

Research Article

Mobile Phone Use Among Market Traders at Fairs in Rural Peru

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Abstract

We characterize market traders at two rural fairs in Puno, Peru, based on quantitative and qualitative data gathered in 2008, to gain insight into types of traders and the information needs that influence the degree to which they use mobile phones to make decisions regarding which weekly fairs to attend. Using variables such as origin, type of goods sold, means of transportation to the market, and reliance on networks, we identify traders as full-time traders, part-time traders, or subsistence traders, that is, people trading solely to survive. We find that when traders are already familiar with the technology, regularly rely on endogenous networks to make decisions, and have more to lose from failing to trade (e.g., those selling perishable goods), they are more likely to use mobile phones to decide where to sell.

1. Introduction

Mobile telephony is a general-purpose technology (in the sense summarized by Jovanovic & Rousseau, 2005) present in all spheres of human activity. Personal and social contexts matter, as people use and appropriate this technology within specific economic structures and cultural ways of doing things. We contend that economic fundamentals prevail. People use mobile phones to reduce transaction costs once they are confident about using this communication tool regularly to communicate with and get information from agents in their networks. They gain this confidence through regular activities and business transactions, which take time to establish. Understanding the use and impact of mobile telephony in a given area requires analysis and understanding of the social and economic dynamics in which the technology has become a daily communication tool.

Extensive evidence attests to mobile phone use in different parts of the world (the earliest books being Castells, Fernández-Ardèvol, Katz, & Aakhus, 2002; Ling, 2004; Qiu & Sey, 2006). However, research on rural areas in developing countries is scant. While some studies are available for Africa (Aker, 2008; Donner, 2008; Esselaar, Stork, Ndiwalana, & Deen-Swarray, 2007; Souter et al., 2005), South and Southeast Asia (de Silva & Zainudeen, 2007), and urban Latin America and the Caribbean (Galperin & Mariscal, 2007), knowledge of Latin American rural areas is almost nil.

In Latin America, use of mobile telephony is far more widespread than ownership. In other words, users outnumber subscribers (Barrantes, 2007; Galperin & Mariscal, 2007), often because a single phone is shared among family members (Donner, 2008; Galperin & Molinari, 2011; Heeks, 2009). Among poorer users, mobility can be even challenged as the cell phone is often kept in a fixed location at home and is used as a substitute

for landline (Kalba, 2007; Ureta, 2008). Because mobile telephony coverage can be problematic in rural areas and the service can be unaffordable, users deploy strategies based on the ecosystem of communication options available in the locality (Donner, 2008). Prepaid subscription is the most common payment option (Barrantes, 2007; Galperin & Mariscal, 2007; ITU, 2011). As airtime is a scarce, expensive resource for the poor, they sometimes use prepaid mobile phones only for receiving calls rather than making them (Bar, Pisani, & Seabra, 2011). Such users value this limited, asymmetric use because it makes them reachable and, therefore, present in networks (Castells, Fernández-Ardèvol, & Galperin, 2011). This type of cost reduction strategy is typical at the bottom of the consumer pyramid (Angoitia & Ramírez, 2008).

Communication with family and friends, which strengthens social bonds, is the predominant use for mobile telephones. This has been described, for instance, by Frost and Sullivan (2006) for rural and semi-urban areas of Latin America; Galperin and Mariscal (2007) for low-income urban users in Latin America; by Barrantes (2007) for three cities of Peru, Souter et al. (2005) for India, Mozambique, and Tanzania; and Donner (2006) for microentrepreneurs in Rwanda. But these so-called social calls can have mixed goals, as when they include messages concerning transactions or on rural economic activities (for Bangladesh—Aminuzzaman, Baldersheim, & Ishtiaq, 2002; for Puno—Peru, Barrantes, Agüero, & Fernández-Ardèvol, 2011). In Nigeria, Jagun, Heeks, and Whalley (2007) found that although the information can be acquired at a distance, there is not a full-distance relationship through mobile among traders. That is, to be fully useful in the economic sphere, mobile phones must be inserted in previously existing relationships of trust.

The aim of this article is to contribute to a better understanding of how mobile phones are incorporated into economic activities in rural areas of Latin America and to analyze the possible transformations resulting from their use. We focus on market participants, or market traders, at two weekly fairs held in the southern Andes region of Puno, Peru. As will be seen, this group includes both full-time and other types of traders, including subsistence peasants. Building on Overa (2006), our study offers evidence

of mobile phone use by market participants in a rural area in South America.

In the analysis, we identify endogenous (chosen) and exogenous (not chosen) networks, as well as how market traders interact with the agents in these networks. The interaction may or may not be mediated—at present, mobile communication is the most common type of mediated interaction—and may or may not explicitly relate to the market traders' decision-making processes.

The information used in this study was gathered as part of a research project "Mobile Communications and Development in Latin America" funded by Fundación Telefónica and led by Universitat Oberta de Catalunya (Open University of Catalonia, UOC).¹ As part of this vast effort, the Peruvian team undertook to study the impact of mobile phones in rural areas.

This article is structured as follows. Having established the conceptual framework, we present the area of study, followed by a section on the methodology and another presenting the characteristics of the markets studied and of mobile phone use. The next section summarizes the analytics regarding the variables influencing the decision of whether to use a mobile phone to choose which fair to attend on any given day. The article closes with a brief discussion of the conclusions.

2. Conceptual Framework

The fairs we studied draw people primarily from impoverished rural communities in which the main household activities are livestock raising and agriculture. These fairs can be characterized as markets in the early stages of development, in which coordination, contract enforcement, and the general definition and protection of property rights depend on personal trust, which acts as a substitute for a legal system (Fafchamps, 2001).

These fairs draw peasants and intermediaries who can play multiple roles even at a single fair. For instance, peasants might sell their products and then use the cash obtained to act as end consumers. Intermediaries are not usually full-time traders, but combine trading with other activities in their daily lives, such as agricultural activities based on land use. Therefore, in the context of our study, we

1. The results are published in Fernández-Ardèvol, Galperin, and Castells (Eds.), 2011.

frame the household decision to engage in a diverse range of livelihood activities using the model proposed by Figueroa (1984).² This contrasts with the most recent literature on the market-participation decision (Cadot, Dutoit, & Olarreaga, 2010; Key, Sadoulet, & de Janvry, 2000).

Market participants are heterogeneous and can be classified into three categories:³

1. **Full-time traders or, simply, intermediaries:** Trading is the most important household activity for this group, which consists of nonlocal people coming from cities to sell at the weekly fair. Mostly, they sell nonperishable processed and manufactured goods, such as sugar, flour, clothing, or plastic items, although some may sell fruit or vegetables brought from a significant distance. They use private and motorized transportation to get to the fair, and their decision making relies less on friends and family than on information gathered from customers and suppliers.
2. **Part-time traders:** These traders are usually local or from small cities around the weekly fair in question. They tend to get to the fair using motorized private or public transportation. They may be subsistence farmers who have embraced commercial activities as a new source of livelihood, either as part of an income-diversification strategy or out of a willingness to move beyond subsistence.
3. **Subsistence peasants:** These participants come from small rural communities.⁴ They attend the fair to sell goods or livestock they have grown or raised themselves and use that income to buy what they do not directly produce (sugar, farming equipment, etc.). They use nonmotorized private transportation (e.g., bikes) and public transportation to

get to the fair, or they might walk. Mostly, they sell perishable goods. They do not have suppliers, but may rely on customers in specific cases.

Each type of participant has specific information and communication needs and adopts different strategies to meet them in light of the existing constraints. For instance, mobility is fundamental for intermediaries, so they are likely to be early adopters of mobile phones and to use them for different types of communication in their commercial activity. In contrast, subsistence farmers attending the fairs may be only users of mobile phones, not subscribers, and may thus rely on *chalequeros* to make calls and on public-access venues to receive them.⁵

These market participants take part in different kinds of networks, which can be exogenous or endogenous. Exogenous networks, which are not chosen by the individual, are typically made up of family members or classmates. Endogenous networks, on the other hand, are chosen by the individual; participation therefore involves a basic economic decision: The perceived benefits of joining and maintaining an endogenous network must outweigh the perceived costs.⁶

The basic definitions of the vertical and horizontal value chain, as established by Porter (1985), are important to our analysis. Agents in the vertical value chain, where different points in the production and marketing processes are interlinked, are both suppliers and customers. In contrast, agents in the horizontal value chain, such as market traders selling the same good, come from a single point in the production process. Within this framework, it is widely accepted in the entrepreneurial and management literature that the links established with different agents in the value chain can become sources of information and knowledge. Such processes can be referred to as knowledge interactions (Nonaka, 1994), as they can contribute to increasing the avail-

2. *Figueroa's comprehensive study in the Peruvian Highlands showed that households engage in diversified activities that fit their low-quality asset base and the seasonality of agricultural production in the context of a less developed country.*

3. *This classification was elaborated from ethnographical and historical evidence, such as Valcárcel (1947) and Bourricaud (1967).*

4. *From peasant communities (comunidades campesinas or parcialidades) or small towns.*

5. *Chalequeros are people who rent mobile phones by the minute. They wear brightly colored vests (hence the name, which comes from chaleco, the Spanish word for vest). The rates they charge are lower than public telephone and pre-paid phone rates (Barrantes, 2007).*

6. *Game theory literature uses the concept of the endogenous network in explaining coalition formation or network interaction in repeated games. The seminal paper is Bala and Goyal (2000).*

able knowledge on the condition of the market, and thus of the weekly fairs, in the area. In other words, by interacting with other agents in the value chain, market traders can improve their knowledge base (Nelson & Winter, 1982; Winter, 1984). One specific such interaction is traders' gathering of information to decide which fair to sell at. In this economic context, interactions with relatives (members of the exogenous network) might be important, as the boundaries between the private and public spheres are not clearly delineated in contexts dominated by poverty and weak and/or recent market integration, and family members participate in the enforcement of property rights needed to effect exchanges (Fafchamps, 2001).

Human societies are based on communication. Mobile phones currently play a key role as facilitators of generic interactions and, in particular, as facilitators in information-gathering processes. This is especially important in poor areas, where mobile phones are the first available telephone for most of the population. The use of mobile phones enhances business activities, as Jensen (2007) and Barrantes (2010) discuss. Indeed, in terms of the definitions the OECD uses, the introduction of mobile telephony as a tool in subsistence entrepreneurs' decision making amounts to a process innovation (OECD, 2005, p. 49). However, exactly how different individuals effectively use this new communication tool varies.

In this light, we expected to find differences in how the three categories of market traders use mobile phones. More specifically, we expected mobile phones to play different roles for different market participants given the differences in their personal networks, the way they interact with them, their position in the value chain, and the specific business they conduct.

3. Context of the Research

3.1 Area of Study

The region of Puno borders Bolivia. It is located in the highlands on the Collao Plateau, which is part of the Lake Titicaca ecosystem (Parodi, 1995). Local altitudes on the plateau exceed 3,500 meters (approximately 11,500 feet) above sea level. Unlike the rest of the Peruvian Andes, it is basically flat, with few of the steep slopes that make productive

activity difficult elsewhere. Despite the relatively gentle slopes, households in this area of Puno face extreme weather conditions throughout the day and year. Ground frost in winter hits them especially hard, as their poor living conditions do not permit preparations to cope with its effects. Most of Puno's territory lies on the plateau; the remainder is spread out along the eastern slopes of the Andes, reaching all the way down to the Amazon Basin.

Home to almost 5% of the Peruvian population, Puno was the second poorest region in Peru in 2007. Its population is evenly split between urban and rural settlements, though it should be noted here that all district capitals in Peru are classified as urban, regardless of the population (INEI, 2007, 2008). In contrast to most other Peruvian regions, the most important city in Puno is not its capital (Puno), but Juliaca, a large, dusty, disorganized commercial city. Juliaca is the economic center of Puno and home to the region's principal airport which offers daily flights to Lima, Arequipa, and Cusco (Cuzco).

In 2008, when the study was conducted, the two major players in the Peruvian mobile telecom market, Movistar and Claro, were waging an intense marketing campaign. They targeted mainly urban areas that already had service coverage, but the campaign influenced the speed of adoption in rural areas, too, despite scant coverage there. Consequently, we decided to focus the study on two markets or fairs⁷—typical trading hubs for the rural population—that would allow us to study the hinterland and provide a rich context for the study of mobile phone use and its impact among rural populations. These fairs are typically held in district capitals, which tend to receive telecommunications service coverage earlier than rural areas do.

3.2 The Weekly Fairs

Weekly fairs have a long history in the Peruvian Andes. Initially held alongside traditional Christian activities (Glave, 2002; Valcárcel, 1947), they evolved into places where subsistence peasants could barter for the goods they did not produce. As a result of peasant market integration and overall economic growth, the weekly fairs further evolved to their current status as places for the rural population to gather on given days, facilitating exchanges for cash-poor communities.

The weekly fairs held on Sundays are the most

7. *Katu*, in the local language.

important, as they tend to attract the largest number of people. This is consistent with the weekly fair's initial relationship to Christian activities, specifically Sunday Catholic mass. Whereas markets are open every day of the week in Juliaca, the weekly fair, which attracts people from a large area of influence, is held on Mondays. This implicitly allows traders in Puno to attend any local fair on Sunday and stop by the Juliaca fair on Monday. Fairs held on other days of the week are less important.

In the context of noncommercial agriculture, and given that the virtual nonexistence of irrigation infrastructure in the Peruvian Andes makes peasants dependent on the rainy season for crop production, fairs held once the rainy season is over are particularly important in the yearly calendar. At this time crops are ready to be taken to market and animals are well fed thanks to the growth of both natural pastures and feed crops. Therefore, fairs held between April and June are particularly large.

4. Methodology

We gathered the evidence discussed here using two complementary research tools. The first was a survey conducted in June and July 2008 at the weekly fairs of Asillo and Taraco in Puno. The sample consisted of 250 market traders at each fair, yielding a total of 500 observations. This sample encompassed almost all the market traders attending the fairs during that season of the year. Interviews were conducted individually, in Spanish or Quechua, and took place on market days. Interviewees responded to a structured questionnaire in a session lasting, on average, 15 minutes. The final design of the structured questionnaire hinged on the initial stages of the second tool, a qualitative, ethnographic study conducted by the team anthropologist in the area of influence of the two selected fairs (Aronés, Barrantes, & León, 2011). The fieldwork, carried out between June and September 2008, involved participatory observations and interviews with local authorities, market traders, and peasants and their families. In all, the combination of quantitative and qualitative approaches should afford a better understanding of the commercial dynamics in the area and thus improve the interpretation of the results.

The two weekly fairs, Asillo and Taraco, were chosen for their similar key structural town characteristics: altitude, population, and poverty level. As explained, altitude is an important geographical

constraint in the area of the Collao Plateau because it limits economic activity. The study also looked for similarities in village size, measured by number of inhabitants, and in the poverty level of the households, using unmet basic needs as the indicator (Feres & Mancero, 2001). Controlling for these factors let us rely on social and economic characteristics to explain our findings on mobile phone use.

The chosen fairs showed similarities for all three criteria. First, they are in capital districts, Asillo and Taraco (considered as both towns and districts), in the provinces of Azángaro and Huancané, respectively. Each fair lasts about 10 hours, from 5 a.m. to 3 p.m. Asillo's market day is Sunday, while the Taraco fair is held on Thursday. This indicates the greater relative importance of the Asillo fair, as Sunday fairs tend to be higher in the hierarchy than the rest. The people of the town of Asillo define their town as a "town of traders," while Taraco's motto is "the genetic capital of Peru," reflecting the main activity of its inhabitants: livestock raising. Asillo's self-definition befits a capital, while the inhabitants of the other towns in the district work in agriculture and livestock raising like the inhabitants of Taraco.

From Juliaca, the commercial capital of Puno, it takes less than an hour to reach Taraco and about one-and-a-half hours to reach Asillo on paved roads by car. Traders who attend the different fairs held regularly in the area go to Juliaca either to buy new goods or to wholesale what they have bought at the smaller fairs. Juliaca is thus the hub of the commercial network identified in the area (see Figure 1).

The fieldwork was carried out in the months of June and July, a critical time in the yearly calendar as it coincides with periods following both the rainy season (October–May) and the main harvest (May–June). In June and July, the harvest makes fresh produce available and livestock are better fed than at other times because rain has contributed to pasture growth. These factors intensify market activity. At no other time of year would we have encountered the trading intensity seen during our fieldwork.

5. Characterization of Market Traders and Weekly Fairs

The analysis of market participants in Asillo and Taraco allowed us to characterize each weekly fair. The first major finding was that although the districts of Asillo and Taraco are somewhat similar in terms of altitude, population size, and poverty, these

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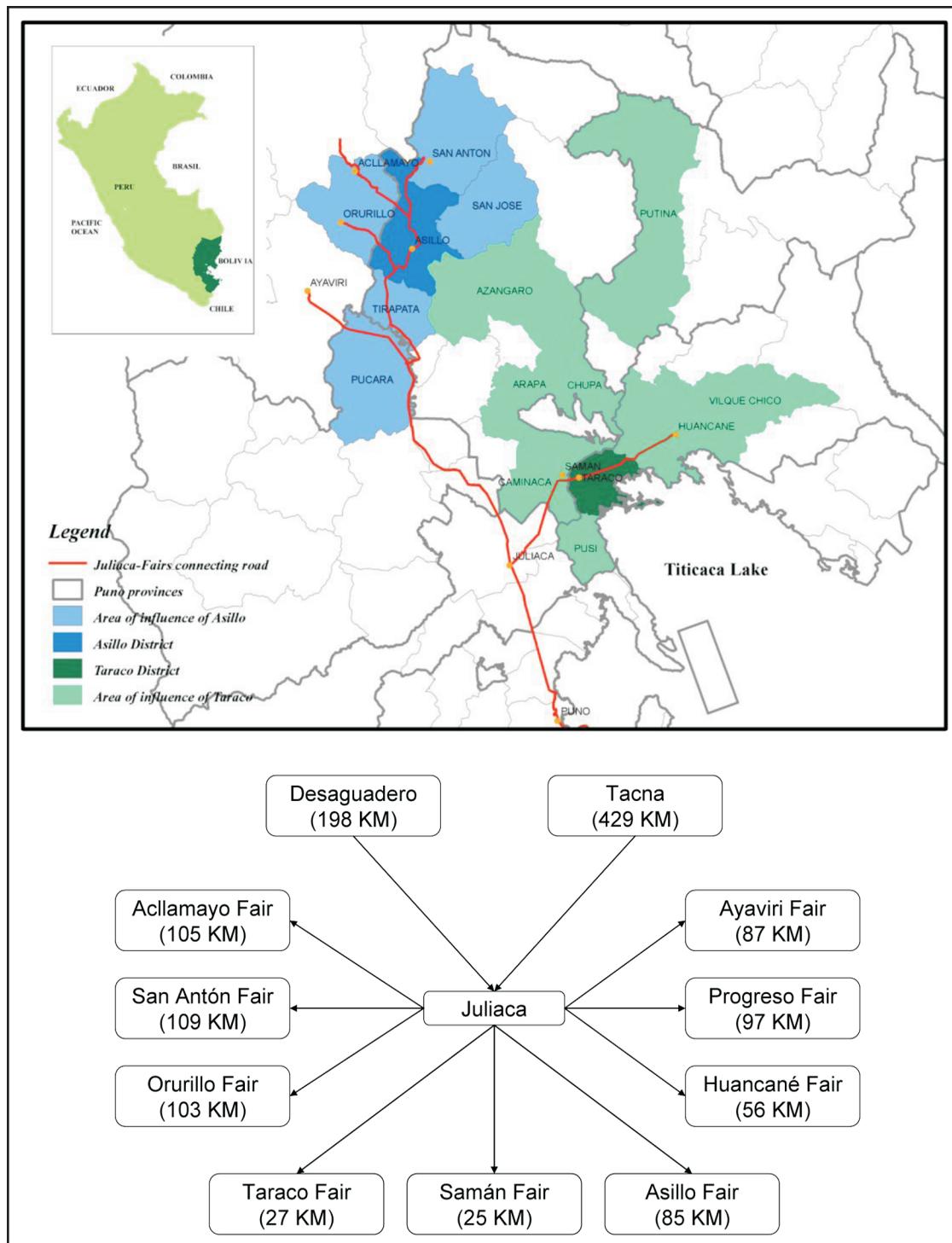


Figure 1. Trade flows, fair dynamics, and approximate distances between fairs and the city of Juliaca.

Table 1. Number of Fairs Attended on a Regular Basis, by Weekly Fair Where the Interview Was Conducted.

Variable	Asillo	Taraco
1 fair	29.3%	42.4%
2 fairs	26.1%	33.2%
3 fairs	19.7%	14.8%
4 fairs	17.3%	6.8%
5, 6, or 7 fairs	7.6%	2.8%
Average	2.52	1.97

Source: Author's elaboration.

Significant differences among fairs: Chi-square test and ANOVA test, p value ~ 0.000 .

towns' weekly fairs differ markedly. This was noticeable in several variables used to economically characterize the types of goods, types of exchanges, importance of vertical and horizontal integration, and extent of the exogenous and endogenous networks. The hypothesis drawn, based on the descriptive data presented below, is that the Asillo fair is more commercially oriented than Taraco's weekly fair, where subsistence-level trading predominates. This analysis, in turn, provides a clearer rationale for the differences in mobile phone use among market traders at both fairs. The discussion in sections 5 and 6 is based on data gathered in the survey conducted with 250 participants in each of two markets. For a better interpretation of the obtained results, we refer to the qualitative results when necessary.

5.1 Types of Traders

All three types of market participants could be identified at these fairs: intermediaries, part-time traders, and subsistence peasants. Several variables enabled this identification.

On average, market participants in Asillo attend more fairs on a regular basis than those in Taraco (2.52 vs. 1.97, as shown in Table 1). In Taraco, 42.4% of market traders attend only one market regularly. This figure falls to 29.3% among Asillo traders. This difference is relevant, since it indicates the importance of trading to the household's livelihood strategy. A vendor for whom trading is the main activity may attend more fairs than one for whom trading is a supplementary activity within the household's time-allocation strategy. Given the greater market attendance in Asillo, it is likely that more of the attendees trade full-time and would

therefore implement a diversified strategy with regard to fair attendance. However, this would not be the case for most participants in the Taraco fair. The lower number of attended fairs indicates that trading might be a supplementary activity for the respondents' households there.

Table 2 shows different characteristics of the market traders and the goods they sell at each fair. At both fairs, more than 60% of the traders were women. As for the goods, in Taraco, only one-third were nonperishable (34.1%), while in Asillo, this share was significantly higher (44.4%). Additionally, 21.3% of the interviewed market participants in Taraco sold livestock, which could not be purchased in Asillo. Given the characteristics of the area under study, we expected livestock and a great majority of perishable goods to be household-produced, that is, produced by subsistence-oriented peasants. To check for this characteristic, we classified goods as obtained either from an external supplier or through household production, in which inputs are not supplied from without but consist of other activities performed within the same household. In Asillo, 60.8% of traders sold goods classified as having a supplier, a figure that fell, as expected, to 45.8% in Taraco.

Evidence also indicated that a significant share of the attendees at Taraco's fair brought goods they had produced themselves, such as live animals, potatoes, or other Andean crops, expecting to find nonlocal traders selling processed or manufactured goods or intermediaries who would buy, say, milk and cheese to take to markets farther away. Local producers sold their wares to obtain goods they do not produce—a typical subsistence livelihood strategy. In contrast, in Asillo there were more

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Table 2. Characteristics of Market Traders, by Weekly Fair.

Variable	Asillo	Taraco	Test significance level
Sex of market traders: Female	6.55%	60.3%	
Good classification:			***
Perishable	55.6%	44.6%	
Nonperishable	44.4%	34.1%	
Livestock	0.0%	21.3%	
Good with supplier (nonhousehold production)	60.8%	45.8%	***
Nonlocal market traders	7.2%	39.6%	***
Local market traders	68.0%	10.4%	***
Means of transportation to the fair:			***
On foot	37.5%	19.3%	
Public transportation	2.9%	72.8%	
Private vehicle	59.7%	7.9%	
2- or 3-wheel vehicle (motorbike, tricycle, bicycle)	20.6%	5.0%	
4-wheel motor vehicle (car, van, truck)	39.1%	2.9%	

Source: Author's elaboration.

ANOVA or chi-square test significance level: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

intermediaries and traders of nonperishable goods, typically processed or manufactured ones. Since Asillo is farther from Juliaca than Taraco is, the transaction costs of going to Juliaca to find a needed good are higher for Asilleños than for Taraqueños. Consequently, a larger variety of goods were available in Taraco (53 categories of goods versus 38 in Asillo), and the Juliaca trade dynamics were less influential in Asillo than in Taraco.

Both the origin of individual market traders and the unique combination of trader origins at a given fair are relevant to our analysis of market differences. Nonlocal traders, that is, traders coming from cities distant from the fair, can be identified as full-time traders. In both, Asillo and Taraco, nonlocal traders came from cities such as Juliaca, Puno, Cusco, or Ayaviri. Their predominance over traders from the town where a fair was being held would indicate that the given weekly fair had a lower commercial profile, as it would mean the fair was operating more along the lines of the original weekly fairs, with subsistence farmers selling their goods in order to buy other goods that were not locally produced but rather brought in by nonlocal traders

(Bourricaud, 1967, chapter 1). The share of nonlocal traders was significantly higher in Taraco (39.6%) than in Asillo (7.2%). Moreover, local traders from Asillo constituted 68.0% of all traders at the Asillo fair, whereas this figure stood at only 10.4% in Taraco. In light of these figures, it can be inferred that in both cases the remaining attendees comprised primarily subsistence peasants who had gone to the fair to trade goods they had produced themselves: 50% in Taraco compared to only 24.8% in Asillo.

Like the distance that market traders had to travel, the means of transportation used to reach the fair was an indicator of the trade specialization of Asillo respondents, nearly 60% of whom used private transportation (59.7%). In contrast, most Taraco traders (72.8%) used public transportation. The rationale for this is simple: If trading is an individual's main activity, and she or he attends several fairs a week, she or he will gain flexibility and autonomy by controlling more segments of the value chain, including, among others, transportation. Moreover, controlling transportation is key to reducing transaction costs.

Table 3. Exogenous and Endogenous Networks of Market Traders, by Weekly Fair.

Variable	Asillo	Taraco	Test significance level
Presence of relatives in at least one of the fairs usually attended	37.6%	44.8%	
Average number of customers	24.1	25.4	
Average number of suppliers	3.7	2.7	**
Average number of similar market traders in the same community	13.4	14.0	
Member of one or more market trader associations	14.7%	9.1%	*
Member of producer associations	9.8%	4.1%	**

Source: Author's elaboration.

ANOVA or Chi-square test significance level: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

5.2 Exogenous and Endogenous Networks

The exogenous network *par excellence* is that made up of relatives. While relatives played an important role in the implementation of commercial strategies at both fairs, they seemed to be more important to Taraco's vendors, 44% of whom indicated that they find relatives at the fairs they attend, compared to 37% of Asillo traders (see Table 3).

The process of forming an endogenous network differs from identifying and participating in an exogenous one. The basic economics are simple: One is willing to incur the costs of association only when the perceived benefits outweigh the perceived costs. Trade associations are perhaps the most obvious choice for a household whose livelihood is mainly trading. Such associations can reduce certain transaction costs and provide benefits in the form of information about market opportunities or the ability to join forces to lobby local authorities. Both our qualitative and quantitative data bore out this intuition. Our survey showed that a higher percentage of Asillo traders (14.7%) than Taraco traders (9.1%) belonged to associations. During our fieldwork, we discovered that Asillo vendors were organized in associations in keeping with the definition of horizontal markets, i.e., based on the goods sold, and that these organizations were further represented by a central association of traders. The rationale given for this was precisely their ability to lobby local authorities, whether to question the mayor's authority or to demand the redesign of a proposed new market building. Association members in Asillo lived in the town.

The rationale for participating in endogenous networks extended to other types of associations as

well: While association membership was low in general, it was even lower in Taraco than in Asillo. Likewise, membership in producer associations was low for Taraco merchants (4.1%) compared to Asillo merchants (9.8%). Again, our fieldwork offered important insights into the reason for this difference. First, these findings once again point to the importance of nonlocal traders. Second, people from Taraco are wary of associations, which, though promoted in Taraco by development NGOs in the past, never managed to catch on among the population and thus weakened or disappeared altogether when the NGOs left (author's evidence, from ethnographic fieldwork).

5.3 Vertical and Horizontal Value Chains

The most commonly traded goods at each fair provide information on the importance of the vertical value chain and how market transactions are integrated into it. Most Taraco vendors are small-scale producers who sell their output directly, without intermediaries, while most Asillo vendors are traders who interact with more suppliers, whether wholesalers in Juliaca or agricultural producers from the towns in the Asillo fair's area of influence. On average, Asillo traders have 3.7 suppliers, while Taraco vendors have only 2.7.

5.4 Summary

Our evidence shows that Asillo traders are more commercially oriented than the Taraco traders: They attend more fairs on average; the majority, as opposed to a minority in Taraco, sell goods needing a supplier and get to the fairs by private vehicle; local traders predominate; and fewer traders find relatives at the fairs they attend, compared to Taraco traders. Finally, although scant in both fairs, the per-

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Table 4. Mobile Phone Use Among Market Traders, by Weekly Fair.

Variable	Asillo	Taraco	Test significance level
<i>Mobile phone</i>			
Users	82.4%	72.8%	***
Average experience as user (months)	11.8	18.8	***
Subscribers	72.8%	62.4%	**
<i>Mobile phone is used to communicate with</i>			
Friends	69.6%	68.1%	
Relatives	92.3%	91.7%	
Similar businesses	39.3%	19.7%	***
Customers	22.8%	12.4%	***
Suppliers	54.7%	29.1%	***
Seller associations and/or networks	2.8%	2.2%	
<i>Use of a mobile phone significantly improved communication with (selected agents)</i>			
Friends	30.8%	20.7%	**
Relatives	40.7%	36.1%	
Similar businesses	5.6%	4.8%	

Source: Author's elaboration.

ANOVA or Chi-square test significance level: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

centage of traders who belong to associations, be they of producers or merchants, is higher in Asillo. In the next sections, we take into account the fair in which traders participate to incorporate these differences.

6. Mobile Phone Use Among Market Traders

The use of mobile phones is shaped by individuals' daily social and economic activities, among other variables. Because the market traders at each fair had different characteristics, we expected them to make different uses of mobile telephony. Both the importance of trading to their livelihood strategies and their relative isolation were consistent with the finding of a higher proportion of mobile phone users and subscribers among Asillo traders than among traders from Taraco: In Asillo, 82% of traders used a mobile phone, and almost 73% were subscribers; for Taraco, these figures stood near 73% and 62%, respectively (see Table 4).

When asked whether they used mobile phones to communicate with relatives, friends, and traders of similar goods, the traders in Asillo and Taraco

gave similar responses for relatives and friends. However, the differences between Asillo and Taraco traders reappeared with regard to communication with traders of similar goods, further confirming the importance of trading to participants in the Asillo fair: 39.3% of Asillo traders used a mobile phone to communicate with traders of similar goods, while only 19.7% of Taraco traders did. Furthermore, most of the Asillo traders who did so claimed to have seen an improvement in communication, indicating strengthening of the horizontal ties of their endogenous networks. Asillo market traders were also more likely than Taraco vendors to use mobile phones to call customers and suppliers (22.8% and 54.7% in Asillo vs. 12.4% and 29.1% in Taraco, respectively).

The higher use of mobile phones among Asillo traders to communicate with customers and suppliers should also come as no surprise given the underlying economics (see Table 5). In the previous section, we established that trading is the primary livelihood for most Asillo traders and that they are integrated into vertical value chains and have a larger number of suppliers, on average, than Taraco

Table 5. Market Attendance: Information Sources (Agents Consulted) and Mobile Phone Use for Gathering Information for Decision Making.

	Asillo		Taraco		Test significance level
	Information sources (agents consulted) (1)	Mobile phone use for gathering information from each agent (2)	Information sources (agents consulted) (1)	Mobile phone use for gathering information from each agent (2)	
<i>Average number of agents consulted</i>	1.5		1.1		***
<i>Agents</i>					
Friends	44%	42%	45%	30%	
Relatives	70%	59%	45%	36%	***
<i>Agents from the vertical value chain</i>					
Suppliers	10%	79%	5%	46%	*
Customers	15%	65%	6%	38%	***
Intermediaries	1%	100%	0%	0%	*
Employers/potential employers	0%	0%	0%	0%	
<i>Agents from the horizontal value chain</i>					
Similar market traders	6%	36%	1%	67%	***
Other market traders	6%	50%	3%	25%	*
Transportation providers	0%	0%	0.4%	0%	
<i>Support institutions and associations</i>					
Producer association or cooperative	0.4%	100%	0%	0%	
Government agencies (supporting producers)	0.4%	100%	0%	0%	
"Comunidad campesina"	1%	50%	1%	50%	
"Ronda campesina"	0.4%	100%	0.4%	100%	

Source: Author's elaboration.

(1) Respondents: All survey respondents.

(2) Respondents: Those answering "Yes" in the previous question.

Chi-square test significance level for comparing columns (1) (Asillo vs. Taraco Information sources):

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

traders. In keeping with these tendencies, a larger percentage of Asillo traders use mobile phones to communicate with customers (9.8% in Asillo vs. 2.3% in Taraco).⁸ This is so because participants in the Asillo fair are generally more likely to ask customers for advice and also to use a mobile phone to do so.

Our qualitative research showed that a clear distinction must be made when evaluating this kind of information. Because economic roles are often mixed with family ties and it is common to do business with relatives, we do not know the extent to which communications with relatives are related to trade. However, the specific identification of agents

8. Figures calculated from data in Table 5: $0.098 = 0.150 * 65$, and $0.023 = 0.060 * 38$, respectively.

in the value chain as customers or suppliers clearly shows the individuals' presence in the endogenous network. This information is relevant, as it offers proof of the different numbers of agents with whom market traders usually communicate.

Asillo traders make more intensive use of mobile phones when deciding which fair to attend: 41% consult relatives, 7.9% consult suppliers, and 9.8% consult customers. For Taraco, these figures are 16.2%, 2.3%, and 2.3%, respectively.⁹

7. Mobile Phone Use for Decision Making: Analytics

Given the importance of the decision to attend a particular fair, whether as a full-time or part-time trader or a subsistence producer in pure exchange economies, and the differences observed in mobile phone use to make that decision, we postulated a simple logistic regression model to explain mobile phone use to decide where to sell. The model's endogenous variable equals 1 when the market trader seeks advice from at least one agent to decide where to sell. Up to 45% of market traders in the full sample have incorporated this practice into their daily activities. The model was estimated by taking 385 observations into account, because of the presence of missing values.

The model's explanatory variables are as follows:

- **Possession of a mobile phone (dichotomous variable):** A person who has a mobile phone is more likely to use a mobile phone to communicate and gather information for different purposes, including deciding where to sell.
- **Perishable goods (dichotomous variable):** Traders taking perishable goods to market can suffer considerable losses when they cannot reach their customers. Therefore, we hypothesized that selling perishable goods would increase traders' need for timely information to decide where to sell. In this context, mobile phones are an important communication tool.
- **Communicates with customers by mobile phone (dichotomous variable):** Customers can be important sources of information when deciding where to sell. When in doubt, a trader

may decide to attend the fair a particular customer is expected to attend, using a mobile phone beforehand to make sure the customer will be there. This variable is also indicative of more experience with using mobile phones, particularly to communicate with agents in the value chain. This underscores the importance of endogenous networks. Finally, communication with customers may reflect trade in special types of goods, which, due to their specific characteristics, require closer contact between the sellers and intermediaries. This might be the case, for instance, between cheese makers and their buyers: The cheese maker has to be sure the customer will be at the market before bringing the goods.

- **Weekly fair (dichotomous variable):** As argued in the previous section, certain differences can be found between the two fairs studied. Traders at these fairs can be expected to exhibit different behavior with regard to mobile communication. Asillo is farther from the commercial center of Juliaca than Taraco is, and Asillo traders are more commercially oriented. Losing or gaining a particular sale or buy is more important to them, since trading is their main activity.
- **Number of information sources consulted to decide where to sell:** This variable indicates the kinds of agents the market trader usually consults to make this specific decision. The variable ranges from 0–7. The higher the number of agents consulted, the more valuable their information might be; therefore, the more likely a trader is to engage in these knowledge transactions by mobile phone. Finally, this variable signals the importance of networks in general, whether exogenous or endogenous.
- **Trader from an outside location (dichotomous variable):** We distinguished between traders from the fair itself and its area of influence and traders from places outside this area, such as Juliaca, Cusco, Ayaviri, and Sicuani. The latter are most likely to be full-time traders. They typically select which fair to attend on a given day of the week in light of

9. Figures calculated from data in Table 5: $0.413 = 0.70 * 0.59$, $0.079 = 0.10 * 0.79$, and $0.098 = 0.15 * 0.65$ for Asillo; and $0.162 = 0.45 * 0.36$, $0.023 = 0.05 * 0.46$, and $0.023 = 0.06 * 0.38$ for Taraco.

the available choices. Mobile phones can be used to meet their coordination and information-gathering needs.

- **Presence of relatives at the markets usually attended (dichotomous variable):** Many of the traders at the fairs studied were subsistence peasants whose relatives comprised both their main social capital and their main sources of information. Traders are more likely to use a mobile phone to decide where to sell when they have relatives at the markets they usually attend. This highlights the importance of exogenous networks, i.e., the ones most relied on in contexts of poverty and little market integration.
- **Sex (dichotomous variable):** Given the differentiated nature of our traders, we hypothesized that social differences exist with regard to sex. In particular, we hypothesized that male traders use mobile phones more than female traders, including gathering information to decide where to sell. Such usage might indicate that a respondent was a part-time or full-time trader, as opposed to a subsistence trader, who are more often women.

Regression results are gathered in Table 6.

Model 1 includes all the aforementioned explanatory variables. Interestingly, neither the presence of relatives at the specific market attended nor sex was statistically significant in terms of explaining whether traders used mobile phones to decide where to sell. When these two variables are dropped from the model (Model 2), goodness-of-fit indicators improve and the percentage of correct predictions increases.

The negligible importance of gender may mean that social relations have changed, so that even in the kind of setting where subsistence-oriented traders are present, women can be full-time traders or it may be men who go to markets in pursuit of subsistence exchanges. Alternatively, the reason may be that the use of mobile phones is so widespread that sex no longer makes a difference, a logic that might also explain the relative lack of importance of exogenous networks in determining mobile phone use to make this decision compared to the importance of endogenous networks, such as those formed with customers.

In all, use of mobile phones to make strategic

decisions, such as which market to attend, is higher among those with more at stake in the trading activity, either because they sell perishable goods or because they are full-time traders. Moreover, mobile phones are more important for those who use them regularly, whether because they are subscribers or to communicate with customers. Finally, a key factor in this explanation is how intensely the information from the different contacts is used: The more varied the number of agents a market trader regularly consults to decide where to sell, the more likely he or she is to use a mobile phone to make that decision, that is, the more mobile phone use is integrated in his or her everyday economic activities.

8. Conclusions

We have characterized two weekly fairs in the Peruvian Andes and analyzed the market participants' strategic use of mobile phones to make business decisions such as which fair to attend. Using data collected through a survey of 250 respondents from each fair and a detailed qualitative ethnographic study, we confirmed the previous ethnographic evidence that market participants can be classified in three groups with different commercial orientations depending on their origin, the type of good sold, the means of transportation used to reach the market, and their reliance on networks: intermediaries (or full-time traders), part-time traders, and subsistence peasants. The market participants at Asillo fall mostly into the first two groups, while the market traders at Taraco belong to the first (intermediaries) and third (peasants). As a consequence, the Asillo fair is more commercially oriented than the Taraco fair.

This in turn affects several characteristics that subsequently come to bear on mobile phone use. Asillo traders attend more markets on a regular basis, mostly travel to fairs in private vehicles or on foot, and participate in more endogenous networks (they sell more goods requiring a supplier and are more likely to belong to trade or other types of associations) than Taraco traders.

As for mobile phone use, more traders in Asillo are mobile phone users or subscribers than in Taraco, and on average they consult more sources to decide where to sell and are more likely to use a mobile phone to do so. The number of regular contacts a trader usually consults to decide where to

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Table 6. Determinants of the Use of Mobile Phones to Decide Where to Sell: Logistic Models.

	Model 1	Model 2
Endogenous: Use of mobile phone to decide where to sell Yes = 45.19%		
<i>Explanatory variables</i>		
Mobile phone possession (<i>tm4_bis</i>) Yes = 31.9%	0.766 (0.006)	0.789 (0.004)
Perishable good (<i>Perec</i>) Yes = 47.8%	0.655 (0.009)	0.633 (0.011)
Communicates with customers by mobile phone (<i>cm10</i>) Yes = 77.4%	0.776 (0.015)	0.830 (0.008)
Asillo Fair (<i>Feria</i>) Yes = 53.5%	0.854 (0.004)	0.809 (0.005)
Information sources used (<i>cm7_intensidad</i>) Average = 1.47	1.432 (0.000)	1.494 (0.000)
Nonlocal market trader (<i>Foran</i>) Yes = 26.0%	0.630 (0.053)	0.574 (0.073)
Presence of relatives at the markets usually attended (<i>cm5_resumen</i>) Yes = 51.9%	0.392 (0.116)	—
Sex (<i>Sexo</i>) Male = 39.2%	0.028 (0.916)	—
Constant term	−3.903 (0.000)	−3.742 (0.000)
Goodness of fit		
Classification table	% of correct predictions (cut: 45%)	
Yes	69.5	70.1
No	75.8	78.2
Total	73.0	74.5
Number of observations	385	385
Degrees of freedom	8	6
Chi-squared test of global significance: G	129.059 (0.000)	126.593 (0.000)
Deviance of variables deleted in the model	—	2.466 (0.291)
−2 ln likelihood	401.103	403.569
Akaike Information Criterion (AIC)	415,103	415,569
Bayes Information Criterion (BIC)	442,776	439,288
Nagelkerke Pseudo R ²	0.381	0.375
Hosmer-Lemeshow test	7.392 (0.495)	4.339 (0.825)

p values in parentheses.

sell, regardless of their nature in terms of network or position in the vertical or horizontal value chain, is statistically significant in explaining whether he or she uses a mobile phone to make the decision. According to our results, a trader already familiar with the technology regularly relies on endogenous networks to make decisions. Traders who have more to lose should they fail to trade are more likely to use a mobile phone to decide where to sell. Clearly, using a mobile phone reduces the transaction costs for such a trader.

As mobile telephony has rapidly spread around the world over the last 20 years, users have appropriated it within the context of their existing relationship networks and everyday ways of doing things. The social, cultural, and economic foundations of people's livelihoods are thus relevant to explaining mobile phone appropriation and use by different communities. In this regard, we contribute new evidence to the literature on the use of mobile phones. These results must be understood in the context of the area of study: a poor and remote location with a clear lack of communication infrastructure, where market traders had an average of 1.5 years of experience using mobile phones.

Five years after the data were collected, expansion of mobile phone use and sustained economic growth have led to rural dwellers' increasing use of mobile phones for communication purposes, including access to the Internet with the newly available smartphones. However, as our article shows, and in line with existing evidence from other areas in the world, the way the technology is appropriated stems from current social, economic, and cultural relations. Is five years enough time to effect changes in these underlying relations that would modify mobile phone use, regardless of available terminal functionalities? It would be interesting to study the same context again to determine how mobile communications are used and the way commercial transactions could have changed. This research may also motivate questions relating to possible age and gender differences in mobile phone appropriation in light of different telecom services available with the mobile phone. ■

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References

- Aker, J. (2008). *Does digital divide or provide? The impact of cell phones on grain markets in Niger*. University of California, Berkeley. Retrieved from <http://www.cgdev.org/doc/experts/Aker%20Cell%20Phone.pdf>
- Aminuzzaman, S., Baldersheim, H., & Ishtiaq, J. (2002, July 7–10). Talking back! Empowerment and mobile phones in rural Bangladesh. A Study of the village pay phone of Grameen Bank. *Fifth International Conference: Transforming Civil Society, Citizenship and Governance: The Third Sector in an Era of Global (Dis)Order*. Conference of the International Society for Third Sector Research (ISTR), Cape Town, South Africa.
- Angoitia, R. de, & Ramírez, F. (2008). *Cost-reduction strategies employed by mobile telephony users in low-income sectors in Mexico* (Research Brief Series, Issue 2). Lima, Peru: Regional Dialogue on the Information Society Network (DIRSI). Retrieved from http://www.dirsi.net/sites/default/files/dirsi_08_RB2_en.pdf
- Aronés, M., Barrantes, R., & León, L. (2011). "Todos tienen celular." Uso, apropiación e impacto de la telefonía móvil en el área de influencia de dos ferias en Puno, Perú ["Everyone has a cell." Use, appropriation and impact of mobile telephony in the influence area of two fairs in Puno, Peru]. Documento de Trabajo N° 161, Instituto de Estudios Peruanos. Retrieved from <http://www.iep.org.pe/textos/DDT/todostienencelular.pdf>
- Bala, V., & Goyal, S. (2000). A noncooperative model of network formation. *Econometrica*, 68(5), 1181–1229.
- Bar, F., Pisani, F., & Seabra, C. (2011). Apropiación y uso: Estudio de caso en Brasil [Appropriation and use: Case study in Brazil]. In M. Fernández-Ardèvol, H. Galperin, & M. Castells (Eds.), *Comunicación móvil y desarrollo económico y*

- social en América Latina* [Mobile communication and economic and social development in Latin America] (pp. 223–272). Barcelona, Spain: Ariel.
- Barrantes, R. (2007). Mobile opportunities. Poverty and telephony access in Latin America and the Caribbean. The case of Peru. Lima: DIRSI. Retrieved from http://dirsi.net/files/peru_final.pdf
- Barrantes, R. (2010). Mobile phones as a tool in the household production process. Evidence from Puno, Peru. *Communication technologies in Latin America and Africa: A multidisciplinary perspective* (pp. 87–116). Barcelona: UOC. Retrieved from <http://in3.uoc.edu/web/IN3/communication-technologies-in-latin-america-and-africa>
- Barrantes, R., Agüero, A., Fernández-Ardèvol, M. (2011): La telefonía móvil en el ámbito rural: Estudio de caso en Puno, Perú [Mobile telephony in rural areas: Case study in Puno, Peru] in M. Fernández-Ardèvol, H. Galperin, & M. Castells (Eds.). *Comunicación móvil y desarrollo económico y social en América Latina* [Mobile communication and economic and social development in Latin America] (pp. 133–179). Barcelona: Ariel.
- Bourricaud, F. (1967). *Cambios en Puno: Estudios en sociología andina* [Changes in Puno: Studies in Andean sociology]. Mexico DF, Mexico: Instituto Indigenista Interamericano.
- Cadot, O., Dutoit, L., & Olarreaga, M. (2010). Barriers to exit from subsistence agriculture. In G. Porto & B. M. Hoekman (Eds.), *Trade adjustment costs in developing countries: Impacts, determinants and policy responses* (pp. 83–100). Washington, DC: World Bank.
- Castells, M., Fernández-Ardèvol, M., & Galperin, H. (2011). Síntesis de resultados y conclusiones [Summary of results and conclusions]. In M. Fernández-Ardèvol, H. Galperin, & M. Castells (Eds.). *Comunicación móvil y desarrollo económico y social en América Latina* [Mobile communication and economic and social development in Latin America] (pp. 319–350). Barcelona: Ariel.
- Castells, M., Fernández-Ardèvol, M., Qiu, J. L., & Sey, A. (2006). *Mobile communication and society. A global perspective*. Cambridge, MA: MIT Press.
- de Silva, H., & Zainudeen, A. (2007). Teleuse on a shoestring: Poverty reduction through telecom access at the “bottom of the pyramid.” *Annual Symposium on Poverty Research*. Symposium of the Centre for Poverty Analysis, Sri Lanka. Retrieved from http://www.lirneasia.net/wp-content/uploads/2007/04/lirneasia_teleuse_cep_a_-mar07_v30.pdf
- Donner, J. (2006). The use of mobile phones by microentrepreneurs in Kigali, Rwanda. *Information Technologies & International Development*, 3(2), 3–19.
- Donner, J. (2008). Research approaches to mobile use in the developing world: A review of the literature. *The Information Society*, 24, 140–159.
- Esselaar, S., Stork, C., Ndiwalana, A., & Deen-Swarray, M. (2007). ICT usage and its impact on profitability of SMEs in 13 African countries. *Information Technologies & International Development*, 4(1), 87–100.
- Fafchamps, M. (2001). The role of business networks in market development in sub-Saharan Africa. In M. Aoki & Y. Hayami (Eds.), *Communities and markets in economic development* (pp. 186–214). New York: Oxford University Press.
- Feres, J., & Mancero, X. (2001). El método de las necesidades básicas insatisfechas (NBI) y sus aplicaciones en América Latina. Estudios y perspectivas. [The unmet basic needs (UNB) method and its applications in Latin America. Studies and perspectives]. ECLAC-United Nations. Retrieved from <http://www.eclac.org/publicaciones/xml/4/6564/lcl1491e.pdf>
- Fernández-Ardèvol, M., Galperin, H., & Castells, M. (Eds.). (2011). *Comunicación móvil y desarrollo económico y social en América Latina* [Mobile communication and economic and social development in Latin America]. Barcelona: Ariel.
- Figueroa, A. (1984). *Capitalist development and the peasant economy in Peru*. Cambridge, UK: Cambridge University Press.
- Frost & Sullivan. (2006). *Social impact of mobile telephony in Latin America*. GSM Latin America and AHCJET.
- Galperin, H., & Mariscal, J. (2007). Oportunidades móviles: Pobreza y acceso telefónico en

- Latinoamérica y el Caribe. Reporte regional [Mobile opportunities: Poverty and telephone access in Latin America and the Caribbean. Regional report]. Retrieved from http://www.dirsi.net/files/regional/REGIONAL_FINAL_spanish.pdf
- Galperin, H., & Molinari, A. (2011). Telefonía móvil y negocios inclusivos: El proyecto SUMA en Argentina. [Mobile telephony and inclusive business: SUMA Project in Argentina]. In M. Fernández-Ardèvol, H. Galperin, & M. Castells (Eds.), *Comunicación móvil y desarrollo económico y social en América Latina* [Mobile communication and economic and social development in Latin America] (pp. 181–221). Barcelona: Ariel.
- Glave, L. M. (2002). Perú, camino peregrino: Santuarios, devociones y ferias en la formación del espacio nacional. [Peru, pilgrim way: Sanctuaries, devotions and fairs in the formation of the national space]. In J.-J. Decoster (Ed.), *Incas e indios cristianos; elites indígenas e identidades cristianas en los Andes coloniales* [Incas and Christian indigenous, indigenous elites and Christian identities in colonial Andes] (pp. 439–450). Cusco [Cuzco], Peru: CBC, IFEA, Asociación Kuraka.
- Heeks, R. (2009). Beyond subscriptions: Actual ownership, use and non-use of mobiles in developing countries [Web log post, *ICTs for Development*]. Retrieved from <http://ict4dblog.wordpress.com/2009/03/22/beyond-subscriptions-actual-ownership-use-and-non-use-of-mobiles-in-developing-countries>
- Instituto Nacional de Estadística e Informática (INEI). (2007). *Censos nacionales 2007: XI de población y VI de vivienda*. [National censuses 2007: XI population and VI households]. Lima, Peru: INEI.
- Instituto Nacional de Estadística e Informática (INEI). (2008). *Perfil sociodemográfico del Perú* [Socio demographic profile of Peru]. Lima, Peru: INEI.
- International Telecommunication Union (ITU). (2011). *World telecommunication/ICT indicators database 2011*. Geneva: ITU.
- Jagun, A., Heeks, R., & Whalley, J. (2007). *Mobile telephony and developing country micro-enterprise: A Nigerian case study* (Developing Informatics Working Paper Series, No. 29). Manchester, UK: University of Manchester Institute for Development Policy and Management (IDPM).
- Jensen, R. (2007). The digital divide: Information (technology), market performance and welfare in the South Indian fisheries sector. *The Quarterly Journal of Economics*, 122(3), 879–924.
- Jovanovic, B., & Rousseau, P. L. (2005). General purpose technologies. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of economic growth* (Vol. 1B, pp. 1181–1224). Amsterdam: Elsevier North-Holland.
- Kalba, K. (2007, June 1–2). The adoption of mobile phones in emerging markets: Global diffusion and the rural challenge. *6th Annual Global Mobility Roundtable 2007*. Center for Telecom Management, Marshall School of Business, University of Southern California, Los Angeles. Retrieved from <http://www.marshall.usc.edu/assets/006/5577.pdf>
- Katz, J., & Aakhus, A. (Eds.). (2002). *Perpetual contact. Mobile communications, private talk, public performance*. Cambridge: Cambridge University Press.
- Key, N., Sadoulet, E., & de Janvry, A. (2000). Transaction costs and agricultural household supply response. *American Journal of Agricultural Economics*, 82(2), 245–259.
- Ling, R. (2004). *The mobile connection: The cell phone's impact on society*. San Francisco, CA: Morgan Kaufmann Publishers.
- Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organisation Science*, 5(1), 4–37.
- Organisation of Economic Co-operation and Development (OECD). (2005). *Oslo manual: Guidelines for collecting and interpreting innovation data* (3rd ed.). Paris, France: OECD-Eurostat, OECD Publishing.
- Overa, R. (2006). Networks, distance, and trust: Telecommunications development and changing trading practices in Ghana. *World Development*, 34(7), 1301–1345.

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- Parodi, A. (1995). *El lago Titicaca: Sus características físicas y sus riquezas naturales, arqueológicas y arquitectónicas*. [Titicaca Lake: Its physical characteristics and its natural worth]. Arequipa, Peru: Regentus.
- Porter, M. (1985). *Competitive advantage: Creating and sustaining superior performance*. New York: Free Press.
- Souter, D., Scott, N., Garforth, C., Jain, R., Mascarenhas, O., & McKemey, K. (2005). *The economic impact of telecommunications on rural livelihoods and poverty reduction: A study of rural communities in India (Gujarat), Mozambique and Tanzania*. London: Commonwealth Telecommunications Organisation for UK Department for International Development.
- Ureta, S. (2008). Mobilising poverty? Mobile phone use and everyday spatial mobility among low income families in Santiago, Chile. *The Information Society*, 24(2), 83–92.
- Valcárcel, L. E. (1947). *Mercados y ferias* [Markets and fairs]. *Las Moradas: Revista de las artes y las letras* [Las Moradas: Journal of Humanities and Arts], 1(1), 64–69.
- Winter, S. G. (1984). Schumpeterian competition in alternative technological regimes. *Journal of Economic Behavior & Organization*, 5(3–4), 287–320.