Mobile phones and micro-trading activities – conceptualizing the link

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Abstract

Purpose – The purpose of this study is to investigate the impact of mobile phones on the micro-trading activities of traders in Ghana. The study aims to develop a conceptual model analyzing the impact of mobile phones on pre-trade, during-trade and post-trade activities.

Design/methodology/approach – A mixed methods approach consisting of a descriptive survey of 136 traders and a case study of two traders was adopted.

Findings – The findings suggest that traders primarily use mobile phones to monitor goods and pricing strategies, scheduling deliveries, and addressing inquiries and complaints in during-trade activities. Traders, including those with no formal education, also use mobile phones as calculators in post-trade activities. This innovative use of mobile phones is a function of their pre-knowledge which may have been developed through formal education and/or social networks. Improving information management through mobile phones directly or indirectly contributes to the economic empowerment of the trader.

Research limitations/implications – The paper proposes a conceptual framework that extends the transaction cost theory to consider transaction benefits and effects in micro-trading. The study develops four propositions which can guide future research.

Practical implications – The study provides practitioners with a “theoretically-inspired” framework which goes beyond examining design and adoption to identify needs and assess impact in mobiles for development initiatives.

Originality/value – The conceptual framework extends the work on transaction cost theory in information systems and may inform future research in mobile phones and micro-trading activities.

Keywords Transaction cost theory, Mobile phones, Micro-trading, Developing countries, Development, Mobile communication systems, Ghana

Paper type Research paper

Introduction

There has been a tremendous growth in mobile phone ownership and use globally. Statistics from the International Telecommunication Union tend to suggest that mobile phone subscribers currently constitute 60 percent of the world population (ITU, 2008a). The report also suggests that there are now more mobile phone users in the developing world than in the developed world. In countries like Ghana, it is estimated that there are 50 mobile phone subscriptions per 100 inhabitants, and further, the ratio of mobile cellular subscriptions to fixed telephone lines is 80 to one (ITU, 2008b). The rapid diffusion of this relatively low-cost technology has spurred a development agenda questioning how mobile phones can be harnessed more effectively for socio-economic development in developing economies and other resource-poor contexts.

Initial efforts to finding answers to these questions can be analyzed from two perspectives: the practitioner and academic research perspectives. The initiatives of mobile network operators, banks, entrepreneurs, governments and development agencies characterize efforts from the practitioner perspective. These efforts tend to focus on the design and
adoption of mobile applications for micro-finance activities or to enhance access to financial services (Donner, 2007; CGAP, 2008). Efforts addressing the impact of mobiles on development concerns and needs – combating poverty and stimulating economic growth – are quite few. This imbalance is also reflected on the academic research front (Duncombe and Boateng, 2009). There is a preponderance of research studies documenting the business models that characterize the initial efforts of practitioners, mobile operators and banks. Academics have begun to catch up with studies seeking development solutions through mobile phones (Heeks and Jagun, 2007; Donner, 2010; Zuckerman, 2010). Some of the few studies making strides at correcting the imbalance argue that there are complexities of factors that affect the poor and hence, make it challenging for researchers to conceptualize the associated needs and impact of mobile phones with one theoretical model or theory (Aminuzzaman et al., 2003). This often contributes to the blurred distinctions between amplification and transformational effects and also between social and production (business) spheres in adoption and usage (Donner, 2007). Thus, future studies will have to draw on a more comprehensive approach to evaluate the multi-stranded impact of mobile phones on the livelihoods of adopters.

This paper responds to this call for research. The paper investigates the impact of mobile phones on the micro-trading activities of women traders in Ghana. Extant literature has fairly covered studies on the mobile phone’s usage and mobiles for development in sub-Saharan Africa. The studies include mobile phones and fisherman and farmers in Ghana (Boadi et al., 2007); mobile phone sharing practices in Ghana (Sey, 2009); mobile phones and development in Nigeria (Heeks and Jagun, 2007; Jagun et al., 2008); mobile payments in Uganda (Duncombe, 2009) and mobile phone ownership and social capital in Tanzania and South Africa (Goodman, 2005). Despite these studies, there is a call for more studies to test earlier findings in different contexts and in different micro-economic activities in order to contribute to better understanding of the impact of mobile phones in developing economies. The underpinning research question is: what is the impact of mobile phones on the micro-trading activities of women traders in Ghana?

The paper is organized in six sections. The first section covered the introduction of the paper. The next section examines mobile phones and micro-trading to develop the research framework for this study. The following section presents the research methods for the study. The next section presents the case studies of two women traders. The analysis of the cases studies is presented in the penultimate section and the conclusions and directions for future research are discussed in the final section.

Using mobiles phones in micro-trading

Transaction cost theory is arguably the most commonly used theory in studying issues relating to assessment of the impact of information and communication technologies (ICTs) on commerce or trade (Pare, 2003; Milgrom and Roberts, 1992). Transaction costs, described as “the costs of running a system” (Williamson, 1985, p. 19), consist of two types of costs: coordination costs and actor motivation costs (Williamson, 1981; Milgrom and Roberts, 1992). Coordination entails all the information and communication related costs before, during and after a transaction. This includes the cost of searching for products, services, sellers, and buyers, and negotiating and ensuring contract compliance and post-contractual agreements (Benjamin and Wigand, 1995; Wigand et al., 1997). Actor motivation costs entail the costs of having incomplete or asymmetrical information and imperfect commitment in a transaction. These costs affect decision making and enforcement of compliance mechanisms, and contribute to the loss of contracts and contractual disputes (Pare, 2003; Milgrom and Roberts, 1992). It is suggestive from the transaction cost perspective that trading is primarily about information. It involves the sharing and communication of information, which leads to the exchange of goods and services, and the management of relationships between parties involved. Hence, participants in a transaction seek for innovative ways to minimize costs in acquiring, accessing and communicating information for pre-trade, during-trade and post-trade activities (Williamson, 1985).
As a technology, product or service, mobile phones have a potential impact on how trade is conducted. Mobile phones consist of features which offer opportunities for diverse functionalities and applications. Extant research in relating mobile phones and commerce have noted features and attributes including personalization, ubiquity, localization, immediacy, and instant connectivity (Michael and David, 2003; Stanoevska-Slabeva, 2003; Zeng et al., 2003). Ubiquity highlights easy access to information in real time as well as independent communication based on the user's location. Buyers and sellers become relatively accessible and can be contacted anywhere at any time. It also gives them the choice to limit their accessibility to particular persons or time. Personalization works in relation to obtaining new information to create services, which helps customize the end-user experience. Localization makes it possible to know where the customer is at a particular moment and to create a match between services, customer's location and preferences.

The combination of these features and attributes of mobile phones in transactional activities in trade has the potential of generating strategic, relational and operations benefits for the trader. These benefits are related to the posited benefits of using ICTs in commerce or trade (Amit and Zott, 2001; Boateng et al., 2008). However, in this paper, mobile phones are the form of ICTs being discussed. Operational benefits are associated with the reduction in coordination costs in delivery of products, goods and services in the market place. Traders will be able to communicate directly with potential customers and trading partners on the availability of goods and services. Information on the quality, quantity and delivery times of goods can be exchanged. This may contribute to reduction in costs of searching for goods, services, buyers and sellers; reduction in delivery and inventory costs especially for perishable products; reduction of risk in frequent long journeys for goods; and increase in the timeliness in decision-making, negotiating and fulfilling transactional terms (Boadi et al., 2007; Jagun et al., 2008). Achieving operational benefits can build up to relational benefits.

Relational benefits are associated with the benefits of improved communication and relationships between actors involved in a transaction. The ubiquity, localization and personalization features of mobile phones can lead to disintermediation where traders may bypass or avoid, “middlemen” and shorten distribution channels to transact directly with potential customers and trading partners (Jagun et al., 2008). This improved and direct communication may increase the motivation and confidence and understanding between traders and their customers and trading partners. These relationship benefits may build up to strategic benefits.

Strategic benefits are associated with benefits which increase the market “reach” (access new markets) and the performance of traders. Operational and relational benefits can build up the trust for market participants to engage in long-term relationships in the good of all (Zaheer et al., 1998). These benefits include the deepening of relationships, loyalty and retention between traders and their customers and trading partners; product and service differentiation and personalization; and increase in the “reach” through improved reputation, recommendations and referrals. In effect, increase in market reach could stimulate the growth and performance for the trader.

Beyond the benefits obtained from using mobiles phones, the next question to be asked is the potential impact or effect on trade. From the mobile phones for development perspective, mobile phones are conceptualized to have three effects on its adopters – incremental or amplification, transformational and production (Heeks and Jagun, 2007; Batchelor and Scott, 2001). Incremental effects characterize benefits from using mobile phones to improve what traders already do. These include the communication and information exchange with customers and trading partners through use of voice calls and text messages. Transformational effects characterize benefits from using mobile phones to create something new – opportunities and access to services and support, which were not previously available or readily accessible. These effects include the use of mobile phones to access new services such as mobile banking, mobile advertising, mobile internet and other related location-based services. Production effects characterize benefits from not using mobile phones but trading or selling mobile phones and related services. Production effects may also contribute to transformational effects in the livelihoods of micro-entrepreneurs or
retailers engaged in production activities. Examples have been documented in studies on new livelihoods of women in the Grameen Village Payphone initiatives in Uganda, Bangladesh and many others engaged in re-selling airtime vouchers and pre-paid cards (Aminuzzaman et al., 2003). With regard to market traders, we are more likely to expect incremental and transformational effects. Production effects may be experienced by traders who engage or expand their businesses to engage in the re-sale of airtime vouchers and pre-paid cards.

In summary, regarding micro-trading, traders may use mobile phones in pre-trade, during-trade and post-trade activities. This application of mobile phones in trade may generate operational, relational and strategic benefits which may have an incremental, transformational and/or production effect on the micro-trading activities of traders. Figure 1 illustrates this summary in a conceptual framework of the impact of mobiles phones on micro-trading.

Research methods

The study seeks to investigate the impact of mobile phones on micro-trading activities of women traders in Ghana. A mixed methods approach consisting of a survey and case study was adopted in order to explore the consistency of findings and obtain richness and detail to understand how mobiles phones impact micro-trading activities (Creswell, 2003). A survey was conducted to explore the mobile phone usage behavior of 136 traders. A follow-up case study was conducted with four traders to develop an in-depth understanding of mobile usage behavior and gain insight to observations from the survey. An exploratory case study approach was adopted since it strongly supports the research objective set at the beginning (Yin, 1994). This research also sought to benefit from the rigors of designing, collecting and analyzing data as discussed by De Vaus (2001). The mixed methods approach enabled us to develop propositions on the mobile phone usage behavior of the traders.

The data were collected over a four-month period. Three sets of interviews were conducted. The first set of interviews was conducted with women traders. A questionnaire was structured to reflect the framework presented in Figure 1. A sample size of 150 was chosen from two markets – Kaneshie and Abogogbloshie – in Accra, capital city of Ghana. Out of the 150, 136 were successfully administered, representing 91 percent response rate. A total of 77 (56 percent) respondents were from Kaneshie market and 59 (44 percent) from Agbogbloshie market. Data from the survey were analyzed through descriptive statistics using SPSS. The second set of interviews was conducted with four traders randomly selected from Madina and Makola markets for an in-depth study of their micro-trading.
activities. The objective was to get a representation of traders across the four major markets in Accra and also capture rich mobile and trading experiences from different markets. Two case studies from the four interviews are presented in this paper. The third set of interviews was conducted with four of the marketing personnel of two mobile network operators in Ghana, and two resellers of mobile pre-paid cards and mobile accessories. There are currently five major network operators in Ghana, namely: MTN, TIGO, Zain, Kasapa, and Vodafone. The interviews were conducted with marketing personnel from TIGO, Zain and resellers of prepaid cards and mobile accessories with respect to the services that have become beneficial to traders. The interviews in both sets of interviews were recorded and transcribed, with copies of transcribed interviews sent to the interviewees to check and resolve discrepancies. The approach to analyzing the case study was primarily by use of pattern-matching logic as explained by Yin (1994). We sought for results that can strengthen the validity of our theoretical framework (Figure 1), further by scrutinizing the context of the case and detailing findings to provide answers to the research question.

Findings

Demographics and mobile phone ownership

The market is dominated by women within the age range of 36 to 40, with 66 percent above 35 years. 82 percent of the respondents were within the economically active age group (16-50), thus having a higher probability of being associated with modern methods of communication than the elderly (beyond 50) who were 18 percent. The traders engaged in different forms of micro-trading goods. A total of 28 percent traded in cereals, 30 percent traded in tubers, 13 percent in vegetables and 29 percent in clothing; 71 percent of the traders were retailers, 13 percent were wholesalers, 7 percent were hawkers (street-side sellers) and 10 percent were itinerant traders. Of the traders, 83 percent had worked as traders for five years or more. Concerning the level of education, most of the respondents had at least a basic level of education. 13 percent had no form of formal education, 58 percent had a form of basic education, 26 percent had a form of secondary or high school education and 3 percent had a form of tertiary education.

Concerning mobile phone ownership, 46 percent of the respondents acquired their mobile phones through personal purchase and 54 percent through gifts from family relations, friends and promotions from mobile network operators. 60 percent of the respondents have more than one mobile subscription. MTN is the most subscribed network (approximately 32 percent), followed by Tigo, Vodafone, Zain, and Kasapa respectively. According to respondents, multiple subscriptions are the recourse to unexpected network failure, congestion and poor or limited network coverage. Other motivating factors include the desire to take advantage of the price competition among the service providers, avoid the high internet work call charges and the relatively low cost of dual-sim phones as compared to buying two separate phones. These findings are not far from that of previous studies in Ghana (Sey, 2009).

It was estimated that the average amount each trader spends a day on phone calls is US$2. On the average, each respondent (trader) makes between six and ten calls and receives about five calls per day. The respondents assert that prior to the use of mobile phones business communication with trading partners and customers were strained. More often than not, business information had to be relayed through messengers or traders had to leave their wares/goods with other traders in order to go out to get information and perform other activities.

Case findings

Case A: the tomato retailer. Aunty Akosua (hereafter referred to as AA) is a tomato retail trader. She has junior high school level education and has been working as a tomato retailer since June 2008. AA works with Jane who serves as an intermediary between her and the farmers in the villages. Jane buys the tomatoes at wholesale prices from the farmers and AA retails them at the market.
Prior to owning a mobile phone, communication between AA and Jane was constrained by distance. The limited access to Jane often contributed to poor inventory management, where AA could be out of stock of tomatoes for a week. In such scenarios, AA had to buy from other wholesalers, and that increased her coordination costs. She was then advised by a friend to get a mobile phone for Jane and herself, in order to enhance communication and reduce the cost and risk of frequent long journeys. In December 2008, AA purchased a used Samsung D500 for herself and a Nokia 3315 for Jane. The cost of Jane’s mobile phone was deducted from her earnings from trading with AA. They are both using TiGO as their service provider. The cost of the mobile phones is shown in Table I.

The availability of text messaging function is an added advantage for AA, since it is cheaper to send a text message than to make a voice call. She uses text messages alongside voice calls to communicate more frequently with customers. She opined that:

Most of my customers are in the working class, meaning they do not have much time to come to the market. I therefore call or text my customers periodically and ask them if they are in need of any tomatoes and then I deliver to them at their offices before they close.

The mobile phone enables AA to keep a record of the contact details of her customers. Other tools like calendar and alarm on the mobile phone are also used by AA. She notes that:

Some of my customers have even scheduled with me the specific days for which they will need my tomatoes. I have therefore created reminders for them on my phone (so I don’t forget them). Therefore, I do not need to be at the market everyday yet still make my money.

The improved communication and information management has improved her relationship with her customers and suppliers.

Case B: the maize retailer: Maize is a seasonal produce that requires cost-saving techniques in its trading activities. The old dry maize is preferred to the fresh one, for this reason planting and harvesting are well-planned by farmers. Maize wholesalers buy produce from farmers in villages and sell to retailers in Accra, the capital city. Grace is a maize wholesaler who has four retailers in Accra. She has a primary school level education and learned the trade from her mother. She uses two Nokia 3310 mobile phones and subscribes to MTN and TiGO network services.

The mobile phone has made it easy for her to carry out her transactions more efficiently. She does not have to travel frequently to do her business unless she has to go round to collect her payments. This she does once in a month. Grace explains that:

I don’t need to come to Accra to supply the maize; all I do is take the orders on the phone and hire a truck to send the commodity. I don’t have to put my life at risk by making unnecessary journeys.

Mobile phones make Grace more accessible to her customers thereby enhancing their confidence in trading with her. Grace mentions that:

Supply of maize is controlled by monitoring prices on the market. Prices determine how much goods should be supplied at a point in time. I am able to send simple text messages to inform customers on maize prices and delivery times. Customers are also able to monitor the trucks that bring the commodities to the markets in Accra. This enables the customers to plan for contingencies.

The timely delivery of trade information enhances decision-making in transactions and therefore contributes to reducing actor motivation costs. Without mobile phones, it would be difficult for Grace to co-ordinate activities more readily.

<table>
<thead>
<tr>
<th>Mobile handset model</th>
<th>Cost of new handset (USD)</th>
<th>Cost of used handset (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung D500</td>
<td>35-70</td>
<td>20-35</td>
</tr>
<tr>
<td>Nokia 3315/3310</td>
<td>30</td>
<td>20-25</td>
</tr>
</tbody>
</table>
Discussion

This section analyzes the findings to understand how mobile phones are used in micro-trading activities, the benefits obtained, and the impact on the micro-trading activities.

**Mobile phones and micro-trading**

In referring to Figure 2 the findings suggest that traders tend to find mobile phones to be primarily useful for during-trade activities. The dominant during-trade activities are monitoring goods and prices (48 percent), scheduling deliveries (44 percent), addressing inquiries and complaints (44 percent) and informing customers (41 percent). The least usage behavior was ordering goods directly from farmers or through intermediary wholesalers (26 percent). The use of mobile phones during market activities was predominant among traders in the cereals, tubers and vegetable produce. Because of the perishable nature of the produce, these traders regularly contact their customers about what type and availability of produce and also had to schedule the supply of goods with suppliers in Ghana and Burkina Faso.

The dominant pre-trade activities are ordering goods directly from farmers or through intermediary wholesalers (50 percent), scheduling deliveries (31 percent) and informing customers on the availability of goods (23 percent). These activities were particularly observed among the traders at the clothing market. These sellers call their wholesalers (importers) to inquire about when the next consignment will arrive and be made ready for the market. Post-trade activities include contacting customers to follow up on services provided (40 percent), addressing inquiries and complaints (38 percent) and calculating purchases (32 percent). The least usage behavior was ordering goods directly from farmers or through intermediary wholesalers (8 percent).

The dominant usage behaviors for the three stages of trade are: ordering goods for pre-trade, monitoring goods and prices for during-trade and follow-up services (and addressing inquiries and complaints) for post-trade. These activities are perhaps most critical to establishing and maintaining transactions. Hence, as earlier argued, traders are

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**Figure 2** Stages of trading and mobile phone usage behavior

![Graph showing stages of trading and mobile phone usage behavior](image)

**Note:** Total number of respondents = 136
more likely to use mobile phones to reduce the costs of acquiring and communicating information needed for these stages of trade.

Concerning the level of education and usage behavior, all respondents who had no formal education actively used mobile phones in all the stages of trading (see Figure 3). Noting that the number of respondents with no formal education was only 13 percent of the sample, it is inconclusive to suggest a significant impact of education on mobile phone usage. However, the innovative use of calculators in trading was observed. 12 out of the 18 traders (9 percent of total respondents) with no formal education claimed to use calculators in trading activities, primarily in post and during-trade activities. Eight out of the 18 traders (6 percent of total respondents) with no formal education also claimed to use text messaging in contacting trading partners and customers. This ability to identify basic functions in mobile phones and integrate them in trading activities is arguably a function of the some level of education and the perceived ease of using the mobile phones they owned. On further enquiry, these traders intimated that they often received help from their children, friends, relatives and sometimes customers in learning some of the functions of mobile phones, especially with “simple” text messages, calculators, and use of calendars as reminders. The perceived ease-of-use was influenced by the mobile literacy of these traders which stemmed from informal education or knowledge dispersion through social networks. The knowledge dispersion through social networks, however, iterates the blurred distinctions between the social and productive (business) spheres in the adoption and usage of mobile phones (Rangaswamy and Nair, 2010). These findings are suggestive of the first lesson:

Lesson One: The innovative use of mobile phones in micro-trading is influenced by the pre-knowledge of the trader which may have been developed through formal education and/or social networks.

This said, the educational status of the trader may not be the only factor influencing the use of mobile functions beyond voice call. With respect to text messaging, 37 percent of the traders claimed to use this functionality in contacting trading partners and customers (NA = 22). 41 percent of traders who were not using text messaging included 46 traders (34 percent) who had some form of formal education. The primary reasons for not using the text messaging were convenience and ease of making voice calls, and the educational barriers on the part of trading partners, customers and themselves. Thus, the readiness to use the

![Figure 3 Educational status and mobile phone usage behavior](image-url)

**Note:** Total number of respondents = 136, number with no formal education = 18 (13%)
mobile phone in trading is, perhaps, a function of the readiness of the trader and the trading partners and customers in the trader’s value chain. The level of mobile knowledge and readiness of the actors in the value chain of micro-trading activities may therefore be considered as characteristics which influence the value that may be obtained through mobile enabled transactions. If a majority of key customers and trading partners cannot read, seldom communicate with text messages or lack adequate mobile knowledge, it may be a challenge to communicate with them frequently through this medium. Thus, the value or transaction benefits obtained may be minimal. These findings are suggestive of the second lesson:

**Lesson Two:** The readiness to use the mobile phone in trading is influenced by the readiness of the trader and the trading partners and customers in the trader’s value chain.

**Benefits obtained**

The findings suggest that traders agreed to have obtained some forms of strategic, relational and operational benefits. In reference to Figure 4, a majority of traders strongly agree to having experienced a reduction in transactional costs, enhanced coordination, and improved relationships with customers. These are relational and operational benefits. For strategic benefits a great number was somewhat in agreement that the mobile phones had extended the customer base, increased their customer loyalty as well as retained trading partners. These combined benefits contributed to an increase in revenue. None of the traders obtained benefits related to service or product differentiation. In our case studies, both AA and Grace intimated on how mobile phones have helped reduce the cost of coordinating their operations, reduced the risk in making unnecessary journeys, and enhanced communication with customers and trading partners. The enhanced communication or increased frequency of exchange of transactional information with customers enabled the traders to build up a relationship with their customers in which each considers the other as a trusted party. In Case A, AA uses her phone’s calendar functionality to schedule the times to supply her customers who need tomatoes. In Case B, customers are able to monitor delivery times of goods and plan for contingencies through text messages. This communication medium creates a borderless environment or redefines the “place” factor in transacting business with customers and creating more personalized services for

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**Figure 4** Benefits obtained from mobile phone usage

![Benefits obtained from mobile phone usage](image)

**Note:** Total number of respondents = 136
them. Personalized services lead to deepened relationships, which can contribute to customer loyalty and retention. Williamson (1981) refers to this phenomenon of “deepened relationships” as asset specificity, a transaction characteristic which depict customers “locked into” a transaction for a considerable time.

However, the extent of usage of the mobile phones is mediated by affordability and accessibility of mobile services. Concerning accessibility, the key challenges to usage of mobile phones were observed to be network failure (60 percent), drop calls (18 percent) and high cost of air time (13 percent). These challenges encouraged traders (60 percent) to have more than one mobile subscription in order to stay connected to trading partners and customers. Poor network coverage and network failures in rural areas where farms are located often affect communication with trading partners. Wholesalers, like Grace, find it difficult to communicate with customers in Accra when they travel to some villages to buy maize from farmers. Hence, Grace subscribes to two mobile network operators and uses the operator with better network coverage depending on her location. Concerning affordability, the high cost of mobile phones and the initial connection charges is another barrier. Traders, as with Grace and AA, usually purchase used mobile phones. They also consider top-up airtime vouchers to be inexpensive since low denominations are available. Promotional services which offer reduced call tariffs to “favorites”, “friends and family” are primarily used by most small businesses and micro-enterprises to communicate with key customers. Therefore even though some retailers earn low incomes, they still find it beneficial to own mobile phones by keeping the cost of owning and operating the mobile phones low. In Case A, AA had to purchase two mobile phones – one for Jane, her employee, and the other, for herself – and subscribe to the same mobile network. Thus, the use of the mobile technology in trading is determined by the readiness of the actors in the transaction to own/access and use a mobile phone. This readiness partly defines the benefits obtained. These findings are suggestive of the third lesson:

Lesson Three: In micro-trading activities, the benefits obtained by the trader tends to be partly influenced by the extent of mobile phone usage by the trader and other actors – customers and trading partners – in the value chain.

Impact of mobile phones on micro-trading

Concerning the impact on trading activities, the traders primarily experienced incremental benefits (90 percent). The traders predominantly used mobile phones to improve existing trading activities. These include the communication and information exchange with customers and trading partners through use of voice calls and text messages. Little can be said about transformational impact of mobile phones. Contrary to previous research on the mobile phones usage by fishermen and farmers in Ghana (Boadi et al., 2007), there is no evidence of the use of mobile banking services in these micro-trading activities. This finding, perhaps, stems from the differences in the economic volume and type of transactions involved in fishing and farming as compared to micro-trading activities of traders interviewed in this research. The use of mobile phones for record keeping of customer details and scheduling of deliveries may also be considered as incremental effects since traders traditionally keep such information in notebooks and diaries. There is also no evidence of production effects; none of the traders were engaged in the selling of mobile services and accessories. They intimated that the retail of mobile pre-paid cards is highly patronized by mobile kiosk entrepreneurs, street vendors and hawkers. This is not an attractive business venture for market traders who traded in foodstuffs. The nature of micro-trading activities therefore led to primarily incremental effects on trading activities.

These findings are not far from that of previous research which highlights the absence of transformational impact and more of the presence of additive or incremental impact in the adoption of mobile phones in resource-poor contexts (Aminuzzaman et al., 2003; Batchelor and Scott, 2001). However, while transformation effects may not be evident in the trading activities, they may be evident in exploring the impact of mobile phones from a more multi-stranded perspective. A multi-stranded impact of mobile phones may include assessing its impact in empowering individuals economically (income, decision-making...
Economic empowerment is evident in both case studies presented above. For example, Grace stated that: [. . .] I am able to send simple text messages to inform customers on maize prices and delivery times. AA also emphasized that:

[. . .] Therefore, I do not need to be at the market everyday yet still make my money.

In this respect, the findings suggest that the women traders have gained some economic empowerment in improved income from cost reduction, decision making and control in managing the uncertainty in transactions with trading partners and customers. Thus, the transformational impact observed is the economic empowerment for the traders. These findings are suggestive of the fourth lesson are:

Lesson Four: In micro-trading activities, since trading is primarily about information, improving information management through mobile phones directly or indirectly enhances decision making, control and income generation, and by this means contributes to the economic empowerment of the trader.

Figure 5 summarizes the findings in a framework of the impact of mobile phones on micro-trading activities of women traders in Ghana.

Conclusion

This research has generated valuable insights and lessons for research and practice. The study shows that, regarding micro-trading, traders use mobile phones for primarily during-trade activities. During-trade activities include monitoring goods and pricing strategies, scheduling deliveries and addressing inquiries and complaints. Some traders, though few in number, innovatively use them to calculate purchases and send text messages to customers and trading partners. This innovative use of mobile phones in micro-trading is influenced by the pre-knowledge of the trader which may have been developed through formal education and/or social networks. The traders obtain operational, relational and strategic benefits that may have incremental and transformational effects. The type of benefits obtained by the trader tends to be partly influenced by the extent of mobile phone usage by the trader and other actors – customers and trading partners – in the value chain. Hence, the readiness of the actors to own and use mobile phones play a critical role in determining the benefits obtained by trader and also by the actors. However, while the
benefits obtained primarily lead to incremental effects, the transformational effects do not
directly refer to the creation of new services in the micro-trading activities, as earlier argued.
They were observed as the economic empowerment of the women traders. In addition,
productive effects are absent due to the nature of micro-trading activities researched in this
study.

Concerning research implications, the conceptual framework, Figure 1, extends the
knowledge on the application of transaction cost theory in information systems. Previous
research has posited two key arguments (Watson et al., 2005; Boudreau et al., 2007). First,
transaction cost theory tends to focus on the costs aspect of transactions while being silent
on transaction benefits. Our conceptual framework, in response, goes beyond transaction
costs to discuss the transaction benefits which stem from the adoption and use of mobile
phones. These transaction benefits are discussed at level of the micro-trading entity, which
could either be an individual or business/organization. The findings from this research
explain how transaction benefits are influenced by the frequency of usage of mobile phones
by actors in the transaction. The framework also explains how transaction benefits lead to
incremental and transformational effects in the micro-trading activities.

Second, the transaction cost theory needs to be reexamined in the context of information
economy where there is a dominance of electronic transactions and physical goods are
increasingly becoming digital or virtual. This research, in response, explains how information
systems, as in the form of mobile phones, influence the transaction characteristics such as
uncertainty and frequency of transactions. Mobile phones enhance the timely
communication of information in pre-, during and post-trading stages of micro-trading.
Improving information exchange shrinks information asymmetry, reduces the demand
uncertainty which underpin transactions, and increases the frequency of transactions
between actors in the value chain (Jagun et al., 2008). The study also explains how the
knowledge of traders, trading partners and customers and dispersion of such knowledge
between the actors influences the innovative use of mobile phones in micro-trading.

Hence, knowledge – intensity and dispersion – may be viewed as a transaction
characteristic which can influence the achievement of transaction benefits. Discussions on
knowledge as an additional transaction characteristic have earlier been conceptualized by
Boadi et al. (2007). This finding is welcome, since it adds to the three transaction
characteristics – asset specificity, uncertainty and frequency of transactions – proposed by

Concerning implications to practice, the conceptual framework tends to be a response to
Duncombe and Boateng (2009) call for “theoretically-inspired” frameworks which go
beyond examining design and adoption to identify needs and assess impact in mobiles for
development initiatives. The authors argue that due to the complexity of influencing factors,
practitioners and researchers alike find it challenging to conceptualize needs or assess
impact within a single model-based approach. As a theoretically-based approach located in
the field of economics, the conceptual framework therefore enables practitioner-researchers
to analyze the needs of the target “entity”, explore their mobile phone adoption and usage
patterns in trading activities, and assess outcome/benefits and impact. For example, traders
exist in different categories – iterant trader, wholesaler, retailer, and street hawker – and
trade in different goods and services. Notwithstanding their prior mobile experience and
educational status, each of these traders has a complex value chain – actors and activities
which define the nature of their trade. Examining the impact of mobiles on such a
micro-trading activity will require a thorough understanding of the activities and actors in the
network. This study attempts to enable practitioners to conduct such an assessment by
providing the conceptual framework as a starting point.

Concerning implications to policy, our attention is drawn to the complex interrelationships
between mobile phone adoption and inclusion in the information economy. Micro-enterprises and micro-trading activities play a central role in economic activities in
developing countries. They are a major source of employment, but often score poorly on
sustainability (Mead and Liedholm, 1998; Gomez, 2007). As Sen (1999, p. 75) explains the
“capability to function” is what really matters to the poor and non-poor person. Comparably mobile phones tend to have an easier path of adoption, and considering their features, mobile phones empower a poor or non-poor trader’s capability to function in micro-trading activities. Empowering the poor to participate in micro-trading contributes to their inclusion in the information economy. As our findings indicate, the emphasis is on the quality of usage or the innovative use of mobile functions and services. Improving the access to and the quality of usage of mobile phones and services may help narrow the digital gaps which exist in resource poor contexts. For example, Esoko, provides a mobile-enabled market information service that tracks the prices of selected agricultural products and makes them available to stakeholders within the agriculture and trade sectors in African countries. Policy initiatives to address the digital divide or foster digital inclusion may as well consider enhancing the quality of usage of such services beyond merely improving access (Mutula, 2008).

For future research and other mobiles for development initiatives, the conceptual framework may be used to analyze mobile phones and other micro-trading activities such as taxi services in transportation, and carpenters and potters in manufacturing.

This work is not in any way exhaustive. The findings and lessons are stepping stones towards the “mobiles for development” movement, which is rapidly expanding. The reality in practice may require more effort and further research.

References


Further reading


About the author

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