

Perspectives on mobiles and PCs: a study of attitudinal convergence and divergence among small businesses in urban India

Jonathan Donner
Researcher
Microsoft Research India

jdonner@microsoft.com
196/36 2nd Main, Sadashivnagar, Bangalore India 560001

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Abstract¹

The paper describes two interrelated prioritization exercises, focused on how owners of small and informal businesses in urban India perceive the mobile phone and the personal computer, respectively. Participants performed two Q sorts (a form of card sort) on statements which could apply to either technology. By contrasting how participants prioritize a range of functional and symbolic statements about both devices, we are able to a) see distinct perspectives focused on business vs. personal/relational uses, and b) identify commonalities in the perceptions of the two technologies. Implications of these commonalities are discussed, in light of the trends towards convergence of the two devices, and particularly their different distribution in developing countries.

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Introduction

“Personal computer” and “mobile telephone” are common terms, but as more functionality is added to mobiles, and as personal computers become more varied in form and application, the terms may be blurring. This paper describes the results of two prioritization exercises (Q-sorts), identifying distinct assessments of each technology among small and informal business owners in urban India, and contrasting these two sets of assessments.

Although the approach could explore the perspectives of any set of users, studies of operators of small and informal businesses in the developing world are relatively rare. Such studies are theoretically interesting for three reasons. First, these business are quite common, and are an important input to broad-based economic development (Mead & Leidholm, 1998). Second, there is often blurring between operators’ personal and business lives. Third, many small business operators are adopting these technologies for the first time, as mobiles, in particular, are becoming increasingly affordable and popular throughout the developing world. As more users from the developing world adopt PCs and mobiles, our overall theories about these devices should reflect and integrate their perspectives and experiences (e.g., (Castells, Qiu, Fernández-Ardèvol, & Sey, 2007)).

Background

Relatively few Indians are active users of digital information technologies. In a nation of over one billion, there were 90 million mobile phone accounts and only 6.9 million internet subscribers as of March 2006 (Telecom Regulatory Authority of India, 2007). Some view these proportions as evidence of a “digital divide” (Norris, 2001); others as both a reflection and reinforcement of a disadvantaged structural position in the global information networks (Castells, 1996). And yet change is afoot. Shining new urban office parks trumpet the importance of IT to India’s booming economy. Computers are found in an increasing number of homes, schools, and offices throughout the country, which is also among the world’s fastest growing markets for mobile phones.

These technologies are intertwined with India's current climate of global openness and economic liberalization; they are embraced by some, wanted by many, but certainly not used by all. They are, as Kavoori and Chadha (2006) observe, 'cultural technologies', and there is much work to be done, across the span of academic disciplines, to understand how people integrate these iconic devices into everyday life. As such, this paper is a small contribution to a growing body of literature on mobiles in the developing world. Other more lengthy treatments are found elsewhere

The enthusiasm around mobile telephony in the developing world is palpable, partially because has extended beyond the physical and economic limits of landline systems, and has enabled hundreds of millions of people to own a phone for the first time. However, mobiles are also assessed, implicitly or explicitly, against another iconic device—the personal computer. Although PC and internet use continues to grow worldwide, the “digital divide” persists, and many look to mobiles as the way to close it. (Economist, 2005). This second contrast creates some interesting research conundrums: when the research community focuses on the implications of the spread of mobile telephones in the developing world, we may do so with these other technologies (landlines and PCs) in mind. And yet, when (for example) a farmer walks into a mobile phone store in a market town in rural India, he may purchase a mobile phone strictly on its merits, as the only communication device plausibly available to him, with no implicit or explicit comparison to a PC. Perhaps the devices are more coupled in our research agendas than they are in the minds of many mobile users.

Thus, this study's goal is to identify perspectives that relatively new users (in this case, small business owners) hold towards the two devices, and to investigate differences between them. Slater and Kwami's (2005) work contrasting the mobile and the PC in urban Ghana is a particularly helpful foundation; they found that users saw the PC, accessed through cyber cafes, as a means of escape and information search, while users perceived (and used) the mobile in a more intimate and complex manner, maintaining ties with others in their neighborhood and throughout their social networks.

In that spirit, we turn to small businesses in the urban Indian context, and explore their perspectives on the two iconic technologies. These businesses are an important part

of the economies of developing nations, but have ICT needs and behaviors which are relatively less well understood than those of small businesses in more than prosperous settings. Previous studies have looked at ICT use among this group from a functional standpoint, suggesting that the telephone (Duncombe & Heeks, 1999) or the mobile (Donner, 2006; Esselaar, Stork, Ndiwalana, & Deen-Swarra, 2006; Molony, 2005) is often more important than the PC.

An earlier study (Donner, 2004) used a Q-sort approach to assess the attitudes of small and informal businesses in Rwanda towards their mobile phones, identifying four distinct perspectives towards the mobile. One saw the mobile as an instrument for the pursuit of instrumental business goals. A second used the mobile to satisfy emotional or intrinsic needs. Two other perspectives mixed instrumental and intrinsic elements, seeing mobiles as productivity enhancers, or as simply indispensable.

The Rwanda study did not contrast perspectives towards mobiles with those towards PCs. Of course, there are some obvious differences between the devices—mobiles are small, cheap, and plentiful while PCs, even laptops, are large, expensive, and rare—but as these devices morph even basic, previously essential distinctions such as between talking versus typing have begun to blur. Indeed, there are a variety of activities in communication, finance, data management and entertainment, which could conceivably be satisfied by either device. In addition, symbolic and cultural factors influence how small and informal business owners perceive each technology, and may intermingle. The Q-sort design is not a vehicle for formal hypothesis testing, but the topics included were intended to allow us to assess both functional and symbol elements in the perceptions of the devices. Thus, the current research does not directly address converged devices, nor any attitudes towards them. Rather, it identifies similarities and differences in the patterns of perceptions towards two relatively distinct devices, the PC and the mobile. The devices have not converged (yet), but the results below suggest that for some people, their perceptions of the two devices already share some commonalities.

Research design

The core of Q methodology is a prioritization exercise that elicits participants' particular, subjective perspective on a complex concept. The process of sorting through a few dozen statements, all related to a single concept but not all of equal appeal, allows the participant to carefully consider (or discover) and report his or her own unique view. When multiple people perform the same Q-sort, quantitative analysis will identify similarities and differences in the way each prioritizes the statements. Unlike a traditional attitudinal survey, which relies on large representative samples to estimate the prevalence of a given attitude in a population, a Q sort uses a relatively small set of participants to identify distinct, archetypal perspectives concerning a topic, thus combining a focus on subjectivity and depth of assessment while retaining some of the generalizability and comparability afforded by quantitative approaches (Brown, 1996). The description in this paper attempts to capture the major steps in the analysis without introducing the detailed transformations and trade-offs involved in the analysis of the Q-sort. For additional description of Q methodology, please refer to more detailed texts (Brown, 1980; McKeown & Thomas, 1988).

The Q Instrument

The statements for these Q-sorts were derived through a combination of methods: most were developed *a priori*, based on the literature on ICT use in developing countries, and the Q-sort with Rwandan small business operators described above (Donner, 2004). These statements were augmented with a) a brief review of mobile and PC advertisements and articles appearing in local papers and b) preliminary interviews with small business owners. For example, the statement that a computer “does the work of ten men” was taken directly from the interviews, while the items on banking, e-commerce and on listening to music were adapted from ads and newspaper articles. Some obvious statements, relating to the size and cost of the PC versus the mobile were excluded from the sample of final items, so as to focus the analysis on functional and symbolic attributes of the two devices. The items for the two sorts were the same, except where the words

“mobile phone” or “computer” were exchanged. The full list of the 30 statements in the sort appears in the Appendix.

Participants could elect to complete the study in English or in Kannada, Bangalore’s primary language. Three trained bilingual research assistants from Christ College in Bangalore recruited participants and administered the Q-sorts. Including some open-ended questions and introduction time, each interview lasted approximately 30 minutes. As a small honorarium, participants received a box of sweets worth roughly \$4 USD.



Table 1: Structure of Q-sort task – Sample (completed) answer sheet

Rating	Least like my view			Most like my view		
	-3	-2	-1	0	1	2
26	1	20	19	5	29	6
8	24	11	28	27	15	17
23	2	22	4	10	30	16
		9	21	18	12	20
			13	14	7	
				25		

Participants place one statement (card) in each space

Participants were asked to arrange (rank) a set of 30 statements according to how well they represent their own viewpoint. The Q-sorts were completed twice—once for PCs, once for mobiles (the sequence of sorts was randomized). The sort was iterative, personal, and tactile, as individuals prioritized statements from “least like my view” to “most like my view” on a board brought by the interviewers.

Data Analysis

Q-sort data is captured by an answer sheet as in Table One, and is transferred to one of a few specialized statistical packages.² The most common process for analyzing Q-sort data—principal components analysis followed by a Varimax rotation—is described in McKeown and Thomas (1988). Followed here, the process identifies *patterns of prioritized statements*. These patterns, called factors, represent distinct, archetypal perspectives on the topic. While each participant’s sort contributes to each factor to a greater or lesser degree, those whose sorts contribute highly and uniquely to one factor are considered to “define” that factor, and to comprise a group of participants who share a perspective. The results section below will describe the factors found in each sort, as well as the groups of participants defining each factor.

Results

The Q-sorts were carried out in Bangalore during December 2006. The participant sample was purposive rather than random, with the goal of including a range of small and informal business owners with up to 5 employees. 58 participants completed the exercise. Though they represent a wide range of businesses, including 17 retail (handbags, jewelry hardware, etc), 19 manufacturing (seats, doll making, paper goods, etc), and 22 service enterprises (taxi, mobile repair, tutor, etc), the group is somewhat more educated and more prosperous than a random sample of small businesses would yield. 6 of the participants earned less than 4000 rupees (\$90 USD) a month from their business; on the other hand, 16 earned more than 15,000 rupees (\$330 USD) per month, and were thus relatively prosperous by Indian standards. 18 were self-employed. 15 were women, which represents a higher proportion of women entrepreneurs than in the general business population (National Sample Survey Organization, 2000).

45 of the 58 participants owned a mobile phone. The most common model was the current ultra-basic workhorse of the developing world, the Nokia 1100. Reflecting the prosperous skew of the sample, 26 of the participants owned a PC at home or work.

² PQMethod was used; available at <http://www.lrz-muenchen.de/~schmolck/qmethod/>

Another 9 frequented telecenters or internet cafes, making 35 participants (60%) with some ongoing exposure to PCs.

One of the core decisions in Q methodology is to select the factors used to describe the overall set of sorts. More factors, comprised of fewer people each, generally account for more of the total variance in the sample, and are likely to yield tighter, more distinctive perspectives on the given issue. However, in this case, fewer factors were extracted, which allowed for easier comparison between the two interrelated sorts.

In the PC sort, 19, 21, and 4 participants defined three factors respectively, meaning their rankings were used to calculate the “archetypal” array of factor scores. The three factors accounted for 35% of the total variance in the data array. In the mobile sort, 21, 16, and 5 participants defined the three factors, for 37% of the total variance. In each case, some participants (14, 16) failed to load distinctively on any factor, loaded negatively on a factor, or shared their loadings across two or three factors. The results of the two sorts are detailed in the sections below.

The PC Sort

Consensus Statements

In the PC sort, a few statements did not differentiate between any of the three groups. Using the Q scale of -3 to +3, participants in all three groups rated “computers help people find work or new jobs” high (+2, +2, +2 respectively). Conversely, “computers are safe and secure to use” (-2, -2, -1) and “computers are good for people who speak Kannada” (-3, -3, -3) were rated quite low. The consensus statements suggest that few in our sample trust the safety/security of PCs, and no one thinks they are easy for the tens of millions of Kannada speakers in India.

Three groups

The first group, defined by 19 participants, focused on the PC as a **tool for elite business**. Their top three statements (+3) were: “computers help businesses be efficient and save money”, “computers help people find new ideas for business”, and “computers provide access to a wide range of news and information”. They also rated “computers

help businesses grow and make more money” higher (+2) than the other groups. On the low side, they ranked “computers are stylish” (-2), “almost everyone wants a computer” (-3) and “computers are for everyone” (-3) at the bottom.

The second group illustrated a quite distinct perspective, focusing on the **broad transformative power** of the PC. “Computers help one person do the work of 10 people”, “computers are for everyone” and “children should be taught how to use a computer” were their top three items. “Computers are good for learning new things” (+2) also rated highly. In addition to the consensus language and security items, “computers help businesses be efficient and save money” (-2), “computers are good for listening to music” (-3) and “computers are durable and reliable” (-3) also ranked low.

The final group was small, relative to the other two. Roughly speaking, they favored items which described the computer as an **approachable entertainer** “computers are good for listening to music” (+3). “Children should be taught how to use a computer” (+3), and computers are easy to learn” (+3). Access to news (+2) and games (+2) also rated highly. They rank computers relatively low for style (-3) and usefulness in emergencies (-3).

The Mobile Sort

Consensus Statements

Consensus statements were scarce in the mobile sort.³ Participants rated “mobiles are good for viewing clips from TV, videos or movies” somewhat low (-2, -1, -2).

Otherwise, there was plenty of dispersion:

Three groups

The first group (the dominant factor) in this sort also viewed the mobile as an **instrument for business**. “Mobiles are helpful in emergencies” was the top item at +3, followed by “mobiles help people access the bank, at send money, or pay for things”, and “mobiles give people power to be a reachable...”. Other high (+2) items were: “mobiles help businesses find new customers”, “mobiles help businesses be efficient and save

³ This occasionally happens in Q-sorts, but the reasons for the relative lack of consensus statements are not easily discernable.

money”, and “mobiles help people get more done in a day”. “Almost everyone wants a mobile phone” (-2), games (-2), sharing (-3), Kannada speakers (-3), and to listening to music (-3) received low ratings.

The second group was more focused on **personal connectivity**. Like group one, they ranked emergencies and “reachability” high, but followed with “almost everyone wants a mobile phone” (+3) and “mobiles help families and friends stay connected” (+2), and “mobiles are for everyone” (+2). Banking (-2), “doing the work of 10 people” (-3), “finding new ideas for business”(-3), and “learning new things”(-3) were at the bottom of this sort. In this group, we see echoes of both the broad *transformative power* and *approachability* themes from the second two factors in the PC sort.

As with the PC sort, the third group was small, and somewhat less internally consistent. Focused on **idea exchange**, they stressed “finding new ideas for business”(+3) and “helping people participate in the broader community and national affairs” (+3) quite high. Banking (-3), and “important and powerful people use mobiles” (-3) were lowest-rated.

Demographic comparisons

Generally speaking, Q methodology is not optimized for examination of demographic or behavioral differences between those who define each perspective—the sample sizes are small and/or nonrandom, and there can be missing data as participants are dropped from defining groups. Rather, the perspectives themselves are the focus of the analysis. Nevertheless, a brief look at the dispersion of individual attributes across the groups can be instructive. Group membership for each of the sorts was assessed by PC ownership, mobile ownership, income, education, and business size (a total of 10 tests). The only visible⁴ relationship between group affiliation and any of these demographic variables was between perceptions about PCs and PC use. Interestingly, those who used PCs were more likely to take the *elite business tool* perspective on PC use, whereas those without regular PC exposure were more likely to belong to the *broad transformational power* group.

⁴ Group membership on PC sort verses PC use $\chi^2(2, N = 42) = 8.9, p = 0.012$

Linking the two sorts

As the discussion so far should indicate, there was substantial consistency between the two sorts. In particular, a dominant “business-focused” perspective emerged from both analyses. There were too few valid cases to do an analysis of the correspondence between individuals’ memberships across the two sorts. However, the loadings for all 58 individuals on each of the business factors were highly correlated,⁵ suggesting that the two sorts tap a consistent perspective toward both technologies.

We can also explore distinctions at the level of individual items. Across the 30 items used in both sorts, a few items demonstrated consistently higher ratings depending on the device being evaluated. According to the participants, mobiles are helpful in emergencies (+3, +3, 0) and PCs are not (0, -2, -3). PCs, on the other hand, are good for learning new things (+1, +2, +1), and mobiles are not (0, -3, -3)⁶.

Discussion

Echoing the results of the Rwanda Q sort (Donner, 2004), some participants in the business groups clearly view both technologies as instruments for making money, and getting more done. However the sorts reveal that not *all* business owners hold business functions as most salient; others attribute transformation or educational components to the devices, and stress connectivity with the world and/or and keeping in touch with friends and family.

The similarities between the two sorts are perhaps more interesting and surprising than the rank-order differences between elements. Both sorts had a dominant business factor, followed by one which was much more personal, expansive, and egalitarian. Among the small business owners who participated, those defining the business-specific factors were more likely to own or use a PC, and offered an undercurrent of “not for everyone” in their sorts. This sentiment was more explicit in the PC sort than in the

⁵ $r = .43, p < .001$.

⁶ More differences between the rankings of the same item across two sorts could be found if all 58 responses had been treated as a group. However, the delineation of the participants into groups avoids averaging, and retains subjectivity. No statements were universally positive across all three groups in one sort, and negative across all three in the other.

mobile sort, but even in the mobile sort, the business factor rated “mobiles are for everyone” only at +1 and “everyone wants a mobile” at -2.

Informed partially by Slater and Kwami’s work in Ghana, I had expected to find relatively less emphasis on instrumental, business-specific, and exclusionary elements across the mobile sorts. Of course, not everyone shared this opinion, as the “*personal connectivity* and *idea exchange* perspectives indicate. In addition, the similarity between the sorts is partially an artifact of the items I chose, and perhaps of the close temporal proximity of the two sorts. However, the appearance of a strong business perspective on both sorts might also indicate a deeper orientation on the part of some respondents towards information technologies in general.

Divergent perspectives on convergence?

In India as in much of the developing world, mobile is a device for voice and for SMS, and few people use it for data purposes, while a PC is a PC, which stays on a desk. For the time being, few people own smartphones or laptops which behave more like ‘converged’ devices. Thus some extrapolation is required to imagine how the perspectives uncovered in the Q sorts would map onto such converged devices. At one level, the sorts might be similar—that presented with laptop or a smartphone, we’d at least see one group take a business/instrumental perspective, and another take a more personal, egalitarian or transformative approach.

By linking participants perspectives (by factor) on the two sorts, summarized above, three pairs of perspectives (a) summarize the complexity of attitudes around the differences between mobiles and PCs, and (b) could inform how people would view converged devices:

“Mobiles and PCs are both good for business”. This was the most common pairing, accounting for 11 of 31 (35%) observable overlaps⁷ between the two sorts. Convergence, for this pairing, might mean a further blending of the functions that make

⁷ 31 of the 58 participants belonged to one of the three primary groups in both sorts; the other 27 are excluded from this ‘pairing’ analysis.

business run more smoothly: universal connectivity, data at one's fingertips, access to new information, etc. Today's smartphone, currently marketed to business users worldwide, might resonate within this attitudinal pairing.

"PCs are for business, but mobiles are for friends and family". Appearing 6 of 31 times (19%), This attitudinal pairing may foreshadow a more complex orientation towards converged devices. Mobiles already support the blurring of domestic and productive spheres (Green, 2002), but here, current orientations towards non-converged devices are separated by both function and by context.

"PCs bring you information, mobiles help you share it". Also appearing 6 of 31 times (19%), this pairing of the second (transformational and personal) factors sorts takes a less business-centric focus. This pairing probably looks most like the distinctions drawn by Slater and Kwami (2005), which contrasted the formal and 'escape' functions of the PC from the intimate, the 'embedded' role of a mobile. Under this pairing, 'convergence' might further blur mass and interpersonal communication, and might offer increased contact with friends and family. Had we run this Q-sort with a different group, perhaps young users or middle class homes, this pairing might have been more common.

Conclusion

For many Indians, the talk about converged devices, or even about traditional PCs, is fairly far off. Current choices include getting by on no connectivity at all, visiting local telephone booths, or saving some money to purchase a mobile phone. However that mobile phone is increasingly likely to have a GPRS or data connection, a camera, or a music player. In addition, even the humble SMS, when used to access advanced services provided over the network, can allow even basic handsets to handle information search, processing and storage functions. However, if and how the majority of Indian mobile phone users use these other functions remains an important and open question, one which a variety of interests, from established players to startup firms, are aggressively pursuing.

For those Indians with enough resources to consider purchasing a PC, or with enough motivation to visit an Internet café, the distinctions between their perceptions of PCs and mobiles are more germane. Mobile phone advertisements are pervasive in India, with various appeals to personal expression and interpersonal solidarity. The popular messages around PCs are more instrumental, with a focus on functionality, on business power, or perhaps on education and transformation. All are themes we saw in the Q-sorts.

Even if the rate of mobile phone adoption slows from its current torrid pace, India in the next few years is likely to offer an environment of relatively few PCs surrounded by a flood of mobile phones. What this ratio will mean for the acceptance and use of “converged devices” will partially be determined by how its users perceive the two parent technologies. This small study suggests that, at least as far as small business owners in India are concerned, those perceptions are as diverse as the devices themselves. By not compressing all participants’ perspectives into a block of ‘average’ scores as a conventional survey might have done, Q methodology has allowed us to identify a variety of current perspectives towards each technology. The distinctions between ‘business’ and ‘personal/egalitarian’ perspectives identified in both the sorts are likely to remain, even as the technologies themselves evolve and converge.

Appendix

Items For PC and Mobile Q-Sorts (-3 to 3 scale)	PC Factors			Mobile Factors		
	1	2	3	1	2	3
[Mobiles/PCs] help people participate in broader community and national affairs						3
[Mobiles/PCs] help one person do the work of ten people		3			-3	3
[Mobiles/PCs] give people the power to be reachable, and to connect with anyone in the world, any time				3	3	
[Mobiles/PCs] are easy to learn	-2		3		2	
It is easy to share a [Mobile/PC] with other people	-2			-3	-2	
[Mobiles/PCs] are durable and reliable		-3	2		-2	
[Mobiles/PCs] help businesses find new customers				2		2
[Mobiles/PCs] help people access the bank, send money, or pay for things	2	2		3	-2	-3
[Mobiles/PCs] are stylish	-2		-3			2
Children should be taught how to use a [Mobile/PC]		3	3			-2
[Mobiles/PCs] are safe and secure to use	-2	-2		-2		
[Mobiles/PCs] are helpful in emergencies		-2	-3	3	3	
[Mobiles/PCs] are good for learning new things		2			-3	-3
[Mobiles/PCs] help people find work or new jobs	2	2	2			
Important and powerful people use [Mobiles/PCs]			-2			-3
[Mobiles/PCs] help businesses grow and make more money	2			2		2
[Mobiles/PCs] provide access to a wide range of news and information about the world	3		2			-2
[Mobiles/PCs] have respected brands			-2			
[Mobiles/PCs] are good for viewing clips from TV, videos				-2		-2
[Mobiles/PCs] are good for listening to music		-3	3	-3	2	
[Mobiles/PCs] make people happy			-2			
[Mobiles/PCs] help businesses be efficient and save	3	-2		2		
[Mobiles/PCs] are good for playing games		-2	2	-2		
[Mobiles/PCs] are for everyone	-3	3			2	
Almost everyone wants a [Mobile/PC]	-3		-2	-2	3	
[Mobiles/PCs] are good for people who speak Kannada	-3	-3	-3	-3		-2
[Mobiles/PCs] help people get more done in a day	2	2		2	-2	
[Mobiles/PCs] help people find new ideas for business	3				-3	3
[Mobiles/PCs] help families and friends stay connected					2	
[Mobiles/PCs] are good for viewing personal photographs						2

Note: cells indicate factor scores, transformed to original -3 to 3 scale, for the two Q-sorts. Relatively neutral scores (-1, 0, 1) are suppressed to ease interpretation of results.

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