RIDE-HAILING IN INDIAN CITIES: USING INTERVIEWEE QUOTES TO DEVELOP A RESEARCH AGENDA FOR SUSTAINABLE MOBILITY

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ABSTRACT

India's very high traffic levels produce some of the worst air quality in the world. To craft sustainable policies to address this, it is important to understand the basis upon which people make transport modal choice decisions within Indian cities. Arguably, this becomes easier when a new mode such as ride-hailing disrupts the market and exposes the complex aspects of the modal choice dynamic within a culture. Through qualitative thematic analysis that draws upon two existing datasets, this paper explores the market niche served by ride-hailing platforms in India in the forms of both taxis and auto-rickshaws. It is shown that ride-hailing has had a distinct effect on the mode choice attribute set for several reasons, some of which trade off against each other in different ways, for different groups. Understanding these reasons facilitates an expanded research agenda and the development of tailored modal choice models to enable sustainable transport policies.

Keywords: ride-hailing, India, urban transport, mode choice, developing countries.

1 INTRODUCTION

For urban policy makers, it is crucial to understand why people make transport choices to allow the crafting of policies that improve environmental sustainability [1]. This imperative is especially strong in developing countries, where rapid economic growth, rural–urban migration, and an exponential increase in personal motorisation has produced crisis-level pollution problems [2]. An example is that of the urban areas of India, where air pollution is among the worst in the world – being an inhabitant of Delhi has been likened to living in a 'gas chamber'; a significant reason for this poor air quality is vehicular emissions [3], [4].

Understanding how people make transport choices, however, is a complex task. Mode choice is driven not only by measurable instrumental factors, but also latent symbolic and affective attributes that differ across social groups and cultures [5], [6]. The utility of a new mode, therefore, is not only estimated by factors such as time and cost, but more opaque, powerful factors such as pride, belonging, and the demonstration of social placement. Getting users to admit such things is difficult and necessitates specialist research skills [7].

In India, the urban transport mode choice set has recently expanded to include ride-hailing through phone apps for both taxis and auto rickshaws, for shared and single occupancy through technological innovation. In terms of sustainability, ride-hailing can be seen as a 'mixed bag'. If it abstracts trips from mass transit its sustainability profile worsens; if it encourages people to share and use their car less, or even give up their cars, its sustainability profile is an improvement on single user car trips and car ownership. Understanding the comparative attributes, market niche, and symbolic meaning of ride-hailing and how it has affected transport choice dynamics, will inform transport planning by enabling stronger forecasting models, and address calls regarding the lack of research undertaken into the role of the apps in India's development [8].

This paper examines ride-hailing in Indian cities by thematically analysing a composite qualitative dataset to build narrative and develop a research agenda. Section 2 describes the

research framing. Section 3 outlines method. Section 4 describes identified themes in a narrative drawing upon quotes from the dataset. Section 5 concludes the paper with a discussion of sustainable policy implications, as well as potential further research.

2 RESEARCH FRAMING

Within developed countries, the rise of ride-hailing platforms such as Uber is attributed to 'disruptive' entrepreneurial companies seeing regulatory gaps such as no restrictions on hailed taxis in the formal transport rules [9]. The growing body of literature around ride-hailing platforms in developing countries, however, does not describe the apps as disruptive or problematic, but 'liberators', aggregators in chaotic markets, to be contrasted with 'dirty' taxis, poor public transport, and crowded and unsafe paratransit [10]–[12].

Instrumentally, ride-hailing offers a clear and distinct set of attributes which may be seen, internationally, as relatively generic. The symbolic and lifestyle connotations of ride-hailing, however, are likely to differ across groups and cultures. For both developed and developing countries, commentators stress the attraction of ride-hailing to younger, well-educated, higher-income people living in urban areas, who are well-versed in using smartphone apps. In developed countries, when modelling the impacts of ride-hailing latent variables have been used to reflect these attributes for both shared or single occupancy: 'tech savviness', 'environmental consciousness', 'green lifestyle propensity', 'variety seeking lifestyles', 'propensity to share' and 'privacy sensitivity' [13]–[15].

Similar research into the emotional and behavioural drivers of ride-hailing adoption in developing countries, however, is sparse. Sabogal-Cardona et al. examined ride-hailing characterisation in Mexico City [16]. Kashyap and Bhatia flagged how in Delhi, being the driver of an Uber or Ola car brings symbolic capital [8]. Ashmore et al. describe a high need to show status when travelling in a socially tiered society such as India; it is noted that shared transportation, such as shared ride-hailing, can signify low economic capacity unless one is clearly travelling with one's peers [17]. Russell sees this symbolic need to be seen alongside one's class as explaining Ola's policy of not seating shared passengers randomly [18]:

> Ola Share… is much like UberPool in that it allows customers to share their journey with others to save money on their fare. There is a twist, however. While UberPool rides seat users randomly… Ola will match customers with people from their own defined social circles [18].

Further research is needed to foster a greater understanding of the market niche and meaning of ride-hailing in developing countries, and how these affects choice. Using Indian cities as a case study, this study seeks to grow the research base, leading to improved forecasting tools and planning techniques to facilitate sustainable and resilient transport policies.

3 METHOD

Qualitative research using thematic analysis was the applied research method due to its flexibility, pragmatism, and ability to foster theoretical fertility [19], [20]. Thematic analysis works in practice by identifying, analysing and reporting strong and recurrent themes within data [21]. Unlike content analysis, the frequency of codes used in thematic analysis need not dictate the admissibility of a theme for further work. It is thus an excellent technique for fostering the growth of a research programme [22].

For this study a qualitative textual dataset was constructed by amalgamating interviewee transcripts from two studies. The first examined transport symbolism across different

national cultures with 13 interviewees sourced from Indian urban areas. The second was a pilot study examining the change dynamics of transport supply around a new transport node in Delhi, for which 14 people were interviewed. Generally, 12 interviewees are seen as sufficient for thematic saturation provided there is relatively reasonable interviewee homogeneity [23]. To ensure this homogeneity, and as much equivalence in the modal choice dynamic as possible, and to minimise positionality distortion [24], interviewees had to speak fluent English, come from a family which has owned a car for at least 10 years, be degree-level educated and over the age of 18, and possess high speed internet access.

For both studies a semi-structured piloted topic guide, approved by a university ethics committee, was used. There was almost equal gender representation across the sample (males, 14; females, 13). Ride-hailing questions were not specifically asked in either study due to the topic being out of scope, or the questions non-mode-specific. In both instances, however, issues relating to ride-hailing platforms were raised by the interviewees themselves. Snowball sampling, as was used by Kashyap and Bhatia in Delhi, was used for recruitment with participants recruited through contacts of two of the authors [8]. The interviews were conducted using Skype or telephone; for both studies each interview lasted for 1 hour. Interviews were recorded and transcribed manually. Nine themes were derived, and data quotes allocated to them. These are presented in the next section.

4 RESULTS AND NARRATIVE

The themes, along with a summary description of their meaning, are shown in Table 1.

When writing up the results of thematic analysis, it is important to tell the story of one's data to convince the reader of the validity and merits of the work. This is done through presenting a balance of narrative and data extracts [21]. In this instance quotes have been presented anonymously in keeping with the requirements of ethics approval.

4.1 Regulatory fluidity

In India's ever changing 'state of flux', ride-hailing entered the urban market in an unregulated space and is still yet to be formally regulated. As elsewhere, the apps act as connectors between drivers and users – there is no driver lock in or fleet ownership. This means there are no formal standards for fleet or driver quality – the market self regulates. It also leaves the drivers of cars and rickshaws free to adopt a hybrid model of haggling and formal charging, and this is placing pressure on other autorickshaw drivers to 'go digital'.

> On Uber the regulations and who uses it is a complex issue indeed. I think there may be multiple viewpoints and as always India is in a state of flux.

> In India there is no regulating authority for taxi service… and I think the government officials get bribed by big companies to let them do what they want under no regulation in place.

> They (the auto rickshaws) aren't owned by the ride apps. They could work for themselves for a bit and try and get a higher fare by haggling or do it the other way – get the lower money, the safe money earlier, and then spends the afternoon holding out for a higher price.

> The auto (rickshaw) market will die if they don't go digital. It is already dying in places where Uber and Ola density is high.

Table 1: Summary of themes.

Theme	Description
1. Regulatory fluidity	The degree to which market entry and other regulations have stabilised. In India ride-hailing is yet to be formally regulated.
2. Price time and comfort	The instrumental attributes of ride-hailing. Ride-hailed vehicles are typically more comfortable than regular taxis, and their fares slightly more expensive than mass transit. Moreover, they allow for direct, point-to-point travel with no interchange.
3. Surety and stress	The degree to which the interaction with a mode is stressful as a consequence of uncertainty. Ride-hailing has removed the need to haggle with taxi and autorickshaw drivers, previously a considerable source of stress. It has also allowed for the precise drop off destination to be established before entering a vehicle.
4. Perceptions of vehicle drivers	How the appearance of the drivers affects the overall perception of the mode. Drivers hailed through the apps are generally positively viewed as clean, often educated, and sometimes having multiple jobs.
5. Safety and security	How safe are the vehicles hailed through the ride-hailing apps? Ride-hailing apps allow for people and their relatives (especially female relatives) to travel in a vehicle where the driver can be traced. This is seen as positive. Shared ride-hailing is less well regarded, however, due to having to share with strangers, typically of the opposite gender.
6. Modernity and prestige	Due to the ancillary need to hail a vehicle from a smartphone, ride-hailing is seen as modern and prestigious, compared to more traditional modes. This increases the mode's symbolic value.
7. Tiering and social status	This is also tied in with symbolic value. Ride-hailing, provided it is single occupancy, clearly allows people to differentiate themselves socially. Different classes of vehicles assist this process.
8. Utility of sharing	The extent to which the ability to share with others offers positive value and opportunities for networking. Due to ride-hailing taking people of similar social class to the same places, the social opportunities afforded are considerable. This allows the usual negative connotations of sharing to be overridden.
9. Utility of in-vehicle time	Time in vehicle is often seen as a negative utility – wasted. Due to the social status presented by ride-hailing, and the opportunities afforded by sharing with 'one's own', however, in India ride-hailing can convert time in vehicle into a positive investment.

4.2 Price, time and comfort

Single occupancy ride-hailed cars are more expensive than auto rickshaws but offer surety of price and greater comfort. They are thus, more than regular taxis, a logical choice for point-to-point customers with a degree of disposable income. A recent increase in metro train fares means that ride-hailing's price point has become more attractive to commuters, especially those who have to change trains. This raises the possibility of abstraction of public transport trips for both single and shared occupancy and raises the prospect of significant impacts on the cycle rickshaws which are often used for access/egress trips. Shared occupancy presents greater sustainability benefits but forces a person to travel with others whose requirements can lead to more convoluted trips and drops offs, and in turn a loss of utility.

> In terms of pricing, Uber and Ola… have a price point that is only marginally higher than auto (rickshaw). They are all a/c cars… there is a minimum fare and a km fare.
>
> … if you have plenty of money you would take an Uber or an Ola through the apps.
>
> The metro fares have gone up and this seems to be having an effect on the cycle rickshaws as the people who don't want to pay the metro fares now negotiate with an auto rickshaw driver or use an app like Uber to get a lower fare. They can go straight from point to point.
>
> Uber Prime and Ola's prime versions are better quality with free Wi-Fi, a/c and a TV screen. And still affordable.
>
> I have used UberShare only once in Pune but the short detour to pick and drop co-passengers didn't work for me. Traffic and one way mean that even short detours add 15–20 minute to journey towns.

4.3 Surety and stress

It appears that an attraction of the ride-hailing apps is surety and reasonableness of the fare charged, as a consequence of removing the need to haggle with drivers. The lessening of stress associated with haggling is not something generally captured in transport mode choice models. But as with lack of journey *time* reliability, lack of price reliability is likely to be an impediment to a mode's use. As noted above, rickshaw and taxi drivers, can 'bank' a fixed daily return through apps to cover fixed costs, and are then free to maximise their returns through haggling. Similarly, for ride-hailing, the removal of parking stress for the more affluent market segments, provided they still have access to a hailed vehicle, may be a reason not to use their own car.

> If you book through the Uber or the Ola app you get charged the distance. They just deduct the money because you are having an account. It's a lot better than haggling. If I want to go India Gate the normal auto wallah asks me for 150 rupees, but if I look for an app it will around 79 rupees. The car will be about 200 rupees. The access to the internet over the phone has changed things a lot.
>
> They don't haggle for short rides.
>
> … people are doing business trips on Prime as there is no parking hassle.
>
> I like using Uber or Ola. They feel safer and the rickshaw drivers don't use their meters. And they argue with you. It's easier to use Ola. You don't have the stress of haggling all the time with the person pretending that they do not go to your destination.

4.4 Perceptions of vehicle drivers

The sophistication and modernity of the supply side of the ride-hailing industry, as well as the drivers generally being well presented and potentially from a similar social group, seems

to increase the utility of ride-hailing. For car-based ride-hailing, some interviewees seemed to feel that being driven by someone who is well presented, educated, and in a flexible and well remunerated job, increased the attractiveness of the mode. This could be seen as an instrumental quality attribute. Good drivers seem highly sought after. Furthermore, the need for drivers to have a bank account for payment may be something which semi-regulates driver quality and offers comfort to the user.

In terms of recruitment, in some cases potential drivers are approached by the ride-hailing representatives at fuelling stations, have the workings of the app explained, and offered an incentive to sign up. In the field, the drivers are incentivised to perform well: the online driver rating system post-ride ensures that most drivers provide a high level of service. In cases of exceptional service, it seems that individual one-to-one deals are done with some drivers to remove them from the marketplace to act as a personal driver.

> I was surprised to know that one person said that he's easily able to make 10,000 rupees a week. Three or four days on, three or four days off.

> The Uber drivers make a very good money. I talk with them, and they are often nice people who are very educated and doing a good job as well, and they want to earn a little money on top.

> From my experience about a third of the rickshaws are registered with the phone app companies. Apparently, they are approached by representatives at CNG stations for getting the gas filled. Then the procedure how to sign up is explained. Some told me about a joining reward.

> It's the same with the rickshaw drivers moving to Uber. The good ones get positive reviews online and more business. But sometimes if you find a reliable one you don't recommend them as you would like to keep them for yourself. That's the way it works.

4.5 Safety and security

Ride-hailing can be seen as more secure than a regular taxi, as there is a driver audit trail if something goes wrong: a user 'knows about the person who is picking them up'. Users can also share the details of the vehicle collecting them with other family members or friends to keep track of a journey. There are great concerns, however, over sharing with strangers. This is an overwhelming concern for female travellers, especially if there are large numbers of men or no other women in the vehicle. Interviewees noted that sharing with people who are socially similar to themselves is fine, but sharing with people who are too different – antisocial, have radically contrasting political views, or who have poor personal hygiene – makes for an unpleasant experience, and acts as a deterrent to usage.

> I don't like to share a ride-hailed cab. It's not only because of the safety, although I do feel safer not sharing as I might be the only woman and Delhi's transport isn't very safe for women. It's also to do with the personalities of the people who you might share with. One time I started talking with a person and we had very opposing political views and it began to feel very awkward. We were talking at first and then the rest of the trip was silence.

> In general, I can see some hesitation in sharing with strangers. I don't think it's always to do with mixing with smelly people though – it's also security. It's not very safe travelling around if you're a woman on her own so you'd need to know that the people you were sharing with were okay. If there's a woman in the group I'd feel better than being alone with men or a man. I suppose the other thing that makes Ola or Uber better than regular cabs or autos is that they'd know who the registered driver was.
>
> You can know about the person who is picking you up, but not the other passengers. So, it also comes down to gender and safety. If I am hailing a vehicle for my sister, I will not book a shared vehicle. I would be very worried for her safety.

4.6 Modernity and prestige

It appears that for some users using something which is seen as 'advanced' or 'western' gives them a feeling of pride and status. This seems to have had an effect on the traditional taxi market; people would rather hail through their smartphone and wait for an Uber instead of taking a taxi even if it is in front of them. Part of this may be due to superior ride quality, but it seems some of it is due to the self-image conferred through app modernity and the use of smartphones for booking rides. Automation seems to confer social capital.

> Uber… Ola… people think highly of these brands.
>
> There is also status from copying the western world. People treat people from western countries with respect, but it is the same with modern amenities. So, if they see a person with an electronic gadget and a person with a traditional mechanical instrument… so people will give more weight to the person who is carrying the electronic gadget.
>
> People… will say I take Ola or Uber to maintain their prestige by being western. These people feel proud in booking an auto or taxi using their mobile phone. Booking through the phone and having the money debited brings status. Even if they are standing next to an empty taxi they will use the phone technology to feel proud about booking their transport through a phone.

4.7 Tiering and social status

In the cultural studies literature India is noted as a high-power differential nation, meaning that demonstrating one's social positioning and economic capacity is crucial to ensure appropriate treatment and societal harmony [5]. A mode needs to match a person's collective's social standing to ensure that there is no 'loss of face', which is a socially damaging event leading to ostracisation and adverse social consequences. In terms of outward appearance, a mode is normalised by the 'right people' being seen to use it.

Given this, it is little wonder that the interviewees stressed that the ride-hailing market needs to provide different categories of vehicles – 'business class' models – to allow a user to demonstrate social positioning. For sharing, people would seek to be seen to travel among their own, so software allocating users to their own social class would be important. A unique complication here, is the commonality of the middle class having personal drivers – a ride-

hailed car could be mistaken for someone's car and driver, and this would make the need for high-end car models and well-presented drivers even more important.

> Like say my mother she wants an Uber or Ola cab. I have to pay another 50% more to get her a prime sedan or SUV. Because the neighbours will watch when the car comes… we have to behave like this in our culture otherwise people will think you're stupid and not speak to you.

> In India the ride-hailing companies have to offer different classes of vehicle – regular, sedans, SUVs, as well as shared. If it was a random system and a small Maruti turned up, then if the person was senior in the corporate world, riding in such a car could make him feel very ashamed and angry, as people might think it was his car and the driver was his own personal driver.

> … if you made this very high status with quality control, then people might do that. It depends on who does it and the economic strata of those who do it. Society is looking for a group to show that something is acceptable. If the professional and educated are doing so it becomes more normal.

> I think even that the software allocates people based on who they are to others who are similar.

> It's just another segment like 'business class' in airlines.

4.8 Utility of sharing

If a risk to sustainable urban transport is an abstraction of trips from mass transit to ride-hailing, a positive consequence of the new mode could be the need not to either own or use one's own vehicle. This would only apply if a single own vehicle trip was transfer to a shared ride trip. One of the quotes presented earlier shows that affluent users might opt for a prime ride-hailed car to avoid parking stress, although the stress may apply more to their driver than themselves, unless an appointment was time critical and a drop-off not possible. In terms of choosing not to own a car due to having access to a shared ride-hailed vehicle, in Ashmore et al. [5] an interviewee from Delhi states:

> … there would be judgement they couldn't afford their own car. Here you're expected to show you are going up by owning your own assets, not going down by using something shared or public. If you don't do these things, then people will assume you are stingy.

In the same study another interviewee from Delhi stated:

> … car free here?! You've a higher probability of winning the lottery! It's not going to happen. The social reaction would be wonderment. People would assume you have lost your job. There's not a chance that they would buy a voluntary car free justification. They assume you had… taken a huge financial hit [5].

In this study an interviewee corroborated this sentiment:

> Sharing is not seen as good it's a substitute for not being able to earn enough to get your own. It would reflect badly on your family. Imagine if someone was going to enter into an arranged marriage and one of the families was told 'he's choosing not to own a car?'

If there is seemingly little prospect of people in Indian cities electing not to own a car for both instrumental and symbolic reasons, then car sharing at least offers the prospect of someone not using their own car and reduce the number of car trips on the road. As noted in the tiering theme, this will depend on who people are sharing with. Touching on the next theme – utility of in-vehicle time – sharing with people who are dissimilar may be seen as off putting, but sharing with those of identical social positioning may itself offer opportunity and represent a time investment.

> I once took a shared ride-hailing vehicle with a professor. He is a very modest man and thought it would make sense to save some money. I said to him that it might not be a very good idea because we would have no idea about who we would share with – what class they belonged to. But he wanted to do it, and we did, and we had a bad experience. Two men got in, and they are starting to use very bad language… then they started arguing with the driver to drop them off first, even though we were scheduled before them… on the return journey we hailed a private vehicle from our phone.

> We had a venture capital meeting with the start-ups. I had met one of the guys when we shared a vehicle from the airport. We chatted and found out we had a lot in common. Some people prefer to request a share rather than their own vehicle for these sorts of reasons. It feels exciting, like the trip might lead to something interesting… I don't feel it lowers my social status – people look into the car and see you talking and assume you're with friends. And sometimes you do make friends this way.

> If you have a lower income and can't afford to own your own car in Delhi, some people have started getting an Uber. It is chauffeur driven it can look like you are arriving in your own car… But if it was a shared Uber and the other people in there were smelly then… I have a friend who would think 'no I am not doing that because I am a high-status person'.

> … a rickshaw alone it means you have more money. If you are taking shared rickshaw, it means you want save money and you don't have as much disposable income. The auto rickshaw goes longer distances and you hire it on your own, so it means you probably don't want to share with others on the metro although the metro isn't low status compared to the bus. If you take an Uber cab it means you are a professional earning a good salary… wherever you try to save money people will think that your disposable income is less.

> If anyone who is in business did it, then people would be puzzled: 'it's clear that the person can afford a car and a driver so what are they doing this for?' In India commercial relationships are trust based so people tend to avoid doing deals with people who do strange things – if there's a significant sum of money involved in a transaction, then a strange choice like this might make them want to do business with someone more regular, who uses their own car.

> I live in an area surrounded by lots of colleagues and there's no way that they would share a car to work… even if was one you booked on your phone. Someone who wasn't very clean might have used it before you. People would think that you were having financial difficulties.
>
> You tend to end up sitting with your own anyway… in a shared Uber or Ola, you'd all be going to the same destination and someone who smelled and had no shoes wouldn't be going to these exclusive neighbourhoods. So, it sort of takes care of itself in not looking like you are slumming it with the poor in a shared vehicle.
>
> I would never suggest a share with my business client… I would not want to put my client into that position. He might feel very awkward in case somebody he knows saw him and thought he was trying to save money – sharing a cab indicates that you don't have enough money to pay for your own transport, even if it has been hailed through an app.

4.9 Utility of in-vehicle time

Conventional utility theory in transport modelling postulates that time spent in vehicle is wasted as it could have been deployed in a productive manner. The concept of symbolic capital inverts this as time spent in congestion rather than on a faster, cheaper mode such as a metro, could be seen as conferring higher status which will have its own rewards. Similarly, time spent in shared vehicles, especially upmarket sedans going to wealthy neighbourhoods, with similar people, can also be seen as a symbolic or literal investment if there is a possibility of elevated status, commercial dealings, friendship or romance.

> The context of the travel is important. The choice set automatically reduces to fit with what is acceptable for a person's status. Things filter out without thinking. For status reasons not practical. If it's fast, cheap, but low status, people would reject it and rather sit in congestion: it would not come up in their choice… congestion and delay are less important because you are not sacrificing status.
>
> In Mumbai it can be used for networking. Some people now look to share an Uber for this reason. I've heard of a venture capital guy closing a deal in a shared Uber… the thing is, when you are with Uber or Ola you have a debit or credit card, and I generally get a sedan, and there would be some software matching the cars and the origin and the destination. I go from the business district to an upmarket residential area, so anyone else in the car… we probably have things in common.
>
> Let me tell you, I work for a good company, a well-known global business, and there are taxis outside the building or circling the area. It's possible to walk outside and get a taxi immediately. But my colleagues, some of them insist on calling for an Uber on their phones. Even if it means they wait another 15 minutes. Why is this? It is because they can say 'see, we have Uber now, like other places, we are modern'. Using Uber brings them status.
>
> There are adverts in India on how people met on Ola Share and fell in love.

5 DISCUSSION

5.1 Sustainable planning and policy implications

Building on previous studies, our study concurs with the broad findings of Gomez et al. [13], Irannezhad and Mahadevan [14] and Lavieri and Bhat [15]. These studies emphasise that ride-hailing's niche market seems to be younger, relatively affluent people living in urban areas who are 'tech-savvy'. In terms of developing countries, our results concur with the findings of Sabogal-Cardona et al. [16] based in Mexico City, which found that higher education and income have a positive effect on ride-hailing adoption. Specifically for India, the findings align with both Ashmore et al. [17] and Kashyap and Bhatia [8] who opined that in Indian cities, both driving for and using, ride-hailing apps brings social capital, and that in order to maximise social status, sharers need to be seen to travel with their peer group.

That said, the findings within this paper rely on the opinions of a moderate number of (socially similar) people, spread across several cities, who were not asked direct questions about ride-hailing. The findings should therefore be seen as inductive – designed to be a bridge between exploratory work to foster theoretical fertility, and quantitative confirmatory work. The material within this paper and the key themes allows for more targeted questions and survey instruments.

Ride-hailing has clearly had an impact in Indian cities. Its regulatory fluidity offers opportunities to compete on instrumental attributes such as quality, price, and time, as well as symbolic attributes driven by status and modernity. In terms of sustainability, it is hoped that despite the lack of regulation and statutory frameworks, the industry continues to promote high-end vehicles, and over time, provided supporting infrastructure is supplied, these become increasing powered by battery. In addition, whilst there seems little prospect of people becoming 'car free' to use ride-hailed modes – car ownership serving too many symbolic needs to be relinquished – there is a chance that some people will increasingly choose not to use their own cars and instead hail a ride, provided status needs are met.

Substituting one's own car trip or a trip taken by public transport, for a single occupancy ride-hailed trip, however, offers scant upside for environmental sustainability. Should ride-hailed trips be shared, however, there would be a drop in overall car trips and in turn pollution and congestion. It would be unrealistic to expect the more affluent market segments to share with others if trips were for people with disabilities, elderly people, or when travelling to or from an important meeting. For other trips, however, car owners may wish to share, if the trip was seen as offering opportunities to fraternise among their own, be it for friendship, commerce, or even romance. As much as encouraging separate sharing tiers for elites may seem distasteful for some in the context of public transportation, it would offer opportunities to generate premium revenues, as time would be invested in-vehicle than at the end of a trip.

5.2 Further research

A key role of this paper is to lay out the dimensions of what a research agenda on ride-hailing in Indian cities may consist of, so as to develop stronger forecasting tools and sustainable policies. The authors would see future research as having three key strands.

- An examination of how regulation may bring benefits to the ride-hailing market in India. This would ask the question 'is the current market mechanism delivering the strongest sustainability outcomes?', and would include the safety aspects of regulation, as well as stringent vehicle standards.

- A comprehensive multi modal exercise to model modal split in Indian cities, with a strong focus on shared ride-hailing. This would cover all aspects of choice – instrumental, symbolic and affective. Wherever possible latent variables should be used to capture non measurable attributes; it is suggested that the cultural studies models would be a useful starting point.
- An exercise to examine sharing in ride-hailing in India: how to destigmatise it symbolically, and how to work with the stigma and to develop products which cater to those who have a choice and wish to be among their own social grouping.

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REFERENCES

[1] Papaioannou, D. & Martinez, L.M., The role of accessibility and connectivity in mode choice: A structural equation modeling approach. *Transportation Research Procedia*, **10**, pp. 831–839, 2015. https://doi.org/10.1016/j.trpro.2015.09.036.

[2] Siddique, S., Ray, M. & Lahiri, T., Effects of air pollution on the respiratory health of children: A study in the capital city of India. *Air Quality, Atmosphere and Health*, **4**, pp. 95–102, 2011. https://doi.org/10.1007/s11869-010-0079-2.

[3] Herman, S., Asian cities choking on worsening air pollution. *VOA News*, 22 Dec., 2015. https://www.voanews.com/a/asian-cities-choking-on-worsening-air-pollution/3113194.html. Accessed on: 23 Nov. 2017.

[4] Rajput, S., *Urban Green Space, Health Economics and Air Pollution in Delhi*, Taylor & Francis: Abingdon, 2021.

[5] Ashmore, D.P., Pojani, D., Thoreau, R., Christie, N. & Tyler, N.A., Gauging differences in public transport symbolism across national cultures: Implications for policy development and transfer. *Journal of Transport Geography*, **77**, pp. 26–38, 2019. https://doi.org/10.1016/j.jtrangeo.2019.04.008.

[6] Steg, L., Car use: Lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice*, **39**(2–3), pp. 147–162, 2005. https://doi.org/10.1016/j.tra.2004.07.001.

[7] Noppers, E.H., Keizer, K., Bolderdijk, J.W. & Steg, L., The adoption of sustainable innovations: Driven by symbolic and environmental motives. *Global Environmental Change*, **25**, pp. 52–62, 2014. https://doi.org/10.1016/j.gloenvcha.2014.01.012.

[8] Kashyap, R. & Bhatia, A., Taxi drivers and taxidars: A case study of Uber and Ola in Delhi. *Journal of Developing Societies*, **34**(2), pp. 169–194, 2018. https://doi.org/10.1177/0169796X18757144.

[9] Brown, A., Sperling, D. & D'Agostino, M., How ride-hailing could improve public transportation instead of undercutting it. *The Conversation*. http://theconversation.com/how-ride-hailing-could-improve-public-transportation-instead-of-undercutting-it-96453. Accessed on: 9 Mar. 2022.

[10] Edrisi, A. & Rezaei, H., Assessment of how ride-hailing services affect individual's travel mode choice in urban transportation. *International Journal of Human Capital in Urban Management*, **6**(1), pp. 81–96, 2021. https://doi.org/10.22034/IJHCUM.2021.01.07.

[11] Shah, S.A.H. & Hisashi, K., Analyzing travelers' attitude towards ride-hailing services in developing countries: Case of Lahore, Pakistan. *IATSS Research*, **46**(2), pp. 223–235, 2021. https://doi.org/10.1016/j.iatssr.2021.12.006.
[12] Tirachini, A., Ride-hailing, travel behaviour and sustainable mobility: An international review. *Transportation (Dordrecht)*, **47**, pp. 2011–2047, 2020. https://doi.org/10.1007/s11116-019-10070-2.
[13] Gomez, J., Aguilera-García, Á., Dias, F.F., Bhat, C.R. & Vassallo, J.M., Adoption and frequency of use of ride-hailing services in a European city: The case of Madrid. *Transportation Research Part C: Emerging Technologies*, **131**, 103359, 2021. https://doi.org/10.1016/j.trc.2021.103359.
[14] Irannezhad, E. & Mahadevan, R., Examining factors influencing the adoption of solo, pooling and autonomous ride-hailing services in Australia. *Transportation Research Part C: Emerging Technologies*, **136**, 103524, 2022. https://doi.org/10.1016/j.trc.2021.103524.
[15] Lavieri, P.S. & Bhat, C.R., Investigating objective and subjective factors influencing the adoption, frequency, and characteristics of ride-hailing trips. *Transportation Research Part C: Emerging Technologies*, **105**, pp. 100–125, 2019. https://doi.org/10.1016/j.trc.2019.05.037.
[16] Sabogal-Cardona, O., Oviedo, D., Scholl, L., Crotte, A. & Bedoya-Maya, F., Not my usual trip: Ride-hailing characterization in Mexico City. *Travel Behaviour and Society*, **25**, pp. 233–245, 2021. https://doi.org/10.1016/j.tbs.2021.07.010.
[17] Ashmore, D., Thoreau, R., Kwami, C., Christie, N. & Tyler, N.A., Using thematic analysis to explore symbolism in transport Choice across national cultures. *Transportation*, **47**, pp. 607–640, 2020. https://doi.org/10.1007/s11116-018-9902-7.
[18] Russell, J., India's Ola announces carpooling service that matches customers within social groups. Techcrunch.com. https://techcrunch.com/2015/10/13/indias-ola-announces-carpooling-service-that-matches-customers-within-social-groups/. Accessed on: 7 Apr. 2017.
[19] Feilzer, M.Y., Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research*, **4**(1), pp. 6–16, 2010. https://doi.org/10.1177/1558689809349691.
[20] Newton-Smith, W., *The Rationality of Science*, Routledge and Kegan Paul: London, 1981. https://cdn.preterhuman.net/texts/thought_and_writing/philosophy/rationality%20of%20science.pdf.
[21] Braun, V. & Clarke, V., Thematic analysis. *APA Handbook of Research Methods in Psychology, Vol 2: Research Designs: Quantitative, Qualitative, Neuropsychological, and Biological*, American Psychological Association, pp. 57–71, 2012.
[22] Vaismoradi, M., Turunen, H. & Bondas, T., Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences*, **15**(3), pp. 398–405, 2013. https://doi.org/10.1111/nhs.12048.
[23] Guest, G., Bunce, A. & Johnson, L., How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, **18**(1), pp. 59–82, 2006. https://doi.org/10.1177/1525822X05279903.
[24] Berger, R., Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research*, **15**(2), pp. 219–234, 2015. https://doi.org/10.1177/1468794112468475.