Intermediated Sharing: Exploring the Tensions between the Owners and the Drivers of Uber Cars in Urban Bangladesh

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Most scholarly discussions around ride-sharing applications center on the experiences of the drivers and the riders (passengers), and thus the role of the owners of the cars, if they are different from the drivers, remain understudied. However, in many countries in the Global South, the car owners are often different from the car drivers, and the tensions between them often shape the experience with these ride-sharing apps in those countries. In this paper, we address this issue based on our interview-based study in Dhaka, Bangladesh, which incorporates semi-structured interviews of 30 Uber drivers and 10 car owners. From our interviews, we identify the contract models that facilitate this partnership, describe the tensions between these two parties, and highlight the reasons for which this partnership often comes under pressure. Our analysis reveals how the local adoption of sharing economy amplifies existing inequalities and disrupts the prevailing social dynamics. We also connect our findings to the broader interests of CSCW around privacy, power, and postcolonialism, and discuss their implications for design and policy formulations.

CCS Concepts: • **Human-centered computing → Collaborative and social computing**; **Empirical studies in collaborative and social computing**;

Additional Key Words and Phrases: sharing economy; Global South; Uber; intermediate use; surveillance; privacy; postcolonialism; HCI4D; ICTD

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1 INTRODUCTION

The number of mobile and online platforms that facilitate a connection between people who have underutilized assets and people who want to use those assets has been growing rapidly all around the world. As a result, goods and services that used to be provided by full-time businesses are now being offered by individuals or peers, which has led to a burgeoning sharing economy [20]. The CSCW community has examined a wide range of issues related to the design, motivations, and practices of different sociotechnical systems that leverage sharing economy [43, 51, 81], including critically examining industry leaders such as Uber and Airbnb [33, 68]. This scholarship has also analyzed these systems when they are deployed outside the Global North [3, 34, 52, 55, 88]. All these studies, however, are confined within the duality of owner/provider vs customer - the two major stakeholders in a shared economy. When the owner and the provider are not the same person (for example, an Uber driver renting another person's private car), different challenges emerge, which is an understudied area in the CSCW and related literature.

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In this paper, we examine this deviation from the basic premise of sharing economy through a study of car owners and drivers in Uber's ride-sharing service in Dhaka, Bangladesh. Uber's adoption in Bangladesh has not only been shaped by technical and bureaucratic means, but also through the country's rich cultural norms [55]. In a country like Bangladesh where a high level of collectivism persists [46], a collaborative platform like Uber initially received a surprisingly underwhelming recognition from the government, mainly because of a legal barrier [55]. Owning a car is also a luxury for many people in Bangladesh, especially for people from the middle-class society [12]. This, coupled with a car rental industry that is not matured enough as the Western countries, have forced a large number of aspirant Uber drivers to rent their car from private owners, who have become a new party of stakeholders. This work identifies the tensions between these two parties to bring forward several new economic, political, and privacy discourses around sharing economy.

Prior works around ride-sharing services in the Global South have investigated issues related to labor [3, 55], working hours [3], or earnings of the drivers [3, 34, 52, 55], tensions between drivers and riders [55], and availability of the vehicles [52, 88]. These studies mainly focused on drivers and riders and did not capture the dynamics between prospective Uber drivers without a car and car owners seeking to rent their cars for Uber. A detailed analysis of the complex relationship between these two parties, and their associated implications have remained understudied in the literature.

Our work intends to fill this gap in the CSCW literature with an interview-based qualitative study that (a) identifies the contract models that facilitate the partnership between Uber drivers and car owners, (b) describes the tensions between these two parties during the course of operating the car, and (c) highlights the reasons for which the partnership is often terminated, including the reasons for stopping using Uber altogether. These findings reveal the intricacies and nuances of technology being used as a means of exploitation for the more powerful car-owner communities, and support the notion that technology amplifies existing inequalities, as proposed in the 'amplification theory' by Kentaro Toyama [85]. We show how Uber disrupts the prevailing social dynamics between car owners and their personal chauffeurs, which is an important trend of the urban culture in Dhaka, Bangladesh. Thus, our work contributes to the CSCW scholarship on sharing economy by illuminating new avenues of design and policy-making that incorporates the tensions between car owners and drivers. We demonstrate how local appropriation of technology-mediated sharing economy introduces additional social, economic, and privacy concerns that need to be addressed while formulating design and policy recommendations. Our findings suggest that if ride-sharing services such as Uber are to sustain in the Global South, vehicle owners need to be considered as a major stakeholder group who have a vested interest along with drivers and riders.

2 RELATED WORK

Sharing economy, which is often identified as peer-to-peer economy [3] or collaborative economy [20], refers to the idea of sharing goods, exchange of services, among other things with underlying monetary incentive [76]. Even though the idea of sharing goods, which is at the heart of sharing economy, has been around for a very long time, sharing economy applications enabled through digital means is relatively new. The digital platforms have drawn attention of researchers in both computing (*e.g.*, CHI [3, 18, 52, 56], CSCW [24, 47, 49, 51, 68]) and non-computing disciplines [26, 27, 35, 45, 66, 82]). In this section, we will reflect upon the literature that focuses on general sharing economy applications, then concentrate on the politics around ride-sharing applications both in the context of the Global North and the Global South, and point out the contribution of our research to the existing literature.

2.1 The Rise of Sharing Economy

The concept of leasing is an ancient one, and can be traced back to 2010 BC based on archaeological discoveries [65]. By the early twentieth century, the practice of commercial equipment leasing became very common around the world [20]. With the penetration of Internet, the leasing business was not limited to large commercial companies anymore for tangible products and consumers were able to use the service of an asset that would be owned by another person. Such consumption of services is identified, by Botsman and Rogers, as 'collaborative consumption' [20]. According to Botsman and Rogers, collaborative consumption is possible under four conditions: (a) trust between strangers, (b) presence of an idle item, (c) value in using that item, and (d) enough people wanting to use the item [20]. Netflix, for example, was one of the revolutionary companies that started out with renting out DVDs and eventually started an online streaming business. With the penetration of "always-on" Internet in the Global North, tech industries revolutionized the way of sharing, allowing people to share their idle items with strangers at a cost. Such ideas generated multiple industries such as Uber, Lyft, Airbnb, Couchsurfing, Zipcar, among others. These industries allowed people to use the service of an asset, which would be either owned by another person or business industry. In his book published in 2001, titled "The age of access: The new culture of hypercapitalism", Jeremy Rifkin successfully predicted the rise of sharing economy: *"It is likely that for a growing number of enterprises and consumers, the very idea of ownership will seem limited, even old-fashioned, twenty-five years from now"* [69].

2.2 Sharing Economy: Motivations and Limitations

Even though digital sharing economy applications offer the promise of economic benefits and flexible work hours, the labor ecosystem utilized by these platforms is very complex and do not necessarily offer the promised benefits. For example, in case of TaskRabbit, an online on-demand labor supply company, workers shared their dissatisfaction with payment and working conditions [81]. Researchers have also documented racial bias in listing properties on Airbnb website. For example, Edelman et al. found that for similar properties, hosts' race, which could be inferred from their photos on the Airbnb website, plays a role in the amount they would be able to charge on Airbnb website [33]. A similar study on Fiverr and TaskRabbit revealed that gender and race of users are correlated with the ratings of their profile, which is often used as a selection criteria [43]. Hence, a low rating would potentially end up in low earning for individuals. Lack of transparency in the rating system has also been studied in sharing economy platforms. For example, Raval et al. found that Uber and Lyft drivers were frustrated with the rating system since the passengers did not know that anything less than 5 (out of 5) is perceived as a bad rating and such underlying rating structure was never revealed to riders through any kind of guidelines by Uber or Lyft [68]. Another study has reported that lack of transparency in the functionality of algorithms on Airbnb platform is a source of frustration for hosts [51].

Several studies in the domain of sharing economy have investigated the socio-technical aspects of design for the digital realm. For example, Dillahunt et al. proposed to incorporate trust and safety in the design solution for members of disadvantaged communities [30]. Researchers have also investigated how users adopt digital platforms to support their needs. Lampinen et al., for example, have found the challenges of multi-person account sharing in the context of Couchsurfing [57]. Then, several researchers have investigated what motivates [17, 59, 78] or demotivates [64, 84] participation in sharing economy platforms. For example, Belotti et al. identified eight motivating factors for participating in sharing economy platforms: *value/morality, social influence, status/power, empathy/altruism, social connection, intrinsic/autotelic reasons, safety, and instrumental motivations* [17, 31]. Meurer et al. found that lack of decisional autonomy was a demotivating factor for

older adults to participate in ride-sharing services [64]. These and many such studies reveal the embedded social and political tensions in the local communities that are often amplified and manifested through the sharing economy applications. Also, much of these discussions around sharing economy is based on research focused on the stakeholders in the Global North. However, issues and challenges with respect to the sharing economy platforms, especially ride-sharing applications, get more complicated with the unique labor structure in the context of the Global South.

2.2.1 Ride Sharing in the Global South. Scholars in CSCW, HCI, ICTD, and related fields have long identified the shared and intermediate use of computing technologies as a dominant practice in many parts of the Global South. Parikh et al. designed a user interface for the management of community-based financial institutions in rural India [67]. In her work, Burrell has reported the shared use of land phones and computers in Africa [23]. Sambasivan et al. have shown how people in India often use mobile phones with the help of others and coined the term 'intermediate user' [74]. Ahmed et al. have similarly demonstrated how low-literate rickshaw drivers in Bangladesh often take help from their social peers to use their mobile phones [9, 11]. Ahmed and his colleagues have later shown how sharing a phone among the family members is often politically laden and can engender privacy vulnerabilities [5, 8]. These and many such studies demonstrate how 'sharing' is inherent among the communities in the Indian subcontinent. However, these studies have also demonstrated how that sharing is shaped by the social norms, inter-personal relationships, and cultural hierarchies.

Sharing economy applications, often originated and designed in the Global North, do not translate to the need of the consumers in the Global South. For example, Kasera et al. found that ride-sharing applications do no match with the *"tempo"* and *"pace"* of drivers in Namibia [52]. Kumar et al. unpacked the tensions between drivers and riders, which originated from non-transparent fare charges from Uber's mobile application in Bangladesh [55]. Ahmed et al. studied an India-based ride-sharing company, Ola, and found that despite the promise of improved working conditions, the work hours or the earnings of the drivers did not change by enrolling into the ride-sharing applications [3]. Unlike the visible ownership structure of shared assets (e.g., cars in Uber, houses in Airbnb, etc.) in the Global North, the ownership and circulations of assets for sharing is quite complicated in the Global South. Kumar et al. pointed out that the drivers who used to give rides to riders, often did not own the car [55]. A similar trend was also documented in Mexico [34], South Africa [88], among other countries. Although these studies mention the complicated structure of car sharing with the drivers, to the best of our knowledge none of the studies unpack the complicated dynamic relationship between car owners and drivers, and its associated implications. Our work intends to fill this gap in the literature.

2.3 Digital Sharing Economy and Postcolonial Computing

For understanding the dynamics between Uber drivers and car owners in Bangladesh, we also need to look into the growing scholarship of postcolonial computing in CSCW and related disciplines. For this, first we take a look at the long-standing discussion around postcolonialism within social science, literature, political science, and other disciplines. Edward Said's famous work 'Orientalism' [72] first showed how the Western narrative of the Arab world is distorted, and how the panopticonic gaze of Foucault's model of power [38] was based on an Euro-centric understanding of knowledge (re)production. Later, development scholars like Arturo Escobar [36], James Ferguson [37], and James Scott [77] extended this line of argument to the international development discourse and showed how development projects are often shaped by 'foreign' definitions of problems and solutions sidelining the traditional cultural interpretations and marginalizing the local communities. Scholars in the Subaltern Studies attributed this problem on the lacuna within the Western history

and literature created by the absence of the voice of the poor and marginalized communities [80], especially from the Global South. This rich body of work on postcolonialism entered into the world of technology and computing, as technologies turned to the vehicle of development in the postcolonial world [15, 40]. In most of the cases, such technology-development happens through a transfer of technology from the West to the Global South [42].

Irani et al. have defined postcolonial computing as a lens to understand the technology transfer from the West to the Global South [50]. They have discussed how technology often works as a new colonial apparatus to enable colonial power-exercise in the modern world. Dourish and Mainwaring have advanced this line of argument by criticizing the way ubiquitous computing technologies put Europe at the center of knowledge production, and create a developmental gaze over the Global South that essentially diminishes the value of vernacular knowledge and situated local practices [32]. Ahmed et al. further argues that such colonial values are often embedded in large scale 'developmental' infrastructures that essentially serve more the richer communities than the poorer ones in the Global South [10]. Ahmed and his colleagues have later also demonstrated how the implementation of the Western 'individualistic' values of privacy challenged the local values and practices in Bangladesh [7]. In their very recent work, Sultana and Ahmed thus challenged the modernist scientific rationales that HCI and related disciplines enshrine and disseminate through technologies [83]. These and many such work within CSCW, HCI, ICTD, and related disciplines have thus shown how many Western technologies inherently hold many Western values that come from the way most Western societies work. However, those values often mismatch with the local values of the Global South, and hence, technologies that embody those values either have a 'different' use or creates questionable impact on the local communities. We argue that the tension between the driver and the car owner is also an example of such value mismatch.

3 UBER, UBER FLEET, AND BANGLADESHI URBAN TRANSPORTATION

Due to increasing population and weak infrastructure, transportation has become a major issue for most urban people in Bangladesh [61, 87]. The number of registered private passenger cars is less than 250,000 in the capital city of Dhaka [1, 22], which has an estimated population of more than 20 million [16]. These cars are mainly owned by the upper and the upper middle class members of the society and the majority of them hire a personal chauffeur in exchange of a monthly payment of around 10,000 to 15,000 taka. Although the rest of the population in Dhaka traditionally rely on public bus, motor cycle, or rickshaw for commuting through the city, there has always been a growing demand for a cheaper alternative to private passenger cars and taxi cabs, mainly because of road accidents, traffic jams, air pollution, safety concerns, among other things.

Against these backdrops, Uber launched their operation in Dhaka in November, 2016 [48]. However, it faced backlash from the government within a few days and got banned because of legal concerns associated with the use of private vehicles for commercial ride-sharing purposes [62]. After a series of legal reforms [63], tensions between Uber and the government ended [44] and Uber continued its operation along with a few other local ride-sharing apps such as Pathao [28], Sohoj [71], and Obhai [29].

As the Uber Fleet app[1] is extensively used by car owners we interviewed, we provide a brief description of its features. The app has been designed to offer more flexibility to car owners and drivers. This app allows multiple users to join a fleet where the fleet manager is usually a person with multiple cars who rent those cars to drivers who do not own a car. This is done in exchange of a daily or weekly rental fee, which is determined by the fleet manager. Even if a driver owns a car, by joining Uber Fleet, it is possible to gain access to more expensive cars and drive for higher

[1] https://play.google.com/store/apps/details?id=com.ubercab.fleet

service levels. For example, a sedan owner can join a fleet to drive a SUV and earn more money per trip. Although the name 'fleet' suggests that one needs to own multiple cars to become a manager, it is possible to run a fleet with just one vehicle. The app offers a few features that are helpful to manage a fleet:

Live Map. The map allows the manager to track the status and monitor the safety of drivers and partners in real-time. Depending on a driver's status, it shows if the driver is 'on trip', 'online', or 'offline'.

Fleet Performance. This feature allows the manager to view fares, trips, and other quality metrics for the fleet in a single view.

Driver Partner Payments. This interface helps the manager to get details about all driver transactions such as weekly earnings, expenses, and payouts.

Fleet Match. This feature allows the manager to browse profiles and contact drivers who are willing to join a fleet[2].

Driver Profiles. This interface is for the drivers where they can view pay statements, online trip activity, and overall performance.

As mentioned above, private cars are mainly owned by the upper and the upper middle class members of the society in Dhaka and these professional people and businessmen are reluctant to become an Uber driver. As a result, they look for prospective Uber drivers without a car to form a partnership. The main purpose of our study is to examine the nature of this partnership and explore the tensions and challenges that take place between car owners and drivers during the course of this partnership.

4 METHODS

All the researchers of our team are born and brought up in Bangladesh, and fluent speakers of Bengali. We conducted our fieldwork from February to August of 2019. During this period of time, one member of our team conducted the interviews with the drivers and the car owners.

For recruiting the drivers, we took Uber rides. After the completion of our rides (and rating the ride), we asked the drivers if they would be interested in participating our study. Then we conducted semi-structured interviews with the interested drivers by the side of the road. Each interview lasted for 20 to 30 minutes. While participation in our study was completely voluntary, the drivers were compensated with 300 BDT [3] for their time, which was equivalent to the average income of the drivers if they gave a ride. We kept interviewing the drivers until we reached a theoretical saturation [70]. By then we had interviewed a total of 30 drivers. The details of the drivers' demography have been presented in Table 1.

During the same period of time, we also conducted the interviews of the car owners. For this, we first started with three people in our social network who owned a car and used their cars for Uber with a driver. After interviewing them, we used snowball sampling [41] to recruit more such car owners with the help of the existing pool of participants. We continued to use this method to interview them until we reached a theoretical saturation. By then, we had interviewed 10 car owners in total. The details of the demography of the car owners have been presented in Table 2. Each interview lasted for 30 to 45 minutes. The interviews were conducted at various public places (parks, restaurants, etc.) that were convenient for both the interviewer and the participant at a mutually convenient time. Participation in our study was voluntary and none of the car owners agreed to

[2]This feature was not available in the local version of the Uber Fleet app in Bangladesh during the time of our study.
[3]1 USD is approximately equivalent to 85 BDT at the time of writing this paper

take any compensation for participating in this study (we explicitly offered them compensation, and they denied[4]).

It should be noted that, although we interviewed two female car owners, we could not find any female Uber driver. This might be explained by the very low prevalence of female car drivers in Bangladesh [19]. Kumar et al. have also reported this scarcity of women drivers in Bangladesh in their recent work [55]. The fewer number of female car owners can be explained by the economic structure of traditional Bangladeshi families where men are in control of money and wealth in most of the cases [53].

All the interviews were conducted in Bengali and audio recorded with the prior permission of the participants. The audio data was then transcribed, anonymized, and translated into English by two members of our research team. The translated data was then analyzed by the whole team using 'open coding' [60] and 'Grounded Theory method' [25] to distill various themes.

The protocol of this study was examined and approved by the research ethics board of the authors' institutions.

5 FINDINGS

We report our findings by identifying each contract model between owners and drivers. Next we highlight the methods adopted by owners to hire drivers. We also describe the tensions between these two parties and the key challenges they face. Finally, we evaluate the reasons for many of these stakeholders to leave the Uber technology.

5.1 Models of Contract

We found three prevalent models of contract between car owners and drivers:

(1) Monthly salary model
(2) Income sharing model
(3) Car renting model

5.1.1 Monthly salary model. This contract model portrays the usual driver-owner relationship in the context of Bangladesh. In this model, the driver gets paid a fixed monthly amount (between 8,000 and 10,000 BDT) for driving the car. In addition, he receives a small amount of commission of roughly 50/60 BDT per trip. Thus, the total monthly income of a driver in this model ranges between 12,000 and 15,000 BDT, depending on the total amount of commission.

In most cases, a driver who operates under this model has to perform the dual role of a personal chauffeur and an Uber driver. As a personal chauffeur, he has to drive the owner and his family members around to office and school. When the car remains idle, the owner makes him drive for Uber to make extra cash. One driver described his workload under this model:

> *"I have been a chauffeur for this family for the last eight years. My salary before Uber started their operation in Dhaka was 14,000 BDT. I used to drop my boss at his office at 9.30 AM and wait there till 6 PM on weekdays. When Uber first started their business, my boss wanted to take this opportunity to earn some extra cash for himself. He made me drive the car for Uber during his office hours so that he could maximize the utility of the car. However, I received no additional compensation for this. After two months, I wanted a portion of the money I earn with Uber. He agreed to pay me 60 BDT per ride but reduced my salary by 4000 BDT. Overall, my workload has increased significantly but my salary has been roughly the same". (D16)*

[4]It should be noted here that, in Bangladesh, paying money for 'talking' to a person is culturally awkward. Hence, unless the participants use their work time for the interviews, they do not want to take compensations.

Name	Age	Monthly Income (USD)	Driving Workload (Hours /Day)	Duration in Uber (Months)	Contract Model
D1	28	155	8	6	Salary
D2	35	260	11	24	Share
D3	48	250	13	25	Rent
D4	35	180	12	3	Share
D5	55	-	11	-	Rent
D6	25	215	8	8	Share
D7	28	240	13	1	Rent
D8	32	250	12	6	Rent
D9	38	190	10	13	Rent
D10	29	260	14	12	Share
D11*	35	215	10	4	Salary
D12	24	240	10	5	Rent
D13	30	180	8	8	Share
D14	35	240	12	25	Rent
D15	45	225	12	1	Rent
D16	56	165	7	24	Salary
D17	41	380	14	22	Share
D18	50	320	12	5	Rent
D19	35	295	12	5	Rent
D20	45	330	14	18	Rent
D21	28	285	12	8	Rent
D22	30	240	10	9	Salary
D23	25	190	10	3	Rent
D24	35	165	9	1	Rent
D25	40	215	10	6	Share
D26	33	240	14	24	Rent
D27*	45	285	12	4	Share
D28	28	200	7	2	Salary
D29	50	285	12	6	Rent
D30	43	250	10	5	Rent

Table 1. Demography of interviewed drivers. The asterisk indicates that the driver has left Uber. Also, D5 was a new driver and didn't drive for a month at the time of the interview.

On the other hand, an owner makes enough money from this contract model to cover the salary for the driver and the maintenance cost for the car. One owner said:

> *"I have only one car, which I use to send my kids to school and commute to my office. Yes, I can drive, but I employed a chauffeur. He takes care of my car. I used to pay him 12,000 BDT per month, and 100 BDT for lunch every day. For maintaining this car, my overall cost is between 20,000 to 25,000 BDT per month. This Uber thing is wonderful as it gave me an opportunity to earn money from my car. When I am in office, the car is not being used, so I registered on Uber and asked my chauffeur to drive for them". (O8)*

Name	Age	Gender	Monthly Income from Uber (USD)	Duration in Uber (Months)	Number of Drivers Working With	Contract Model
O1	34	M	300	24	1	Rent
O2	40	F	240	5	2	Share
O3	65	M	475	8	2	Share
O4	35	M	240	12	1	Salary
O5*	28	M	200	1	1	Salary
O6	32	F	285	3	1	Salary
O7	25	M	295	9	1	Rent
O8	50	M	300	18	1	Salary
O9	40	M	700	12	3	Share
O10*	45	M	200	8	1	Rent

Table 2. Demography of interviewed car owners. The asterisk indicates that the owner has left Uber.

Owners use the Uber Fleet app to track their cars when they are operated by drivers and they are reasonably happy if the driver can make more than 5 trips per day, as the above owner additionally mentioned:

> *"I can always check the status of my car and and 6/7 rides per day earn me about 700/800 BDT. I can use this money for fuel, small repairing jobs, and my chauffeur's salary. For his increased workload, I have offered him an increment of 2,000 BDT". (O8)*

The responses from multiple other owners also indicated that the threshold for them is around 5 to 10 trips per day and the tracking convenience offered by the Uber Fleet app make them feel comfortable about using it for Uber. Some owners prefer their car to be used on a moderate frequency for Uber. Considering the traffic jam in Dhaka city and the depreciation cost, they do not want their cars to run full-time. Also, they need the car time and again for personal use, so they switch between personal use and commercial use. One such owner said:

> *"I need to use my car multiple times during the day. So, I cannot use it on a full-time basis for Uber. Moreover, my family doesn't like that our car be used like a taxi. As a result, I don't use the car extensively for Uber". (O4)*

The salary model is not very popular among drivers as performing the dual role of a personal chauffeur and an Uber driver becomes a very difficult task at times.

5.1.2 Income sharing model. This model has become increasingly popular among drivers who are willing to drive extra hours. In this model, the negotiation takes place early, typically as a 40/60, or a 50/50, or a 60/40 split, depending on the expertise of the driver, the condition of the car, and ride completion bonus provided by Uber. This model enables the driver to make more money as they can keep almost half of the income for each ride, as opposed to a small commission for each ride under the monthly salary model. One driver who operates under this model said:

> *"My previous job did not have a decent salary. I was a personal chauffeur and sat idle for most of the time during the day. So, I left the job and took this one where the earnings made from Uber are split into a 40/60 ratio. 40 percent is my share. This split is done after considering the cost for oil, repair, garage cost etc.". (D10)*

One owner mentioned:

> *"Drivers prefer splitting income than having a salary. This Uber thing has become a business, and they want to be a part of that too". (O9)*

We found that this model is driven by the intention to make more money from Uber, which benefits both the car owner and the driver. However, we observed many instances where one party was not happy about the commitment from his partner. Some owners feel that their drivers have a fixed goal for the day and as soon as they meet it, they stop driving. They are also not happy if the driver stops driving after a certain hour as they think the driver can always push for more hours. Some drivers, on the other hand, feel that their car owners don't allow them to drive the car for enough hours and use it more often for their personal use. As one driver said:

> *"The car owner doesn't care enough about the earnings from Uber as this is not his primary source of income. For me, this is much more important as I have to make a handsome amount to feed my family". (D25)*

To get around this problem, many car owners and drivers are moving to the car renting model which is described next.

5.1.3 Car renting model. This model is the opposite to the monthly salary model. Under this model, the driver rents the car from the owner in exchange of 20,000 to 30,000 BDT per month. The owners see this model as an opportunity to earn a fixed monthly income. At times, however, they feel that they have lost the ownership of the car to some extent. They are also in a dilemma as most drivers with a good rating and a higher smartphone literacy prefers this model but renting the car to them means it would be used more frequently, resulting in a higher depreciation. On the other hand, these drivers are more professional and can handle the car better than those who drive less frequently. One owner mentioned:

> *"The good part is that I do not have to check my earnings frequently as I know that I will be paid a fixed amount at the end of the month. I do not have to track the driver too. On the flip side, the idea that another person is doing business with my own car, which I have bought for personal use in the first place, is not much comfortable for me". (O1)*

From a driver's perspective, this model puts extra pressure on him as he has to earn at least the amount to be paid to the owner. Typically, they have to earn more than 2,000 BDT daily to withstand under this model, which involves accommodating 14/15 rides a day. Drivers who adopt this model usually have a high workload, typically between 12 to 14 hours per day. They also have to make up for the traffic jam by driving more on weekends. One driver mentioned:

> *"The earning here is up to you. The more you drive, the more you receive. I am under constant pressure to meet the daily requirement. Three weeks ago, on a Friday (weekly holiday), I gave 22 rides. That day, I started at 9 AM and when I completed my last trip, it was 2:30 AM (17+ hours)". (D20)*

This model seems to be the most widely used one as more than half of the participants we interviewed operate under this model.

5.2 Hiring Methods

The hiring takes place in two steps: searching and recruitment.

5.2.1 Searching. When owners look for drivers, the searching occurs both offline and online. Offline searching is the most common method to recruit drivers who work under the salary model. In Bangladesh, there is a tradition of nepotism [54], especially based on home district and extended family clans. Consequently, owners look for drivers from the same home district who is known to them or referred to them by someone they know. As one owner said:

> *"I always rely on drivers who are from my home district as they are good. If anything happens, I can trace them back to their home residence in the village". (O3)*

One driver's response echoed the same sentiment:

> *"I was brought here from my village to drive this car where I used to drive microbus occasionally. The owner is also from the same village. It's comfortable for both of us this way". (D16)*

Some owners prefer hiring drivers from the same neighborhood as they feel that they could trust those people more:

> *"My current Uber driver resides in my neighborhood. This is the reason I find him trustworthy." (O1)*

Owners also hire drivers based on professional recommendations from their car mechanics. We have seen owners soliciting for drivers at their familiar car rental shops too. Hiring drivers from known and identifiable sources is conducive for owners to control the power dynamics.

Online searching, on the other hand, mainly takes place on social media. Owners usually post on Facebook describing their car model, payment structure, and expected workload and drivers who are interested respond by commenting on the post or sending a message. In addition to common Facebook groups, there are also many driver-only or owner-only groups, which facilitates this searching process.

5.2.2 Recruitment. The recruitment usually happens through a face-to-face interview. Drivers who are found online have to go through a more extensive interview process compared to drivers who are recommended offline by friends or family members. During the interview, owners usually look for three things: integrity, driving skills, and smartphone literacy. Some owners review the prior rating of the driver too.

One owner described the interview process in the following way:

> *"I try to assess if they are honest and experienced. I go for a test drive with every driver I interview and I observe how they operate my car. I also ask them to open and use the Uber app in front of me and explain to me some of the advanced features there. Ability to use the app/map is what I want. This is my primary source of income - so I try to hire drivers who can use the app effectively". (O9)*

We observed that integrity and driving skills are the primary concerns for owners who operate under the salary model as their children and family members frequently use the car too. Smartphone literacy is the major concern for owners who use the car exclusively for making money.

5.3 Tensions between Owners and Drivers

Most of the drivers we interviewed were vocal about three major issues: unfair splitting of income, extensive surveillance, and unclear agreement on maintenance and accident costs. The car owners, on the other hand, mainly expressed concerns about negligence and lack of expertise of the drivers. Female car owners feel that they face additional challenges in this sharing economy model.

5.3.1 Income Splitting. As the demand of an Uber ride fluctuates over time, drivers are always worried about their income on slow business days, especially those who adopt the renting model. One of the drivers we interviewed had a few consecutive slow days and he said:

> *"I received six trips yesterday, eleven on the day before that. Today it is 11 p.m. already, but this is my seventh trip only. I have earned only 1100 BDT today. After paying 1000 BDT to the owner, what is left for me?" (D29)*

The heavy traffic of Dhaka city puts additional stress on drivers as the amount of trips get decreased due to traffic. Furthermore, according to drivers, when they manually request a fare adjustment, Uber doesn't review it if the discrepancy (between what Uber pays them and what they claim) is below 65 BDT. This policy impacts the earnings of the driver:

> *"If this happens in 4 trips in a day, I am deprived of around 250 BDT when my daily earning is around 1000 BDT". (D8)*

As a result, drivers who operate under the renting model try to negotiate with the owners time and again. However, as the availability of cars is far less than the availability of drivers, car owners usually have the upper hand and drivers have to either comply or leave their job, which then gets filled up quickly by another unemployed driver. One driver who used to operate under the salary model told us:

> *"I had been a happy Uber driver for almost a year. My initial monthly salary was 12,000 BDT and I used to make additional 4,000 BDT per week for completing the 'trip completion bonus' - a promotional bonus from Uber for completing 46 trips per week. Things started to get wrong when Uber increased their commission to 25%. My boss (the car owner) started losing money and he reduced my salary to 10,000 BDT. Even worse, Uber raised the threshold for 'trip completion bonus' to 50 trips per week. I tried to talk to my boss about it but he wouldn't listen. So I eventually left the job". (D14)*

The responses from a few other drivers also indicate that as Uber keeps increasing their commission rate and decreasing their promotional offers, the car owners adjust their loss of income by exploiting the drivers.

5.3.2 Surveillance and privacy. As mentioned before, owners can constantly track the drivers of all of their cars in a single app screen called Uber Fleet. This app allows the owner to check the current location of a car, its location a few minutes ago, the current destination, number of trips received, earning from the current and the previous trips, and an overall summary of daily/weekly/monthly earnings. The app also shows a complete timeline of the driver including where he had stopped for a while and when he went offline. We observed that drivers have mixed feelings about this surveillance feature. The drivers who value personal freedom were very vocal against it:

> *"Previously, I was driving on a monthly salary contract. One day, I was not feeling well as the weather was very hot. I stopped the car, went offline to stop receiving requests, and intended to take rest for a few minutes. Within 5 minutes, the owner called me to ask about it. When I told him that I was feeling sick, he responded by reminding me that the earnings had not been good lately. He ordered me to start driving at once". (D18)*

The driver eventually left that job and negotiated with a different owner to rent his car in exchange of a monthly rate of 27,000 BDT. The risk was higher as he had to make at least 50,000 BDT per month to cover his expenses but he valued his freedom more.

Another Uber driver who drives under the income sharing model said,

> *"The car owner always uses his app to check my activities. Even if I go to the washroom and it takes a little longer, I get a call from him for an explanation. I am not a thief - I am not stealing any money and I have never gave an unauthorized ride. Then why am I not trusted?". (D2)*

Unlike the previous driver, he didn't switch to the car renting model despite being dissatisfied with his current owner as he was reluctant to deal with the uncertainty and preferred to have a job with consistent income.

Some drivers, on the other hand, are not concerned at all about surveillance. As one driver said:

> *"I don't do anything illegal. What is the difference, whether I am tracked or not? If you are a good person, you don't worry about being tracked". (D22)*

A few drivers do not see this as an intrusive surveillance mechanism, rather as a help feature. They find the Uber app quite difficult to use and they think that this feature helps them as the owner could call if he senses anything unusual and give his instructions.

5.3.3 Maintenance and accident costs. Most of the drivers we interviewed expressed concerns about unclear agreement with car owners regarding maintenance and accident costs. In their opinion, owners in general do not take the responsibility of maintenance and accident costs. Similar to the income splitting and surveillance issues as mentioned above, drivers have a strong sentiment of being exploited in this regard too. One driver who operates under the renting model said:

> *"I have worked with three different car owners and in all three occasions, I was not in a position to negotiate because I didn't have another job offer. I had no chance to discuss the shared responsibility in case of an accident takes place or some maintenance is required. I did not raise this point because I desperately needed the job. There is always traffic jam here in the roads of Dhaka and it is not always under my control. Small accidents can happen anytime, minor maintenance might be required as well. I had to pay from my own income even for a broken mirror too. It is a necessity for me as I drive this car to feed my family, so I had to install a new one". (D9)*

Another driver highlighted that it's easier for the owners to exploit them because there is no written agreement:

> *"We are always in pressure as the owners won't take any responsibility in case of an accident. So, we just pray to not face any accident in this busy city because if we do, the repair cost is on us. As we have no written agreement here, it is easier for the owners to deprive us". (D12)*

Some drivers mentioned that the owners of their car take the responsibility of repair and maintenance if the cost exceeds a certain amount (usually 500 BDT). However, the agreement is a verbal one - no written contract is documented for this. One driver said that it's just an implied agreement (based on his own experience):

> *"It is tacit in Uber owner-driver agreement that drivers will take the responsibility for any maintenance cost that is below 500 BDT. If the cost exceeds this amount, it then becomes the owner's responsibility. At least I have seen this with all my owners till now." (D20)*

Another driver, who operated under the income sharing model said that he used to drive a car by paying a monthly rent of 24,000 BDT. According to their initial verbal agreement, the owner was responsible for the maintenance cost. However, the owner used to spend for maintenance and repair only after the driver had paid him the rent at the end of the month. As a result, the car's condition was deteriorating, which impacted the driver's income. Later, he found a new car owner who offered him a 50/50 income split and he switched his job. He seemed to be reasonably happy about this decision as he said:

> *"I have been driving the car of my new boss for four months. He never stalls any necessary maintenance because it will impact his income too. Sometimes he even buys parts beforehand." (D17)*

This response suggests that there are differences in the negotiation process between car owners and drivers based on the contract model.

5.3.4 Negligence and lack of expertise. For some car owners, drivers' unprofessional behavior and negligence are issues of major concern. One of them mentioned an incident where his driver forgot to close the lid of the radiator of the engine. Eventually, all the coolant got evaporated. When the car was taken to repair shop, it was revealed that the engine had been damaged. He had to pay a total of 120,000 BDT to replace the engine.

> *"These irresponsible drivers are ruining us. My wife warned me not to give the car for Uber as the risks are high. I should have considered that. As Uber fosters this culture (renting the car), shouldn't they have a policy for such extreme incidents?". (O7)*

A few other owners also talked about minor incidents that occurred due to drivers' negligence and they feel that they are well within their rights to constantly track the drivers through the Uber Fleet app to prevent such incidents. They also complained about smartphone illiteracy of the drivers. They think that drivers, in general, do not have the necessary expertise to use the Uber app properly and this results in a significant loss of revenue, especially for owners who operate under the monthly salary or the income sharing model.

5.3.5 Gender-specific issues. As mentioned above, all the 30 Uber drivers we interviewed were male and we could not find any female driver. However, two of the ten car owners we interviewed were female participants and they talked about a few gender-specific issues. One of them (O2) described how her driver used to take advantage of a female boss. In her opinion, as she didn't prefer to go to mechanic or parts shops, she couldn't cross check the actual price and the driver used to steal money from her by managing fake money receipts. The other female owner said that it is significantly more difficult for a female car owner to get a good driver. She talked about her experience a few months ago when she posted on Facebook looking for a driver. She mentioned that the first two drivers didn't show further interest after talking to her over the phone as they realized that they would be working under a female boss. To her surprise, the third driver demanded a few thousand BDT less than the usual amount and although she hired him, she is very much skeptic about the driver's motive:

> *"Probably he (the driver) makes up for it by stealing money in other ways. However, I should not confront him as my past experience says that if he leaves, it will be difficult to find a replacement driver". (O6)*

In contrast, male car owners do not face much difficulty in finding a new driver as the demand for an Uber car is very high in general. This indicates that gender asymmetry is a major issue for female entrepreneurs to organize a ride-sharing business.

5.4 Reasons for Leaving Uber

As the tensions between car owners and drivers escalate, some of them eventually stop using the Uber technology to make money. We highlight a few stories that depict the reasons for leaving Uber, from both drivers' and owners' perspective:

5.4.1 From drivers' perspective. One of the participants we interviewed had been a driver for a rental car company for five years. When Uber first arrived in Dhaka, he was unsure whether to join Uber or continue his current job, which paid a reasonable salary. After a year, he eventually decided to start working for Uber, being motivated by a friend's financial freedom as an Uber driver. He started under the income sharing model but soon realized that he had missed the momentum. The bonus amounts from Uber were not so high as his friend had described and the competition increased as so many new drivers had started driving for Uber. In addition, his partner (the owner of the car) was unhappy because his rating was not high enough. A representative from Uber called him over the phone and suggested him to start doing things like opening up the back door for

the rider when the ride ends and politely asking them to give a 5-star rating. When his partner also told him that he should start behaving in a more 'subservient' manner with riders, it hurt his self-esteem and he finally decided to quit the job. He said:

> *"What type of person will drive for Uber (and for such partner) anymore? Am I a servant?". (D27)*

Another driver told us that he had been a personal chauffeur for a family for eight years. In his final year with them, he was asked to start driving the car for Uber when it was not being used for their personal use. He agreed to do so but soon realized that the behavior of his boss had suddenly changed. He was constantly being scrutinized about weekly earnings from Uber and the boss hinted that he had been cheating as the earnings were not so high. The driver got angry and said that he would leave the job. Much to his surprise, the boss didn't stop him. In his view, the boss reacted in a passive manner as he knew that he could find someone with a better Uber experience. A few years ago, when he wanted to quit the same job for personal reasons, the boss and his family didn't let him go. Instead, they allowed him a leave for few weeks with full payment. The driver got emotional as he said:

> *"My boss didn't want to lose me a few years ago. His wife even said that I am like his own son and she wanted no one else to drive the car. After Uber came, my honesty didn't value much to them". (D11)*

This story indicates that the introduction of Uber in Dhaka has disrupted the prevailing social dynamics between car owners and their personal chauffeurs.

5.4.2 From owners' perspective. The owners highlighted two major driver-related reasons for leaving Uber: inexperience in using smartphone and lack of integrity. One owner, who had already left Uber told us that his driver is nice and trustworthy but illiterate. Due to his very limited prior experience in using smartphone, the driver struggled when he was asked to drive for Uber. The owner had to choose between two options. One was to find another driver with a better Uber experience and replace his current driver with the new one. The second option was to continue with his current driver and quit Uber. He decided to go with the second option as he felt that his car would remain at a better condition in his current driver's hand. He said:

> *"This Uber thing is for smart people, who can use smartphone well rather than driving the car well". (O5)*

The second owner quit Uber because of his negative experiences with most of the drivers he had worked with. He found it increasingly difficult for a car owner to survive in this market without being vigilant and argumentative. He commented:

> *"I have come to this conclusion that this is not for me. Most of the drivers team up with repair mechanics to steal money from car owners - it is difficult for us to monitor everything. If you cannot have the mindset of a boss who would constantly argue, suspect the drivers, and do whatever it takes to earn money, you won't thrive". (O10)*

This response suggests that rather than working with the drivers as partners, owners need to behave more like a boss to thrive in this industry. This, in turn, results in good and honest drivers being more exploited.

6 DISCUSSION

In the sections above, we have described how the local adoption of Uber is shaped by the involvement of a new group of stakeholders, namely private car owners, who make money from Uber without driving their cars. We have reported the contract models between these owners and prospective Uber drivers without cars, described the searching and recruitment strategies, highlighted the

tensions between car owners and drivers, and identified the potential reasons for leaving Uber. Our findings generate a number of design and policy implications and a few lessons for CSCW communities that have been presented in the following paragraphs.

First, at a very immediate level, our study generates a number of design implications for CSCW researchers. For example, we have observed that the current version of Uber application does not have an option to rate the driver and the owner separately, and hence, drivers are often being rated low for the faults of the owners (and vice versa). For making Uber more suitable for this model, the ride-sharing applications need to modify their rating system. The driver and the owner should have a separate rating system through which each party can share their feelings and report abuse with evidence. Also, the rating system should adopt different contract models, because, as we have seen in our data, different models put different responsibility on these two parties. Besides these, ride sharing applications should have a justified model of transparency of the driver's activities, which would give the car owner necessary information about their car and still preserve the privacy of the driver.

Second, we observed that in a lot of cases, especially for maintenance and accident costs, the agreement between car owners and drivers is more of a verbal understanding than of any written agreement. Some drivers told us that the car owners take advantage of this implied agreement, and they often ignore or delay repairing jobs. A few owners, on the other hand, accused their drivers of negligence where the driver operated the car in a careless way to cause significant damages. In both cases, lack of a clear, written agreement limits the ability to get a compensation. This issue is further aggravated by the fact that insurance penetration in Bangladesh is very low compared to the global standard [13], and as such, none of the parties could seek effective remedy for their individual loss. We believe that ride-sharing applications should stress on a formal documentation of these agreements to avoid any kind of misunderstanding and exploitation. We also believe that the government should create required laws and policies to handle these issues and the law-enforcing agencies should be trained to enforce these laws in an appropriate way.

Third, our findings reveal a tension between the drivers and the car owners that is rooted in the socio-economic hierarchy of the country. Cars are still expensive in Bangladesh, and only rich people can buy them. The traditional model of hiring chauffeurs for driving personal cars still exists and influences the practice of hiring a driver for driving a Uber car. The age-old power-laden relationship between the drivers and the owners still remain there, although, as our data shows, Uber often gives the drivers more freedom. We have shown how some contract models are more helpful for the drivers than the others. However, many drivers come from a humble background, and they do not have the power to bargain and negotiate on one model to another. Additionally, many of these drivers are less educated, have less access to digital technologies, and have smaller social capital. These factors make the situation even more difficult for them. Their use of Uber application and the associated experiences of driving the car, hence, cannot be perceived without taking into account this power politics. We argue that, in such a setting, drivers work as an 'intermediate' worker whose actions are shaped by the social reality created by the application's technical aspects and the power politics between the richer car owners and the poorer driver communities. Our work thus connects the growing literature in CSCW, HCI, and ICTD around the shared [6] and intermediate [74] use of computing devices by adding a new kind of intermediate use that is shaped by the situated local practices.

Fourth, our findings indicate that drivers' lack of efficiency in using smartphone is a major concern for car owners. As reported above, some owners think that being able to operate a smartphone is a more important quality to succeed in Uber rather than being a good driver. We connect this practice with the Marxist scholar Harry Braverman's famous work on 'deskilling' [21]. Braverman argues that, with the advancement of capitalistic agenda of consumption, newer technology will be

introduced and the nature of work will change. He maintains that such change will diminish the values of old work and skills and generate the demand for a new 'technical' skill for the workers. We argue that the introduction of Uber has introduced a new kind of deskilling mechanism in the work of driving motor vehicles. While many values of knowing about the car, the traffic rules, and the social norms still exist, they are often devalued against the gradually increasing demand of knowing how to use Uber effectively. This puts a barrier for many old and rural drivers who are not very efficient in using mobile phone applications. To save these vulnerable populations, CSCW, HCI, and ICTD researchers should work together to 're-skill' them with new technologies, protect their worker rights, and/or ensure their smooth transition to another suitable job. As Industry 4.0 becomes more matured [58], this trend will continue to persist and industries in the Global South should be well-prepared for this paradigm shift.

Fifth, our data reveals a new kind of 'surveillance' that is imposed upon the drivers by the car owners through Uber application. As we have seen in our data, the drivers have mixed feelings about car owners tracking them through the Uber Fleet app. The majority of the drivers were vocal against it, especially when owners call them after they go offline for a few minutes for health or sanitary concerns. However, some drivers' responses indicated that they support the *"nothing to hide"* argument on privacy [79], which essentially implies that privacy is only for bad people who have something to hide. In some cases, the surveillance is supported by the drivers who are less efficient in using mobile phone applications, and they expect the car-owners to 'keep an eye on' them and help them if they are in trouble. Thus, we see the reflection of what Bruce Schneier calls *"the most common retort against privacy advocates"* [75], within the responses of this vulnerable population group. We argue that, as opposed to characterizing the problem as "security versus privacy", designers should consider "security plus privacy" as the overarching goal when designing for this vulnerable people. It should also be noted that, regardless of what the drivers want, the decision on surveillance is almost always taken by the car owners and the drivers actually have very little voice over this decision. While the car owners' concerns about their cars are justified, imposing a constant surveillance over the drivers is problematic. A growing body of work within CSCW and related areas has started focusing on the privacy, security, and surveillance concerns in the Global South reporting the tensions around biometric identification [7], sharing technology [5], social media usage [73], and repairing devices [4], among others. Our study contributes to this body of work by showing how ride-sharing applications impose a digital surveillance over the drivers. Future research in this area should focus on finding a way to address this issue through design and policy interventions.

Finally, our study also contributes to the broader issue with postcolonialism in CSCW literature. Our findings bring to the fore how the traditional social hierarchy between the car owners and the drivers dominate over the more 'liberal' idea of 'ride-sharing'. The essence of 'sharing' hence is different in Bangladesh than in many parts of the liberal West. As our findings shows, sharing happens here through a social norm, and an imposed model of sharing is improvised by the local people to 'work' [14] within their existing social structure. We further argue that our findings demonstrate how Uber often exacerbates the situation for the drivers, who are the less powerful player in the game, by supplying the tools for surveillance and stricter financial contracts. This supports Kentaro Toyama's famous theory of amplification [86], which explains how technology amplifies the role and impact of existing social conditions. We suggest that CSCW scholars should critically examine the uses and abuses of ride-sharing applications in the Global South to protect the marginalized driver communities there.

7 LIMITATIONS AND CONCLUSION

We conducted this study in Dhaka, which is the capital of Bangladesh and one of the most crowded cities in the world [2]. The socio-economic context, literacy rate, transportation facilities, and Internet penetration in Dhaka are significantly different from other parts of the country. So, our findings may not represent the situation of the whole country. Furthermore, we only focused on Uber, while there are a few other ride-sharing applications (including 'Pathao' [39] and 'Obhai' [29]) also operating in Dhaka. The experiences of the owners and the drivers might be different with those applications. So, our findings should be considered within the context of Uber users. Furthermore, our data is limited by the methods we used for recruiting our participants, and by the researchers' social capital. So, we refrain from any kind of generalization of our findings. Instead, we focus more on the strength of qualitative and interview-based work. Using grounded theory method, we demonstrate various methods of intermediate sharing mechanisms that exist in the city around the use of ride-sharing applications. By analyzing the data, we also show various tensions that are associated with these models. We also discuss potential design and policy interventions to address some immediate struggles faced by the vulnerable driver communities. Using various lenses, we further demonstrate how our findings are connected to CSCW's broader agendas of privacy, power, and postcolonialism. Taken together, this paper contributes to deepening our understanding of the operation of ride-sharing applications in the Global South from broader social and political perspectives.

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