connected to the world.	0.17	0	2	2	3
*My mobile phone saves me time.	-0.36	0	1	-2	2
Describes Me Least					
**I give my mobile phone number to many people.	-1.27	-4	2	0	3
**My mobile phone is stylish.	-1.49	-4	-2	-1	1
<i>Distinguishing statements: *p < 0.05, **p < 0.01</i>					
Factor 2: Connectivity					
Statement	Z	F1	F2	F3	F4
Describes Me Best					
**I use my mobile phone to stay in touch with my friends.	2.18	2	4	-3	-4
*I keep my mobile phone with me at all times.	1.29	0	3	0	4
Other Distinguishing (Relatively High) Statements					
**My mobile phone makes me feel more secure.	0.8	-1	2	1	-1
**Having a mobile phone makes me happy.	0.78	0	2	-1	-3
*I give my mobile phone number to many people.	0.61	-4	2	0	3
**My family is better off because I have a mobile phone.	0.5	0	1	-2	-2
*I like customizing my mobile phone with accessories like special sounds and carrying cases.	-0.29	-1	0	-1	-2
Other Distinguishing (Relatively Low) Statements					
*I use my mobile phone for emergency calls.	0.31	2	1	2	4
**My mobile phone helps me come and go without worrying about missing calls.	-0.3	-2	-1	-2	2
*My mobile phone helps me keep informed about prices in my business.	-1.15	1	-2	2	-1
Describes Me Least					
**I use my phone more for business than for social calls.	-1.33	3	-3	3	2
**My mobile phone helps my business save money.	-1.43	1	-3	1	1
**My mobile phone lets me get more done during the day.	-1.6	1	-4	-2	3
<i>Distinguishing statements: *p < 0.05, **p < 0.01</i>					

Table 3. (Continued)

Factor 3: Business					
Statement	Z	F1	F2	F3	F4
Describes Me Best					
**I can't do business without my mobile phone.	1.75	-3	3	4	-2
*My phone gives me access to new customers.	1.49	1	-2	3	-1
**I bought my mobile phone for business.	1.19	-1	-2	3	-1
Other Distinguishing (Relatively High) Statements					
**My mobile phone helps me keep informed about prices in my business.	0.83	1	-2	2	-1
*My mobile phone makes me feel more secure.	0.21	-1	2	1	-1
*I give my mobile phone number to many people.	0.14	-4	2	0	3
*I am interested in learning about new features or mobile models.	-0.15	-3	1	0	-2
**My mobile phone helps me make more money in a day.	-0.4	3	-4	0	-4
Other Distinguishing (Relatively Low) Statements					
**My mobile phone lets me get more done during the day.	-0.78	1	-4	-2	3
*My mobile phone saves me time.	-0.82	0	1	-2	2
Describes Me Least					
**I use my mobile phone to stay in touch with my family.	-0.91	4	4	-3	2
**Having a mobile phone makes me feel more important.	-1.98	-1	-2	-4	0

*Distinguishing statements: *p < 0.05, **p < 0.01*

Factor 4: Security

Statement	Z	F1	F2	F3	F4
Describes Me Best					
**I use my mobile phone for emergency calls.	2.31	2	1	2	4
*I keep my mobile phone with me at all times.	1.93	0	3	0	4
**My mobile phone lets me get more done during the day.	1.57	1	-4	-2	3
*I give my mobile phone number to many people.	1.16	-4	2	0	3
Other Distinguishing (Relatively High) Statements					
**I use my mobile phone to stay in touch with my family.	1.09	4	4	-3	2
**My mobile phone helps me come and go without worrying about missing calls.	0.85	-2	-1	-2	2
*I use my phone more for business than for social calls.	0.63	3	-2	3	2
**My mobile phone is stylish.	0.16	-4	-2	-1	1
Other Distinguishing (Relatively Low) Statements					
**I use my mobile phone to stay in touch with my customers.	-0.01	2	3	1	0
*My mobile phone helps me keep informed about prices in my business.	-0.51	1	-2	2	-1
**My phone gives me access to new customers.	-0.95	1	3	3	-2

*Distinguishing statements: *p < 0.05, **p < 0.01*

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Table 4. Rural Factors

Commonalities					
Statement		F1	F2	F3	F4
Having a mobile phone makes me feel more connected to the world.		3	3	2	3
I use my mobile phone for emergency calls.		4	3	2	1
I keep my phone with me at all times.		2	2	2	4
My mobile phone is stylish.		-4	-4	-4	-3
Factor 1: Business					
Statement	Z	F1	F2	F3	F4
Describes Me Best					
**My business is easier now that I have a mobile phone.	1.66	4	0	-2	2
Other Distinguishing (Relatively High) Statements					
**My mobile phone helps my business save money.	0.77	2	-1	0	0
Other Distinguishing (Relatively Low) Statements					
**I use my mobile phone to stay in touch with my family.	0.15	0	4	4	2
**I use my mobile phone to stay in touch with my friends.	-0.57	-2	1	0	3
Describes Me Least					
*I was among the first of my friends and business associates to get a phone.	-1.01	-3	0	-3	-4
**My mobile phone gives me more control over who I talk to, and when I talk to them.	-1.53	-3	0	0	-2
**I share my mobile phone with my family or friends.	-1.83	-4	1	-2	0
<i>Distinguishing statements: *p < 0.05, **p < 0.01</i>					
Factor 2: Mixed					
Statement	Z	F1	F2	F3	F4
Describes Me Best					
**I enjoy talking to my friends and family on my mobile.	2	-1	4	-1	2
**My mobile phone makes me feel more secure.	1.57	1	3	1	-2
*My mobile phone saves me time.	1.21	0	3	1	-3
Other Distinguishing (Relatively High) Statements					
*I share my mobile phone with my family or friends.	0.34	-4	1	-2	0
**I was among the first of my friends and business associates to get a phone.	-0.07	-3	0	-3	-4
Other Distinguishing (Relatively Low) Statements					
**My business is easier now that I have a mobile phone.	-0.06	4	0	-2	2
*My phone gives me access to new customers.	-0.11	1	0	1	2
**I use my mobile phone to stay in touch with my customers.	-0.68	4	-2	4	1
<i>Distinguishing statements: *p < 0.05, **p < 0.01</i>					

Table 4. (Continued)

Factor 3: Intrinsic					
Statement	Z	F1	F2	F3	F4
Describes Me Best					
**Having a mobile phone makes me happy.	1.4	-2	-2	3	0
Other Distinguishing (Relatively High) Statements					
*I am interested in learning about new features or mobile models.	0.74	-1	1	2	0
**I like customizing my mobile phone with accessories like special sounds and carrying cases.	0.3	-3	-3	0	-2
Other Distinguishing (Relatively Low) Statements					
**My business is easier now that I have a mobile phone.	-0.79	4	0	-2	2
**My mobile phone helps me find work.	-1.03	0	0	-2	3
Describes Me Least					
**I give my mobile phone number to many people.	-1.97	-1	-2	-4	-1
<i>Distinguishing statements: *p < 0.05, **p < 0.01</i>					
Factor 4: Mixed					
Statement	Z	F1	F2	F3	F4
Describes Me Best					
**I keep my mobile phone with me at all times.	1.68	2	2	2	4
**My mobile phone helps me find work.	1.42	0	0	-2	3
**I use my mobile phone to stay in touch with my friends.	1.23	-2	1	0	3
Other Distinguishing (Relatively High) Statements					
*I use my mobile phone to stay in touch with my family.	1.09	0	4	4	2
**I enjoy talking to my friends and family on my mobile.	1.03	-1	4	-1	2
**My business is easier now that I have a mobile phone.	0.92	4	0	-2	2
**I use my mobile phone to stay in touch with my customers.	0.67	4	-2	4	1
*Having a mobile phone makes me happy.	-0.06	-2	-2	3	0
Other Distinguishing (Relatively Low) Statements					
**I use my phone more for business than for social calls.	-0.23	3	2	2	0
*My mobile phone helps me come and go without worrying about missing calls.	-0.3	-2	-3	-3	-1
**My mobile phone makes me feel more secure.	-0.85	1	3	1	-2
Describes Me Least					
**My mobile phone saves me time.	-1.32	0	3	1	-3
*My mobile phone lets me get more done during the day.	-1.65	-1	-1	-2	-4
<i>Distinguishing statements: *p < 0.05, **p < 0.01</i>					

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This factor describes responses where people perceive the statements “I use my mobile phone to stay in touch with my friends” and “My mobile phone helps me make more money in a day” as rather important where the normalized Z-scores are relatively high (+3 and +2). In contrast, the prestige or intrinsic statement “My mobile is stylish” was rated quite low.

It is clear that this particular group does not view the mobile phone as an object of style (-4), nor do they give their mobile phone numbers to many other people (-4). Instead, affiliates to Factor 1 recognize most significantly the business aspect of mobile telephony, followed by the security utility that the phone provides. This group, therefore, emphasized the importance of the mobile phone as a business tool rather than a fashion item. They also emphasized how the phone allows them to stay in touch with their friends (+2), perhaps as they go about conducting their business. Overall, this group seems to see the phone as a productivity tool.

Factor 2: Connectivity

Thirteen participants affiliate strongly with this factor. This group of respondents has a demographic makeup of sole proprietors and other business owners with less than three employees, as well as several miscellaneous others. For this group, communication with friends is essential (+4), as is constant availability, as they admit to carrying their phone at all times (+3) and giving their number to many people (+2). The phone also makes them feel happy (+2), secure (+2), and makes their family better off (+1). On the other hand, this group rated statements related to business and productivity rather lowly, saying that they do not use the phone to find out about prices (-2), they do not use their phone more for business calls (-3), and they do not see the phone as enabling them to accomplish more in a day (-4). In sum, it seems that members of this group are primarily concerned with being available and in touch with their family and friends, and that they derive feelings of pleasure and security from that high level of connectivity.

Factor 3: Business

The 12 participants defining this factor bought a phone for their business (+3), use the phone to gain access to new customers (+3) and stay informed about prices (+2), and in general, feel that they can't do business without their phone (+4). On

the other hand, perhaps due to the centrality of the phone in their business routine, they do not feel that the phone lets them get any more done in a day (-2). Furthermore, they do not see the phone as a tool for connectivity with their family (-3), or as a stature booster (-4). Taken together, this set of statements indicates a business-minded group of individuals for whom the phone is an essential tool. And indeed, from our demographic notes, this group comprises business people in areas such as the oil industry, computer technology, money exchange (forex bureau), and others.

Factor 4: Security

This group is defined by four participants, who assign the highest rank of +4 to the statements “I use my phone for emergency calls” and “I keep my phone with me at all times.” This suggests that the safety of themselves or their loved ones is of primary concern to members of this group. The group also views the mobile as a productivity enhancer, given the relatively high rank assigned to the statements “My mobile phone helps me come and go without worrying about missed calls” (+2) and “My mobile phone lets me get more done during the day” (+3). Further, the group ranked the statements “I use my mobile phone to stay in touch with my family” (+2), and “My mobile phone is stylish” (+1) as relatively important, while the statement “My phone gives me access to new customers” (-2) was seen as relatively unimportant.

Thus, this group has elements of connectivity-oriented users as well as gratification, since they use phones to stay in touch with family and find their phone stylish. Furthermore, they perceive the phone as offering some productivity enhancements, such as getting more things done and staying in touch with customers. However, what is uniquely distinguishing about this factor is its emphasis on security, with the top two statements associated with this factor concerned with this issue.

Rural

Commonalities across factors

One of the most striking things about the rural study was that, during the initial sort of the cards into three piles, most participants sorted most cards into the “describes me best” pile. The second stage of the sort then became a difficult exercise in prioritization. Many participants were visibly torn on

which statements to promote to the highest levels and which to leave behind.

Nonetheless, in contrast to the urban data, which had few pervasive commonalities, several statements emerged as items of consensus for most participants. All four factors agreed that their mobile phones make them feel more connected to the world. That statement was ranked +3, +3, +2, and +3, respectively. Several participants spoke of communicating with family members in other countries in Africa and in the West as justification for their high rating of this statement.

There was also widespread agreement on the phone not being an object of fashion. The statement "My phone is stylish" received rankings of -4, -4, -4, and -3. During the study, many participants openly scoffed at this statement upon reading it.

Finally, while no distinct security or safety factor is identified in the rural data, there was nonetheless widespread reliance upon the phone for emergency use. The statement "I use my phone for emergency calls" was ranked +4, +3, +2, and +1, while "I keep my phone with me at all times" was ranked +2, +2, +2, and +4. It was clear that many participants felt strongly about this function of the phone. Several participants offered compelling stories of using their phone to call for help during a robbery, to call for medical care for a loved one, or as a deterrent against sexual violence.

Factor 1: Business

Thirteen participants defined this factor. Of the statements distinguishing it from the others, few were positive. Most prevalent among them was the assertion that business is easier to conduct thanks to the phone, which was rated +4. Participants in this group also claimed that their phones helped their business save money. On the other hand, members of the group do not share their phone with friends or family (-4), or especially rely on it for communication with family (0) or friends (-2). Overall, this group views the phone as a serious tool that has improved their ability to conduct business, much as in the urban factor of the same name.

Factor 2: Mixed

This factor describes a variety of personal uses of the phone. Above all, the eight participants defining this factor enjoyed talking on the phone with their family and friends (+4). However, they rated the

statement "My phone makes me feel more secure" quite high as well (+3), and they view the phone generally as a time saver (+3). No business-related statements were rated highly—the phone is not seen particularly as making business easier (0), and the phone is not used to stay in touch with customers (-2). We find this factor to be a mix of personal, productivity, and security uses, with a clear bias against business. Unlike the previous factors in this study, this group does not admit to a clear, single description.

Factor 3: Intrinsic

The five participants defining this factor were clearly enthusiastic about intrinsic uses of their phones as technological artifacts. Their most highly rated distinguishing statement was "Having a mobile phone makes me happy" (+3), and they were also uniquely keen to learn about new features or models (+2), and, less strongly, to accessorize their phone (0). On the other hand, participants in this group were not very interested in business functions of the phone (-2), or in using it to find work (-2). They also reported not giving their number out to many people (-4), the reason for which is not clear.

Factor 4: Mixed

Our analysis identified a large number of statements with broad meaning as distinguishing this factor. The six participants defining this factor keep their phone with them at all times (+4), use it to find work (+3), and stay in touch with friends (+3). They also find that it makes their business easier (+2), and they use it to stay in touch with their customers (+1). Thus, whereas Factor 2 reveals a variety of personal uses with a bias against business uses, this factor suggests an even more general blend of valued uses.

Interviews

A dominant theme in all three interviews was cost, which is understandable in an environment of extreme scarcity such as Liberia. While our survey did not address cost directly, it is clearly an important consideration, since it shapes usage patterns. One participant summed up the situation aptly, saying that, in Liberia, "things must be cheap or free." Another revealed that the Liberian market enabled some users to spend as little as US\$0.79 per month to maintain a phone subscription. Many cost-saving measures were described. One participant reasoned

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Table 5. Points of comparison between rural and urban Liberian data, and urban Rwandan data from Donner (2004).

I use my mobile phone for emergency calls				
	F1	F2	F3	F4
Urban Liberia	2	1	2	4
Rural Liberia	1	2	3	4
Urban Rwanda	2	1	-4	-3
My mobile phone is stylish				
	F1	F2	F3	F4
Urban Liberia	-4	-2	-1	1
Rural Liberia	-4	-4	-4	-3
Urban Rwanda	-3	1	-3	-3
Having a mobile phone makes me feel more connected to the world				
	F1	F2	F3	F4
Urban Liberia	0	2	2	3
Rural Liberia	3	3	2	3
Urban Rwanda	2	1	3	3

that the sharing of phones by swapping SIM chips must be a popular practice, since there are so many requests for free replacement chips. Flashing—the intentional placing of a missed call to notify a friend without using airtime—was also cited as common. Most operators offer free calling after midnight or 1:00am, a service which has attracted huge volumes of calls, an average of some 19 million minutes per night for the largest operator. One complaint from the regulator we interviewed was the difficulty of knowing exactly how much a call costs to carefully manage one’s expenditure, a particular challenge due to the cryptic and confusing discounts frequently offered by providers. This is clearly a hindrance to those who are especially cost-conscious.

Another theme which emerged was the difference between urban and rural usage. One operator framed the phenomenon concisely, as the difference between a *lifeline* and a *lifestyle*. He claimed that, in rural areas, the phone is seen more as a tool and a connection to the outside world, which agrees with our survey findings (see Table 5).

The other operator suggested that this reality is reflected in the two groups’ choice of phones, with rural users preferring simpler, more durable phones with longer battery life. This idea also agrees with

our survey results, which found that rural users rejected stylish phones. The lifeline metaphor extends yet further. It was also suggested by both operators that phones are used in poorer rural areas to request money from relatives in Monrovia and in the diaspora. Flowing in the other direction, supposedly, is information about family, friends, and the community.

In urban areas, on the other hand, our interviewees suggested that phones are able to realize more of their intrinsic potential, moving beyond the status of a tool, and becoming part of a lifestyle. One participant cited an interesting statistic: Even though a basic color-screen phone costs \$3 more than its black-and-white-screen counterpart, the former is selling better, indicating that cost is not the only determinant of behavior. Another interviewee said that downloading ringtones and music is an increasingly popular activity in urban areas.

Certain “lifeline” affordances of the mobile phone are bound to be relevant in both urban and rural settings. Our survey suggested that security was one such affordance, and our interviews have confirmed this. One participant related that when his company considered removing free calling during late night hours, customers complained that late

night was when they most needed the ability to make calls without credit on their phone, in case of an emergency situation. Another operator suggested that many users leave their phones on at night for safety, rather than switch them off to conserve battery: "I have couple of friends who . . . could not afford for the phones to say off at night . . . because, you know, the criminal rate in the night."

Discussion

The results of our Q-sort analysis have highlighted a set of uses and gratifications for mobile phones in Liberia, some of which are particularly interesting in light of previous research. We discuss them below. Table 5 presents comparisons of several noteworthy statements.

Perhaps the most striking and unique result of this study is the prevalence of security and emergency use reported by Liberian mobile phone users and confirmed through our expert interviews. Data from Monrovia suggested a distinct factor emphasizing security, while rural data revealed security as an item of consensus. In both cases, the emphasis on security was considerably stronger than that reported by Donner (2004) for Rwandan users, as shown in Table 5. This greater emphasis could be due to Liberia's much more recent civil conflict. From informal discussions with participants, it was clear that the safety and security of self, of loved ones, and of personal property are still a major concern in Liberia. This is by no means surprising. Despite the 15,000-strong UN peacekeeping mission, the country's police force is still under development, and many ex-combatants have turned to crime as a source of financial support. In such a situation, it is understandable that a mobile phone would be seen as providing security, as it would allow the user to call a family member or an authority in the event of a crime or transgression. In several cases, even police officers themselves spoke of their mobile phones as a source of security.

Of all the findings of this study, this emphasis on security carries the most implications for possible future technology designs. Current phones, while providing access to centralized network security services such as 9-1-1, were not designed for an environment with weak state institutions and a lack of centralized security apparatuses. Instead, one could

imagine a phone design incorporating a "panic" button feature, which emits a loud noise and flashing light, and automatically contacts other phones, either in the immediate geographical area, or on a predefined emergency contact list. This feature could be activated in an attempt to stop a crime in progress, or to act as a deterrent against potential offenders.

Another result of particular interest highlights a difference between urban and rural users within Liberia. While analysis of urban data revealed four fairly-well defined factors, two of the four rural factors admitted to a more blurry description. We feel that this may be due to the multifaceted livelihoods characteristic of rural citizens, or to the fact that the mobile phone is often the only available ICT service in rural areas. We encountered many rural participants who reported a number of different occupations. One claimed to work for the Ministry of Immigration in addition to being a farmer. Another taught secondary school in addition to selling rubber. Several students reported also working in various family businesses. Such users are not likely to fit neatly into any one category, such as "business" or "connectivity"—their use of the phone is more varied.

On the other hand, rural users displayed an overwhelming rejection of the phone as an object of style. As reported, participants often openly scoffed at the "My phone is stylish" statement upon reading it from the card. It seemed that the idea of a phone being stylish was absurd, and to consider it so would be shameful. This is in contrast to both the urban Liberian and Rwandan data, both of which revealed a factor in which the same statement received a positive rating, as shown in Table 5. We surmise, and our expert informants agree, that rural Liberians view their phones as serious tools, not fashionable accessories. While in central Monrovia there exists a group of relatively successful businesspeople that exhibit consumerist behaviors, consumerist populations are mostly absent throughout rural Liberia. This is due to poverty and the pervasive lack of a formal economy in many of these areas. We suspect that, in such a context, the idea of flaunting or fetishizing a phone as stylish seems disassociated with local realities. Also, due to limited resources, most participants owned the least expensive, most durable, and longest-lasting phone models. They seemed to be aware of the humbleness of

their devices in comparison to the phones available in the city. This awareness is sure to preempt any pretensions of fashionability.

With this in mind, the emergence of an intrinsic factor focusing on technological enthusiasm in the rural data becomes noteworthy. Members of that group expressed interest in learning about newer, more advanced phones, despite the fact that they were likely to be unaffordable. Participants often spoke about this interest in technology as if it were a civic duty—that any good citizen should be up to speed with the latest technology. We suspect that this group is ultimately aspirational, ascribing to a vision where technology serves as an engine of their personal, and the nation's, development.

One finding from Donner's study which was mostly replicated in our data was the feeling that the phone supports connectedness to the world, as also shown in Table 5. This finding was especially prevalent among rural users, which is not surprising, given the fewer options available to rural users for communicating internationally. Some parts of Liberia, such as Sinoe County, are without radio stations, newspapers, or Internet cafés, leaving the mobile phone as the only link to the outside world. Our expert interviewees confirmed this finding, highlighting the instrumental importance of that outside connectedness as a means to request much-needed financial support.

Also common to the two studies was the finding of strong business-related factors. Our study identified clear business factors for both the urban and rural populations. In addition, several other factors rated productivity-related statements highly, such as "My mobile phone helps me find work." It is clear that the mobile phone plays a crucial role in the largely informal Liberian economy.

Conclusion

This study has employed the uses and gratifications approach and the Q-sort methodology to investigate mobile phone usage among urban and rural Liberians. As in previous work, several distinct user groups were identified. Urban users saw their phones variously as productivity enhancers, means of connectivity to family and friends, essential business tools, and security providers. A group of business users was also identified among rural users, as was a group of techno-enthusiasts, and two groups which

eluded definite description. The multifaceted nature of these groups replicates Donner's principal finding (2004) in highlighting the diverse uses and gratifications characteristic of mobile phone users in a low-income region.

However, the chief difference between these two studies—our identification of the prevalence of security use among Liberians—is potentially important in its own right. As stated, we believe that this finding may be related to the nature of Liberia's immediate post-conflict environment. Not only does such a finding have implications for future technology designs (which we are interested in exploring), it also suggests further research into the role of ICTs in the process of stabilizing and rebuilding a nation following a civil conflict. The unfortunate fact of widespread civil conflict in today's world makes understanding such phenomena even more important.

Beyond personal security aspects and affordances of mobile phones in post-conflict societies, we are very interested in the effects of mobile phones on post-conflict politics, development, and reconstruction generally. This current study has not produced findings in these other areas, but this is an active area of future study for our group.

A more general theme that we encountered is the sheer indispensability of the phone for most users. In many cases, the mobile phone is *their only option* for communications other than physical travel, which is costly and time-consuming. In other places where the methods of communication are various and many, the idea of a single modality being so essential is harder to fathom. But many participants we spoke to related stories of the phone saving them many miles of travel. Businesspeople celebrated the time saved in ordering goods from their suppliers over the phone, instead of traveling by costly public transportation, sometimes only to find the supplier out of stock. One participant described a hypothetical situation in which her daughter had fallen ill and she was without a phone. How should she know where to take her, when the only doctor in the area could be in any of several different towns, each a considerable distance away? Add to this the security role they apparently perform, and it is clear that the phone is a truly indispensable item.

A weakness of this work arises from the requirement that participants be able to read. This was the

unfortunate reality, since performing a Q-sort requires rapid and repeated visual scanning of the statement cards. Unlike in a traditional survey, we felt that simply reading the statement to the participant once would not be sufficient to support the sorting process. Especially in rural areas, this unfortunately excluded a significant number of potential participants. In the future, we are interested in experimenting with study designs using iconography or sounds in order to allow non-literate participants to share their view. ■

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