*History, Archaeology and Fine and Applied Arts Research Journal*
ISSN: 2997-6294 |
Volume 10 Issue 1, January-March, 2022
Journal Homepage: https://ethanpub.online/Journals/index.php/E27
Official Journal of Ethan Publication

# SIGNAL STRENGTH AND SOCIAL NETWORKS: AN ANALYSIS OF MOBILE PHONE COMMUNICATION AMONG MYANMAR'S TRISHAW OPERATORS

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**Abstract:**
*Amidst the bustling streets of Bago, Myanmar, a diverse array of vehicles paints a vivid picture of urban mobility in this rapidly evolving Southeast Asian city. From motorbikes to trucks, taxis to private cars, the urban landscape embodies a dynamic interplay of transportation modes. This study delves into the intricate fabric of urban mobility in Bago, providing a nuanced understanding of how individuals navigate this complex environment. Through extensive research and observations, this research sheds light on the mobility patterns, preferences, and challenges faced by the city's residents. It explores the role of motorbikes as a dominant mode of transportation, the coexistence of various vehicles on the roads, and the implications of this mobility diversity on urban life. The study draws on the perspectives of local residents, offering insights into their daily experiences and mobility practices. Additionally, it examines the influence of technological advancements and changing infrastructures on the urban mobility landscape. By unraveling the intricacies of mobility in Bago, this research contributes to the broader discourse on urban transportation in rapidly developing cities, providing valuable insights for urban planners, policymakers, and researchers alike.*

**Keywords:** urban mobility, transportation modes, motorbikes, urban life, Southeast Asia.

## Introduction

Standing on a busy street corner in Bago, a city northeast of Myanmar's capital Yangon, one would see a deluge of motor bikes, various types of trucks and buses, taxis, an occasional private car, the odd ox cart, and some *sai kaa* or trishaws, three-wheeled pedal bicycles used to transport people and goods. In other words, there is a bit of everything for transporting passengers and freight. Another thing an observer would see is a blanketing of every available space with advertisements for mobile phones and the mobile network operators, Telenor, Ooredoo, and MPT. This article examines how mobile telephony is changing the structure of trishaw driving in Myanmar, where mobile phones are just now becoming common. The accessibility and the ability to micro-coordinate through mobile phones is how trishaw operators get their fares and organize their work. Those who adopt mobile phones can become "digitally dependent" workers through the cultivation of regular customers. Conversely, those who do not have mobile phones run the risk of marginalization. Use of the mobile phone can make the individual individually addressable (Ling, 2008; Ling & Donner, 2009). This, in turn, facilitates microcoordination (Ling & Yttri, 2002) and thereby extends the potential for small-scale entrepreneurs in the Global South (Donner & Escobari, 2010; Jagun, Heeks, & Whalley, 2008).

The traffic situation of Bago would be familiar to a long-term observer in Myanmar, but the telephonic onslaught is quite new. Until 2013, mobile phone subscriptions were rare and expensive, but the situation has been changing rapidly in the past two years. Now, millions of people are buying, often for the first time, a mobile phone. They are making the transition from never having had phones at all to being the owners of new, Internet-enabled smartphones. We focus on why the men who operate trishaws adopt or reject the use of mobile communication, and on how it is changing their relations with clients.

***Myanmar and Mobile Telephony***

Myanmar (known as Burma until 1989) was a British colony until 1948, after which it gained independence as a democratic nation. Then, following a coup d'état in 1962, it was under a military dictatorship until 2011. In 2011, a new government instituted a series of economic and political changes. The country has a population of about 53 million. The estimated PPP GDP/capita for 2014 is US$4,800, ranking it at 170 (of 230) in the world. In 2014, the UN ranked Myanmar at number 150 (of 187) on the Human Development Index (UNDP, 2014). The mean year of schooling is only 3.5. In 2014, more than half of the population was multi-dimensionally impoverished, and 74% made less than US$2 per day
(ibid.).

Until 2011, there were fewer than two mobile phone subscriptions for every 100 persons (ITU, 2013). Under the monopoly of state-run Myanmar Post and Telecommunications (MPT), a mobile subscription, excluding the cost of the phone, could cost more than US$3,000 (Petulla, 2015). They were accessible to the non-elites only after years of saving, or through lotteries that entitled the winners to an inexpensive subscription, which was then often sold on the black market. In 2013, as part of a broader reform and democratization process, the government issued licenses to two network operators, Telenor and Ooredoo. The new infrastructure that is being built by these companies and a competitive market have reduced the price of a subscription to about US$1.50.

This new low cost has fueled high demand for mobile phones, and the new network operators have quickly sold millions of subscriptions: Ooredoo sold 1 million subscriptions in Yangon during its first three weeks of operation, and half a million people subscribed to Telenor in one day (*Economist*, 2015). While mobile phones are increasingly common, the number of subscriptions overestimates the number of actual users (as in many countries in the Global South), since it is estimated that, in Myanmar, about 43% of all phones may house two or more SIM cards, that is two or more subscriptions (Open Signal, 2015).

**Trishaw Operators: Transportation, Communication, Micro-entrepreneurship**

This article examines mobile communication among trishaw operators in Myanmar. It joins other research on mobile phones among micro-enterprises, such as Jensen's work on fishermen in southern India (2007), or Jagun, Heeks, and Whalley's work on cloth producers in Nigeria (2008). The nexus of mobility and communication has been explored both in mature economies (Goggin, 2012; Ling, 2012; Ling & Yttri, 2002; Sheller & Urry, 2006), and in emerging ones, with work examining the use of mobile media to support various types of enterprises (Djane & Ling, 2015; Donner & Escobari, 2010; Horst & Miller, 2006; Jagun et al., 2008; Jensen, 2007; Tacchi, Watkins, & Keerthirathne, 2009).

Examining how mobile communication affects trishaw operators brings together elements of transportation, small scale-entrepreneurship, and microcoordination in a developmental context. Transportation of people and goods is complex when confronted with the challenges of rapid population growth, poverty, crowding, poorly designed and antiquated roads, and congested urban areas (Cervero, 2013). Many of these issues are not common in the automobile-based transportation systems of Europe and North America (Flink, 2001), where there are various social constellations, including the family, work, community, and leisure, that are all linked together by using the car (Sheller & Urry, 2006).

Bicycles remain an important form of non-motorized transportation in some European cities, such as Copenhagen (Gössling, 2013) and Amsterdam (Beck & Immers, 1994), and couriers play an important role in many Western cities (Fincham, 2007). That said, bicycle-based transport is not as central to these local economies as it is in the Global South. According to Cervero (2013), bicycles and rickshaw/trishaws offer an efficient, technically accessible, and inexpensive form of transportation in developing economies in Asia. For example, in Hanoi in 2001, there were 90 bicycles per 100 people, and a large portion of daily trips were made using the bicycle (Vasconcellos, 2001). According to Gallagher (1992), rickshaws contributed 11 million passenger miles per day in Dhaka in 1992, surpassing the passenger traffic transported by the London Underground. Inexpensive Chinese motor bikes, which include motorized bicycles, are encroaching into the bicycle-based transportation sector (Galucci & Scanlon, 2014). In Malaysia, there are as many as 23 motor bikes per 100 people (Haworth, 2012). In Laos, motor bikes make up

almost 80% of the traffic (Cervero, 2013). In Yangon, cars dominate (indeed, overwhelm) the main arteries, and Mandalay, Myanmar's second-largest city, is sometimes called "Motorcycle City" because of the large number of motorbikes that circulate.

Trishaws have their roots in the hand-drawn rickshaws that came to Asia at about the turn of the 20th century (Edgerton, 2008), followed by the cycle-based trishaws in the 1920s. The trishaw is an inexpensive and easily accessible first step into micro-entrepreneurship (Ellis, 1999), affording an economic foothold for people moving into cities from rural areas (Begum & Sen, 2005). As noted earlier, there are many diverse forms of transport in Myanmar, each having its own characteristics (range, speed, expense, comfort, load capacity, maneuverability) and thus serving different purposes. Trishaws are slower and have a more limited range than either motor bikes or taxis. However, they are inexpensive and highly maneuverable in the tight spaces of the streets and markets. The passenger seat, that is a type of sidecar, can be configured to take one, two, or (in some cases) three persons, or can be adjusted to carry goods. In sum, the trishaw occupies a niche in the transport landscape that is well suited to delivering passengers and goods over relatively short distances (for example, from a truck terminal to a store) in narrow, congested markets. In big cities, a neighborhood might have two or three trishaw stands where operators queue to ferry people and goods within the quarter or to nearby bus stops.

***Economic Position of the Trishaw Operators***

According to Cervero (2013), driving a trishaw is an entry-level job for uneducated men (no women operators were observed in this study). Forbes, who studied trishaw operators in Indonesia, characterizes this work as a marginal economic activity, and trishaw operators as having a tenuous economic and social position. Indeed, operators studied by Forbes (1981) sometimes did not even have a stable residence: some trishaw operators slept in their vehicles, ate from street-side food stalls, and washed in public drains. Only rarely were they in a position to purchase a trishaw. Most often, they rented one. As further evidence of their social and economic marginality, they were often the focus of police inspections that sometimes appeared to be harassment or a mechanism to extract payoffs.

In larger cities, trishaw operators need a license to operate, the cost of which is well beyond their means. People with capital (and/or fortunate connections) buy the licenses, and then rent out the trishaws to the drivers, who pay a daily rental fee. Alongside licensed trishaws, there are large numbers of unlicensed ones, whose operators constantly risk confiscation of the vehicle and fines (Shin, 2013). In smaller places, there is less traffic, and licenses are either cheaper or nonexistent. Trishaw driving is a year-round business, since trishaws are essential for goods and personal transport throughout the year. Even during the monsoon season, there remains a need for this service, when passengers carry an umbrella and trishaw operators simply get wet. The work can be dangerous, and health problems, particularly respiratory problems, are common (Avogbe et al., 2011), as are accidents (Jaiswal, Nigam, Jain, Kapoor, & Dhaon, 2006; Mohan, 2002; Mohan, Kajzer, Bawa-Bhalla, & Chawla, 1997).

Trishaw driving is a low-paying job. Some of the people interviewed in this study took home as little as US$2 per day, placing them into the lowest echelon of the economic pyramid (Collins, Morduch, Rutherford, & Ruthven, 2009; Ravallion, Chen, & Sangraula, 2009). According to our informants, in the rainy season, a good trishaw operator in Bago and Kyaikto could average 5,000–7,000 Kyats (US$5–7) per day after expenses, but it could be as little as 2,000 Kyats (US$2).[1] Elderly trishaw operators (often in their 50s and 60s) and those who had health problems made less. In smaller towns and villages, trishaw operators were locals, but in Yangon, younger drivers were often from the countryside, looking for a way to make a living in the city. Trishaw operators with heavy family obligations were not

[1] The exchange rate noted is that which operated on the street at the time of the interviews in the fall of 2014. The official exchange rate varies from this. In 2013, it was as low as 950 Kyat per U.S. dollar, and as of late 2015, it has approached 1,300 Kyat per U.S. dollar.

as able to save money (for example, to buy phones[2]) since there were more immediate needs. By contrast, younger unmarried trishaw operators could live at home and thus were subsidized by their parents. They were in a better position to save money for a phone and perhaps a motor bike. This family-based safety net seemed less common in the bigger cities.

***Bicycle Transport as a Micro Enterprise***

As noted, trishaw driving is a small-scale enterprise. As such, this analysis follows the work done by Donner and Escobari (2010). They reviewed 14 papers that examined the interaction between mobile telephony and small-scale entrepreneurs in the Global South, and found that mobile phones have reduced the costs, risk, and uncertainty for micro-entrepreneurs, while extending both social and business networks. Donner and Escobari found that mobile phones support productivity among microentrepreneurs, but benefits are not uniform: "The benefits of mobile use accrue mostly (but not exclusively) to existing enterprises, in ways that amplify and accelerate material and informational flows, rather than fundamentally transforming them" (ibid., p. 654). Echoing these findings, the mobile phone is changing the situation of trishaw drivers in Myanmar, and as suggested, the benefits reaped are not uniform. The mobile phone allows the individual driver to be individually addressable (Ling, 2008). This facilitates microcoordination (Ling & Yttri, 2002), which is particularly important in the transportation sector. According to Jagun, Heeks, and Whalley, the mobile phone also extends the reach of these and other small entrepreneurs (2008). The data analysis of this paper is framed around these theoretical dimensions.

**Method**

The material for this paper comes from interviews and observations of trishaw operators in Bago, Kyaikto, and Yangon in southern Myanmar, and in villages around Thandwe, on the coast of Myanmar. We were able to examine Bago, Kyaikto, and Thandwe before Telenor and Ooredoo started to operate, and thus situate our data collection at a time when the MPT monopoly made subscriptions too expensive for many people.

Yangon is the commercial hub of Myanmar, with a population of 5.2 million in 2014. Bago is a city of about 489,000 people, located approximately 80 km northeast of Yangon. At the time of our research, MPT, Telenor, and Ooredoo were available in both Yangon and Bago, though with patchy coverage. Kyaikto is a smaller town of about 30,000 people, located about 170 km northeast of Yangon, which at the time was covered only by MPT and Ooredoo. In the villages around Thwande, only MPT operated, as they were not part of the priority areas for the two companies or the Burmese regulatory authorities.

This paper is part of a larger project that tracks changes in Myanmar as mobile telephony becomes accessible to larger segments of the population. Four researchers have done fieldwork in different areas of the country.[3] These interviews were informed by a period of broader field observations conducted in August 2014, which provided depth and background information. The focus in this part of the project was on the role of mobile communication in various aspects of entrepreneurship: on fishing, on rubber farmers, on rice farmers and tea growers, on technical workers, etc. Approximately 90 individuals from a variety of backgrounds were interviewed, using open-ended questions that became gradually semistructured. In this phase, given the breadth of the fieldwork and the need to compare findings and observations of the different researchers, we coded both interviews and field diaries using an online software package for qualitative analysis, Dedoose. This allowed the sharing and cross-coding of the material and the identification of emergent themes. The role of trishaw operators was noted as one of the themes.

In January and February of 2015, there was an intense study of trishaw operators, with approximately 25 interviews in Bago, Kyaikto, Yangon, and near Thandwe. Informants were recruited by going to the points where trishaw operators congregated. In the larger towns, this was often at the trishaw stations. In other cases, it was by

[2] The least expensive feature phone costs approximately 20,000 Kyats (US$20), while the least expensive smartphone costs around 43,000 Kyats (US$43). More expensive handsets could cost upwards of 100,000 Kyats (US$100).

[3] The field workers are two Indian PhD students, a post-doctoral researcher from Italy, and a professor from the United States, all supported by a Burmese professor.

approaching them on the street corners when they were between jobs. An interpreter helped carry out the interviews. A drawback of this opportunistic approach is that it does not allow generalization, and it is possible that the sampling only captured some dimensions of what is certainly a complex social situation.

The semi-structured interviews were all with Burmese-speaking respondents, assisted by Englishspeaking Burmese translators. In some cases, the interviews were recorded, but in most cases, the use of recording equipment would have stifled the interaction. The contents of each interview were noted on paper as the interview took place. This was expanded into more fully developed field notes immediately after the interview, while the impressions were fresh. As is often the case, development of the field notes gave rise to other questions. These questions sought more depth regarding certain issues (e.g., the flow of cash for the trishaw operators). In some cases, they provided critical checks on other information that had been gathered earlier (e.g., the role of licensing). The interviews continued until we had reached saturation, (i.e., there were only repetitive responses to the questions; see Bowen, 2008). As the interviews took place and during the development of the field notes, we noted themes that emerged from the data (Spradley, 1979). These emergent themes were tested with critical questions in later interviews, and then formed into the findings described in the next section. In most cases, the interviews were oneon-one, but in other cases, they informally included up to a dozen others who were nearby and contributed to the flow of dialogue with comments and embellishments. For example, when a trishaw operator said he used his phone for business purposes, another operator might also remind the interviewee of the social and entertainment uses of the device. These elements were accordingly entered into the field notes. All the interviewee names have been changed to protect the privacy of our informants.

**Findings**

***Buying a Mobile Phone***

At the time of the interviews, many, but not all, of the trishaw operators had a mobile phone. Those who did have a phone often had more than one SIM card. Typically, their first subscription was with MPT, which provided the broadest coverage. In the locations where Telenor or Ooredoo were operational, many also had a subscription with one or both. Many of the trishaw operators showed personal discipline and/or played on the largesse of their parents when saving for a phone. An example is Maung Tin Aung, a 25-year-old operator in Kyaikto. He was unmarried and living with his parents. This meant that he could save more than if he had been supporting a wife and children. At the time of the interview, he had had his phone for only four days. He had saved for almost two months, putting away about 1,000 Kyats (US$1) a day (about a third of his total earnings) for a 40,000-Kyat (US$40) Chinese “Coolpad” smartphone. He anticipated that having a phone would mean an increase in income. Maung Sein, a trishaw operator in Yangon who also lived with his parents, said that he had had a mobile phone for more than two years, and that he had recently bought another. His first mobile phone with MPT had cost 120,000 Kyats (US$120) for both the phone and the subscription. It took him 4 months to save the money at a little more than a dollar a day, which was about a tenth of his income. Maung Sein’s new phone, which was a smartphone, had cost only 40,000 Kyats (US$40). Another Yangon trishaw operator, U Nyein, had had a more difficult time saving up. He had saved for three months to obtain the 65,000 Kyats (US$65) to buy the phone, saving approximately 725 Kyats (US$0.72) per day. There was a common, if not well-defined, sense among these operators that the phone was a useful tool for their work.

In Kyaikto, U Aye Thein, who was in his mid-30s, had bought a new Huawei smart phone only two weeks before the interview. This had cost him 45,000 Kyats (US$45) for the phone and the subscription. Previously, he had had a feature phone for four years. U Aye Thein had bought the first phone as part of a “savings group” with 10 other trishaw operators. Each day, the 10 operators pooled 1,000 Kyats apiece. Every fourth or fifth day, when there was enough money in the pool to buy a phone, the drivers would have a small lottery to see who would win. Over the month-and-a-half of this process, he said that it was fun and it engendered a good group feeling. It also functioned as a type of “forced” savings for this work group. Rather than making an individual decision to buy his phone, it had been a group activity.

In geographically and socially more compact places like the fishing villages around Thandwe, few trishaw operators had mobile phones. Neither Telenor nor Ooredoo covered this location at the time of the interviews, and the only existing coverage came from MPT, whose subscription cost around 4,500 Kyats (US$4.5). However, not many of the operators or their clients felt the need to have a phone. The smaller scale of the area meant that traditional routines of finding fares sufficed. Indeed, the few trishaw operators who had a phone did not think it generated enough business to justify the purchase. U Kyaw Win had bought a feature phone in 2014 for 30,000 kyats (US$30), since he thought a smartphone was too difficult to use. He had hoped the phone could help him increase his business, but this had not yet materialized. Things might change as mobiles become more common, and as Telenor and Ooredoo move into the market.

In all the sites, there were also trishaw operators who did not own a mobile phone. These were, more often than not, elderly operators. When asked why they did not have a phone, they often said that it was too difficult to learn, or that the expense was a barrier. This was the case with the 63-year-old operator U Khaing, in Bago. On a normal day, he made US$2–3. When asked why he did not have a phone, he said that he was too poor, and that all his wages went to support his family. In other cases, the physical condition of the trishaw operator meant that it was difficult to save. At a station in Yangon, all of the operators owned a phone. When asked who had been the last person to get a phone, they said that one colleague had bought his phone only a month earlier. They said that he had had difficulties saving because of poor health and the need to support his family.

Looking across all the locations (Thandwe aside), the younger (usually in their 20s) and the higher-earning trishaw operators had mobile phones. The more marginal operators lagged behind. This echoes the findings of Jensen's study of fishermen in India, where the larger, better-off boats were the first to buy phones (Jensen, 2007).

***Using a Mobile Phone***

The mobile phone had two main areas of utilization in business, namely facilitating contact with customers (getting fares and cultivating important customers) and, to a lesser degree, facilitating "back office" logistics (e.g., forming temporary, informal syndicates). In addition, many of the trishaw operators, particularly the younger operators in Yangon, said that access to their social ties (family, friends, and eventually girlfriends) and to entertainment (following football stars, watching movies, listening to music) were important aspects of having a phone.

***Getting Fares: Prowling and Trishaw Stations***

Trishaw operators have several ways of getting business. They might prowl the streets, sometimes using the bell mounted on their handlebars to tout their availability, or they might wait near the markets for fares. There are also trishaw stations where the operators congregate and locals know that they can find a ride. At the stations, a quasi-formal queuing system among the operators is organized into a series of "ups," that is, customers take the trishaw operator who is first in the queue. The queue system distributes the fares to all the drivers on an equal basis. It also means that there is a cyclical guarantee of rides. As the number of phone-based orders increases, however, the viability of the queuing system is affected. Operators with phones can wait in the queue so long as they do not have a job. However, because of their individual availability, one of their regular customers can call them out of the queue. This shortens the queue for the operators behind them, but it also means that the pool of possible fares is smaller.

***Regular Customers: Becoming a Digitally Dependent Worker***

Perhaps the most important source of income for many of the trishaw operators is regular customers. It is here that we see the operation of microcoordination and thus the most significant effect of mobile telephony for trishaw operators. Before adopting mobile phones in the larger towns and cities, it was more difficult to develop these "on call" connections. Rather, the operators needed to have an agreed-upon time and place for regular customers. It was impossible to adjust the appointment or cancel it should something arise. Access to the mobile phone and its ability to facilitate coordination has altered the workings of this system, since the trishaw operator does not need to physically check in.

Regular customers are an important part of the trishaw operators' income. The trishaw operators we interviewed often had three to five important clients. These clients were frequently shopkeepers who needed the trishaw

operators to retrieve or deliver goods from local transportation hubs where supply trucks would deliver them. In some cases, a single client might need several deliveries during the day. The mobile phone facilitated this type of work. U Aye Kyaw in Kyaikto had had a relatively permanent connection with a local shopkeeper over the last two years. Indeed, that shopkeeper was his only important client and the only one who had his mobile number. The shopkeeper paid him about 4,000 Kyats (US$4) per day for three or four deliveries. In addition, he made about 3,000 Kyats (US$3) per day with other types of pick-up work. Thus, that single client represented the single largest part of his income.

While providing steadier income, the system of important clients also makes the trishaw operators particularly accountable to these people. The operators must be responsive to the needs of the phone-enabled regular customers and work to gain/maintain their trust, an important dimension of microentrepreneurship in developing countries (Molony, 2008; Overå, 2006). If a shop owner is not able to reach his preferred operator, he may go to any other operator on his list. This means that the operators are, to some degree, on tenterhooks vis-à-vis their important customers. The situation of U Aye Kyaw illuminates this. When asked what he would do if his phone was ruined or broken, he said that he would quickly buy a cheap feature phone just so that his main client would be able to reach him.

Wallis (2013) discusses a similar situation among rural-to-urban migrant women in China employed in the service sector. The phone is one of their most cherished possessions. However, it is also a type of leash. It makes the women accountable to their employers in a way that was not previously possible. The same can be said of the trishaw operators. They are, in a sense, more tied to their regular customers. Unlike the Chinese women studied by Wallis, the operators do not have any formal contractual relationship with the customers. If they displease the client by, for example, being unable to respond to a call, many others are willing to fill in.

***The New Geographies of Mobile Telephony***

U Aye Kyaw had also discovered that there were areas in Kyaikto that were poorly covered by the phone company's towers. In practical terms, this meant that he could not be in those locations in parts of the day, because he might miss an important call from his client. While the phone has streamlined operator-client connection, it has also tethered the trishaw operator to the important client in a new way.

This echoes the "accountabilities of presence" described by Troshynski, Lee, and Dourish (2008). They studied paroled sex offenders who were not allowed near schools, swimming pools, and other areas where children spent time. The offenders were required to wear a GPS tracker that would map their movements and thus made them accountable to parole authorities. It also made them newly aware of where these forbidden areas were located. In other words, they were mapping a technologically based layer of open and closed areas onto their daily movements. Clearly, the motivation for accountability of U Aye Kyaw is different from that of the parolees studied by Troshynski, Lee, and Dourish. Still, elements of the same accountability and power gradients are seen in a heretofore-unknown geographical layer. U Aye Kyaw had a newly realized need to be within the footprint of the mobile signal, and thus available to his important client. His concern for violating the trust that the client had placed in him was the disciplining factor.

According to Overå (2006; see also Molony, 2008), telephonic availability can be parlayed into trust between trading partners. To be sure, the trishaw operators such as U Aye Kyaw noted that being available to important clients was an important reason to have a mobile phone. One can ask, however, if this was only the development of trust: Was it trust with a tincture of power; or was it perhaps even the opposite? There are elements of both trust and power in the interaction between trishaw operators and regular clients, with the operators in the more vulnerable position. Indeed, the trishaw operators were "on call" for the shopkeepers and needed to remain within their telephonic reach. The phone may mean that the trishaw operators have fewer, but perhaps more reliable clients. There is likely a practical upper limit to the number of important clients that one trishaw operator can have. Donner and Escobari (2010) suggest that the mobile phone can, in some cases, expand the size of micro-entrepreneurs' markets. In the case of trishaw drivers, the mobile phone makes them more responsive, and perhaps more vulnerable, to their

special clients. They may have more stable income from these clients. However, there are limits on the number of important clients that they might have. A simple analysis of probabilities points to this. If, for example an operator can manage 10 trips in a particular time-period and has five important clients who are all equally likely to call, there is about an 8% chance that any two will call at the same time. Moreover, the work of a trishaw operator is peak oriented. There is, for example, an acute need for operators when a supply truck comes. If the operator has five important clients and can only manage two trips during the critical period, there is a high chance of a double booking, and thus of frustrating his important clients. This suggests that there is an optimal, and rather small, number of such clients that a trishaw operator can have.

In sum, the individual addressability (Ling, 2008; Ling & Donner, 2009) afforded by owning a mobile phone seems to have regularized contact between a trishaw operator and his important clients, resulting in a reliable flow of income for the operator. The interviews show that the trishaw operators need to be more responsive to these few sources in order to retain them as customers. Another consequence of this type of patronage between the shopkeepers and operators is that it may exclude the operators who are more marginal and those who do not have a mobile phone, in a business that is already characterized by uncertainty and fewer opportunities for improving one's economic situation. Thus, while the mobile phone is allowing for the development of special operator-customer relationships, it has also brought with it several issues that complicate this type of patronage. Moreover, as a mobile phone becomes increasingly necessary to keep and find customers, it can exacerbate the marginalization of older and impoverished poorer drivers.

***The Telephonic Identity***

The arrival of the mobile phone also means that the trishaw operators need to establish what might be termed as telephonic identity by distributing their telephone numbers to eventual clients. Interviews and observation show, however, that the trishaw drivers limited this circle to established contacts. A common way to distribute contact information is to use a business card. This approach was not, however, standard practice among the trishaw drivers. Some taxi drivers and trishaw operators of small taxi fleets, particularly those catering to business travelers, had printed business cards with phone numbers. These people hand out not just a single card, but rather three or four, in effect deputizing the recipient to market their services.

However, none of the trishaw operators in this study had cards. In some cases, they could not even recall their own number. U Kyaw Win, for example, had his number written out on a piece of paper taped to a piece of cardboard, which he kept in his satchel. Further, the trishaw operators rarely had pen and paper with which to write the number down for potential clients. Their important clients had their phone numbers. When asked for a business card, trishaw operators might use a piece of scrap paper that was at hand and write it out. Perhaps because of a lack of need, or perhaps because of the cost, they had not taken the extra step of printing business cards. Thus, their phone numbers existed in a somewhat limited oral/digital sphere. The phone number was communicated to important clients and then coded into the phone's memory register (or on strips of paper, sometimes taped to their handset, for those who did not know how to add contacts to their phone) for their small number of important ties. This situation illuminates the nascent nature of their telephonic identity.

***Potential "Back Office" Uses: Syndicates and Central Dispatching***

In addition to operators using their phones to interact directly with customers, several other uses appeared in an embryonic form. These included using the phone to organize mobile-phone based syndicates (or temporary informal groupings) of trishaw operators, and some forms of central dispatching.

Neither of these was well developed.

The trishaw operators see themselves as independent micro-entrepreneurs. However, in some cases, they said that the phone was used to organize temporary informal syndicates to deal with a sudden influx of business. Other researchers have reported a similar phenomenon. Townsend, for example, describes the use of mobile-based syndicate techniques among taxi drivers in Boston. He reports that taxi drivers, when confronted with an acute need for extra cabs (e.g., a theater letting out), used mobile phones to call other drivers they knew rather than calling the

central dispatcher. The mobile phone allowed them to subvert the existing dispatch system and to alert "friends and relatives that drive taxis" of the opportunity (Townsend, 2000, p. 96). That is, individual addressability and microcoordination enabled by the mobile phone allow for direct organization of temporary syndicates without the need to go through a central dispatch.

In the case of the Boston taxi drivers, the mobile phone gave them the chance to distribute extra fares within the group of trusted co-workers and at the exclusion of those who were not close ties. In Myanmar, there is no central dispatching for trishaw operators. There was, however, a conceptualization of loose mobile-based syndicates. For example, one motor bike driver had allied himself with two other drivers he would call if he came across a situation where there was the need for more drivers. This group of motor bike drivers was thinking beyond the normal independent approach to operating a motor bike taxi service and re-conceptualizing how they might approach the work, now that they had access to mobile telephones. In some cases, the trishaw operators used the phone for the same purpose. Specifically, one informant in Yangon said that he and his colleagues had been asked to help with a house move for a client. The job was too big for one trishaw operator, so more operators were enlisted. He noted that all the trishaw operators at that stand had the contact numbers of the others on their phones to facilitate this type of interaction.

Another use of the mobile phone is the facilitation of a central dispatch function. As noted above, it is common for cab drivers to distribute jobs in this way, sometimes even using GPS functionality (Liao, 2003). More recently, there are mobile based applications, such as Uber and Lyft, that take on many of the functions of a central dispatching system (Cici, Markopoulou, Frías-Martínez, & Laoutaris, 2013). At the time we conducted the study, there was no central dispatching function for trishaws in any of the locations. That said, some of the functionality of a dispatcher is seen in the approach taken by one driver, U Ko Ko. He did not have a mobile phone, but his wife did, and she functioned as a dispatcher for him. Clients would call her to order rides, and he would go home several times a day to get his new assignments. While she was not a dedicated central dispatcher, she carried out some of the same functions. Eventually, customers were able to call a number and get a message to the trishaw operator.

As this was a cumbersome approach, were he to get a phone, it would certainly facilitate the system.

**Discussion and Conclusion**

Comparing the situation of entrepreneurial U Aye Kyaw to that of the elderly U Khaing illuminates contrasting understandings of the mobile phone. It also serves as a lens with which to examine the effect of mobile communication on trishaw operators as micro-entrepreneurs in Myanmar. U Aye Kyaw is the operator from Kyaikto who displayed a certain mobile dependency. He said that, if his phone broke down, he would immediately purchase a replacement with a cheap feature phone so that his important client could reach him. That is, he understood the potential of individual addressability (Ling, 2008; Ling & Donner, 2009) and the microcoordination (Ling & Yttri, 2002) afforded by the phone. He also understood its geographical limitations and the de facto tethering. He was exploring both the potentials and the limitations of mobile communication. He was working out how he could mold the mobile phone to his needs as a trishaw operator. At the same time, he was increasingly aware of the limitations of the technology. By embracing the mobile phone, he had tied himself to a type of patron-client relationship that may be a step back from the notion of an independent actor. This ties into discussions of the mobile phone as it is a device that facilitates independence, but also ties us to our social sphere (Campbell, 2014). The phone was becoming a necessary tool to facilitate the connection with the shopkeeper, and it produced a balanced flow of income. That said, he had become enmeshed or perhaps vulnerable to the digital world. The phone has thus become a source of wellbeing while, at the same time, being a locus for the trust/power-based interaction with his main client.

The situation of U Khaing in Bago—just as that of the trishaw operators around Thandwe—is different. He operates in a web of traditional, face-to-face, local ties, without the need for mediated interaction. He rides and looks for fares in a well-trodden (or pedaled) radius that he has known for decades. The tools of his trade are a bicycle and a street corner near the market. There is enough passing trade to keep him going, albeit at a limited level. Developing an

entrepreneurial, mobile-based relationship with important clients seems to be beyond him, and indeed his income does not allow him to save enough money to buy a phone.

In a broader sense, change is being forced upon both U Khaing and U Aye Kyaw. The latter is pursuing the opportunity provided by the mobile phone and, at the same time, has come to understand some of its problematic dimensions. U Khaing is seeing the distributive nature of the queuing system undermined by mobiles, and his ability to secure stable clients (to some degree) diminished. All of this touches on a broader theme—namely, the ability of people to grasp what we call the digital imagination (Oreglia & Ling, 2015). While this concept has been used to describe other issues (Dave, 2000; Treadaway, 2004), we use it to encompass the technical, personal, and social skills necessary to use the potentials and the dangers of digital devices, including the evolving expectations, fears, folk beliefs, and local knowledge about these devices. The trishaw operators are in the throes of developing this capacity, regardless of whether they are adopters or rejecters. Some are working out the skills necessary to use the mobile phone. They are marshaling their economic wherewithal in order to purchase and use a device. They are drawing on intermediaries, or what Bakardjieva and Smith (2001) call "warm experts" to facilitate and support their use. The advice they get may be well-founded information, but it may also be less reliable, second-hand, unfounded notions gathered through casual discussion. In other cases, they are seeing the structure of their work changed by others' adoption of the mobile phone. In some cases, they strive to join the group of users. In other cases, they seek out the remaining niches that are available to non-users.

The fate of trishaw operators and their use of the phone is in transition. The technology is working its way into the functioning of the trishaw business. Most trishaw operators will likely adopt mobile phones, which will become a part of their way of doing business and, as suggested by Donner and Escobari (2010), will contribute to their economic welfare, just as it will provide them with access to entertainment and social interaction.

However, some of the trishaw operators, especially the ones hindered by age, poor health, or lack of interest, will probably not become mobile users. In the short term, these non-adopters hold a position in the transport ecosystem, even without mobiles. They may have a set of stable customers, they know the local geography, they know the temporal ebb and flow of the area where they operate, and they know when and where to get fares. Thus, they can continue to exist at the margins of the economy. If they are complacent about the changing situation and the shifting technical context, however, they may become ever more marginalized, especially as mobile phones become more common among their clients. The cruelty of poverty and the weight of aging mean that some trishaw operators are unable or unwilling to adopt new technologies. For others, the device will become an increasingly central part of their daily work life, and will streamline their connections to important clients and facilitate their social interaction. Trishaw operators will continue to provide transportation in Myanmar. The mobile phone is, however, changing the way they carry out their job.

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