

Research Article

Microentrepreneurs and Mobiles: An Exploration of the Uses of Mobile Phones by Small Business Owners in Rwanda

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Abstract

Despite a worldwide boom in mobile phone ownership, studies of the social and economic implications of mobile telephone use in the developing world are rare. Approaching mobile phone usage from the individual level, the study uses Q methodology to ask 31 owners of urban micro and small enterprises (MSEs) in Kigali, Rwanda to articulate what using the mobile means to them. The exercise identified four distinct perspectives on mobile use among the participants. One perspective sees it as a device for the pursuit of instrumental business goals. A second perspective uses mobiles to satisfy emotional or intrinsic needs. Two other perspectives mix instrumental and intrinsic elements, seeing mobiles as productivity enhancers, or as simply indispensable. Taken together, these distinct perspectives illustrate a range of intended uses and gratifications among MSE owners, and suggest numerous paths for future research. Q methodology is discussed in some detail so that researchers can consider its utility as a way to understand users of information and communication technologies.

Introduction

Each day, thousands of people in the developing world purchase a mobile telephone. In communities where landlines are scarce and expensive, many of these new users are getting their first phone number—some may even be making their very first call.¹ In doing so, these new users acquire the power to carry their voices and ideas across time and space, and to more easily cultivate their social and economic networks. How exactly do they use this new power? What social, physical, and economic gains do they realize? Development practitioners and academics have more questions than answers. Despite a rich tradition of study of the social and

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1. The first commercial mobile phone network was installed in Chicago in 1983 (Brodsky, 1995). Since then, over one billion people have become mobile phone users, most within the last 5 years. Of those, the proportion living in the developing world is rising (ITU, 2002b). For example, between 1995 and 2001, mobile phone usage in Africa grew at a staggering 82% a year, while fixed lines in Africa grew at 7% per year to a total of only 21 million lines (ITU, 2002a). According to the UN ICT Task Force, more mobile lines have been connected in Africa in the past 5 years than have landlines in the last 100 years (UN ICT Task Force, 2002).

economic impacts of Information and Communication Technologies (ICTs) in developing nations (Adeya, 2002; Saunders, Warford, & Wellenius, 1994) and despite the fact that there are twice as many mobile phone users as Internet users worldwide (ITU, 2002a), studies of the social and economic dimensions of mobile telephone use in the developing world are rare.²

This study approaches the phenomenon of mobile phone usage from the *individual level*, asking participants to articulate what using the mobile means to them. The study focuses on owners of urban micro and small enterprises (MSEs), which are critical to the economies of developing nations (McMillan & Woodruff, 2002; Mead & Leidholm, 1998). Applying a small-group quantitative methodology (Q-sort), it treats users not as a block with a single set of needs, but rather as goal-pursuing individuals who interact with the technology in different ways.

Based on interviews with urban MSE owners in Kigali, Rwanda, the study identifies four distinct approaches to mobile use. One perspective sees the mobile as an instrument for the pursuit of business goals. A second views the mobile as satisfying emotional or intrinsic needs. Two other perspectives mix instrumental and intrinsic assessments, seeing their mobiles as productivity enhancers or as simply indispensable. Taken together, these distinct perspectives point to a range of intended “uses and gratifications” (Blumler & Katz, 1974) among MSE users in the developing world, and suggest numerous paths for future research.

Mobile Telephones and Economic Development

To understand the role of the mobile telephone in economic development, we start with Saunders et al.’s (1994) comprehensive review of the contributions of telecommunications to development, even though it predates the widespread use of mobiles. They argue that telecommunications can contribute to economic development in the following ways:

- Better market information
- Improved transport efficiency and more distributed economic development
- Reduction of isolation and increase in security for villages, organizations, and people
- Increased connectivity to and coordination with international economic activity

It is reasonable to expect that the diffusion of mobiles throughout the population of a developing nation would enable each of these factors, just as landlines have done.

Cellular technology has enabled mobile telephony, and numerous researchers are exploring the particular social and economic implications of the newer wireless telecommunications devices (B. Brown, Green, & Harper, 2001; Katz, 1999; Katz & Aakhus, 2002b). In this vein, Rheingold’s (2002) “Smart Mobs,” Townsend’s (2000) “Real-Time City,” and Katz and Aakhus’s “Perpetual Contact” (2002a) each point to recent and perhaps fundamental changes in the way both economic and non-economic (social) activities are carried out. A global industry has been built because hundreds of millions of people value mobility—and the possibilities for coordination (Ling & Haddon, 2003) and “perpetual contact” that accompany it. Yet the impact of mobility on economic development is largely unknown. User research will allow us to explore if and how mobility functions matter to new and potential users in the urban and rural areas of the developing world.

Entrepreneurs and ICTs

If one is concerned about the interplay of mobiles and economic development, one group of particular importance is the developing world’s smaller entrepreneurs—owners of microenterprises with 0–5 employees and of small firms with 6–20 employees.³ Owners of these micro and small enterprises (MSEs) are worthy of special attention because their firms comprise a significant proportion of most nations’ economic activity (McMillan & Woodruff, 2002;

2. There are exceptions, such as the research on *Grameen Village Phone in Bangladesh* (Bayes, Von Braun, & Akhter, 1999; Richardson, Ramirez, & Haq, 2000), and Plant’s (2002) worldwide observational studies. Others have examined country-specific issues in the Philippines (Ellwood-Clayton, 2003; Strom, 2002), Bulgaria (Varbanov, 2002), and China (Yu & Ting, 2003). Nevertheless, most research on the social and economic dimensions of mobile use focuses on developed economies.

3. Definitions of micro-, small- and medium-sized enterprises vary widely. Generally, MSEs (comprised of microenterprises and “small enterprises”) are the smallest, most numerous businesses within the larger group of enterprises called SMEs (small- and medium-sized enterprises). Though SME is a more popular term, MSE is more appropriate for this population, where all the enterprises have 20 or fewer employees.

Mead & Leidholm, 1998). Urban MSEs span the gamut of economic activities, including street vendors, traders, service providers (mechanics, tailors, etc.), and small manufacturers. In rural areas, the bulk of MSEs are agricultural. Microenterprises, especially, are often informal or semi-formal entities.

Researchers and development practitioners have begun to study the ICT needs of MSEs (la Rovere, 1996; Lind, 2000; Matambalya & Wolf, 2001; Müller-Falcke, 2002). One emerging theme posits that because not all microenterprises and small firms face similar challenges, not all enterprises have the same ICT needs (Barton & Bear, 1999). For example, Duncombe and Heeks (2001) present a comprehensive approach to ICT needs based on their analysis of SMEs in Botswana. They argue that not all small firms need to become intensive ICT users to be effective. Instead, because the information needs of the majority of SMEs are simple, informal, and based on social ties with known, proximate actors, Duncombe and Heeks argue that the majority of SMEs require little or no ICT technology, *save perhaps the telephone*. Echoing Saunders et al. (1994), as well as Eggleston, Jensen, & Zeckhauser (2002) and Kayani and Dymond (1997), Duncombe and Heeks conclude that the telephone is

the information-related technology that has done the most to reduce costs, increase income and reduce uncertainty and risk. Phones support the current reality of informal information systems, they can help extend social and business networks, and they clearly substitute for journeys and, in some cases, for brokers, traders and other business intermediaries. They therefore work “with the grain” of informality yet at the same time help to eat into the problems of insularity that can run alongside. Phones also meet the priority information needs of this group of communication rather than processing of information (2001:19).

Mobile telephone technologies are not the only way to provide telephony to the large community of MSEs that requires it. Landlines, public telephones, shared phones (such as Grameen Village Phone⁴), and especially telecenters and small telephone shops (Barton & Bear, 1999; Bertolini, 2001; Colle & Roman, 2002; Kenny, 2002) are alternate mechanisms.

Nevertheless, the incredibly rapid growth of mobiles makes it essential to understand how MSEs utilize them.

User-Level Approaches

Saunders et al. (1994) and Kenny, Navas-Sabater, and Qiang (2002) recommend using market and user-based research to understand ICT needs in developing nations. This paper addresses those recommendations, and seeks to understand how MSE owners use the mobile to address the challenges they face in everyday activities. This “micro-level,” user-focused inquiry draws from the *uses and gratifications* approach within communication research (Blumler & Katz, 1974; Dordick, Lum, & Phillips, 1983; Ruggiero, 2000). The approach seeks to examine how ICTs are used by individuals to satisfy their needs, and thus to understand their motives for ICT use. Viewing mobile use through the uses and gratifications lens helps explain barriers and drivers to adoption, as well as explain usage patterns that may vary across individuals and contexts.

Previous work on the dimensions of telephone usage (Dimmick, Kline, & Stafford, 2000; Dimmick, Sikand, & Patterson, 1994; Leung & Wei, 2000; Noble, 1989; O’Keefe & Sulanowski, 1995) provides clues about what sorts of uses and gratifications MSE owners might pursue via their mobiles. LaRose (1999) reviews studies that indicate strong evidence for at least two factors underpinning telephone usage: *instrumental* (task-related) and *intrinsic* (socially or emotionally focused). A third dimension, *security*, appears in some similar studies (Dimmick et al., 1994; Dordick et al., 1983). The general expectation of this study is that MSE owners will value both intrinsic and instrumental elements of mobile usage, though not all in the same way or to the same degree.

Within an instrumental set of motivations, a few distinct elements are possible. First, like landlines, the mobile offers *access to information*, particularly about prices (Bertolini, 2001; Chaffee, 1982; Eggleston et al., 2002), and *productivity*, by time savings or reduction of travel expenses (Abler, 1977; Bertolini, 2001; Katz, 1999). In addition, mobiles offer—of course—*mobility* (Roos, 1993; Townsend, 2000), *coordination with others* (Noble, 1989;

4. Bangladesh’s Grameen Village Phone is perhaps the best-documented example of mobile phone usage by microenterprises. Over 10,000 microentrepreneurs have purchased a mobile and have become telecommunication providers for an entire village (Bayes et al., 1999; Richardson et al., 2000).

Rheingold, 2002), and *constant connectivity* with friends, family, and business contacts (Katz & Aakhus, 2002a).

In terms of intrinsic motivations, *status*—the mobile as social signal—may be as relevant in the developing world as it is in the developed world (Varbanov, 2002). Other intrinsic motivations, such as *entertainment* (O’Keefe & Sulanowski, 1995), *happiness*, the joy of *early-adoption* (Rogers, 1983), or *play* (Stephenson, 1967) with the features of the mobile may also prompt mobile usage. Additional goals, such as *security* (Dimmick et al., 1994) and *control* (Sarch, 1993), may be important to MSE users.

Blurring of Personal Versus Business Uses of the Mobile

The variety of uses and gratifications for the mobile underscores a significant challenge in its study: since they are generally attached to a person rather than to a location, it is difficult to classify mobiles as enabling exclusively home/personal or business activities (Gant & Kiesler, 2001; Geisler & Golden, 2002; Green, 2002; Haddon, 2000). Many microentrepreneurs work out of their home (Chen & Dunn, 1996) or have no fixed place of business. Owners of more established small businesses may have a fixed business location, but still may not have a landline at home or work. In either case, the mobile may be used for both personal and business communication. Thus, the traditional method of both sociological and developmental approaches to telephony, which is to separate business from personal/domestic functions, needs to be replaced with an integrated approach that accounts for the dual use of many mobile handsets.

Mobiles in Rwanda

Though the country is densely populated, most of Rwanda’s 8 million people live in rural areas and are engaged in agriculture. The economy is growing again after the 1994 genocide, though it still has a GDP (PPP) per capita of only \$1,200 (CIA, 2003). It has a state-owned telecommunications company, RwandaTel, and a dynamic cellular company, MTN Rwanda Cell, which is quickly adding base stations and users. In 2002, there were 2.8 landlines and 13.6 mobile lines for every 1,000 people (ITU,

2003). Billboards advertise MTN’s services on the streets of Kigali, and pre-pay phone cards make mobiles accessible to a growing number of Rwandans, especially in larger towns. While differences in political, cultural, and economic contexts make every nation unique, it is fair to say that the day-to-day challenges faced by Rwanda’s urban microentrepreneurs are similar in many ways to those faced by urban microentrepreneurs elsewhere in sub-Saharan Africa, and perhaps beyond.

Research Goals

Using a prioritization exercise with a set of statements drawn from the list of motivations discussed in the literature, the study explores the subjective, integrated opinions of participants concerning their mobiles. Asking participants to consider a variety of motivations (intrinsic and instrumental) and contexts (personal and business) in one integrated exercise allows us to better understand how MSE users *think* they use the mobile, as well as their expectations of what use entails. Understanding MSEs’ answers to these questions may help economic development practitioners and mobile phone providers design services and campaigns to get mobiles in the hands of more MSE users. Communication and development theory, meanwhile, will benefit from an additional mapping of the reasons for adoption and use of a rapidly spreading communication technology.

Methods

Since its invention by William Stephenson (1953), Q methodology has been used by researchers across a diverse set of fields. While interested parties should look to specific methodological texts (S. R. Brown, 1980; McKeown & Thomas, 1988) for details on the approach, a brief introduction is warranted here. The approach can be a valuable addition to the methodological toolkit of researchers in ICT and development, many of whom work in places where other forms of user research (e.g., surveys) can be difficult to field.

The Q-sort technique is well-suited to the uses and gratifications approach to communication behaviors.⁵ The core of the method is a prioritization exercise that elicits from a participant his or her particular perspective on a complex concept or issue.

5. An excellent bibliography of Q-related materials, compiled by Steven R. Brown, is available on Peter Schmolck’s Q-Method Page: <http://www.rz.unibw-muenchen.de/?p41bsmk/qmethod/>.

The process of sorting through a few dozen statements, all related to a single concept but not all of equal appeal to the participant, allows the participant to carefully consider (or discover) and report his or her own subjective, unique view. When multiple people perform the same Q-sort task, it is possible to use quantitative techniques to identify similarities and differences in the way they prioritize the elements. Thus, with even a relatively small set of participants, researchers can identify distinct, archetypal perspectives concerning the topic at hand.

Q methodology emerges from and supports an ongoing tradition that is interested in *subjectivity*—in eliciting and examining the complex and unique perspectives of individuals. To this end, the methodology draws on elements from both the qualitative and quantitative research paradigms. On the one hand, like many qualitative methods, Q methodology helps researchers uncover rich contextual perspectives in ways survey questions cannot do, and is often applied to relatively small numbers of participants (occasionally, even single cases).

On the other hand, like quantitative methods, Q allows for easy comparisons across multiple individuals, as well as for rigorous examinations of the interrelationships between multiple concepts. Thus, Q methodology can be considered a “bridge between” (Sell & Brown, 1984) or “combination of” (S. R. Brown, 1996), qualitative and quantitative methods. Though these philosophical and methodological distinctions between Q and other research paradigms are the topic of ongoing discussion in the community of Q researchers (S. R. Brown, 2002), for many researchers interested in ICT users, it might be sufficient to consider Q as a complement to—rather than as a replacement for—traditional survey approaches on the one hand, and qualitative interviews on the other. Q methodology’s overall focus on subjectivity, rather than objectivity, has implications for the ways in which its instruments are created, participants are selected, and results are

interpreted. The rest of this Methods section addresses each of these implications in turn.

The Q Instrument

During a Q-sort, participants are asked to arrange (rank) a set of statements according to how well they represent the participants’ viewpoint. This is usually done manually; statements appear on individual index cards, which participants physically arrange on a tabletop workspace underneath a “header strip” that guides the number of statements allowed under each category. Table 1 illustrates the shape of the eventual sort—in this case, a continuum from “least describes me” through “best describes me”—under which more items are allowed in the middle and fewer on the extremes. Table 1 also represents an answer sheet, used to capture the order of the statements once the sort is complete; each statement is given a number, and its location on the tabletop workspace is written in the corresponding space on the answer sheet. Table 2 lists the statements used in this Q study.

Unlike most survey designs, Q statements are considered as a set, and participants are encouraged to iterate, rearrange, and consider the “big picture” until they are comfortable with the final placement of the items relative to each other. The process is quiet and personal, often requiring careful consideration and introspection on the part of the participant. Thus, the meaning of an individual statement ranked in a Q by the participant is primarily expressed through its placement relative to other statements at the time of the sort, and is further interpreted by the researcher as he or she evaluates the resulting set of completed sorts (McKeown & Thomas, 1988).⁶ This process of iteration, comparison, and reflection is the key to eliciting the subjective perspective of the participant.

The statements structure the range of concepts that participants have at their disposal as they are asked to perform the sort. Since a primary goal in selecting statements is to ensure a representative

6. Q-sorts can also be performed using photographs as stimulus items rather than statements. For example, photographs can be used to elicit people’s perspectives on the attractiveness of various landscapes (Fairweather & Swaffield, 2002). The fact that people view photos differently—picking up on different details, being drawn to different elements within the photo—is a good illustration of how critical a participant’s unique, subjective interpretations of stimulus items are to the sorting task. It is only once we see how an individual sorts photographs relative to each other in the sort matrix that it becomes possible to see what the participant views as important about “landscapes” in general. The same process of iteration, comparison, and reflection occurs, although less obviously, as individuals sort and interpret text statements.

Table 1. Structure of Q-sort task: Sample (Completed) Answer Sheet

		Least Describes Me					Best Describes Me			
Rating		-4	-3	-2	-1	0	1	2	3	4
	10	15	2	27	9	32	13	3	7	
	14	17	22	5	1	11	31	21	20	
Spaces to Arrange and Record Statements		23	16	29	24	19	28	4		
			6	26	18	12	20			
					8					
						25				

group of concepts pertaining to the issue at hand, Q researchers often speak of a “sample” of statements. Most sorts contain 20–60 statements derived from interviews with participants or chosen by the researcher according to hypotheses about what kinds of concepts might be relevant to participants.

This study contained 32 text statements written by the researcher. The process of selecting concepts and writing statements was informed by three sources, each reviewed in the discussion above: (1) the uses and gratifications literature about telephones, (2) the “mobile society” literature, and (3) the benefits to small business of telephones, as covered by Saunders et al. (1994) and Duncombe & Heeks (2001). The key implication of these sources suggests that both instrumental and intrinsic motivations may be at play. The overall set of statements was left relatively unstructured, rather than standardizing the number of items in each rough category or balancing the items in a factorial design (McKeown & Thomas, 1988). As Table 2 illustrates, in addition to intrinsic items, various instrumental statements were chosen related to connectivity, information, productivity, security, and other issues. Statements related to both business and personal matters (family, friends) were included.

The Q procedure was administered in a one-on-one setting. Two desktop-sized cardboard workspaces helped guide the sort. The first board contained three spaces: “Less Like Me,” “Neutral,” and “More Like Me.” These spaces helped participants conduct a preliminary sort. The second workspace contained the signature shape in a Q-sort, an upside-down pyramid with 32 individual spaces, each large enough to contain one of the

statements. Participants were asked to use this second workspace to sort the statements into nine columns, ranging from “Least Describes Me” to “Best Describes Me” (see Table 1). All items and instructions were professionally translated into French and Kinyarwanda prior to administration. Including some open-ended questions and introduction time, each Q interview lasted 20–25 minutes. As a small honorarium, subjects received a pre-paid mobile phone card worth roughly \$5.

Selecting Participants

Most Q studies involve more than one participant. However, since the subjective perspectives of the participants are the focus of the analysis, large and/or representative samples of participants are not as common among Q studies as in conventional quantitative/objective survey research (McKeown & Thomas, 1988). This is not to say that Q researchers do not strive to gather a set of respondents who are likely to reveal a range of perspectives. However, many Q-sorts involve fewer than 50 participants, because these small numbers are generally sufficient to draw out the “archetypal” patterns of responses (perspectives) on the issue at hand. Of course, small or unrepresentative samples of participants in a Q exercise will prevent the estimation of the relative proportion of people in a population who ascribe to perspective X or perspective Y. As McKeown and Thomas (1988) explain, whereas many surveys seek to measure and validate concepts and traits that are presumed to exist *independently* of any given person, Q methodology assumes that (a) an individual’s perspective on an issue is created in response to the sorting of all stimulus items and (b) the shapes of

Table 2. List of Statements, Ordered by Concept

Concept	Statement Number	Statement
Connectivity	1	I use my mobile to stay in touch with my customers.
	3	I use my mobile to stay in touch with my suppliers.
	13	My mobile gives me access to new customers.
	15	I use my mobile to stay in touch with my family.
	24	My mobile helps me come and go without worrying about missing calls.
	26	I use my mobile to stay in touch with my friends.
Information	19	My mobile helps me find work.
	21	My mobile helps me keep informed about prices in my business.
Intrinsic	6	Having a mobile makes me more important.
	7	Having a mobile makes me feel more connected to the world.
	9	I like customizing my mobile with accessories like special sounds and carrying cases.
	20	I enjoy talking to my friends and family on my mobile.
	23	Having a mobile makes me happy.
	28	My mobile is stylish.
Productivity	32	My family is happier because I have a mobile.
	5	My business is easier now that I have a mobile.
	8	My family has more money because I have a mobile.
	14	My mobile saves me time.
	17	My mobile lets me get more done during the day.
	29	My mobile helps my business save money.
Security	30	My mobile helps me make more money in a day.
	22	I use my mobile for emergency calls.
Other	27	My mobile makes me feel more secure.
	2	Getting a mobile changed the way I do business.
	4	I am interested in learning about new features or mobile models.
	10	I can't do business without my mobile.
	11	I was among the first of my friends and business associates to have a mobile.
	12	I give my mobile number to many people.
	16	I share my mobile with my family or friends.
	18	I keep my mobile with me at all times.
	25	My mobile gives me more control over who I talk to, and how/when I talk to them.
	31	I use my mobile for business more than for social calls.

the archetypal perspectives are interesting in and of themselves, regardless of how many or how few people are thought to have that perspective in the population as a whole.

For this study, Q exercises were carried out in and around Kigali during October 2002. The participant-sample was purposive rather than random, with the goal of including a range of MSE owners with up to 20 employees. Interviews were based in the capital's markets, streets, and small shops. Participants in-

cluded both microentrepreneurs involved in informal businesses: trading, textiles, foodstuffs, household items, etc., as well as owners of more established small enterprises, such as a bakery and a butcher shop.

Analysis Methods: Finding Archetypal Perspectives

In a Q-sort, the data gathering methodology and intended analytical approach are intertwined, so a

brief discussion of the general analysis procedure is warranted.⁷ The key challenge is this: even though the Q method views the subjective and unique perspective of each participant as interesting and relevant on its own, the task of understanding and discussing dozens of distinct perspectives can be daunting (McKeown & Thomas, 1988). By applying a sequence of statistical procedures to the set of Q-sorts, it is possible to identify, interpret and discuss a small number of common perspectives on the issue, as defined in varying degrees by the participants. Once this simplification has occurred, these “archetypal” perspectives can then be named and interpreted, both on their own and in reference to each other. This data reduction is performed using a form of factor analysis. The following paragraphs review the process; interested readers are encouraged to pursue details of the methodology in more extensive texts (S. R. Brown, 1980; Kim & Mueller, 1978; McKeown & Thomas, 1988). By streamlining many of these transformations and calculations, the software program PQMETHOD⁸ has made the approach accessible to a wide range of researchers.

To prepare for the factor analysis, participants’ rankings on each item are first entered into a matrix, where statements appear in rows and participants appear in columns. This is unlike other applications of factor analysis, where participants are placed in rows and their responses to questions are placed in columns. Inverting the matrix in this way (with statements in rows) places all the responses on a common scale: “importance to the participant, relative to the other stimulus items” (McKeown & Thomas, 1988). The correlation between columns is then calculated, which identifies how alike (or unlike) each participant’s rankings are from each other participant. An example of this correlation table, displaying only the first six sorts from the current study, appears in Table 3.

The next step is to apply factor-analysis procedure to the correlation matrix. While conventional factor analyses are generally used to identify groups of similar *questions*, the factor analysis step in Q

methodology draws from the correlation table described above to identify groups of similar *participants*. There are a number of possible factor extraction methods (McKeown & Thomas, 1988), but the goal of each is the same: to identify a set of underlying dimensions that capture as much of the variance in the total set of correlations as possible, thus reducing the complexity and size of the correlation table. Generally, the original extraction is followed by a second step, which selects and rotates a subset of the factors to aid in interpretation.

As McKeown & Thomas (1988:51) explain, the selection of the number of factors for analysis in this second step “is not as straightforward” as it is in the first step; mathematically, one can look to the proportion of the total variance in the original matrix explained by the factor.⁹ However, the researcher’s judgment is also involved, as factors can be included (or excluded) according to theoretical criteria, such as characteristics of the participants defining the factor or the alignment of the statements within the factor.

The rotation of factors can be done using a mathematical procedure such as Varimax, which attempts to maximize the amount to which any particular sort loads on a single factor while minimizing the extent to which it loads on any other factor. However, in Q methodology, some researchers prefer a hand rotation, which allows for a more judgmental, and perhaps more meaningful solution (S. R. Brown & Robyn, 2003). Table 3b illustrates what the four final Varimax-rotated factors look like for the first six sorts from the current study. Table 4 displays the full results. These decisions—on factor selection and on rotation methods—underscore the interpretative, judgmental approach to quantitative analysis that makes Q methodology distinct from both traditionally qualitative and quantitative methods.

Regardless of whether one uses Varimax rotation or hand rotation, the result of the rotation is a set of factor loadings. These loadings represent the extent to which each participant’s sort is similar to the

7. The analysis section of this paper draws particularly on “statistical analysis,” pages 46–54 in McKeown & Thomas (1988).

8. PQMETHOD is available at <http://www.rz.unibw-muenchen.de/~p41bsmk/qmethod/>

9. The proportion of variance explained by the factor is indicated by the factor’s eigenvalues (the sum of the factor’s squared factor loadings). Eigenvalues greater than one are considered significant (McKeown & Thomas 1988:51).

Tables 3a–3d. Example of Transformation of Correlation Matrix to Factor Loadings and Factor Arrays (partial table: 6 of 30 cases displayed)¹⁰

3a. Correlations between participants' sorts							Factor analysis and subsequent rotation used to reduce matrix	3b. Factor Loadings				
Participant Number	1	2	3	4	5	6		Participant Number	F1	F2	F3	F4
1	1	0.11	0.47	0.94	-0.06	-0.01	5	1	0.11	0.18	0.81*	0.11
2	0.11	1	0.30	0.16	0.02	0.34		2	0.74*	0.02	0.04	0.33
3	0.47	0.30	1	0.44	-0.11	0.18		3	0.38	0.27	0.39	0.37
4	0.94	0.16	0.44	1	0.03	-0.05		4	0.12	0.13	0.86*	0.14
5	-0.06	0.02	-0.11	0.02	1	-0.24		5	-0.17	-0.55	0.17	0.28
6	-0.01	0.34	0.18	-0.05	-0.24	1		6	0.69*	0.09	0.13	-0.05

* loading is significant at $p < .01$

Significant loadings are used to calculate factor arrays (as z-scores)



3c. z-scores, per factor					
Statement Number	(Statements 1–5 of 32 shown)	F1	F2	F3	F4
1	I use my mobile to stay in touch with customers.	0.53	-0.15	-0.09	0.45
2	Getting a mobile changed the way I do business.	0.46	-0.30	-0.40	1.75
3	I use my mobile to stay in touch with suppliers.	1.04	-0.21	-0.21	0
4	I am interested in learning about new features.	-0.10	-0.73	1.26	-0.01
5	My business is easier now that I have a mobile.	1.75	-0.41	-0.50	-0.19

Factor arrays are re-expressed as ranking scores, like original sorts



3d. Item rankings, per factor					
Statement Number	(Statements 1–5 of 32 shown)	F1	F2	F3	F4
1	I use my mobile to stay in touch with customers.	+1	0	0	+1
2	Getting a mobile changed the way I do business.	+1	0	+1	4
3	I use my mobile to stay in touch with suppliers.	+2	0	0	0
4	I am interested in learning about new features.	0	-2	+2	0
5	My business is easier now that I have a mobile.	+4	-1	-1	-1

10. A similar table appears in McKeown & Thomas (1988:50).

“archetypal” sort represented by the factor. Mathematically speaking, participants who load significantly¹¹ on a factor, that is, largely agree on the statements that describe them best (and least), are designated as *defining* that factor. Theoretically, participants who define a factor are considered to share a common perspective (S. R. Brown, 1993; McKeown & Thomas, 1988). To represent this archetypal perspective, the final step is to calculate the rankings represented by the factor in a format as if “the factor” were the voice of a single individual completing the sort. To do so, the rankings from each of the participants defining each factor are weighted (according to their factor loadings), combined, and then displayed as a *factor array*. These arrays are initially calculated as z-scores (Table 3c), but can be re-expressed as rankings in the same format and scale as the original instrument (e.g., -4 to +4, as is shown in Table 3d).

With this final step, it becomes easy to interpret each factor as representing an archetypal sort, where each factor is the mathematical representation of a distinct perspective. Then the researcher examines the resulting factors (including the relative placement of items within each factor, as well as the differences in placements of items between factors) to interpret and name the perspective it represents. As was suggested earlier in the discussion of selecting and rotating factors, the process of examining factor solutions is iterative, and requires the judgment and interpretation of the researcher, rather than adherence to strict criteria. The researcher may experiment with extracting different numbers of factors (according to how much variance each explains and/or how many participants define each factor), as well as with choosing different sets of participants to define each factor array. Since the people defining a factor can be said to (more or less) ascribe to a single, archetypal perspective, their demographic or behavioral characteristics may be also considered at this stage, as part of the interpretation process.

Results

The analysis yielded four factors, each of which can be considered a mathematical representation of a

distinct perspective held by participants about what the mobile means to them. One of these perspectives is characterized by instrumental approaches to the mobile (convenience); one perspective is more intrinsic, focusing on how the mobile makes participants feel important and perhaps stylish; and two perspectives mix intrinsic and instrumental approaches, focusing on the mobile’s indispensability or productivity, but also on how the mobile makes them feel—important. The following paragraphs describe in more detail the factors (and the perspectives each factor represents), as well as the groups of participants defining each factor.

Thirty-one Rwandans (21 men, 10 women) participated in the exercise. Four additional people submitted sorts, but their results were discarded due to problems with transcription. Two people heard the instructions and declined to participate. Given the strangeness of the task and the relative lack of experience of Rwandan MSEs with surveys or other forms of attitudinal research, we were pleased with overall willingness of the MSE owners to participate. All participants were MSE owners; 11 were micro-entrepreneurs with no employees, 9 were micro-entrepreneurs with 1–5 employees, and the remaining 11 (small business owners) had 6–20 employees.

Using PQMETHOD, a principal components analysis on the correlation matrix revealed at least eight factors with eigenvalues greater than 1. As is conventional in Q interpretation, several Varimax-rotated solutions were examined, according to the iterative/judgmental procedure described in the previous methods section. In this case, a four-factor solution was chosen for its balance of parsimony and explanatory power. The four selected factors accounted for 60% of the initial variance.

Participants were considered to define a factor if they loaded significantly (approx. 0.45 or greater) on a single factor. Under these criteria (McKeown & Thomas, 1988), 8, 5, 7, and 5 participants defined the four factors respectively, meaning their rankings were used to calculate the “archetypal” array of factor scores. Four participants did not define any factor, since their factor loadings did not exceed 0.45 for any of the four factors. Two participants loaded

11. According to McKeown & Thomas (1988), significance at the $p < .01$ level is achieved when a factor loading is greater than 2.58 times the standard error for the loading, which is calculated as $1/\sqrt{N}$, where N is the number of statements.

Table 4. Participants Sorted by Factor Loadings and Number of Employees

# Emps.	Type	Age	Sex	Factor 1	Factor 2	Factor 3	Factor 4
0	Taxi Driver	25	M	0.708X	0.305	-0.146	-0.054
2	Tailor	22	F	0.687X	0.088	-0.134	-0.053
3	Tailor	28	F	0.673X	0.260	0.186	-0.043
4	Phone Sales	42	M	0.601X	-0.644	0.082	0.167
8	Bookshop	30	M	0.464X	-0.307	0.140	0.171
8	Shop	40	M	0.727X	-0.066	0.110	0.240
11	Butcher Shop	40	M	0.695X	-0.104	0.017	0.327
15	Shop Owner	37	M	0.736X	0.017	0.036	0.333
0	Vegetable Seller	48	M	-0.008	0.766X	0.227	-0.016
0	Vegetable Seller	37	F	0.015	0.704X	0.452	0.175
0	Potato Seller	38	F	0.152	0.815X	0.154	0.248
0	Cabbage Seller	37	F	0.175	0.807X	0.167	0.212
1	Bean Seller	35	F	-0.011	0.653X	0.451	0.215
0	Fisherman	—	M	-0.045	0.044	0.766X	0.160
0	Flour Seller	35	F	-0.019	-0.009	0.769X	0.108
0	Jeans Seller	25	M	0.095	0.032	0.708X	0.195
0	Vendor	24	M	0.460	0.190	0.598X	0.080
2	Clothing Seller	26	M	-0.184	0.055	0.621X	-0.198
3	Toy and Shoes Seller	32	M	0.119	0.135	0.862X	0.141
4	Tailor	37	M	0.111	0.184	0.805X	0.119
0	Vendor	25	M	0.142	0.357	0.049	0.587X
6	Importer	27	M	0.154	-0.053	0.199	0.903X
10	Shop Owner	33	M	0.156	-0.042	0.224	0.912X
12	Shop Owner	43	M	0.159	-0.064	0.117	0.914X
14	Beauty Shop	34	F	0.089	0.027	0.138	0.909X
0	Milk Seller	24	M	-0.013	-0.308	-0.133	0.300
3	Phone Sales	33	M	-0.171	-0.552	0.169	0.282
3	Baby Store	30	F	0.381	0.273	0.386	0.374
7	Butcher Shop	38	M	0.097	-0.783	0.093	0.220
7	Shop Owner	36	F	0.282	0.015	0.011	0.383
20	Bakery	50	M	-0.052	-0.086	0.067	0.082
Pct. of variance explained:				14%	16%	15%	16%

Note: X = case defines the factor, and is used to calculate "archetypal" factor scores.

significantly and negatively on one factor, meaning their perspectives could best be described as basically the *opposite* of the archetypal perspective represented by that factor. (The rankings of the four nonloading and two negative-loaders were excluded from the calculations of any of the four sets of factor scores). Table 4 summarizes the factor loadings and demographic attributes of all 31 participants, as well as which participants' rankings were used to calculate each set of factor scores.

Consensus Items

Participants defining each of the four factors ranked "Having a mobile makes me feel more connected to the world" high (+2, +1, +3, +3, respectively) suggesting wide appeal of the basic connectivity function of the mobile.

On the other hand, participants defining each of the four factors ranked "My family has more money because I have a mobile" low (-3, -3, -3, -3, respectively), suggesting no salient cause-effect

Table 5. Consensus Items

State- ment #	Statement	F1	F2	F3	F4
1*	I use my mobile to stay in touch with my customers.	1	0	0	+1
7*	Having a mobile makes me feel more connected to the world.	2	1	3	3
8**	My family has more money because I have a mobile.	-3	-3	-3	-3
9*	I like customizing my mobile with accessories like special sounds and carrying cases.	-2	-2	-2	-2
20**	I enjoy talking to my friends and family on my mobile.	-1	-2	-1	-2

* = does not distinguish between any pairs at p<.01.

** = does not distinguish between any pairs at p<.05.

Table 6. Factor 1: Convenient

State- ment #	Statement	z-score	Factors			
			F1	F2	F3	F4
Describes Me Best						
5**	My business is easier now that I have a mobile.	1.75	4	-1	-1	-1
17**	My mobile lets me get more done during the day.	1.52	4	0	0	2
15	I use my mobile to stay in touch with my family.	1.46	3	2	0	0
14**	My mobile saves me time.	1.22	3	0	0	-1
26	I use my mobile to stay in touch with my friends.	1.11	3	3	1	0
Other Distinguishing (Relatively High) Statements						
3**	I use my mobile to stay in touch with my suppliers.	1.04	2	0	0	0
21**	My mobile helps me keep informed about prices in my business.	0.72	1	-1	-1	-1
10**	I can't do business without my mobile.	-0.17	0	-2	4	-4
Other Distinguishing (Relatively Low) Statements						
23**	Having a mobile makes me happy.	-0.39	-1	3	2	1
6**	Having a mobile makes me more important.	-1.15	-2	4	3	4
Describes Me Least						
25	My mobile gives me more control over who I talk to, and how/when I talk to them.	-1.24	-3	-4	-2	-4
8	My family has more money because I have a mobile.	-1.27	-3	-3	-3	-3
28	My mobile is stylish.	-1.28	-3	1	-3	-3
16*	I share my mobile with my family or friends.	-1.58	-4	4	2	-2
11	I was among the first of my friends and business associates to have a mobile.	-2.18	-4	-4	-4	-2

Note: Distinguishing statements: *p<.05; **p<.01.

Table 7. Factor 2: Intrinsic

State- ment #	Statement	z-score	Factors			
			F1	F2	F3	F4
Describes Me Best						
6	Having a mobile makes me more important.	1.55	-2	4	3	4
16	I share my mobile with my family or friends.	1.34	-4	4	2	-2
12	I give my mobile number to many people.	1.33	0	3	4	0
23	Having a mobile makes me happy.	1.23	-1	3	2	1
26	I use my mobile to stay in touch with my friends.	1.22	3	3	1	0
Other Distinguishing (Relatively High) Statements						
24*	My mobile helps me come and go without worrying about missing calls.	1	1	2	1	0
28**	My mobile is stylish.	0.66	-3	1	-3	-3
Other Distinguishing (Relatively Low) Statements						
2*	Getting a mobile changed the way I do business.	-0.31	1	0	1	4
4*	I am interested in learning about new features or mobile models.	-0.73	0	-2	2	0
Describes Me Least						
8	My family has more money because I have a mobile.	-1.19	-3	-3	-3	-3
30	My mobile helps me make more money in a day.	-1.27	-2	-3	-2	2
19**	My mobile helps me find work.	-1.51	2	-3	-1	3
25	My mobile gives me more control over who I talk to, and how/when I talk to them.	-1.6	-3	-4	-2	-4
11	I was among the first of my friends and business associates to have a mobile.	-1.69	-4	-4	-4	-2

Note: Distinguishing statements: * $p < .05$; ** $p < .01$.

between mobile acquisition and perceived family prosperity. Table 5 describes items that did not significantly distinguish among any factor.

Factor 1: Convenient

Both microentrepreneurs and small business owners defined this factor. Table 6 indicates that the participants defining this factor like the mobile as a time-saver (+3) and as way to get more done in a day (+4). The group is unique, however, in reporting that their business lives have become easier with the mobile (+4). Perhaps it is the way the mobile helps them stay in contact with suppliers (+2) and to find out prices (+1) that makes it so convenient. Though participants defining this factor use the mobile to stay in touch with their family (+3), they do not share the mobile with them (-4); the mobile belongs to them alone. Relative to any other group,

the participants defining this factor do not view the mobile as something that makes them feel happy (-1) or important (-2).

Factor 2: Intrinsic

All participants defining this factor were microentrepreneurs. Table 7 indicates that this factor is different than the *convenient* factor. This group's top items concern feelings of importance (+4) and happiness (+3), sharing the mobile (+4) and the number (+3) with friends, and staying in touch with friends (+3). The participants defining this factor also assert that their mobile is "stylish" (+1), and that it allows them to come and go without missing calls (+2), presumably from their family and friends. By contrast, participants defining this rank two work-specific items especially low: the mobile as a way to find work (-3) and the mobile as something

Table 8. Factor 3: Indispensable

State- ment #	Statement	z-score	Factor			
			F1	F2	F3	F4
Describes Me Best						
10**	I can't do business without my mobile.	1.69	0	-2	4	-4
12	I give my mobile number to many people.	1.41	0	3	4	0
7	Having a mobile makes me feel more connected to the world.	1.36	2	1	3	3
13**	My mobile gives me access to new customers.	1.35	0	0	3	1
6	Having a mobile makes me more important.	1.3	-2	4	3	4
Other Distinguishing (Relatively High) Statements						
4**	I am interested in learning about new features or mobile models.	1.26	0	-2	2	0
31*	I use my mobile for business more than for social calls.	0.04	-1	-1	0	2
Other Distinguishing (Relatively Low) Statements						
19**	My mobile helps me find work.	-0.5	2	-3	-1	3
Describes Me Least						
29*	My mobile helps my business save money.	-0.93	0	-1	-3	3
8	My family has more money because I have a mobile.	-1.24	-3	-3	-3	-3
28	My mobile is stylish.	-1.72	-3	1	-3	-3
11	I was among the first of my friends and business associates to have a mobile.	-1.88	-4	-4	-4	-2
22	I use my mobile for emergency calls.	-1.91	2	1	-4	-3

Note: Distinguishing statements: *p<.05; **p<.01.

that changed the way they do business (0). Furthermore, in responses to an open-ended question as to why they purchased a mobile in the first place, three of the five participants defining this factor reported “to be like everyone else” or to be “like their friends.”

Factor 3: Indispensable

All seven of the participants defining this factor were microentrepreneurs with fewer than five employees. Table 8 suggests that this factor is differentiated by its highest-rated statement—participants defining this factor cannot do their business without the mobile (+4). Sharing their number with people (+4), they depend on the mobile to find new customers (+3). But, unlike the *convenient* group, the statements they rate high have little to do with something that has changed the way they do business. It may be the connectivity with customers that allows their business to function. Given the high rankings of “feeling connected to the world” (+3) and “feeling

more important” (+3), it seems that the overall connection to the mobile may be intrinsic, as well as instrumental.

Factor 4: Productive

One microentrepreneur and four small business owners define this factor. Like those defining the *convenient* factor, the participants defining this factor see the value of the mobile as a tool, an investment, or as something that helps business productivity. As Table 9 indicates, this factor is the only one to rank “The mobile helps my business save money” high (+3). Participants defining this factor also give high marks to “The mobile changed the way I do business” (+4), perhaps because the mobile helps them “get more done” (+2) and “make more money in a day” (+2). While for this group, the mobile might be more of a business device (+1) and less of something to be shared with friends and family (-2), there is an intrinsic element to their view of the mobile; like those defining the

Table 9. Factor 4, Productive

State- ment #	Statement	z-score	Factors			
			F1	F2	F3	F4
Describes Me Best						
2**	Getting a mobile changed the way I do business.	1.75	1	0	1	4
6	Having a mobile makes me more important.	1.56	-2	4	3	4
7	Having a mobile makes me feel more connected to the world.	1.46	2	1	3	3
29**	My mobile helps my business save money.	1.41	0	-1	-3	3
19	My mobile helps me find work.	1.39	2	-3	-1	3
Other Distinguishing (Relatively High) Statements						
30**	My mobile helps me make more money in a day.	0.99	-2	-3	-2	2
17**	My mobile lets me get more done during the day.	0.8	4	0	0	2
31*	I use my mobile for business more than for social calls.	0.76	-1	-1	0	2
Other Distinguishing (Relatively Low) Statements						
16*	I share my mobile with my family or friends.	-0.88	-4	4	2	-2
Describes Me Least						
28	My mobile is stylish.	-1.35	-3	1	-3	-3
22	I use my mobile for emergency calls.	-1.49	2	1	-4	-3
8	My family has more money because I have a mobile	-1.5	-3	-3	-3	-3
25	My mobile gives me more control over who I talk to, and how/ when I talk to them.	-1.5	-3	-4	-2	-4
10	I can't do business without my mobile.	-1.51	0	-2	4	-4

Note: Distinguishing statements: * $p < .05$; ** $p < .01$.

intrinsic and *indispensable* factors, members of this group feel that having the mobile makes them "more important" (+4).

Follow-Up Analysis: Demographic Attributes of the Groups

In addition to reporting their factor scores, Table 4 breaks down participants according to gender, number of employees, and occupation. Chi-square tests were conducted to assess the relationship between group membership and gender, group membership and company size. The tests were significant at $p < .1$ and $p < .01$, respectively. For gender, $\chi^2(3, N = 25) = 6.815, p = 0.078$; this was due probably to the higher concentration of women defining the intrinsic factor. For firm size (microenterprises with five or fewer employees versus small firms with six or more employees), $\chi^2(3, N = 25) = 12.132, p = 0.007$; no larger firms defined either the intrinsic or the indispensable factors. An ANOVA comparing the mean age of participants defining each factor did

not find a significant difference in age among groups.

Given the extremely small number of participants and the nonrandom method used to select them, considerable care should be taken in interpreting the relationship between demographic variables and factor membership. In other words, the Q exercise provides much stronger evidence for the existence of the four perspectives (represented by each factor) than for the size and distribution of groups in the population that hold these perspectives (McKeown & Thomas, 1988). Thus, the discussion will treat the observed relationships between factor definition and firm size as worthy of further study, rather than as a finding that is generalizable to a larger population.

Discussion

The results support the expectation that MSE users approach mobiles from distinct perspectives. The four perspectives identified represent different sets

of intended uses and expected gratifications from mobile phone ownership, each of which resonates with dimensions identified in other, more ICT-dense environments, such as the United States and Europe. While some participants value mobiles for clearly instrumental reasons, others value them for intrinsic reasons; still others report perspectives on their mobiles that draw on a combination of instrumental and intrinsic elements.

The existence of an intrinsic perspective—focused on style, happiness, and social status—is certainly not surprising, given the way mobiles have been socially constructed and aggressively marketed as status symbols and consumption items (Smith, 1998; Townsend, 2000; Varbanov, 2002). To participants defining the intrinsic factor, the mobile's utility for pursuing self-presentational/social uses and gratifications such as "to be like everyone else" and "to be more important" is more salient than its utility in a purely economic (business) sense.

The existence of an instrumental perspective, represented by the *convenient* factor, is not surprising. This perspective sees the mobile as a timesaver and as a tool for maintaining connectivity with business and personal contacts. When development practitioners and scholars look toward the benefits of telecommunications technologies (e.g., Saunders et al., 1994), it may be with a similar instrumental perspective in mind.

Two other perspectives were identified, each with slightly more complex approaches to the mobile. The perspectives, represented by the *indispensable* and *productivity* factors, both gave high rankings to instrumental elements: "accessing new customers" for the former; "saving money" and "finding work" for the latter. However, like the participants defining the *intrinsic* factor, participants defining the *indispensable* and *productivity* factors also reported that the mobile made them "more important." It is difficult to ascertain from this exercise whether the mobile indeed makes them more important in the eyes of their peers or their customers, or rather simply makes them *feel* important. However, the fact that these participants ranked "importance" so highly seems to fit with the view of the mobile as a status symbol, as discussed above. Both these perspectives remind us that people may pursue multiple, perhaps disparate, uses and gratifications through their mobiles.

Participants defining the *convenient* factor sug-

gested they use the mobile to keep in touch with family; those defining the *intrinsic* factor to keep in touch with friends. Both statements reflect the blurring of personal and business uses of the mobile discussed earlier. Instead of using a mobile technology to take work home, users may be using the mobile technology to bring home to work. In a workplace without landlines, the mobile may be an easy way for an MSE owner to keep in touch with his or her family. This blurring issue should be studied in more detail.

Though the small number of participants and nonrandom method of selecting participants do not allow us to definitively associate demographic characteristics with factor loadings, two observed relationships among the study's participants are worth noting, as foundations for further exploration. First, the *productive* and *convenient* factors were defined by significantly higher proportions of participants with more than five employees. The key distinction here may not be the size of the firm per se, but rather the way—for this particular participant sample—firm size correlates with the complexity of the firm. While many of the smaller businesses are vendors—roaming or based in a simple market stall—the larger firms involved were mostly more permanent, complex shops, presumably with payrolls, rent, and perhaps even bookkeeping systems. Pointing back to Duncombe and Heeks (2001), who argue that the information and communication needs of MSEs are mostly simple, it might be the case that productivity and convenience are aspects of the mobile that are more attractive to the more established, more complex businesses.

Second, it is the case that the *intrinsic* factor was defined by a significantly higher proportion of females than the other three factors. This may hint at differences in the ways men and women in Rwanda (and elsewhere) orient to mobiles (Rakow & Navarro, 1993; Townsend, 2000; Yu & Ting, 2003). As is the case with the firm size/complexity issue, further exploration via survey techniques (which can better control for multiple sources of causation/association) is merited (S. R. Brown, 2002).

A final issue concerns the benefits of basic connectivity (whether via landline or mobile) versus those benefits particular to mobile phones. While the *productivity* factor might be speaking about any kind of voice telephony, the elements that are more important to the *intrinsic*, *indispensable*, and *conve-*

nient factors are likely to be more closely tied to the unique social status/display and mobility functions of the mobile. Further study is necessary to isolate conventional "connectivity effects" from the newer "mobility effects," especially in the developing world where many individuals will own only a mobile phone and never a landline.

Using Q methodology, this study identified four distinct perspectives on mobile phone use, each of which can be presumed to be held by some members (segments) of the population of MSEs in Rwanda and beyond (Mauldin, Sutherland, & Hofmeister, 1978; McKeown & Thomas, 1988). Other methodological approaches would be required to determine the relative proportions of adherents to these perspectives in the larger population. To complement and augment the findings from this small-group Q exercise, it might be helpful to approach these intrinsic and instrumental dimensions through traditional, representative survey methods, as others have done (Dimmick et al., 1994; LaRose, 1999; Leung & Wei, 2000). In addition to exploring uses and gratifications in more detail, such studies would be better suited to tracking economic impacts of mobiles, as well as MSEs' willingness and capacity to pay for mobile services. That said, replication of the Q approach in other nations and contexts, such as with rural MSEs, would be helpful, particularly because the mobile seems to sit at the intersection of a such a wide variety of needs and motivations. We have only begun to identify the range of perspectives users in the developing world might have concerning their mobiles.

In summary, by identifying multiple perspectives on mobile use, some intrinsic, some instrumental, and some mixing instrumental and intrinsic elements, this study supports Duncombe and Heeks's (2001) assertion that the academic and development communities should not treat all MSEs as if their needs were equivalent. Development practitioners (and mobile providers) can benefit from looking at this group of MSE owners as complex, goal-seeking consumers of a new technology (Dhawan, Dorian, Gupta, & Sunkara, 2001; Hammond, 2001; Tomlinson, 2002), and can design distinct or complementary campaigns to appeal to the various perspectives (Mauldin et al., 1978). Meanwhile, theoreticians can use this glimpse into the minds and motivations of the Rwandan MSE owners to further explore what the mobile means to the kinds

of people who will make up many of the *next* billion mobile phone users. ■

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MICROENTREPRENEURS AND MOBILES

Appendix. Statements and Rankings

Concept	Statement No.	Statement	Factors (z-scores)			
			F1	F2	F3	F4
Connectivity	1	I use my mobile to stay in touch with my customers.	0.53	-0.15	-0.09	0.45
	3	I use my mobile to stay in touch with my suppliers.	**1.04	-0.21	-0.21	0
	13	My mobile gives me access to new customers.	-0.01	-0.26	**1.35	0.3
	15	I use my mobile to stay in touch with my family.	1.46	1.15	-0.08	-0.1
	24	My mobile helps me come and go without worrying about missing calls.	0.34	*1.0	0.41	-0.16
	26	I use my mobile to stay in touch with my friends.	1.11	1.22	0.55	0.15
Information	19	My mobile helps me find work.	0.92	** -1.51	** -0.5	1.39
	21	My mobile helps me keep informed about prices in my business.	**0.72	-0.51	-0.33	-0.49
Intrinsic	6	Having a mobile makes me more important.	** -1.15	1.55	1.3	1.56
	7	Having a mobile makes me feel more connected to the world.	1.07	0.8	1.36	1.46
	9	I like customizing my mobile with accessories like special sounds and carrying cases.	-0.58	-0.96	-0.53	-1.21
	20	I enjoy talking to my friends and family on my mobile.	-0.46	-0.68	-0.48	-0.82
	23	Having a mobile makes me happy.	** -0.39	1.23	0.97	0.49
	28	My mobile is stylish.	-0.28	**0.66	-1.72	-1.35
	32	My family is happier because I have a mobile.	-0.57	1.17	0.72	-0.35
Productivity	5	My business is easier now that I have a mobile.	**1.75	-0.41	-0.5	-0.19
	8	My family has more money because I have a mobile.	-1.27	-1.19	-1.24	-1.5
	14	My mobile saves me time.	**1.22	-0.3	-0.06	-.2
	17	My mobile lets me get more done during the day.	**1.52	-0.25	-0.03	**0.8
	29	My mobile helps my business save money.	0.12	-0.36	* -0.93	**1.41
	30	My mobile helps me make more money in a day.	-0.89	-1.27	-0.82	**0.99
Security	22	I use my mobile for emergency calls.	0.85	0.85	-1.91	-1.49
	27	My mobile makes me feel more secure.	-0.65	0.7	-1.79	0.83
Other	2	Getting a mobile changed the way I do business.	0.46	* -0.31	0.4	**1.75
	4	I am interested in learning about new features or mobile models.	-0.1	* -0.73	**1.26	-0.01
	10	I can't do business without my mobile.	** -0.17	-0.98	**1.69	-1.51
	11	I was among the first of my friends and business associates to have a mobile.	-2.18	-1.69	-1.88	-1.17
	12	I give my mobile number to many people.	-0.02	1.33	1.41	-0.12
	16	I share my mobile with my family or friends.	* -1.58	1.34	1.19	* -0.88
	18	I keep my mobile with me at all times.	-0.11	1.01	0.2	0.72
	25	My mobile gives me more control over who I talk to, and how/when I talk to them.	-1.24	-1.6	-0.78	-1.5
	31	I use my mobile for business more than for social calls.	-0.47	-0.65	*0.04	*0.76

Note: Distinguishing statements: *p<.05; **p<.01.

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