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Evolution of Self-organisation Mechanisms of a New Informal Mode of Transportation : Case Study of Two Municipalities in West Bengal, India

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Abstract

Battery operated three-wheeler vehicles (Electric Rickshaws or toto) were introduced in India in 2010 in Delhi. They soon proliferated in the rest of the country, being introduced in West Bengal in 2013, in Baharampur town. Without any barrier for entry in operation and manufacture (assembly) of these semi-engineered vehicles the number in Delhi itself increased from 4000 to 1,00,000 in first the four years. The unpredictable growth in number and popularity of these vehicles due to their abundance, benign pollution and comfort, was met with intuitive regulatory effort from informal institutions and heuristic methods by formal institutions while conflict within and between administrative, judicial and informal institutions continue to baffle the implementers, owners and operators. Fleets dominated by barely road-worthy vehicles operate without or with minimal formal regulation and accountability, hijacking road space, passengers and causing shift of jobs. The initial efforts for organisation have appeared within the operators themselves to offer everyone a fair chance of livelihood while maintaining order between competing modes and confused passengers. These organisations are continuously evolving their stand and strategy in response to the changing needs and reactions of the patrons, the operators, the public authorities and competitors. The primarily politics- and market-oriented decisions taken by these institutions are often self-afflicting in the long-run. The author has used first-hand experience of the last ten years, discussions with various stakeholders and a survey of operators in two adjacent municipalities in the state of West Bengal, India to understand the workings of these informal organisations.

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Keywords: Informal transportation; paratransit; developing world; battery-operated rickshaws; TOTO; route associations; informal institutional mechanism; informal sector data collection

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Nomenclature

angkot	abbreviation of angutan kota, 12-17 seater minibuses for shared passenger transport, seating only, South-east Asia
ARAI	Automotive Research Association of India
boda boda	motor-cycle taxi (Kenya)
BTA	Bhadrakali Toto Association
CAPI	Computer-Assisted Personal Interviewing
CIRT	Central Institute of Road Transport (Pune, India)
H1, H2 etc.	1st and 2nd half of calendar year
INR	Indian Rupee
ICAT	International Centre for Automotive Technology
jeepney	Originally converted jeeps in the Phillipines and WWII for shared passenger transport. No 14-16 seater minibuses, seating only, South-east Asia
KJTA	Konnagar Jatiatabadi Toto Association
KM	Konnagar Muucipality
KPEA	Konnagar Pourasabha E-Rickshaw Association
Lakh	0.1 million
MoRTH	Ministry of Road Transport and Highways
motodop	motorbike taxi (Indonesia, Vietnam)
Q1 etc.	Quarter of calendar year
remorks	larger trailer or cage attached to the front of a motor-bike (Indonesia, Vietnam)
RTO	Regional Transport Office
SA	Study Area
SCFM	Small Capacity Feeder Mode
SCFS	Small Capacity Feeder Service
toto	Generic name for the three-wheeler, four passenger (occasionally 2 or 6 passenger) battery operated rickshaws seen in India since 2010.
Tricycles	motorized small 3-wheeled hooded passenger vehicle assembled locally using imported 100 to 125 cc motorcycle engines and other parts imported or locally manufactured, The Phillipines.
UKM	Uttarpara-Kotrung Municipality
VRDE	Vehicle Research & Development Establishment

1. Introduction

Electric Rickshaws or Battery operated Rickshaws are three-wheeler rickshaws known by many names in the world. They are a smaller version of but akin to Tuktuk of Bangkok, Indonesia. In India, legally accepted electric rickshaw models are termed “E-Rickshaws” or “Battery Operated Rickshaws”, categorized as a special purpose vehicle providing last-mile connectivity (MoRTH, 2014b, 2014a) with 4 passenger capacity, 40kg luggage limit, maximum 2000KM battery power, speed-cap of 25kmph, handle-bar operation and maximum physical dimension of 2.8m (L) x 1m (W) x 1.8m (H) as per the amended CMVR of India (ICAT, 2016a; MoRTH, 2015a, 2015c). In West Bengal, four-seater electric rickshaws i.e. covered three wheelers are known as Toto, irrespective of their technical specifications and legal status. Two- and six-passenger semi-engineered and engineered models are also seen. Irrespective of the legal status and technical specification, all totos are technically battery-operated three-wheeler rickshaws and are being referred to as such in this research, unless mentioned otherwise.

Introduction in India occurred before the 2010 Commonwealth Games in Delhi with the intention of slowly phasing out cycle rickshaws (Singh, 2014). E-Rickshaws cater to the unmet and latent mobility needs, especially in small and medium towns and rural India, competing with and sometimes replacing modes and systems in place. These rickshaws

are SCFS providers like auto rickshaws and cycle-rickshaws and pedal-operated-cum-battery operated cycle rickshaws aka *tuntuni*. (ref. figure 1).

Figure 1. Left to right : Hand-pulled rickshaw, Cycle Rickshaw, Auto-rickshaw (3Wh), Toto, Pedal rickshaw retrofitted with battery or *tuntuni*

Comparable to app-cabs (Uber and Ola among a few others) among higher-income user group and larger cities with better traffic management system and roads, Totos have revolutionised the way people perceive mobility and paratransit amidst vehement and continuous debate on their usefulness and long-term effect on congestion and other modes. The proliferation of totos in India have occurred at an unpredictable rate and number and before any form of regulatory mechanism was conceived, let alone planned. Totos were informal in every sense of the term, namely, vehicle, operational mechanism and regulatory framework. Regulatory efforts were delayed, a long legal vacuum (Kumar, Batra, & Sankaar, 2017) and they are chaotic (J. B. D. Ahmed & Mridul, 2014), "without proper application of mind" (J. B. D. Ahmed & Mridul, 2014), slow, experimental, conflicted between the state administration, central administration and judiciary, replete with reconsidered decisions about introduction and revoking of laws eventually leading to disowned responsibilities, internal conflict of interest and poor implementation, an informal process in itself (cited by Harding, 2015; Ananya Roy, 2009).

Self-regulation in absence of formal mechanism (Toshikazu Shimazaki & Rahman, 1995, p. 56) in India comprises primarily of self-appointed leaders and organisers affiliated to the ruling political parties and already regulating competing modes via corresponding associations or unions formed in each municipalities, initiating a sense of order, legality and acceptance among individual operators by organising them in similar unions, enlisting them and assigning them informal registration numbers to display on their vehicles. The jurisdiction of unions are fragmented by municipality boundaries and vehicle mode but the unions themselves are unified under the umbrella of state level political guidance with agendas that are characteristic of politically led organisations. They act as the intermediary between the individual operators and planning authorities, state transport department, police commissionerate, urban local bodies and local police. They are also the first to create and maintain records of the owner, driver, vehicles and operational characteristics of this vast and vague sector, take intuitive decisions based on their understanding of market demand, dictate the terms of operation and public decision making process, maintain personal rapport with every driver and owner and evolve continuously with the changing legal and market scenario.

The universal challenges faced by researchers while studying the mechanism of informal institutions are mainly due to the following reasons (CDIA, 2011; Cervero, 2000; H. Schalekamp & Behrens, 2009).

(1) ***Lack of standard procedure and lack of accountability to third party*** **:** There is a lack of maintained organisation structure and legal accountability towards an outsider (researcher). This results in almost nil institutional memory. As a result the data and opinion can be uninformed, incomplete, personal, subjective, contradictory and even unreliable through a passage of time in spite of cooperation from the organisations.

(2) ***Non-comparable data and records*** **:** There is no standard and accepted method of data collection and record keeping within an organisation and no two organisations work similarly. Multiple, insolated and loosely connected organisations operate independently in common routes, travel zones, residents, vehicles, operators and passengers. Thus, analysis of their action on the same ground is difficult.

(3) ***"Inexplicable" agendas and decisions*** **:** The political affiliation of these organisations hinder them from working with the objective of service provision towards the passengers and drivers. The level of cooperation and the rationale behind their decisions are often misguiding, undisclosed or partly disclosed and using them in scientific research can be difficult and futile.

(4) ***Conflicting interests within and between organisations*** **:** These lead to many unsolved questions that cannot be prudently pursued by an independent researcher.

The study area, Uttarpara-Kotrung and Konnagar Municipalities are planned to be connected to the Kolkata Municipal Corporation and the district of North 24-Parganas via metro line. To ensure the patronage and profitability of a metro service, efficient feeder services are one of the most important requirements. The main point of dispersion towards the bigger cities of Kolkata and Howrah, Ballykhal and Ballyghat (ref. figure 3) already draw a lot of feeder traffic in the morning due to the Dankuni-Sealdah train route and the 30 bus routes via Ballykhal and Ballyghat. Before the introduction of totos, the existing bus and auto rickshaw service from Konnagar, Rishra and Serampore was already insufficient, resulting in long waiting time of 20-30 minutes ("*feels like 30 to 40 minutes during the evening rush hour*" stated by a commuter in an auto-rickshaw queue after his actual waiting time was clocked from afar by the researcher and the commuter's own estimate was sought without disclosing the actual figure to him) and speeding buses overcrowded in the last leg of the journey (table 4 and figure 24, appendix A). Between 2013 and present time, almost 800 (highest estimate among those available from different sources) totos were plying in Uttarpara and Konnagar in the study area, significantly reducing waiting time but increasing road congestion and journey time by 10-50% (as per perceptions of regular four-wheeler and two-wheeler drivers on the route 20 minute journey has turned into 30 minute in peak office hour). Traffic police, RTO and civic police have continuously increased their enforcement of traffic rules, laws, vigilance and management of traffic since early 2017, forcing the toto owners and the unions to rethink their stand about compliance and slowly increasing the number of RTO registered vehicles, i.e. Electric Rickshaws in the legal sense of the term. More than 90% totos are unregistered as per different estimates and there is no count of registration-worthy vehicles and availability of necessary documentation with those vehicles. MoRTH, through RTO, allows the permission to ply and insurance benefits to totos. Besides that, all totos, their owners, drivers and their operation are directly or indirectly guided and monitored by the unions that maintain peace with the authorities while providing mobility and employment to the stakeholders. In the polycentric policy environment of India understanding the institutional nature and dynamics of urban transport planning, actor behavior and motivation, interests at play, instances of opportunistic behavior, externalities, can help in understanding how decisions are made (Vaidyanathan, King, & de Jong, 2013). The first-hand knowledge about demand, supply, performance of formal and informal regulations that the unions have are valuable for formulating policies and enforcing laws, especially in the present study area where there is no existing study and planning activity in this regard especially and it cannot be done without taking due account of the informal institutional mechanisms that cannot be abolished. This study can also act as a prototype or guide for toto-related study in other areas in the state or increasing the efficiency and coverage of apps and software like "SmartE" for Delhi (ET, 2015; Narayanan, 2016; News18.com, 2017; The Hindu, 2018) and "E-Rickshaw Driver" for Ujjain (Ujjainsmartcity.com, 2018).

This study is a based on last 10 years of observation, still photography, video photography, literature study of reports for various government and semi-government agencies, study of reports prepared with public intiative, the few peer-reviewed journal publications available, general discussion with stakeholders, semi-structured interviews with passenger and drivers of the different paratransit modes in Uttarpara and Konnagar, discussion with association members and an ongoing semi-structured interview of vehicle owners and drivers in Konnagar.

This paper is structured in the following manner:

Section 2 is a brief literature review of existing studies on institutional mechanism of informal transit
Section 3 discusses the history of electric rickshaws in India, formulation of regulatory framework amd preceding studies on the topic of e-rickshaws
Section 4 gives a brief about the study area and the characteristics of existing transport scenario.

Section 5 discusses the methodology applied while conducting this study.
Section 6 discusses the important observations from the study – these include the role of unions with respect various government policies and market requirement. This section also referes to the data so far collected in the ongoing survey.
Section 7 offers a critique of the regulatory framework.

2. Literature review

Structure of informal, as against formal, transport has been studied comparatively rarely and in less depth. Cervero (2000) provides numerous examples of the roles played by operators all over the world under different names and capacities while Neumann *et al.* (2014, p. 15) summarises the generic roles with exemplary cases that has been used as a base for preparing table 1.

Irrespective of size and regulatory mechanism of the organisation, an institution governing transportation perform any combination of the five functions :

(1) Registration of vehicle and maintaining documentation
(2) Preparation of policies and rules,
(3) Implementation of rules,
(4) Monitoring compliance and
(5) Penalising offenders.

The author lists out the roles and area(s) of intervention of informal institutions and its application in the present case in table 1 below. The 57 items occur in different combinations.

Table 1. Areas of intervention for informal institutions

Broad category		Role and responsibility
A. MARKET ASSESSMENT	(1)	Market assessment
B. INCEPTION	(2)	• Inception of association, • Institutionalising individual operators & personal businesses
	(3)	Independence as an association and visibility
	(4)	Formation of rules for membership and operation
C. OPERATIONS : Internal working of the institution	(5)	Making rules of operation of vehicles – eligibility, required documentation, fee etc..
	(6)	Making rules of membership – eligibility, required documentation, fee etc..
	(7)	Territory assignment
	(8)	Understanding with other competitive modes
	(9)	Enumerating vehicles with unique and serial numbers of association
	(10)	Enumerating vehicles with unique and serial numbers as TIN from municipality (Deen Dayal Scheme)
	(11)	Maintaining account of owner
	(12)	Maintaining account of driver
	(13)	Maintaining account of vehicle
	(14)	Appointing members for various internal and interactive work and delegating responsibility
	(15)	Modification of organisation

Broad category		Role and responsibility
	(16)	Dissolving of association
	(17)	Special charges and favours for memberships and / or vehicle or parts
	(18)	Other businesses like sale, maintenance and servicing of vehicle and spares
	(19)	Transparency to members
D. OPERATIONS : Internal working and interaction with owners and drivers regarding…	(20)	Collection of entry fees
	(21)	Collection of membership fees
	(22)	Collection of parking fees (if separate)
	(23)	Daily rent for vehicles
	(24)	Garage charges (overnight)
	(25)	Parking space and capacity
	(26)	Parking charges (may or may not be included in the membership fee)
	(27)	Enrolling new members in organisation (or not)
E. OPERATIONS : rules, execution and monitoring of…	(28)	Vehicle type
	(29)	Vehicle specification
	(30)	Insistence of maintenance of paperwork
	(31)	Route (where fixed)
	(32)	Fare
	(33)	Method of collecting passengers
	(34)	Sharing mode (share or reserved)
	(35)	Number of vehicles in a route
	(36)	Time of operation or shift (time of clock)
	(37)	Hours of operation (total working hours)
	(38)	Number of vehicles in a given shift
	(39)	Special duties (at late or early hours)
	(40)	Special fare (late night or early hours)
	(41)	Special fare (reserve)
	(42)	Special fare (festive season)
	(43)	Special rates (banner and announcement)
	(44)	Designating stand and/or stops
	(45)	Maintaining the stand and/or stops
	(46)	Maintaining log and managing queue by starter
	(47)	Maintaining log and managing queue by operator
	(48)	Monitoring number of owned vehicles above cap
F. Problem solving and facilitation with both formal and informal agencies	(49)	Facilitating and encouraging registration into formal sector
	(50)	Negotiating with other authorities (eg. impounding vehicles and holding the driver by police)
	(51)	Listening to complaints from drivers
	(52)	Listening to complaints from passengers
	(53)	Making rules for passengers to follow for smooth operation

Broad category	Role and responsibility	
	(54)	Resolving conflict with other agencies
	(55)	Penalising defaulting and offending vehicles
	(56)	Negotiation with "outsiders", i.e. drivers that increase the competition without "permission"
	(57)	Maintaining peace with other modes in competition

Studies on operational characters of informal transit (called paratransit, IPT etc. based on the geographic location) have documented informal institutions and have helped the researcher formulate the methodology. The institutions are universally known as "association" or "route association" that control the demand and supply, route, fare, stops etc.. Some associations are registered under Labour Laws of the country, making them a formally recognised institution and the rest are informal. The associations split and coalesce depending on the scale of operation and agenda. Some associations turn into formal or semi-formal bodies, registered as unions or cooperatives. In Dakar, Senegal, *GIE*s – *Groupments d'Inte´reˆts E´conomiques* (Economic Interests Groups) work according to cooperative principles (Filho, Ribeiro, & Thiam, 2015). NGOs and government bodies form (or attempt to form) new or incorporate old-yet-able informal organisations in a process of formalising or restructuring the paratransit sector as in the case of South Africa (M. A. Ahmed, 2004; Y. Ahmed, 1999; Mistro & Behrens, 2015; H. Schalekamp, 2013; H. Schalekamp & Behrens, 2013; H. V. Schalekamp, 2015; Wilkinson, 2008). Shimazaki and Rahman's (1996; 1995) in-depth and secondary data-oriented study of Asian paratransit briefly mentions that in absence of formal regulation, route-organisations play a significant role in balancing supply and demand, their small capacity vehicles viciously competing with buses for up to 5km to 7.5km long trips, while the fare remains practically a matter of bargaining. Li *et al.* (2011) have studied 800 paratransit (commonly used term for informal or semi-formal modes in Indonesia) operators in Jabodetabek Metropolitan Area, Indonesia to understand their response to various formal policies while making a job choice but has not given specific attention to the informal work environment and its effect. In São Paulo, the services of 8 to 10 passenger vans that function as an authorized feeder service have been planned, managed and controlled by a syndicate which originated from informal operators (Bertozzi, 2009; Brasileiro & Turma, 1999; cited in Darido, 2003; cited in EiróL, Martinez, & Viegas, 2011).Neumann *et. al.* (2014, p. 26) used Cervero's (2000, p. 15) classification of vehicles from class I to V to list 23 types of paratransit in 23 cities in the world. Associations in 12 of these 23 cities are operated by route associations though each association has a different role to play in their local context.

Kurokawa and Iwata (1984) have conducted a comprehensive and pioneering research on *jeepneys* and tricycles in Metro Manila with the purpose of comprehensive transport planning for the city after bus and LRT services were proposed. Jeepney fleet comprises of both legal and illegal vehicles making a suitable case study of formal, semi-formal and informal management and operations for the same mode as studied by Okamura *et al.* (2013). Kurokawa and Iwata (1984) identified the shortcomings of public data and management are apparent as 453 routes out of the planned 1200 were not operating at all and 30% of the actual routes were unplanned, illegal and operated by illegal jeepneys. 28,000 (67%) of the estimated 41,800 jeepneys were recorded in government records and the rest operated on illegal number plates. Alongside formal jeepneys, informal and illegal *jeepneys* and their informal management-cum-operations have been discussed in greater details among the all the literature studied and it includes extensive reconnaissance, personal discussion-cum-interviews and surveys. They have mentioned the existence of fake number plates, informal permits called *colorum*, terminus and lack of sufficient data among other features while also acknowledging the benefits of informal management in providing an overall high level of service at city level : *It is to be noted that the effectiveness and efficiency of jeepneys have been achieved not only by their flexible operation but also due to flexible utilization attitudes of passengers and flexible or loose enforcement of regulations and control by the public sector*. This study was not done during the formative years of *jeepney* operations but it *is* one the first published thorough research on informal vehicles that was also used to explain the "over-supply" of formal buses in Manila (Napalang & Regidor, 2015). The status of dependable data is similar to that in this research and that is one of the reasons why their study methodology is most analogous to the methods developed and employed in the present

research. *Jeepney* operation is still very much informally managed in many ways, including passenger capacity, where a single seat in front is used to squeeze in two people by affixing an informal "slim only" notice on the seats (Dacawi, 2016), a practice followed by "magic" operators in India as well, to squeeze in two people in the open luggage hole at the back.

Phun, Lim and Yai (2015) observed that in Phnom Penh five non-governmental route associations regulate and monitor route, fare, access to certain stand and identity marks, namely "stickers" for *motodop* and *remorks* while membership of drivers is not exclusive to any one association. Two among these five are mode-specific and three are general, i.e. they are also involved in non-transit oriented activities. Rugut and Makori's study (2015) of *boda boda* in Kenya shows the presence of associations as well as public institutions in the management. Chavis (2012, pp. 30–31) presented the optimal profits from informal transit with entry restricted with the influence of informal associations that work like cartels, though having dealt with formal regulations in more depth through the thesis. Factors influencing growth of informal transport sector studied by Wawira (2014) in Embu District in Kenya showed that informal associations affect the operations in a manner similar to and simultaneously with formal agencies, i.e. with similar norms. The coercive, violent and unsafe practices of the drivers to collect passengers, restrict competition, overtake on road, avoid dead miles, reduce investment in upkeep of vehicles have attached an often well-deserved stigma to informal transportation operators all over the globe appearing in most of the studies. A planned integration of *matatu* have been taken up in South Africa and they provide a systematic lesson in formalising and informal sector. In the process of documenting and analysing the responses the informal and semi-formal organisations, a view of their working has been offered by Chitere et al. in Nairobi (Chitere, Mccormick, Orero, Mitullah, & Ommeh, 2011), in Cape Town through a six year long process involving qualitative, semi-structured interview of semi-structured qualitative interviews were conducted with 30 operators and eight drivers from different parts of the city to explore their aspirations and views on reform (Behrens, 2016; H. Schalekamp, 2013; H. Schalekamp & Behrens, 2009; H. V. Schalekamp, 2015) & Dar es Salaam (Behrens, McCormick, Orero, & Ommeh, 2017) and in Nairobi (Wawira, 2014). All the available public transport including buses in Davao city was studied by Guillen, Ishida, and Okamoto (2013) using analytical framework and AMOS. Among the less detailed studies, Finn (2012) shared extensive experience with six examples of large-scale paratransit and minibus services in a number of locations in Africa, the former Soviet Union/CIS, Asia, Middle East, and South America.

Angots in Indonesia are the most consistently documented and noteworthy example of adaptation, self-organitation and response to government intervention such as "Angkot shift program" (CDIA, 2011; Haggerty & Lee, 2015; Tri B. Joewono, Tarigan, & Susilo, 2016; Tri Basuki Joewono & Kubota, 2005b; Kawaguchi, Kuromizu, & Yagi, 2013; Mateo-Babiano, Susilo, Joewono, Vu, & Guillen, 2004). *Angots* are classified as "paratransit" under "public transport" in Indonesian policy documents but their daily operations are defined and regulated by informal or semi-formal institutional mechanism. *Angot* drivers are required to hold driving licenses and the vehicles need to conform to the city's traffic management system like one-way routing, but fare, rank or stand aka *pangkalan* (CDIA, 2011), route, issuance of vehicle numbers fall under the purview of multiple associations aka *paguyuban* operating in a single city, segregated both in body and spirit. While some associations are meant exclusively for regulating *angkots*, others are general and membership or payment of fee is not always mandatory. The *angkot* drivers faced closure of operation when in 2014-15 new BST was introduced and their licenses were to become invalid and non-renewable after 2017. After a failed attempt to consolidate themselves at city level co-operative (*Roda sejahtera*) during 1992-1996, *angkots* chose to improve their existing associations instead of consolidating into a city-level single organisation to conform to the wish of the public authorities (Haggerty & Lee, 2015, p. 16). Some *paguyubans* increased their efficiency and usefulness to members by conducting regular monthly meetings, having a reserve of funds for maintenance and operational needs, and a savings scheme for members in need. *Calo* or parking attendants attract customers to drivers (CDIA, 2011) whereas in India "starters" in auto rickshaw stand maintain queue and order (Arora et al., 2016; Chanchani & Rajkotia, 2012).

In India, Informal Public Transportation is a subset of Intermediate Public Transport or IPT (Kalra, Ghosh, Kumar, & Hoyez, 2014, fig. 2.1 after WRI, EMBARQ) and comprises of 3 and 6-8 seater three-wheeler auto rickshaws, *chagda*, cycle-rickshaw and different improvised vehicles. In common practice, IPT or paratransit is synonymous with

auto-rickshaws aka auto because they have a large modal share, especially in the tier II and III cities. Autos fall under a type of for-hire vehicles called "contract carriage" under Central Motor Vehicle Rules. Totos, when registered under RTO as E-Rickshaw, are contract carriages but they operate freely as reserved or shared modes, carrying up to 6 passengers instead of the designed passenger capacity of 4 people.

In Kolkata Municipal Area (the urban agglomeration) and in some areas of Chennai, autos operate on share basis and on fixed route, as miniature omnibuses. Auto rickshaw vehicles are standard and engineered, with prescribed rules for checking and monitoring of vehicle health and vehicle permit to be allowed to ply. Drivers require license. Most cities have an official cap on maximum number of vehicles operating in a given route or a given city ("closed permit") though illegal autos (i.e. without vehicle permit) are regularly seen in large numbers. In Indore, auto rickshaws are given three kinds of permits – city permit or route permit and (2) either among a temporary (4 months) or long term (5 years) permit (Bhat, 2011). Auto rickshaws are organised under union which are notorious for causing or turning a blind eye to fare increase, arranging for illegal autos to ply, fracturing routes to cream-skim, unsafe driving practice etc. (Arora et al., 2016; Chanchani & Rajkotia, 2012; Mani, 2012; Mani, Pai, & Aggarwal, 2012; Mani & Pallavi, 2012; Sivaraman, 2013; Toshniwal & Mani, 2014). In recent years, social activists and non-governmental organisations have tried to improve the services and organisation of auto rickshaws through projects like Fazilka dial-a-rickshaw (Vedant Goyal & Asija, 2015), EMBARQ's Rickshaw Rising Challenge (Chadha, 2016), Namma Auto (Kalra et al., 2014), "rent-to-own" Rickshaw Bank cycle rickshaw initiative, G-Auto, G.Riks (Anand et al., 2012) etc..

The above mentioned cases are different from this research on the following four grounds :

(1) Angkot, jeepney and matatu are both 12-17 seater shared minibuses that operate very differently than the 3 or 4 seater autos or toto in terms of accessibility, service frequency, fleet size, route or the absence of route, trip length, stops, personnel per vehicle and working hours. For example, number of driver per passenger is lower in minibuses compared to 3-4 seater vehicles. The size and design of the minibuses do not always necessitate engaging a helper for ticket collection and passenger management. Thus, involvement of associations per passenger transported is higher in 3-4seater vehicles. Minibuses cannot provide door-step connectivity in cities with narrow roads whereas auto and totos can, creating a vast difference in the nature and range of services provided by these two modes. The character of competition is also different due to the passenger capacity of the minibuses. For example *the bus and Jeepney are directly competitive in the trip length of 5 to 7.5 km. The higher competitive power of the Jeepney in the shorter trip distances is attributed to its high frequency which is 3.5 times higher than the bus even on average. The hourly passenger capacity carried by Jeepney and bus is almost the same for a short distance. The hourly passenger capacity carried by Jeepney and bus is almost the same for a short distance. But above this range hourly capacity of the bus is almost twice that of the Jeepney* (Toshikazu Shimazaki & Rahman, 1995). Tricycles do not share rooute with buses and thus do not compete with buses like jeepneys do (Kurokawa & Iwata, 1984).
(2) Autos are regulated modes in principle though poor implementation of regulations and blatant violation of traffic rules make them appear informal.
(3) Objective of the above mentioned studies are not the informal institutional mechanisms that make the system work in spite of minimal or non-existing official regulation. Informal institutional mechanisms have been seen as makeshift, temporary and amateurish arrangements waiting to be abolished, improved and/or replaced by people who know how to do things properly. Admitting that the workings of informal systems are inefficient (Golub, 2003), their contribution has not been fully acknowledged or identified and except by CDIA (2011) in Indonesian cities and by Schalekamp (2013) and Mistro and Behrens (2012, 2015) in Cape Town, detailed research have not been documented. CDIA (2011) research was individual driver level whereas Schalekamp (2013) and Mistro and Behrens (2012, 2015) collected most of the data from a level higher than the individual driver, i.e. the representative of drivers called "operators".
(4) The available literature studied established modes whose operations have already passed the formative period, having gone through many changes and adaptations while this paper observes a new informal mode with informal operating mechanisms conceived and implemented by newly established (informal) institutions.

The chief usefulness of the above-mentioned studies are in helping the researcher identify and compare between different informal and semi-formal institutional mechanisms and the execution level limitations of interviews and surveys due to possible misinterpretation and mistrust.

3. Electric rickshaws in India and West Bengal and corresponding formal regulation

3.1. Evolution of electric rickshaws – the years before toto

Between 1995 and 2005 Nimbkar Agricultural Research Institute or NARI re-engineered and successfully tested, though without widespread availability in the market, pedal operated cycle rickshaw to develop four battery operate models, one of which was meant for physically challenges people (Nimbkar Agricultural Research Institute, 2018; Rajvanshi, 2002). In 1996, the first electric three wheeler VIKRAM SAFA was developed by Scooters India Pvt Ltd, Lucknow and approximately 400 vehicles were made and sold. These vehicles ran on 72 volt lead acid battery. In 1999, Mahindra and Mahindra Ltd. Launched its first electric three wheeler and also launched a new company, based in Coimbatore, in 2001, to make and sell electric vehicles named Bijlee. In 2004, MEML was closed down due to lack of demand (evautocars, 2017).

3.2. Introduction of totos in India

Totos originally operated in China and afterwards Indian traders imported parts and assembled them, added a cage made in welding-shop to make them operable. It was originally introduced in Delhi before the 2010 Commonwealth Game with the intention of slowly phasing out cycle rickshaws (Singh, 2014). There numbers have increased drastically. By estimates of S P Singh, senior fellow at Indian Federation of Transport Research and Training reported in The Indian Express (2014) and cited by Singh (2014), from 2010 to 2014, the number of totos in Delhi increased from 4000 to 1,00,000. City level studies have been conducted in Delhi, Kanpur, Siliguri, Amritsar, Roorkee, Barddhaman (table 1, appendix 2) but they seldom offer an estimate of actual numbers in a city or a survey of operators (Kumar et al., 2017), whereas most report the similar daily earnings (INR 500-600 per day), rents (INR 250-400 per day), battery cost (INR 20,000 *c*), charging time etc. Sample size of survey of operators and drivers are 140, 200, 220, 400 and 400 in the five reports that do mention them. In West Bengal, Roy (2016) estimates a 6000-7000 totos in Barddhaman Town while official assessment is 4000. In West Bengal, Howrah district authorities, through the office of the District magistrate, Police Commissionerate and Municipal Corporation have constantly tried to regulate TOTOs which have increasing contributed to congestion and other disruptions since last 4 years. The newspaper articles reporting these issues are the only documented source of the number of Totos in Howrah. According to the latest report (Anandabazar Patrika, 2018a) there are more than 20,000 totos in Howrah In the study area, there are 600 – 800 totos by various estimates at present. Newspaper articles are practically the only secondary sources of information about informal institutional mechanisms as they report conflicts between the unions, operators, police, state government, RTO and passengers. Among other, CapaCITIES pilot study in Siliguri has acknowledged the existence of unions and held discussions with them as well (CapaCITIES, 2017b). Khanna et al. (2016) and CapaCITIES in their Delhi and Siliguri pilot study report (2017c) made a thorough study of formal regulation mechanisms at central and state (West Bengal) level.

According to Proposed Deendayal E-Rickshaws Scheme applicable to the entire nation, (PIB of MoRTH, 2014) “drivers of these rickshaws should be their owners and they should be able to register their vehicles with the Municipal corporation with a fee of Rs.100/- and get an Identity Card” which was in conflict with the ambit of Motor Vehicles Act already in place. In April 2014, the Ministry for Road Transport and Highways was ordered by the Delhi High Court to remove totos from the road but it could not be implemented due to the enormity of the task and protests by operators. Similar conflict has been continuing in West Bengal as well. Failure to implement the ban was an indirect recognition of the utility of totos and it prompted the Delhi High Court to order Delhi Government to form norms to regulate them (J. B. D. Ahmed & Mridul, 2014). Motor Vehicles (Amendment) Bill, 2014 was introduced in Lok Sabha on December 15, 2014, but it was not enacted. Delhi government in the same month announce E-Rickshaw Sewa Scheme applicable to Delhi National Capital Territory vide notification no. F.DC/ARU/TPT/2014/245/1724

dated 29th December, 2014 that specified the physical area of operations, vehicle specifications and documents required for a toto to avail a "contract carriage permit" and ply in NCT (GoNCTD, 2014) which was followed by state governments. The requirement of permit was revoked by MoRTH in August 31, 2016 and MoRTH left the onus of traffic management on State Governments (PIB of MoRTH, 2016). In April 2015, the Prime Minister Launched Pradhan Mantri MUDRA (Micro Units Development and Refinance Agency) Yojana (PIB, 2015) which refinances loans of up to INR 10 lakh given by lending institutions to small borrowers for non-farm income-generating activities. Under this scheme, the Prime Minister distributed a total 5,100 e-rickshaws, of which a thousand each were meant for Noida and Ghaziabad. The rickshaws were linked to the Ola app and expected to offer online payment facility to customers. The distribution was aimed at empowering Dalits and women but 2000 vehicles were collecting dust and according to Noida road inspector Mahesh Sharma till 23rd April, 2016, 352 licenses had been issued in Noida to e-rickshaw drivers but not even a single vehicle has been registered or issued route permit (Jha, 2016). Government of West Bengal's in 2014 launched Gatidhara Scheme, which in to be implemented by the Transport Department where the Labour Department provides up to INR 1,00,000/- subsidy to families with INR 25,000/- monthly income, covers electric rickshaws along with bus, taxi and autos (AITC, 2014; GoWB, 2016; indiafilings.com, 2016). West Bengal State Government has been also been distributing E-Rickshaws (the legal variant) to encourage compliance and self-employment (Anandabazar Patrika, 2018b).

Motor Vehicles Act was amended (Ministry of Law and Justice (Legislative Department), 2015) allowing totos to be registered as a special vehicle type called E-Rickshaw or Battery Operated Rickshaw. Earliest vehicles were semi-engineered and assembled, they were unfit for legal recognition based on their technical specification alone. To be eligible for legal recognition, the vehicle that had been manufactured by agencies that has been approved by government-approved testing agencies, namely ICAT, ARAI, VRDE, CIRT, for manufacturing totos after a prototype vehicle manufactured by the manufacturer as per certain specifications and with parts from approved manufacturers as per documents received through e-mail communication from ICAT (2016b) and in rule 124, after sub-rule (2) of MoRTH (2015a) that has been set by the said testing agencies. In the pdf file titled "E-Rickshaw / E-cart models approved as per GSR 709 (E) and SO 2590(E) dated 8th October 2014 updated last on 27th May 2016" received from ICAT via –mail (2016b) 117 models (108 of E-rickshaws and 9 of E-carts) by 105 manufacturers were approved by ICAT. This list does not include the manufacturers "Big Bull" and "Ishita" that were seen of the field. There are 12 approved dealers in Howrah district adjoining the study area (Anandabazar Patrika, 2018a) but the same number for study area was not found.

Formulation of statutory framework for E-Rickshaw up to in present form has been well-summarised by CapaCITIES (2017b) and TERI (2017) as quoted below:

> Tripura Battery-Operated Rickshaw Rule (2014) is a modified version of the state's cycle-rickshaw regulation, applied to battery-operated rickshaws on the premise that their top speed of 17 km/h is more akin to a cycle-rickshaw than a diesel-powered auto rickshaw.
>
> Tripura was the first state in India to form a comprehensive policy on e-rickshaws. Till date several other states in India have introduced their policies regarding the e- rickshaws. But the Tripura Battery Operated Rickshaw Rules, 2014 and E-rickshaw policy of Chandigarh are the most informative with clear notifications. Through notification number 1526-WT/3M-56/13/Pt-II dated 27th April 2014, the Transport Department, GoWB, issued a notification regarding the registration and issuance of permit for the e-rickshaws. Another notification was released with vide reference number 1569(19) – WT/3M-56/13(Pt-II) dated 28th April 2014 and *substituted by G.S.R. 27 (E), dated 13-1-2015 (w.e.f. 13-1-2015)* (MoRTH, 2015b), stating the framework for the registration and a guideline was issued regarding the issuance of permits for e-rickshaws and formulation of routes, issuance of driving license *with validity of 3 years maximum* (clause 3 of MoRTH, 2014b) and registration of e-rickshaws. [Italics author's].

3.3. Licensing procedure and requirement in the notification

Central Government vide notification number G.S.R 27(E) dated 15/01/2015 further amended the Central Motor Vehicles rules, 1989 and inserted a rule 8a after Rule 8 regarding the issue of license to an applicant for driving

provided that the applicant has successfully undergone training for a period of not less than ten days and obtained a certificate of training from the registered e-rickshaw operator association or a manufacturer producing e-rickshaws, as the case may be (MoRTH, 2015b).

This notification also states that e-Rickshaws are to be registered as contract carriages as defined under Sec.2 (3) of the Motor Vehicles Act, 1988 and all the procedures of registration, certificate of fitness and permit of e-rickshaws are to be followed in terms of the relevant provisions of the Motor Vehicles Act, 1988 and Central Motor Vehicles Rule, 1989 on payment of the prescribed fees. In West Bengal, New Town Kolkata Development Authority has since 2014 acknowledged the role of providing local pollution free transportation services (Ei Samay, 2014) and have included electric vehicle stands in area wise transportation hub proposal in their Smart City Plan. 85 battery operated vehicles already operated at the time of preparing those proposals (NKDA, 2017).

In 2016, E-Carts and E-Rickshaws freed from permit requirements as per the MoRTH Press Release (2016). By 2016, only 1500 totos received RTO registration in West Bengal as Indian Express quoted Union Minister Mr. Nitin Gadkari (Mazoomdaar, 2001). Discussions with RTO officials, Ward councilor-cum-union leaders and municipality officials revealed that e-rickshaws were allowed to ply in three wards adjacent to the ward in which the owner-cum-driver resided. The "ward rule" has reportedly been repealed but is seen in newly registered (Q1-2018 onward) vehicles (figure 19, appendix a). Implementation of this rule will cause a toto to operate within a radius of approximately 750m (figure 3) in Uttarpara.

Harding (2015) attributes the "crisis" of electric-rickshaws i.e. feeble success of the formal policy making efforts to "polycentric nature of urban transport policy making" (citing Vaidyanathan et al., 2013), and "paucity of data" (citing Breman, 2004) while TERI report (Kumar et al., 2017) cited lack of enumertion and requiremnt of almost 40 documents for registration and licnese, unclear insuarance facilities for passengers, non-standardised manufacturing process and components as reasons for poor success in regulating of totos. Both the studies are for Delhi though they apply to the rest of India.

4. Study area

The study area (table 2 and figure 3) is a narrow strip of what contains the principal route of feeder service from the district Hooghly to the districts Kolkata and Howrah. It contains a small part of north of Bally Municipality, the eastern part of Uttarpara-Kotrung Municipality between the railway line and River Hooghly (wards no. 1 through 19), and entire Konnagar Municipality. It is approximately 6.5 km long in the North-South direction, 2 km wide at the widest portion and 200m wide at the narrowest portion, the southern end. The study area, including the northern part of Bally Municipality where the stand is located, has a geographical area of about 12.17 sqkm. The combined geographical area of Uttarpara and Kotrung municipality in the study area is 11.373 sqkm with a population of 1,95,958 persons and 17,230 persons/sqkm population density as per 2011 census. In comparison, Kolkata Municipal Corporation has a geographical area of 185 sqkm and 24,300 persons/square km population density. Both Uttarpara-Kotrung and Konnagar Municipalities are older than the municipal corporations of Kolkata and Howrah. The Grand Trunk Road, 18-20m wide, is the only arterial road in this area, runs north-south and is surrounded by a dense, mixed landuse.

Table 2. Municipalities in study area

Municipalities →		UKM	KM	Total (UKM + KM)	Bally Munic.
Established in		1835	Part of a municipality since 1865, Became separate municipality in 1944		
Area (sqkm)	2001	16.34	4.32		
	2011	16.34	4.32	20.75	
	2011 (SA)	7.053	4.32	11.373	0.8 approx
Population	2001	150204	72,211	222415	
	2011	159147	76,172	235319	

	2011 (SA)	119786	76,172	195958
	Increase	8,943 (5.90%)	3,961 (5.50%)	12,904 (5.8%)
Population density (person/sqkm)	2001	9192	16716	10765.48887
	2011	9740	17632	11390.07744
	2011 (SA)	17,000	17632	17230.10639
	Increase	548 (5.96%)	916 (5.47%)	

4.1. Regional connectivity

The study area is connected to Kolkata and Howrah through Ballykhal bus-stop and Ballyghat Railway station. From Ballykhal about 23 buses (approximately 15 introduced after 2014 and 5 among them are publicly owned and operated) ply to different parts of urban Howrah District, rural interiors of Howrah and primarily, Kolkata. Additional connectivity is offered by auto, toto and shuttle vans.

The G.T. Road has been traditionally used for inter-ULB trips like those to Howrah, Kolkata, Rishra, and Serampore when there were few connecting buses from Ballykhal. Increased number of buses from Ballykhal in last decade has made it easier to do without inter-ULB buses on G.T. Road though people travelling beyond Ballykhal still prefer not to change modes at Ballykhal.

Among the 7 bus routes (1 recently discontinued, 3 introduced in later part of 2016, 3 more introduced in April-May 2017) that run through the study region, three ply along G.T. Road. Their fleet size have diminished from 75 to 12, most of the reduction occurring in last 3 years. During the first pilot study (i.e. in H2-2017) the users were not fully familiar with the service details of newer fleets, exhibited by the visible low occupancy and response of operators. Recent newspaper articles announcing new buses (Banerjee, 2018; Konar, 2018) have increased the awareness about availability of new modes and the occupancy is “full to the brim” during morning and evening peak hours.

4.2. Transit systems within the study area

Figure 2. Map of Konnagar Municipality *(source : Konnagar Municipality)*

Buses, totos, auto-rickshaws and cycle rickshaws are the four paratransit modes providing feeder services in the study area in comparable cost. Except the former, all three are small capacity feeder modes. 30-40% of the passenger in the buses during morning rush towards Kolkata are destined towards Ballykhal collection point, as reported by bus operators. This percentage in the evening in the opposite direction depends on the number of buses available coinciding arrival of trains at Ballyghat station. Between May 2017 and July 2018, three new bus routes were introduced in the study area, one from Uttarpara college (see table 4 and figure 3) Station and two along G T Road from Serampore to Kolkata via Ballykhal.

Shared auto-rickshaws have been the only motorised small capacity feeder modes from the 1990s until 2014. Due to ceiling in the number of routes permits issued, their number remains 56 for past 15years and 54 are in operation at present. Auto-rickshaw and cycle rickshaws are both registered vehicles. The former has official route permit and the latter has a designated stand, i.e. waiting point. The first toto or electric rickshaw was introduced in 2013 and started operating on the same route as the auto route on G T Road. During the pilot study in Nov-16 to Mar-17, 300 totos ran (250-260 was till been recorded by UKM) in Uttarpara and 200 in Konnagar with approximately 200-250 running at any point of time in the study area. There was no fixed route for totos and they concentrate on the profitable Ballykhal-Bagkhal route.

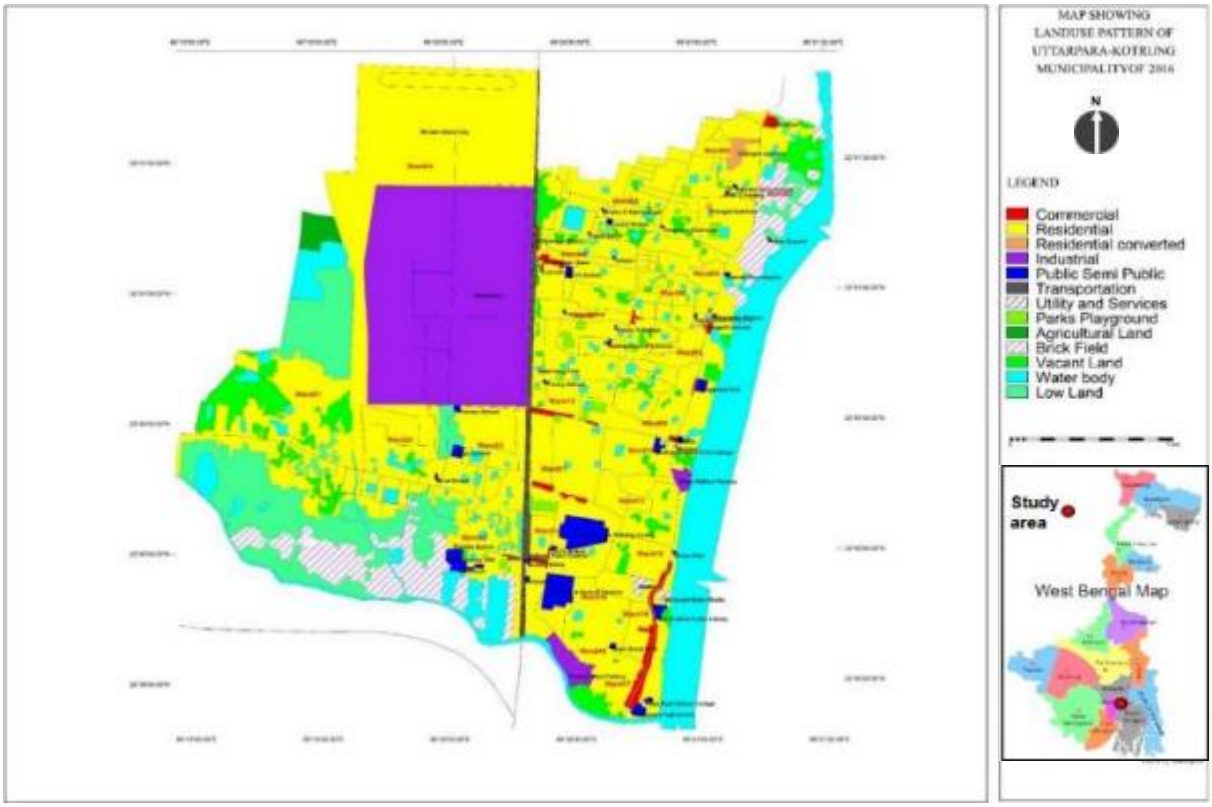


Figure 3. Map of Uttarpara-Kotrung Municipality (*source : Uttarpara Municipality)*

Major routes, stops, parking areas, fare and peak hours are elaborately given in tables 4 and 5 and figure 3. There are fewer numbers of for both toto and rickshaws in Uttarpara-Kotrung compared to that in Konnagar due to the lack of sufficient space and not due to lesser demand.

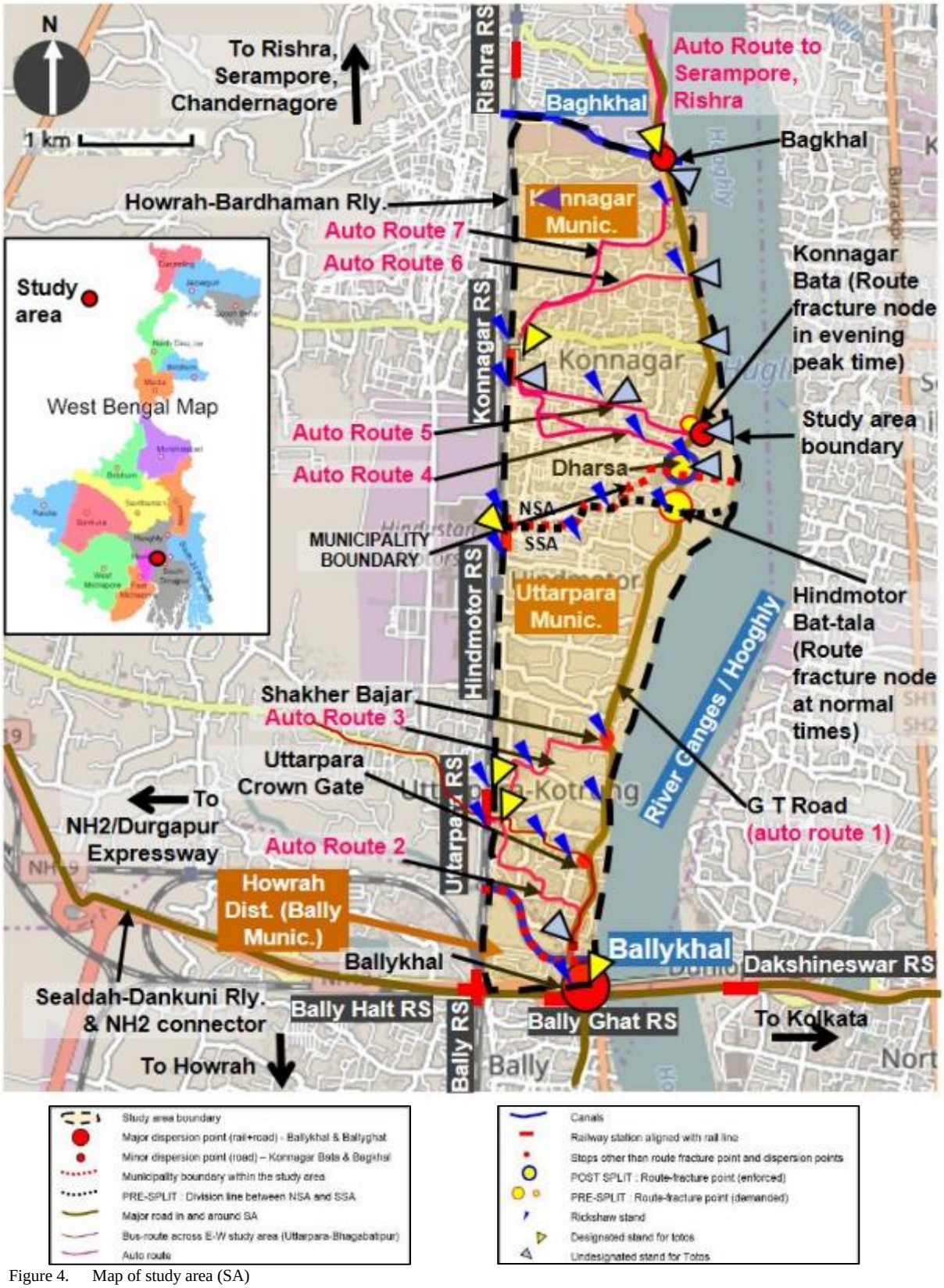


Figure 4. Map of study area (SA)

Table 3. Feeder routes in study area

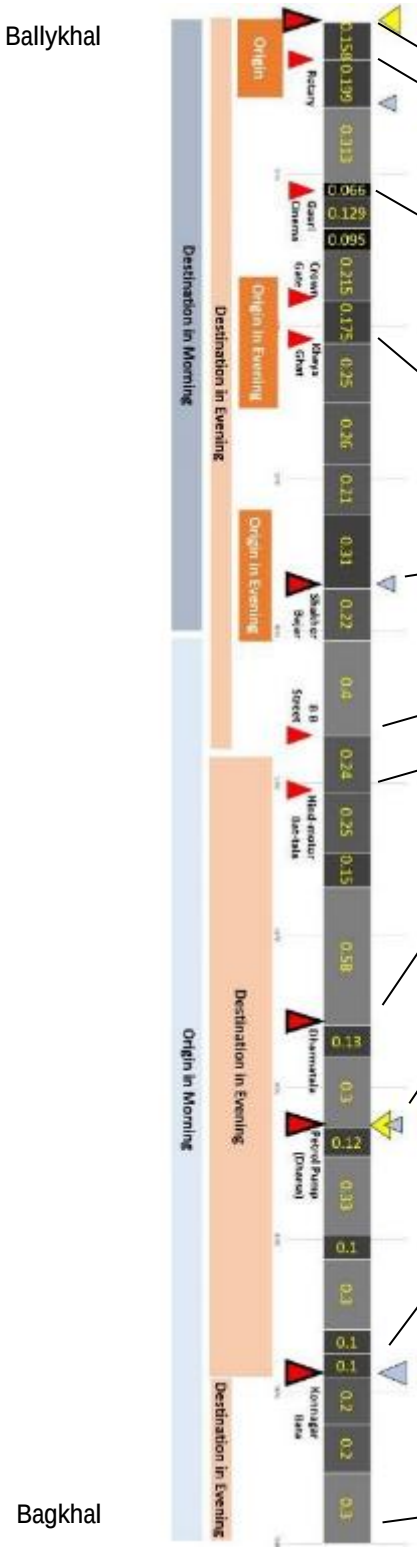
Route no. in fig. 3 *fleet size*	Name (minimum fare pre and post 15 June 2017 where applies)	Path	Length (km)	Abutting landuse	Rush hour	Other for hire modes available	End to end fare per person,		Journey time (minutes) rush hour / lean hour April 2017
							Nov-16 to Mar-17 (Rs.)	w.e.f. 15 June 2018	
1. *54*	Ballykhal-Bagkhal – auto (6, 7) –	G T Road	7.5	NSA – mixed and commercial SSA - mixed	**0630-0730** to Uttarpara & Shakherbajar market, **0800-1100** to Ballykhal, **1600-2000** from Ballykhal	• Bus (rare), • Rickshaw : mainly from stand but for <800m journey	12 (But route fracturing at Bata & Bat tala)	18	45 / 20
	Toto routes								
	Ballykhal-Bagkhal - toto	G T Road					15-20-30 But route fracturing(Arora et al., 2016, p. 34; Tri Basuki Joewono, Santoso, & Susilo, 2015) at Bat-tala & Dharsa (Rs.10)	Not applicable	55 / 35
	Ballykhal-Dharsa Toto (6, 7)					Rickshaw	Not applicable	10	15+
	Ballykhal-Uttarpara Station (10,10)	flexible	flexible			Rickshaw	10	10	10 +
	Kanthalbagan outwards (10,10)	flexible	flexible		Train arrival times **(0700-1000 & 1600-1100)** with 5-10 minutes headway	Rickshaw	10	15 (from G T Road)	flexible
	Dharsa-Station Toto (10, 10)	Interior Road	1.5 +			Rickshaw	10 but less regular	10	15 +
	Konnagar Bata-Konnagar station Toto (10,10)	fully through Criper Road (partly one way)	0.7 +		Train arrival times **(0700-1000 & 1600-1100)** with 5-10 minutes headway	Rickshaw	10	10	15+
	Auto routes :								
2. *12*	Ballykhal Uttarpara Railway Station	G T Road for 800m, then Interior road	1.9	Mixed	**0500-0600** to station (factory workers), **0800-1100** both to station and G T Road, **1400-1800** from schools, **1600-2000** from Stations	• Rickshaw : Cruising and from stand, • Cruising toto as per demand, no fixed route or stand • Totos hired from stand on G T Road (feasible on in lean hours)	8-9-10	10	12 / 8
3. *12*	Shakher Bajar-Uttarpara RS aka Uttarpara station-Shimultala	Interior Road	1.5				8	8	10 / 8
4. *8*	Dharsa or Colony-Bajar to Konnagar Station		1.6		Train arrival times **(0700-1000 & 1600-1100)** with 5-10 minutes headway		6	7	10/8 (due to poor road condition since no congestion in interior roads)

Route no. in fig. 3 ***fleet size***	**Name (minimum fare pre and post 15 June 2017 where applies)**	**Path**	**Length (km)**	**Abutting landuse**	**Rush hour**	**Other for hire modes available**	**End to end fare per person,**		**Journey time (minutes) rush hour / lean hour April 2017**
							Nov-16 to Mar-17 (Rs.)	**w.e.f. 15 June 2018**	
5. 12	Konnagar Bata-Konnagar station	Interior : 200m Arabindo Road then Criper Road	0.8		**0500-0630** to station (factory workers), **0800-1030** to Ballykhal and few to Rishra, Serampore		7	7	10 / 8
6. *8*	Bishalaxi-Konnagar Station	C S Chatterjee Road	0.9	Predominantly Residential			8	8	18 / 15
Source : Reconnaissance survey by authors (Oct 2013-June 2017 and April to July 2018 and continuing)									

Table 4. Major stoppages along G T Road and their attractions

Stop sl. no. among total 34	**Stoppage name**	**Distance from Ballykhal (km)**	**Attractions**	**Public transport route plying directly through these**
1	Ballykhal terminus (under railway bridge)	0	• Spacious and organised terminus for auto and toto both • Passengers from and to Ballykhal Bus stop and Ballyghat Railway Station. • Raja Pyari Mohan College aka Uttarpara College • Uttarpara Government High School • Dense residential area • Buses and 10-seater shared shuttle services to Kolkata • Buses to Howrah Municipal Corporation and other municipalities and interiors of Howrah District	• Termini auto routes 1 & 2 • Auto to Howrah and Dunlop
8	Crown Gate	1.175	• Dense residential area • Uttarpara station 1km away (by rickshaw or on foot) • Fish market • Commercial centre • Uttarpara General Hospital	• Auto route 1 • Bus – Uttarpara-Bhagabatipur • Bus – 254 • Bus – D/4
13	Shakher Bajar	2.38	• Dense residential area • Mahamaya Maternity and Paediatric Hospital (Govt.) • Commercial centre • Auto route 3 to Uttarpara station • Auto route 3 to Amarendra Bidya Pith (School)	• Auto route 1 • Auto route 3 terminus • Bus – 254 • Bus – D/4
27	Konnagar Bata	5.7	• Dense residential area • As per demand, this is actual terminus for auto rickshaws since they begin operation in 1990 but without any space for parking. Closest parking is at Bagkhal. • Auto route to Konnagar railway station • Two-min walk to ferry stop (to Sodepur) • Beyond this, maximum number of trips are to and from Rishra & Serampore	• Auto route 1 • Auto route 5 terminus • Bus – 254 • Bus – D/4
34	Bagkhal	7.4	• Factories and residential • Toto and auto terminus for Rishra and Serampore. • 90% of the trip to Srirampur.	
Source : Primary research (Oct 2013-June 2017)				

Figure 5. Graphical and scaled representation of Ballykhal Bagkhal route as a straight line (refer to legend in figure 2)



	Stop name	Distance from previous stop in km
1.	Ballykhal terminus (under railway bridge)	0
2.	Ballykhal Rotary	0.158
3.	Uttarpara College	0.199
4.	Tiptop	0.313
5.	Shani-mandir (=temple)	0.066
6.	Gauri Cinema	0.129
7.	Uttarpara Ganabhaban (Municipality)	0.095
8.	Crown Gate	0.215
9.	Ramghat	0.175
10.	Kheyaghat	0.25
11.	Doltala	0.26
12.	Shaw Wallace	0.21
13.	Shakher Bajar	0.31
14.	Shimultala	0.22
15.	Shibtala	0.4
16.	B B Street	0.24
17.	Hindmotor Bat-tala	0.25
18.	Ghoshpara	0.15
19.	Dharmatala	0.58
20.	Shayebpukur (last stoppage in UKM)	0.13
21.	Petrol Pump (Dharsa)	0.3
22.	Dharsa More (=crossing)	0.12
23.	D. Waldie	0.33
24.	BSNL Office	0.1
25.	Arobindo Road	0.3
26.	George Telegraph Law College	0.1
27.	Konnagar Bata	0.1
28.	Konnagar phanri (=police station)	0.2
29.	Konnagar High School	0.2
30.	Konnagar Baro Mandir (= twelve temples)	0.3
31.	Bishalaxi	0.2
32.	Hatirkul	0.2
33.	Fort William	0.4
34.	Bagkhal	0.6

Figure 6. Enlarged map of Konnagar Station showing the designated and undesignated stands and passenger flow

Figure 7. Enlarged map of Konnagar Bata showing the designated and undesignated stands and passenger flow

5. Methodology

The methodology for this research comprises of the following :

i. Maintenance of written, photographic and video journal by the researcher since 2014
ii. Pilot study (2016-2017) of passengers' perception of feeder services and interviews of operators of feeder service modes
iii. Interview with union leader of both the municipalities in 2018
iv. Interview of individual drivers and owners (collectively called operators) of vehicles in 2018
v. Vehicle measurement in 2018 simultaneously with interview of operators

5.1. Pilot study (2016-2017)

A qualitative interview-based pilot study focusing the perception of users about feeder services was done in the study area between 2016 September and 2017 June. Interviews with 20 passengers, 10 toto drivers, 10 auto rickshaw drivers, 5 cycle-rickshaw drivers, one retrofitted pedal rickshaw driver, 2 bus operators (one from route no. 3 and the other from route no. 54) was conducted. Number of interviewees were equally split between the two municipalities. The pilot study was done with the help of a one page printed questionnaire and approximately thirty minute indivudual interview. The main questions posed to the passengers were the change in their travel expereince, day planning and daily activities after the introduction of Totos. The passengers were also asked to define their understanding of the terms "comfort", "convenience", "reliability/dependability", "safety", and "customer service" with respect to their travel in the study area. The passengers were also asked to compare their experiences of bus, auto, toto, rickshaw and mode preference under different circumstances when all modes are equally available and their actual choice depending on the actual availability of different modes. Drivers were asked about the change in their income, working hours, passenger count after the introduction of Totos and their view of the future possibilities. No detailed discussion with union leaders and police, municiaplity and RTO official was possible at this stage. The interviews were recorded on handheld smart phone as well as on-spot written notes on the questionnaires. Still and video photographs were also taken. The limitation of this study is attirbuted to the absense of traffic data in the study region and absense of data on the physical and operational characteristics of not only totos, but even rickshaws and autos. The statistical analyses done by Joewono and Kubota (2007; 2007c, 2007b, 2007a; 2015) heavily depended on the data collected during the 2005 survey (Tri Basuki Joewono & Kubota, 2005a). Qualitative studies in South Africa are result of long, public policy oriented study. A need for studying the operational characteristics of feeder services was furthere reinforced at the end of the pilot study.

5.2. Present study (2018 and ongoing)

Objective :

The objective of the present survey is to find the institutional framework, physical characteristics and operational characteristic of feeder services and resulting socio-economic changes among the operators with individual operator level qualitative and quantitative study. Relevant observations relating to the evolution of the informal institutional mechanisms of toto operations are highlighted in this paper.

Informal institutions cannot be abolished, especially among such a variaety of changing demand scenario. The problem identification and solving mechanisms with results can be used by the formal institutions overseeing the entire operations as a whole utilise the informal institutions to the best of their capacity and distribute resposnibilty in a transparent manner.

Preparation :

The interview chain started with the Executive Officer at Uttarpara-Kotrung Municipality. Further interviewees were referred to understand the regulations and roles of different organisations in implementing them. The conflict of

jurisdiction between the Municipalities and RTO regarding identifying totos and acknowledging their legal status through vehicle registration has resulted in the former organisation to officially repudiate all involvement and ownership of the process and any progress made. It is however understood that the State Motor Vehicles Department and RTO sought the help of municipalities to document the name of owner, vehicle make, purchase date, address of owner and the number of totos plying on the municipalities and neither the municipalities nor the police could regulate the totos in spite of all the congestion and disturbances they caused.

Before the survey started, in February pamphlets and FAQs in Bengali and Hindi were printed (figure 63, appendix A) and was being distributed in Ballykhal, Uttarpara Station, Konnagar Station and Konnagar Bata among passengers and drivers of auto and toto. Putting up a poster would have required permission from stand-owners and union leader and it was done in July 2018, after sufficient rapport with union members were built.

A part of the survey included measuring the vehicles which did not require human interaction. The vehicle measurement work was used a a convesation starter in undesignated stands like Dharsa, Bisalaxi and Baro Mandir (Konnagar Municipality).

Discssions with and data supplied by associations :

The cooperation and acknowledgement of the union leaders were necessary to access individual drivers and owners of the vehicles. In April 2018, both the old (Konnagar Jatiatabadi Toto Association or KJTA) and new (Konnagar Pourasabha E-Rickshaw Association or KPEA) Toto unions in Konnagar Municipality cooperated though no documentation from KJTA was found. The registers (figures 41-45, appendix A) kept at the of KPEA office near Konnagar Station stand was made available for copying. From this the (informal-) registration numbers rather identification numbers given by KPEA and name of corresponding owners and some drivers were found. Many interviews were conducted and are being conducted with the following people :

1. Executing officer of Uttarpara-Kotrung municipality
2. Ward councillor in charge of disbursing temporary identification numbers to totos in Uttarpara-Kotrung Municipality
3. MVA Technical, RTO, Chinsurah,
4. MVA Technical, Motor Vehicle Inspector
5. Executive officer, Serampore RTO
6. Erstwhile chairman of KJTA
7. Chairman-in-council, Uttarpara-Kotrung Municipality and President of Uttarpara Toto Association
8. Secretary of KPEA
9. Treasurer of KPEA
10. Stand “owner” of Uttarpara Toto Association,
11. Starter of Uttarpara Toto Association, Ballykhal-Dharsa route

The discussion topics were

1. The history of toto union in Konnagar
2. Major milestones in toto operation in Konnagar
3. Members
4. Number of unions
5. Routes
6. Rules of the union
7. Documentation done by the unions
8. Records maintained by the union
9. Mechanism of enrolling new members
10. Relation between the municipalities and the union
11. Other activities of the union

Operators' interview and questionnaire preparation

Who is an operator ? An operator is the person who is driving the vehicle at the time of interview. The operator may be the owner of the vehicle, a family member or friend driving the vehicle without any strict financial arrangement or a hired driver.

The UTA registers the owners of vehicles against a unique serial number against the owner's name and the same number is assigned to the vehicle owned by the owner. Unofficially, the actual driver on spot may not be the owner of the vehicle and this relationship is not documented, because, first of all, it is not approved either formally or informally and secondly, it is too flexible. The vehicle number and corresponding vehicle is the only fixed item in the documentation, unless the vehicle number is also transferred to another vehicle due to replacement or ownership change or scrapping.

For the larger survey, of which this study is a part, an attempt have been made to thoroughly document the existing vehicles in the study area and the opertor of the same vehicle at the time of interview. There are at least 700 owners "registered" or documented in some manner and at some point of time with some union in the study area and 100 to 300 more vehicle that operate individually without any consolidation or institution. The ambition of the study is to document all the 700 documented vehicles. It is assumed based on various discussions and estimates that at least 25% of these 700 will be non-reachable because they may rarely operate their vehicles even though they are registered in with the union.

Officially, the driver or operator must own the vehicle driven. In reality, it is not neither practical nor possible. There is no fixed data of the number of vehicles driven by owner-driver and hired-driver. A vehicle may be owned by one member of a family and driven by another, with or without any strict financial arrangement. The vehicle may be driven by a hired driver one week or one day of the week and by another one the next, or even by the owner himself. This is why the questionnaire and interview is linked to a vehicle and the opertor at the time of interview and not to a person. There will be an attempt to interview the owner of vehicles driven by hired-drivers at a later stage but it is unlikely to be a successful attempts because non-driving owners hold other jobs and are not very open about their role.

A detailed questionnaire was simultaneously being prepared following discussions with the union leaders and the drivers present at the stand adjacent to the union office. After 2 weeks of discussion, 10 paper-questionnaires were put on trial by the researcher and a paid surveyor. Employing more than one surveyor was avoided as the success and progrees of this survey depended on personal rapport building and it would have been difficult to successfully coordinate more than one surveyors to follow the spirit of discussion.

While paper-survey was being conducted, as a manner of expediting the survey and data entry and minimising error in the process, free and open-source Computer-Assisted Personal Interviewing or CAPI app and programs were being tested with the paper-questionnaire. Between Google forms, Zoho and KoboToolbox, KoboToolbox was chosen because it could be filled and stored offline, edited after submission and data could be exported easily in excel format. It offered an app for handheld android devices with only data collection and submission permissions while providing a single page (scrollable) view of the entire questionnaire, allowed skip logic and an option to choose the order in which data was filled against any question. Survey nos. 11-20 were done in KoBoCollect on a "Lenovo tab 4 8" tab to try out and finalise the questioanaire. The price of printing 600 sets of 20-page paper questionnaire was comparable to the price of the tab considering the delivery time and cost. The tab and KoBoCollect app was found to be well responsive to finger touch which reduced the additional burden of carrying and using stylus. The tab runs for 7 hours with full charge, the maximum hours an interviewer can work outdoors in June. Survey nos. 20-39 were done using the final questioannaire on KoBoCollect customised for Konnagar Municipality Toto Drivers. After the completion of each interview, the interviewee was made to sign a survey register stating that the interview had indeed taken place.

To ensure that no vehicle was being interviewd twice, a survey sticker with a serial numeber (KS # standing for Konnagar Survey) written with permanent marker ink was being affixed at a secure place in the vehicle. Each survey

was linked to a unique vehicle and a unique KS number. After the first 20 trials, it was found that the fastest option was to use a question cue for interviews while taking notes in a notebook and voice recording and filling the questionnaire on KoBoCollect later. Each discussion was taking about 30 minutes whereas toto drivers stay in the KPEA stand for not more than 10 minutes before their turn comes. So each interview was taking at least 3 attempts to complete. At any one point of time 3-5 interviews were in progress. When there was no driver present or willing in the stand, the data was filled in KoBoCollect app or vehicles were measured. At night, the survey data were checked, data gaps were filled by calling the drivers on phone and forms were being submitted. In this matter, data collection i.e. interview, data gap filling, data input and data compilation for each interview was taking 20 to 30 (interview) + 20 (data input and verification by phone) = 40 to 50 minutes.

From one week's daily queueing log maintained by drivers at the Konnagar Station stand and discssions with the regualrs of the stand, 60 KPEA vehicles were seen to use the stand, while 30 come every day, 10 came 5-6 days a week and the rest were irregular and uncertain. That left 396 less 60 = 336 totos cruising on the roads of Konnagar Municipality with uncertain timing and routes. A process of fixing appointments with these 336 drivers to interview them is being discussed with the KPEA president and treasurer.

The questions

All the questions and cues on both paper and CAPI versions were written in both English and colloquial Bengali to encourage the operators in responding. In the final CAPI version, there are 350 questions to be filled KoBoCollect based on the answers of 40 question cues for the interview. The 40 question cues covered topics like the driver's (or owner-driver's) vehicle, personal, family, education, professional, perception of passengers, percpetion about competition, understanding of the legalities and formalities of toto driving and future plans. The questions are descriptive, multiple choice (single option and multiple option both) and rating-based. It was found that operators mostly refer their times to either the number of days or week or months before the date of the interview or attach it to festivals such as Durga Puja (biggest festival in West Bengal), Bishwakarma Puja (important for drivers and vehicle owners). The answer to question options regaring time was thus framed as "number of weeks or months ago" and as "before such and such Puja" or "after…". The split of association has shown one of the biggest tangible effect and hence that has been also used as an reference or indicator of time which was further detailed out in terms of week and month. It is expected that the the survey may take more than 6 months to complete and data may change. The questionnaire including the question cues were framed keeping in mind the change is next few month as far as can be predicted. There was also mention of a lottery based on the KS numbers at the end of the surveys. There was an option for each respondent to participate in a lottery against the KS number.

In addition to the detailed vehicle measurement explained below, the driver seat width and kneespace was measured for all the KS surveyed vehicle. There are certain situations and passenger types that prefer the front seat and understand the exact reasons in future, these measures were taken.

Vehicle measurement

Vehicle measurement is meant to document the variety of vehicles termed toto. There are 23 branded models and one vehicle from each model was measured. In addition, 20 more vehicles from non-standard models and preferably from before 2016 was measured. The data was filled in a printed sheet and the following data was filled :

i. Purchase date and seller type
ii. Side, front and rear elevation drawings of a toto (31 things measured),
iii. Accessories present or absent (total 16 nos. of accessories)
iv. Body types like open cage, moulded polymer etc. (6 types but no measurement)
v. Isometric sketches of the rear wheel guard (15 types identified and 11 things measured in each type),
vi. Schematic side elevation of windshield (6 types identified and dimensions not taken)
vii. Cage floor design (3 types identified but dimension not taken)

This data have not been used in this paper but it was part of the survey conducted. Measured vehicles were given "KM number" in the questionnaire (KM = Konnagar Measurement) and a corresponding sticker was affixed on the vehicle. The vehicles measurement can be correlated with the passenger perception survey and identification of service quality attributes.

Still and video photography

Still and video photography for 15 minutes in peak and lean periods have been and is being done in the major points, namely, Ballykhal auto and Toto stand, Konnagar Bata, Konnagar Station, Uttarpara Station for last 5 years. During videography, a count of passengers, their waiting time, auto, toto and bus frequencies were done. In addition to the discussions with toto and auto drivers, these records where used to estimate and verify the waiting time and frequency data. In the last few minutes of the videography, waiting passengers were randomly asked how long they had been waiting. Their estimate was later compared with the actual time recorded in the video but the passengers have never been told the actual time. In absence of individual Origin-Destination survey and a detailed passenger survey, origins and destinations of passengers were estimated from discussions with starters, drivers and operators. Still photos have also been used to record the change in appearance of totos over time and the different identification numbers displayed on them.

5.3. Challenges and limitation of the methodology

There is no reliable information about the growth of toto number. It has to be back-calculated from the purchase date of individual vehicle. However, in cases of sold or scrapped vehicles or second hand vehicles, there is no way of tracing them and completing the count.

Spotting the drivers who do not use the stand ("running vehicles") i.e. those who collect passengers by cruising are proving to be the biggest challenge because there movement is random. During idle hours, drivers go home and rest and charge their vehicles as they are all local people. In comparison, auto rickshaws of Ballykhal-Bagkhal route display their working hours on the notice board at the auto stand. Drivers are not obliged to work every day or for any particular number of hours or according to any fixed routine. It is being planned that with the help of the union leaders, a few drivers will be requested to meet the interviewers for 30mintues (60-100/- worth trips) at the union office for the interview. The success of this method is yet to be tested.

6. Observation

6.1. Evolution and working of the associations :

Internal organisation

The study area falls under three urban local bodies, entire Konnagar Municipality, wards 1-19 of Uttarpara-Kotrung Municipality and a small part of northern Bally Municipality. One of the major roles of Bally Municipality is limited to the provision stand for Kolkata, Howrah and Hooghly-bound bus, autos, totos, rickshaws and shuttle vehicles in return for a fee. The fee is collected via members of respective unions including Uttarpara Toto Association. At present there are three toto unions in Uttarpara-Kotrung Municipality and two in Konnagar Municipality. All the 5 unions are affiliated to the Union of the ruling political party in each municipality. In effect, municipal boundaries are medium of segregation of toto unions. Major decisions are taken by not the toto unions, but the core political party.

The inception dates of toto unions in both municipalities are vague. It is understood that they originated as a subset of the same union that oversees auto and rickshaws. As the number of vehicles have increased, the toto unions have shifted to their physically separate office.

Somewhere in 2014, Uttarpara Toto Association and KJTA were conceived. When a ward councilor needed to be entrusted with the responsibility of enumerating totos and "registering" them under municipalities, the councilor in charge of toto unions from each municipality was by default selected to perform the job.

The Ballykhal-Bagkhal route is the most profitable route in the study area with only 45 autos plying from 7am to 9-30pm (table 3). It was imperative that the totos will select this route for operation and replicate the route and fare of autos. Some totos chose to ply on internal roads, especially in Hindmotor and Konnagar where as the crow flies the distance between G T Road and rail-track is 1.5 to 2 times than that in Uttarpara and longer by road due to the more convoluted nature of the roads (ref. figure 2). There was no route-related regulation in either of the municipalities.

Within 2016, oversupply of totos on Ballykhal-Bagkhal route significantly reduced the benefits of high income and low competition being enjoyed by totos. Even informal mechanisms to stop Konnagar totos (i.e. owners of the vehicle resided in Konnagar or adjoining villages) to collect passengers from Ballykhal in the evening was absent. Passengers to Konnagar are dependent on totos since there is a 20-30 minute queue in auto line and buses on routes no. 3 and no. 54/2 are 30 to 90 minutes apart, and crowded. The few shuttle vehicles heading for garage are unreliable. In Ballykhal-Bagkhal auto lines, about 2/3rd of the autos are unofficially designated by starters or queue managers to Ballykhal to Dharsa passenger while the rest 1/3rd were meant for Konnagar passengers so that each auto could carry passengers for the entire trip. In absence of a proper stand, queueing and segregation of passengers were impossible in the case of totos.

In late 2016, restricting totos and diverging their routes became a necessity. This is when the regulatory role of unions as route-organisers started. From early 2017, the Ballykhal stand was developed with sidewalk (figure 20 in appendix, right side) and queueing system started. With continuous flow of passengers from arriving trains at Ballyghat Station, starters or queue managers are needed in termini such as Ballykhal. Konnagar vehicles were denied access to Ballykhal toto stand and as a result they formed informal queues in College More (ref. ◁ symbol in figure 6 and 7 for undesignated stands and figure 33 in appendix).

Around June 2017, 70-80 totos were transferred to Makla (West of Uttarpara Station) under the directive of Uttarpara Toto Association as the first tangible step in decongesting G T Road and reducing competition within Uttarpara.

On September 17, 2017, Toto route was split at the municipality boundary, i.e. Dharsa Petrol Pump (ref. figure 2 and 3). The KJTA association was practically dissolved and all the 400 (approximately) totos shifted to the newly formed KPEA association. The new association has a more visible office, constructed stand, interacts regularly with drivers and passengers to maintain order and discipline and works in a more impersonal manner. After the split of routes territory division was strictly enforced and the only way totos could ply in the other municipality was by carrying reserve passenger, hanging the "reserved" board on the windshield and they could not collect passengers from the out-of-bound municipality on their way back, unless they were also "reserve" passengers. KPEA claims to be a member of INTTUC though it has not been verified by the researcher. Without the option of plying up to Ballykhal, Konnagar totos chose to ply in the interiors roads. To quote the erstwhile chairman of KJTA (29 April 2018), "*Work destinations are in Uttarpara, past Dharsa (Ballykhal, Ballyghat, College, Amarendra Vidyapeeth, Bhadrakali High School etc.). If the totos are not allowed to ply beyond Dharsa* [up and down both], *then no point in plying on G. T. Road.*" This can be cited as an ideal example of self-predatory action through cream skimming practices of informal systems. During other interviews, "*gari bheeshon bere gechhe, erpore amra puronora ki korbo?*" translating in spirit to "*it's way,* way *too many vehicles now; what are we, the early entrants, to do now?*" was the among the first few comments even before interview started. This was offered as a self-produced justification to whatever decision anyone has made or any inconvenience that may have been caused to anyone without being asked. Individual operators and institutions have taken a defensive stand against any query.

In continuation the decongestion of G T Road in Uttarpara-Kotrung Municipality, in Uttarpara, 200 totos were assigned to ply on Ballykhal-Dharsa route and the rest were made to choose different interior routes. A separate union

has been formed for Ballykhal-Uttarpara station where already 22 autos ply. Another less organised union named Bhadrakali Toto Association operates from Kanthalbagan Bajar. This was formed by the 2-3 rickshaw drivers that turned into toto owner-drivers and continue to occupy their original place in the rickshaw stand. Newer members cruise for passenger and there is no scope of waiting in stand in the already small rickshaw-cum-toto stand at Kanthalbagan.

Each union and formal regulating agency has bestowed the vehicles with their own identity marks like stickers and "number plates". No one mentioned of a permit for vehicle or license for drivers though the former was required under DeenDayal Scheme. The revoking of permit requirement in 2016 was mentioned by an RTO official only.

At present an Uttarpara-Kotrung and Konnagar Municipality vehicle carries a combination the numbers shown in tables 5 and 6 respectively :

Table 5. Informal, semi-formal and formal, obsolete and valid identification numbers assigned to totos in Uttarpara-Kotrung Municipality

Sl. no.	Identification number as in June-2018	Figure no. append. A
i.	First stage union number with ward number : UK <#[1]> or UK(M) <#[1]>, ward no. (of owner's residence) <#[a]>– casually painted on the body with name and mobile number of the owner, now useless.	1, 2, 4, 5, 10, 12
ii.	Ballykhal-Uttarpara Toto Association written in Bengali as বালীখাল উত্তরপাড়া টোটো অ্যাসোসিয়েশন (only number, in Bengali). Only number <#[2]>.	1, 2
iii.	Uttarpara Toto Association number – Uttarpara Toto Association <#[3]> or উত্তরপাড়া টোটো অ্যাসোসিয়েশন <#[3]> printed on yellow paper, later same number was issued in TIN.	3
iv.	Number assigned in the fee register, three types– T/M-< serial number of municipality > <#[3]> or Union <#[4]> or New <#[5]> needed for union's internal records and parking fee records.	3
v.	Temporary Identification Number or TIN UKM T/M 10 <#[3]> given by municipality – painted or and blue on white number plate – of no use now.	3, 8, 12,
vi.	HMC parking sticker using the vehicle ID as documented in union's register– essential for using Ballykhal stand – Disha Parking Services, Order by HMC <T/M #[3]> or <Union #[4]> or <New #[5]>.	9, 13
vii.	Route number, also works are association ID – issued by Uttarpara Toro Union after 2017 September on Ballykhal-Dharsa route, Ballykhal Dharsa <#[3]>.	14
viii.	For those outside Ballykhal-Dharsa route, present route (station route or Bhadrakali Association) – Association name and location and/or street name <#[6]>.	5, 6, 7
ix.	RTO registration number – Statutory, irrespective of municipality and as per amended CMVR (2018, Chapter IV).	8, 10, 11, 12

Table 6. Informal, semi-formal and formal, obsolete and valid identification numbers assigned to totos in Konnagar Municipality

Sl. no.	Identification number as in June-2018	Figure no. append. A
i.	Earliest union number – only numerals <#[7]>.	none
ii.	KJTA or Old Union number mentions association name and location : Konnagar Toto Association, Bishalakshi More K(M) <#[8]>.	15, 18
iii.	Temporary Identification Number or TIN given by municipality - Mistaken by most as old union number by many operators – T/M 09 <####[9]>.	16
iv.	KPEA number – Konnagar Municipality Area's E-Rickshaw Drivers' Association or কোন্নগর পৌর এলাকার ই-রিক্সা চালক অ্যাসোসিয়েশন <#[10]> - used for union's internal records, drivers' log	17, 19
v.	RTO registration number – Statutory, irrespective of municipality and as per amended CMVR (2018, Chapter IV)	20

Territory assignment : In the face of stiff competition, the territory is finally assignment is a result of political power struggle. It still works in a manner where everyone earns a minimum amount. While confinement of totos in the

interiors of Konnagar seems to have deprived the operators from the most profitable part of the business, the following comments from interviews are notable :

1. *There are too many totos these days. It became impossible drive on the G T Road.*
2. *Where* is *the passenger ? Is there any guarantee ?* … With reference to life prior to the split
3. *I prefer to use the stand because I can at least make Rs. 500/- to 600/- per day for sure.*

Enrolment

Enrolment is voluntary, it is required first for the peace and safety of the individual operator rather than for maintaining order of the system. 13 out of the 39 interviews operators were introduced by a friend to the union, though 2 out of them transferred for KJTA. Only 3 out of 39 reported that they approached the union before buying the vehicle. Few recall the procedure of getting T/M and KJTA numbers, it was either through notice in stand or word of mouth. The common practice is Konnagar is to purchase vehicle and then register. It was however emphasised in Uttarapara that "*we are not issuing new number now*" which translates to a strict restriction of supply. Too many enrolment numbers have reduced their significance. However, it is out of fear that vehicles used to and do enroll, even when it means losing a whole or a half-day's earning.

Enrolment has no strict timeline or schedule. As of now, UKM unions are not allowing new vehicles to ply in UKM. There are many vehicles that have collected numbers but chose not to operate. In Konnagar, KPEA has enrolled the erstwhile KJTA members and even non-members to two phases, one in September (verbally communicated to researcher), at the time of incorporation of KPEA and once more in December 2017 (as per date written in the KPEA register). Further number allocation is due in July-August 2018 since around 20 to 25 new vehicles are awaiting. Drivers in KPEA are also encouraged to register. Enrolment is mandatory and enforcement is a variable and sometimes unpleasant process depending on situation. Owners residing outside the concerned municipalities are not allowed to ply at all. Many such owners had even sold off vehicles to KPEA members after the split resulting in loss of livelihood in surrounding areas (Zee News, 2017). The news of membership and enrolments spread mostly by mouth even if notices are put up at stands (figures 54(a) to 54(b).

The different charges for memberships of unions and registrations :

- Municipality registration for Temporary number : INR 100/-
- Uttarpara Toto Association : HMC parking logo : INR 90/- (@ INR 3/- per day)
- KJTA membership enrolment fee : INR 50/-, INR 550/-, INR 5000/- reported.
- KJTA monthly fee : INR 90/-
- KPEA members enrolment fee : none
- KPEA monthly fee : INR 60/-
- Bhadrakali Toto Association members enrolment fee : Unknown
- Bhadrakali Toto Association monthly fee : INR 100/-

Fare and rent

The minimum fare per person in INR 10/- in almost entire West Bengal for upto 5-6 km distance in the study region. On G T Road, the fare is comparable to the autos due to competition. Auto fare is more regulated by the auto unions. The daily rent, i.e. for 10-12 hours day, in Konnagar has been fixed at INR 300/- per day whereas many used to take INR 350/- earlier. The starting fare on Ballykhal-Bagkhal route was INR 6/- to keep parity with the minimum auto rickshaw fare and bus fare. In other routes, as in the norm of Totos elsewhere in the state, INR 10/- was the starting fare. At the time of the present survey, May-2018 to July-2018 and continuing, there are 600-700 totos operating in the study area. The minimum fare was increased from INR 6/- to INR 7/- for both auto and totos in Ballykhal-Bagkhal route from 1 July 2017, incidentally the very day Goods and Services Tax (GST) came into effect in India. For the last two years, totos haven charging Rs. 10/- after 10pm on G T Road route. In June 2018, minimum

fare of buses were increased from INR 7/- to INR 8/- following the price hike of diesel and petrol but the fare of totos and autos have not changed.

It can be seen from table 7, that the full fleet of autos do not work even at the peak hour and that leads to long waiting time at terminus. The toto and auto stands are about 100m apart hence the commuters are forced to make a choice without looking at the queue and they cannot change their mind once they are in the queue. This leads to confusion and inconvenience. After route-split, the short distance commuters opt for totos where there is often a slow moving queue and 10-15 minute waiting period. The returning auto and totos often choose not to come back empty from Konnagar termini, causing the fleet size to effectively reduce.

Table 7. Demand calculation during evening peak

Col. no.	Item	Source	Value (best-avg-worst)	Unit
A	Passenger capacity of auto in reality .		5	people
B	Passenger capacity of toto in reality		5	people
C	Headway i.e. Waiting time for short distance auto at Ballykhal stop	observed	10	minutes
D	Headway i.e. Waiting time for long distance auto at Ballykhal stop	observed	20	minutes
E	Passenger flow with zero waiting time and only 10-30 seconds of passenger boarding time, sometimes up to 3 totos loading simultaneuosly (this remains for 20-30 minutes after a train arrives)	observed (30 second loading time)	10 = 300 = 600	person/min person/30min person/hr
F	In reality, the passenger flow and headway is not uniform for 1 hour and the average headway in one hour is approximtely	observed	1	minute
G	Corresponding passenger flow as per G	observed	150 300	Person/30min Person/hr
H	Round trip time for totos in evening peak (Ballykhal-Bata)	observed	1.5	hour
I	Fleet size toto for H	60 x 1.5	90	totos
J	Round trip time for totos in evening peak (Ballykhal-Dharsa)	observed	1	hour
K	Fleet size toto for H	60 x 1	60	totos
L	When auto routes are divided based on trip-length, the starte assigned every fourth or fifth auto to Konnagar bound passengers. Time headway between autos	C and D	10-20-30	minutes
M	Hence, effective passenger flow was (10 min waiting time)		30	per/hour
N	Hence, effective passenger flow was (20 min waiting time)		15	per/hour
O	Hence, effective passenger flow was (30 min waiting time)		10	per/hour
P	Queue length was		20-30	people
Q	Round-trip time for autos (Ballykhal-Bagkhal) during evening peak - observed		60	min
R	Fleet size - reported		45	Nos.
S	Headway due to fleet size of 45 (as it should be)	60/45	1.33	min

Table 8. Role of the five associations of present against the items in table 1

Broad category		Role and responsibility	UKM			KM	
			UTA	UTA(S)	BTA	KJTA	KPEA
A. MARKET ASSESSMENT	(1)	Market assessment	Y, L	Y, F	Y, L	Y, L N, F	Y, L
B. INCEPTION	(2)	• Inception of association, • Institutionalising individual operators & personal businesses	Y, L	N, N	Y, L	Y, L	N, N
	(3)	Independence as an association and visibility	Y, L	N, N	Y, L	Y, L Y, N	Y, L

Broad category		Role and responsibility	UKM			KM	
			UTA	UTA(S)	BTA	KJTA	KPEA
	(4)	Formation of rules for membership and operation	Y, L	Y, F	Y, L	Y, L N, N	Y, L
C. OPERATIONS : Internal working of the institution	(5)	Making rules operation of vehicles – eligibility, required documentation, fee etc..	Y, L		Y, L	Y, L Y, F	Y, L
	(6)	Making rules of membership – eligibility, required documentation, fee etc..	Y, L		Y, L	Y, L N, N	Y, L
	(7)	Territory assignment	Y, L		?	Y, L Y, F	Y, L
	(8)	Understanding with other competitive modes	Y, L		Y, L	Y, L Y, F	Y, L
	(9)	Enumerating vehicles with unique and serial numbers of association	Y, L		Y, L	Y, L N, N	Y, L
	(10)	Enumerating vehicles with unique and serial numbers as TIN from municipality (Deen Dayal Scheme)	Y, L N, N		N, N N, N	Y, L N, N	N, N
	(11)	Maintaining account of owner	Y, L	Y, F	Y, L	Y, L N, N	Y, L
	(12)	Maintaining account of driver	Y, L	Y, F	Y, L	N, N N, N	Y, L
	(13)	Maintaining account of vehicle	Y, L	Y, F	Y, L	Y, L N, N	Y, L
	(14)	Appointing members for various internal and interactive work and delegating responsibility	Y, L	Y, F	N, N	Y, L N, N	Y, L
	(15)	Modification of organisation	Y, L	Y, F	N, N	Y, F N, N	Y, L
	(16)	Dissolving of association	N, N	N, N	N, N	Y, F	N, N
	(17)	Special charges and favours for memberships and / or vehicle or parts	?	?	?	Y, L N, N	N, N
	(18)	Other businesses like sale, maintenance and servicing of vehicle and spares	?	?	?	Y, L N, N	N, N
	(19)	Transparency to members	Y, L	?	?	N, L N, N	Y, L
D. OPERATIONS : Internal working and interaction with owners and drivers regarding…	(20)	Collection of entry fees	Y, L Y, L	 Y, F	?	Y, L N, N	Y, L
	(21)	Collection of membership fees	Y, L	Y, F	Y, L	Y, L	Y, L
	(22)	Collection of parking fees (if separate)	Y, L	?	?	N, N	N, N
	(23)	Daily rent for vehicles	Y, L	?	?	? N, N	Y, L
	(24)	Garage charges (overnight)	N, L	?	?	? N, N	Y, L
	(25)	Parking space and capacity	Y, L	?	Y, L	? N, N	Y, L
	(26)	Parking charges (may or may not be included in the membership fee)	Y, L	?	?	? N, N	Y, L
	(27)	Enrolling new members in organisation (or not)	Y, L	?	Y, L	? N, N	Y, L
E. OPERATIONS : rules, execution	(28)	Vehicle type	N, N	?	?	? N, N	Y, L
	(29)	Vehicle specification	N, N	?	?	? N, N	Y, L

Broad category		Role and responsibility	UKM			KM	
			UTA	UTA(S)	BTA	KJTA	KPEA
and monitoring of…	(30)	Insistence of maintenance of paperwork	Y, L	Y, L	?	? N, N	
	(31)	Route (where fixed)	Y, L	Y, F		? N, N	Y, L
	(32)	Fare	Y, L	Y, ?		N, N	Y, L
	(33)	Method of collecting passengers	Y, L	Y, F	Y, F	Y, L N, N	Y, L
	(34)	Sharing mode (share or reserved)	Y, L	Y, F	Y, F	Y, L N, N	Y, L
	(35)	Number of vehicles in a route	Y, L			Y, L N, N	Y, L
	(36)	Time of operation or shift (time of clock)	N, N	N, N	N, N	Y, L N, N	Y, L
	(37)	Hours of operation (total working hours)	N, N	N, N	N, N	Y, L N, N	Y, L
	(38)	Number of vehicles in a given shift	N, N	N, N	N, N	Y, L N, N	Y, L
	(39)	Special duties (at late or early hours)	N, N	N, N	N, N	Y, L N, N	Y, L
	(40)	Special fare (late night)	Y, L ?	?	?	? Y, F	Y, L
	(41)	Special fare (reserve)	Y, L	?	?	?	?
	(42)	Special fare (festive season)	Y, L	?	?	?	?
	(43)	Special rates (banner and announcement)	?	?	?	?	?
	(44)	Designating stand and/or stops	Y, L	Y, L	Y, L	Y, L N, N	Y, L
	(45)	Maintaining the stand and/or stops	Y, L	Y, L	Y, L	Y, L N, N	Y, L
	(46)	Maintaining log and managing queue by starter	Y, L	Y, L	Y, L	Y, L N, N	Y, L
	(47)	Maintaining log and managing queue by operator	Y, L	N, N	N, N	Y, L N, N	Y, L
	(48)	Monitoring number of owned vehicles above cap	Y, L	?, ?	?, ?	Y, L N, N	Y, L
F. Problem solving and facilitation with both formal and informal agencies	(49)	Facilitating and encouraging registration into formal sector	Y, L	?, ?	?, ?	Y, L N, N	Y, L
	(50)	Negotiating with other authorities (eg. impounding vehicles and holding the driver by police)	Y, L	?, ?	?, ?	Y, L N, N	Y, L
	(51)	Listening to complaints from drivers	Y, L	?, ?	?, ?	Y, L N, N	Y, L
	(52)	Listening to complaints from passengers	Y, L	?, ?	?, ?	Y, L N, N	Y, L
	(53)	Making rules for passengers to follow for smooth operation	Y, L	?, ?	?, ?	Y, L N, N	Y, L
	(54)	Resolving conflict with other agencies	Y, L	Y, L	Y, L	Y, L N, N	Y, L

Broad category		Role and responsibility	UKM			KM	
			UTA	UTA(S)	BTA	KJTA	KPEA
	(55)	Penalising defaulting and offending vehicles	Y, L	Y, L	Y, L	Y, L N, N	Y, L
	(56)	Negotiation with "outsiders", i.e. drivers that increase the competition without "permission"	Y, L	Y, L	Y, L	Y, L N, N	Y, L
	(57)	Maintaining peace with other modes in competition	Y, L	Y, L	Y, L	Y, L N, N	Y, L

Abbreviations UTA = Uttarpara Toto Association, UTA(S) = Uttarpara Toto Association-station route,
BTA = Bhadrakali Toto Association,
KJTA = Konnagar Jatiatabadi Toto Association, KPEA = Konnagar Poura Elakar E-Rickshaw Association

Key Role : Y = has/had this responsibility or role, N = does/did not have this responsibility or role, ? = not known yet
Status : L = leader or decision maker, F = follower or subsidiary, M = mutual N = neutral, ? = now unknown
Present or past :

Present and past (continuing) = Past = Present and new role =

Table 2, appendix B presents the attempts at counting the numbers of totos in the study area are different point of time. Table 3, appendix B presents the different milestones in the operations of totos, their implication for totos and passengers and the roles unions played in it. Figures 54(a) to 54(h) in appendix A show the notices used for announcing public and internal messages. These notices are not preserved, nor recorded in any other manner, leading to poor institutional memory and selective memory.

6.2. Interview data :

Table 9. Summary of interview data

Sl. no.	Question or attribute	Options	Frequency	% in that category
1.	2.1_1. Profile of respondent	Only driver	12 (3 owners are family members)	30.8 %
		Driver-owner	27	69.2 %
		NR	0	0 %
2.	4.1_1. Age of respondent	18+ to 20 years	4	10.3 %
		driver (12 of 39)	2	16.7 %
		owner-driver (27 of 39)	2	7.4 %
		20+ to 30 years	9	23.1 %
		driver (12 of 39)	4	33.3 %
		owner-driver (27 of 39)	5	18.5 %
		30+ to 40 years	10	25.6 %
		driver (12 of 39)	2	16.7 %
		owner-driver (27 of 39)	8	29.6 %
		40+ to 50 years	12	30.8 %
		driver (12 of 39)	2	16.7 %
		owner-driver (27 of 39)	10	37.0 %
		50+ to 60 years	2	5.1 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	1	3.7 %
		60+ years	2	5.1 %

Sl. no.	Question or attribute	Options	Frequency	% in that category
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	1	3.7 %
3.	4.1_4.How many people stay in your house permanently?	2	3	7.7 %
		3	6	15.4 %
		4	11	28.2 %
		5	10	25.6 %
		6	6	15.4 %
		7	1	2.6 %
		8	0	0.0 %
		9	1	2.6 %
		NR	1	2.6 %
4.	4.2_2. Academic qualification of respondent	Below class VIII	16	41.0 %
		driver (12 of 39)	8	66.7 %
		owner-driver (27 of 39)	8	29.6 %
		VII pass but below X	12	30.8 %
		driver (12 of 39)	2	16.7 %
		owner-driver (27 of 39)	10	37.0 %
		X pass	5	12.8 %
		driver (12 of 39)	2	16.7 %
		owner-driver (27 of 39)	3	11.1 %
		XII pass	2	5.1 %
		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	2	7.4 %
		Graduation (Arts stream)	2	5.1 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	1	3.7 %
		NR	2	5.1 %
		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	2	7.4 %
5.	4.2_6. Other skills suitable for making a living	None	19	48.7 %
		driver (12 of 39)	4	33.3 %
		owner-driver (27 of 39)	15	55.6 %
		Electrician’s job	3	7.7 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	2	7.4 %
		Driving	3	7.7 %
		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	3	11.1 %
		Motor mechanic’s work	1	2.6 %
		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	1	3.7 %
		Construction work (constr.)	6	15.4 %
		driver (12 of 39)	5	41.7 %
		owner-driver (27 of 39)	1	3.7 %
		Mobile repairing (+ constr.)	1	2.6 %
		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	1	3.7 %
		Other incl. cooking	6	15.4 %
		driver (12 of 39)	2	16.7 %

Sl. no.	Question or attribute	Options	Frequency	% in that category
		owner-driver (27 of 39)	4	14.8 %
6.		none	31	79.5 %
		driver (12 of 39)	5	41.7 %
		owner-driver (27 of 39)	26	96.3 %
		1	3	7.7 %
		driver (12 of 39)	3	25.0 %
		owner-driver (27 of 39)	0	0.0 %
		2	0	0.0 %
		driver (12 of 39)	0	0.0 %
	2.4_1. How many totos does the owner of this toto own, EXCLUDING this one? – includes responses from drivers	owner-driver (27 of 39)	0	0.0 %
		3	1	2.6 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	0	0.0 %
		Do not know	3	7.7 %
		driver (12 of 39)	3	25.0 %
		owner-driver (27 of 39)	0	0.0 %
		NR	1	2.6 %
		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	1	3.7 %
7.		Yes	11	28.2 %
		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	11	40.7 %
		No	14	35.9 %
		driver (12 of 39)	2	16.7 %
		owner-driver (27 of 39)	12	44.4 %
	2.2_3. Is it TOTO bought with loan?	Do not know	9	23.1 %
		driver (12 of 39)	9	75.0 %
		owner-driver (27 of 39)	0	0.0 %
		NR	5	12.8 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	4	14.8 %
.		5+ to 6 hours per day	2	5.1 %
8.		driver (12 of 39)	0	0.0 %
		owner-driver (27 of 39)	2	7.4 %
		6+ to 10 hours per day	3	7.7 %
		Driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	2	7.4 %
		8+ to 10 hours per day	2	5.1 %
		driver (12 of 39)	0	0.0 %
	8.2.1_3. How many hours in a day you drive? (on a normal day)	owner-driver (27 of 39)	2	7.4 %
		8+ to 12 hours per day	12	30.8 %
		driver (12 of 39)	5	41.7 %
		owner-driver (27 of 39)	7	25.9 %
		10+ to 12 hours per day	6	15.4 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	5	18.6 %
		10+ to 12+ hours per day	9	23.01 %
		driver (12 of 39)	4	33.3 %
		owner-driver	5	18.6 %

Sl. no.	Question or attribute	Options	Frequency	% in that category
		12+ hours per day	5	12.8 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	4	14.8 %
9.		Pre-split	28	71.2 %
		driver (12 of 39)	4	33.3 %
	6.1_1. How long have your been driving	owner-driver (27 of 39)	24	88.9 %
	Toto w.r.t. split of association?	Post-split	11	28.2 %
		driver (12 of 39)	8	66.7 %
		owner-driver (27 of 39)	3	11.1 %
10.		since last 6 months or less	5	12.8 %
		driver (12 of 39)	4	33.3 %
		owner-driver (27 of 39)	1	3.7 %
		since last 1 year	7	17.9 %
		driver (12 of 39)	3	25.0 %
		owner-driver (27 of 39)	4	14.8 %
		since last 1½ year	4	10.3 %
		driver (12 of 39)	1	8.3 %
	6.1_2. How long have your been driving Toto (=	owner-driver (27 of 39)	3	11.1 %
	been in the business?)	since last 2 years	9	23.1 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	8	29.6 %
		since last 3 years	2	5.1 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	1	3.7 %
		Since more than last 3 years	12	30.8 %
		driver (12 of 39)	1	8.3 %
		owner-driver (27 of 39)	11	40.7 %
11.	2.1_8. Full time operator (same response as No personal income other than that from driving toto)	Yes	37	98.5 %
		No	2	5.1 %
12.	5.3_7. What is the number of earners in your family other than yourself ?	0	18	46.2 %
		1	13	33.3 %
		2	6	15.4 %
		3	1	2.6 %
		NR	1	2.6 %
13.	4.2_10. Is there any family-occupation or business?	Yes	8	
		No	31	
14.	5.2_1-1. Number of different sources of earning the respondent held prior to this	0	2	
		1	34	
		2	2	
		3	1	
15.	8.1_9. & 5.2_1-1. Occupation prior to joining toto-driving	Job in Factory	7 (1 also worked as bus-driver)	17.9 %
		Construction worker	3	7.7 %
		Daily labourer	2	5.1 %
		Job at shop	10	25.6 %
		Working with family-owned shop	2	5.1 %

Sl. no.	Question or attribute	Options	Frequency	% in that category
16.		Auto-driver (and also drove private vehicles)	1	2.6 %
		Rickshaw driver	5	12.8 %
		Bus driver or Conductor (also had job in factory)	2	5.1 %
		Not applicable	2	5.1 %
		Crafts	2	5.1 %
		Other including unspecified	5	12.8 %

Personal profile :

The personal profile of the interviewed operators are presented in table 7. 39 operators from the stand were interviewed. They are the most regular users of stand, working full day and all days. Their profile is summarised below. The respondents comprise of 12 drivers and 27 owner-drivers. 50% of the respondents are aged between 20+ and below 50 years. Drivers are younger, 50% of them being between 18 to 30 years old and 66.7% of the owner-drivers falling within 30+ to 50 years of age. 41% of 37 respondents who disclosed their academic qualification, are educated below class VIII and a total 85% of them are educated below class XII. 66.7% of the drivers have studied below class VIII against 29.6% owner-drivers and 16.7% drivers have studied up to class X but below XII against 37% owner-drivers. 53.6% of the 38 respondents disclosing their family size have a 4 or 5 people living in the same house. The respondents do not perceive family as the people sharing the same kitchen but rather as a number of related people, by blood or by marriage, in the same house.

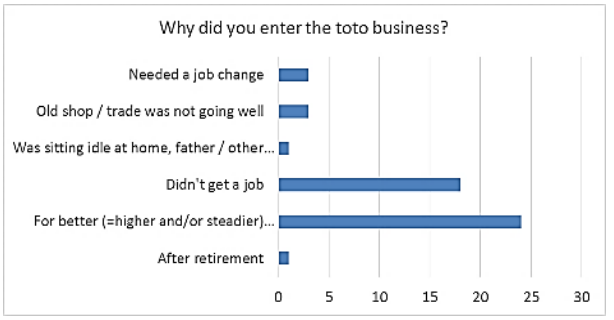


Figure 8. Reason for becoming toto operator, multiple choices from MCQ type questions

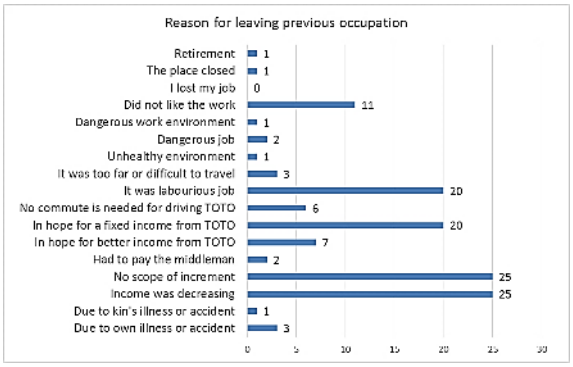


Figure 9. Reason for leaving previous occupation

Impetus and context for entering this segment

While is universally accepted that informal businesses have minimum barriers to entry in supply side, the researcher wanted find out why the present operators chose toto instead of other possible and available alternatives for earning a living. It was stated by 19 nos. or 48.7% of all 39 respondents and 17 nos. of 63% of owner-drivers that they have no other skills sutiable for earning a living. Of the 19 nos., 2 were unemployed, 4 were rickshaw drivers before they turned toto operators and 11 worked in some shop or factory. 14 among the 39 respondents have been in this business since before the last two years and 7 among them are also among the 19 that claimed to have no other skills. 10 nos. or 25% of the 39 respondents worked in some shop, 7 nos. or 18% in a factory, 5 nos. of 12.8% as rickshaw driver. 5 drivers (41% of the interviewed 12) had shifted from construction work or daily labour.

The operators were asked their reason for entering this job in two manners, first they were asked why they turned toto operators and *afterwards*, they were asked to explain the reason for changing the earlier occupation. In both cases,

the questions were multiple choice with the option of choosing more than one answer. The options were created and worded from the discussions previously held with groups and union leaders. In response to the former question, the opertors used to say they joined this business *"aro bhalo"* (=better) income without defining what they thought to be *"better"* as far as income was confirmed. In response to the latter question, they voluntarily to use to the term *"bandha-dhora"* which translates to a mix of fixed and steady and *"aro beshi"*(=more). But none of the options were read out to the individual respondent while conductiong the one to one interview. This way, the researcher has tried to capture the repondents' percpetion and that too, without influencing their mind, or without putting words in their mouth. The responses to the 2nd questions revealed more about the advantages of toto driving in comparison to the conventional works and it was found that people hoped to earn a *steady* living rather that a *higher* amount, from this new profession and to do that while staying near home, so this is not a "captive job" (Li et al., 2011) for the drivers. Toto driving was also considered to be less labourious (mentiond 20 times in the interviews, refer figure 9) than the former employments. During informal discussions, *"I was sitting idle at home, so father / uncle / elder brother bought me a toto to drive and make myself useful"* came up as a prompt and frequent response from young operators, with or without a previous occupation to the casually asked question "what got you started?".

Toto ownership

Among all 27 owner-drivers, 6 started as drivers and 5 among them has been driving since before 3½ years The statutes require that totos should be owned by the driver and not driven by anyone other than the driver. It is empathetic to the need of operators that have no other means of earning a livelihood. However, it is conflict with the way toto is perceived by the operators as a source of income. Toto is seen as a variant of a family shop or a shop run by a friend, i.e. family or community assest, where the community can be three friends. This is why, the number of totos owned by the respondent himself not given as much importance as the number of totos owned by the family. 11 of the totos were bought with loan from microfinance, 14 were not bought on loan and there was either no response or no knowledge about the rest. No toto was found to be bought under "Gatidhara" subsidy. None of the vehicles were owned by a female though on the KPEA register there were almost 10 nos. of female oweners and 3 pairs of totos whose owners shared common surname, which may be because they are from the same family.

31 nos. (26 nos. owner-driver) among the 39 respondents claimed that the owner of the concerend vehicle had no other toto in the family. 17 nos. or 46% of the operators were the only earning members in the family and this was their sole means of livelihood. 13 nos. or 33.3% had only one more earning member in the family. 3 drivers did not know the answer. Except two vehicles, all the others were ICAT approved vehicle many did not have all the necessary documents to apply for RTO. 8 of the vehicles were bought 2nd hand by the current owners and 18 were bought first hand. Rest did not know or did not respond to this question. 6 among these 8 were more than 1½ years old. At least 6 bought new totos from the association which means that they probably paid the extra INR 30,000/- above the actual price to the association.

Toto registration

29 out of the 39 surveyed claimed to drive before the split of route. However, when asked about registration process with KJTA, 31 responded. 23 among them claimed to have been members of KJTA though 9, including 4 drivers, could not recall any of the numbers held by the vehicle from that time. Every respondent has a KPEA number. Regarding KJTA registration, 11 respondents (owners) went and registered themselves, 6 were called by KJTA to register, 3 were not members. There was great confusion among respondents about what was the number given by the union and what was the number given by the municipality. 10 people could recall how they got the KM and T/M numbers among which 2 could recall both.

Daily earning :

Operators do not keep any account of their daily earnings. The first asnwer was "*nothing is fixed, there is 300 one day and 600 another, some days even 800. We can't say. It is not possible to say. No one can say."*. During duscussion,

a consented figure is INR 600/- per day earning and work 7 days a week. Appaently most live hand to mouth and do not care to keep an account. Among the 39 interviewees, 21 owners reported a daily earning within INR 600/- per day during. The drivers In the interviews, drivers on stands stated that they are happy to earn a roughly fixed sum of INR 600/- per day after shifting to the stand while before the split of route, their earning per day dropped to INR 400/- per day. Most of the time people travel alone or pair. When asked individually about working hours, number of trips and number of passengers per trip the drivers stated that on an average they work 10-12 hours a day from the Konnagar Station Stand, make 7-8 trips from the stand and 40% of the trips were reported to have been made by full vehicle (4 to 5 people). They also earned some amount from cruising, especially around noon and 2pm, and 3-4pm. Based on this the fare earned per day will be as given below.

Table 10. Calculation of daily earning of toto driver

Col. no.	Item	Formula	Value	Unit
A	No. of trips per day .	reported	8	Nos.
B	40% of 8 trips	40% of A	3	Nos.
C	60% of 8 trips	40% of A	5	Nos.
D	No. of passengers on each of 40% of the these trips (on 3 trips)		4 one way + 2 return = 6	Nos.
E	No. of passengers on 40% of trips	B x D	6 x 3 = 18	Nos.
F	No. of passengers on each of the rest of the round trips (5 nos.)		5	Nos.
G	Total no. of passengers in the rest of the 5 trips	C x F	5 x 5 = 25	Nos.
H	Total number of passengers carried on an average day	E + G	18 + 25 = 43, rounded off to 45	Nos
I	Per person fare (fixed throughout Konnagar Municipality, irrespective of distance traveled unless exceptionally long journey or wait time included)		10	INR
J	So, earning on an average day from trips	H x I	10 x 45 = 450	INR
K	Share of trips in a day's earning (stated during discussion) for those who use the stand as much as they can		60-70	%
L	So, earning on an average day	{J/(K70%)} x 100	642, rounded off to 650	INR

Advantages of toto according to operators' assessment of passengers' perception and experience

The advantages of toto were found out through indirect question first and then by direct questions. The indirect questions enquired the major causes of the success of totos are the situations and occassions under which the totos earn more than average (figure 8), the frequency of reserve trips (figure 9) and situations (figure 10) and trip purposes (figure 11) when totos were reserved. In spite of mentioning situations other than Puja and reserve, the respondents mentioned them because that is predominent as their source of extra income. Hence it was kept among the options. This again confirms that the respondents do not think in terms of rating and ranking and they are irritated when asked to answer in such terms.

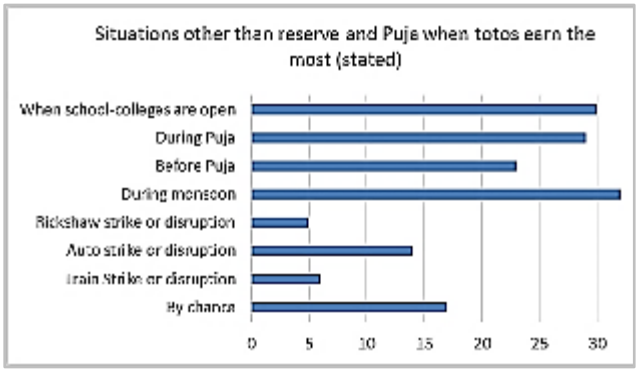


Figure 10. Situations other than Puja and reserve when totos earn the most

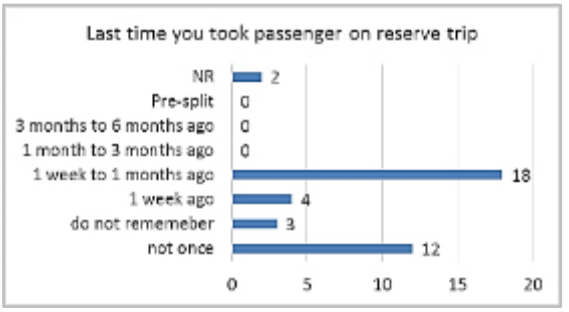


Figure 11. Last time the operator got a reserve trip (28 recalls)

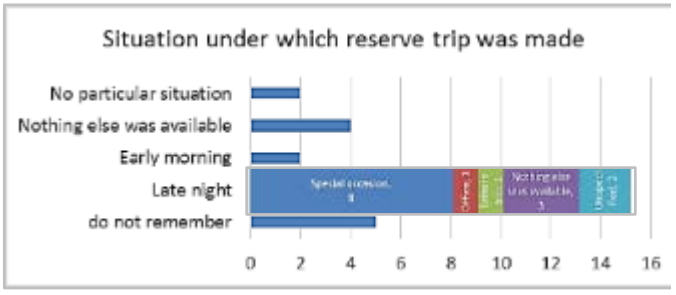


Figure 12. Situation under which the reserve trip was made among the 28 recalls

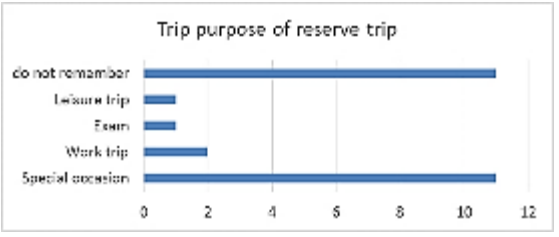


Figure 13. Trip purposes of reserve trip (28 recalls)

Out of the 28 times totos were last reserved to go outside territories, 18 happened within 1 week and 1 month prior to the interview. The frequency of “situations under which toto was used on reserve basis” was 15 out of these total 28 times different situtations were cited (figure 10). It was found that the 15 out of the 28 number of situations when totos were used on reserve basis was in late night and 9 among these were for attending a special occasion or leisure, i.e. occassions where a group of 2-5 people travel together at late hours. The commonest rate was INR 300/- for a return trip, i.e. 300/5= INR 60/- per person. Even though medical emergency was not mentioned in the personal surveys, it did appear during group discussions as a strong reason for reserving totos, and not necessarily at odd hours. These two situations provide a strong advantage over autos, that are spacious enough but neither deviate from route nor work during odd hours or on request and over rickshaws, which are slower, costlier (1km on main road will cost 60/- for two people, one way), difficult to bargain with and does not accommodate more than two person per vehicle and the driver is likely to be inebriated in late hours should he be available. The battery operated refit pedal rickshaws accommodate 4 people, have a speed of upto 45 kmph, are not particularly any more uncomfortable compared to totos and are thus perceived to be a major competition by totos.

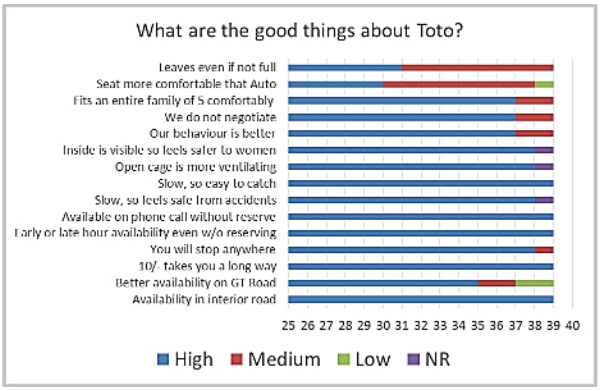


Figure 14. The "good things" about toto perceived by operators and rated

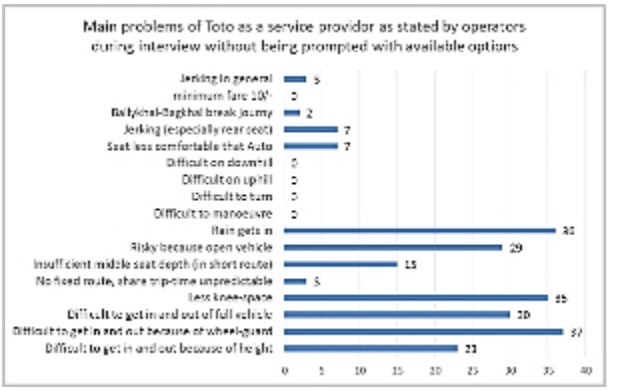


Figure 15. Problem of toto as service providers as perceived by the operators from their interaction with passengers

Competition

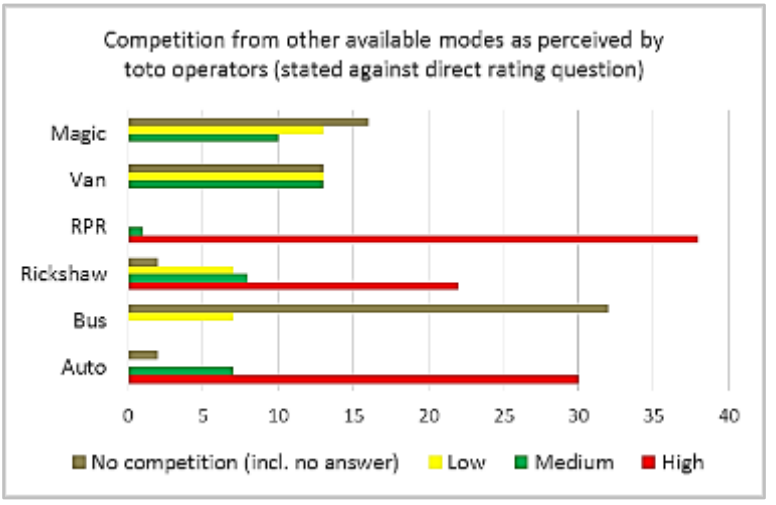


Figure 16. Perception of inter-mode competition

Informal institutions are crucial to maintain a supply-demand balance. Here, this balance in not only for a single mode operating on different territories but more importantly, a balance between different modes. In the discussions with bus operators and even some auto-drivers, it was frequently and vehemently insisted that the totos have put the buses (routes 3 and 54/2) out of business though no one mentioned that the fleet size of route 3 buses had already dropped within 20years, from 72 buses to 10 buses in 2014. In contrast, the interviewed toto operators do not perceive buses as a serious threat (figure 16). In the pilot study, operators and passengers from both the municipalities responded with "*What bus ? Where* **is** *the bus?*". Similarly, the small number of auto rickshaws were also not considered a threat because the nature of service provided was very different, totos filling the gaps the regulated, route-bound and monopolistic autos did not provide. Among these, the top are "last mile connectivity", "not waiting for the vehicle to fill up before leaving", "availability in odd hours and/or possibility of reserving on phone" (figure 14).

Shift time, work hours per day and work-days per month (not per week) are flexible and voluntary. Shft and daily hours depend, in addition the opertors physical ability, on the day's prediction of passenger number and the age of the battery. There is no designated number of leaves people take 3-5 full days off per month. During discussions, many operators said that physsically they could have driven longer hours everyday if the charge in the battery lasted longer. Batteries are charged throughout the night. Most batteries above 3months old need to be charged for an additional 4-6 hours during the day. Operators gave non-committal anwsers when asked about their preferred and common shift times, replying *"nothing is fixed"*. The question was rephrased as what they have been doing for the past week. To that question, 35 out of the 39 operators reported to follow the shift of "morning to early afternoon, then rest and

charging, then late afternoon to night". There are 3 out of the 39 who take out their vehicls between 5ams and 6:30am when autos do not ply and rickshaws are difficult to find. 15 out of 39 take out their vehicles around 6am to 6:30am and drive till 1:30pm to 2pm. 4 out of these 15 (and no one else among the rest) reportedly drive till 11:30pm to midnight. 7 out of 39 srive till 9pm to 9:30pm. However, 23 out 39 drive till 10pm and 11:30pm and they also start their afternoon shift between 3pm to 4:30 pm.

Toto owners were asked about their perception of the competition, or rather hostility, faced by the other modes (figure 16). They were asked to mention and rate their advantages over other modes, their perception of the difficulties or disadvantages of their service from the the point of view of passengers (figures 14 and 15). In addition to their perception, they were asked about the last time they carried people on reserve system, under what situation and what the trip purpose was (figures 10 through 13). There was little remembered by respondents beyond 3 months and some openly admitted to not remembering at all and this may be the case for some who said they never took a passenger on reserve at all since 7 out of the 12 responding such have been driving before the split happened, i.e. before territory division started to be strictly enforced. The rating choices were kept as high/more, medium, low/less, neutral and not applicable. Answer options were enlisted from wordings used during interviews and group discussions. Operators were asked what they thought to be the most important factors in an open ended question. These were marked as "high/more" by the interviewer. The remaining options were read out and repondents were asked their perception. Medium and low are vague in the minds of the respondents because they think only in terms of the most important ones and not rating and ranking. Numerical rating and ranking are not well suited for personal interview of operators as they do not think in this manner.

Toto operators admitted that the if available, people will opt for autos instead of totos even though the empty seat is more easy to spot in a toto and it is easier to catch the eye of a toto driver due to design and speed of the vehicle, thus totos are easier to hail. Totos receive the benefit of 'mere exposure effect' (Fang, Surendra, & Ahluwalia, 2007; Guillen et al., 2013) as their large number, flexible route and territory and time regulation make them practically omnipresent.

6.3. Effect on drivers and passengers after strict enforcement of territory division in September 2017

The unions have played significant role in rationalising route, negotiating between different parties, maintaining order at termini and institutionalising a system comprising of individual operators. The success of individuals under the rule of unions depend a lot on personal rapport and there is informal report of large scale malpractice and corruption. However, some unions operate in a transparent, impersonal and fair manner. As per the suggestion of RTO, Serampore, KPEA is trying to arrange a training ground for totos where driving test and on spot registration and license issue for toto drivers can be done. Drivers in Konnagar stand themselves maintain log as a substitute of hiring a starter at an extra cost. They also decide who will stay till late hours for the last train and ensure that passengers are not inconvenienced. In general, unions are responsible for creating the facility of a stand where space permits. Unions work with the police during festive season to maintain order on road by engaging volunteers.

In the case of Uttarpara and Konnagar, the decision of splitting the route has made large impact on the operating mechanisms of totos and other feeder modes in both the municipalities. From the survey of 39 drivers, results related to formal and informal mechanism are presented below.

29 out of the 39 surveyed used to drive before the split of route. 23 among them were members of KJTA. These 29 were asked whether they drove on Ballykhal-Bagkhal route in order to understand the effect of the split on them. 60% of them drove mostly on the interiors and 34% of them drove on G T Road (table 9) and 23 out of 29 have all been driving for more than 2 years. People driving on the interior routes are the most regular and enthusiastic users of the stands. As to the change in their lifestyle after the split, these 29 responded as below :

Increased income after split of association – 8 (big change) 7 (medium change) and 14 neutral
Increase in work hours – 10 (big change), 3 (medium change), rest neutral

Reduction of dead miles – 13 (9 reported increase in work hours and 3 reported decrease in work hours)

Table 11. Responses on driving routes prior to split

	Number of operators since						
13.7. Route / territory (pre-split)	last 6 months	last 1 year	last 1 1/2 year	last 2 years	last 3 years	before last 3 years	Total
90% or more of times on G T Road			1	4		5	10
Mostly cruising, seldom on G T Road		1	2	5	2	7	17
No, only interiors		1					1
No response			1				1
Total		2	4	9	2	12	29

It was found that obtaining RTO registration is not among their priorities, mainly because survive hand to mouth everyday with little saving. One owner of a registered vehicle volunteered "*only thing I have gained is extra expenses, now on a regular basis. Nothing else. Nothing.*". The reason for "wanting" to buy RTO registered vehicle is a fear of a distant future but the reason for not buying one is that the operators do not consider it a priority, yet. However, operators have flocked to union office when a newspaper reported (ABP, 2018) that Kolkata High Court has given an ultimatum to convert or procure totos in E-Rickshaws and most are not clear whether it is their familiar and already procured Municipality registration or the new RTO registration that was being strictly enforced.

During interviews in April-June 2018, when asked "Is this an RTO eligible vehicle?" 9 said yes but only 1 had RTO number. 3 among those 9 said that the ball lies in RTO's court. 4 did not respond. Of the 27 that said "no", 15 said that the model was eligible for registration but the paperwork was incomplete. Two more said that the vehicle is old and was bought before the amendment and will not comply with the technical requirements.

The major impact of the split is being felt by the passengers. A Rs. 15-20/- toto journey from Baghkhal to Ballykhal now costs 10 (Bagkhal to Konnagar Bata) + 10 (Konnagar Bata to Dharsa) + 10 (Dharsa to Ballykhal) = 30/-. But the most punishing effect is not monetary, but time, which is most valuable during the morning office rush. People unwilling to spend extra money and hassle waiting for totos twice, can chose to wait for auto for 20-30 minutes at Konnagar Bata. In the table 4, appendix 2, it can be seen that due to waiting time for autos in the current scenario and increased congestion on road, situation have become worse than what it was before the introduction of autos. Where in the worst case before the introduction of totos cost 53 minutes of a passenger's time from Bagkhal to Ballykhal in the morning rush hour, the best case by toto now costs 74 minutes and the average case by auto costs 50 minutes.

7. Conclusion

This research is a part of a doctoral thesis on user perception of feeder services. In addition, the researcher has studied a system under swift and effective change. In case of informal institutions, especially politically affiliated ones, the factors behind their working are beyond the scope of an individual researcher. Hence, the role of the researcher in the current study is more of an observer, rather effecter. The conclusion is more of a critique of the system in its formative and adaptive state.

7.1. Conclusions on methodology

The minute description of the research execution explains why interviews with poorly educated, prejudiced and insecure informal operators need to be checked and rechecked and how easily they are led to a certain answer by the way a question is phrased and the by the sequence of questions. While qualitative and group discussions may not be representative of the entire population, objective interviews may not even correctly represent the view of the individual interviewee in the first place. The informal sector works without a clear long term vision and little memory, hence reliability of their recall items and perceptions is also questionable. However, by keeping a detailed record and

maintaining an objective and impartial image, a researcher can convince the individual operators to speak their mind. The researcher needs be prepared to go back to the first principles, as prescribed by the grounded theory, and be prepared to re-think many decisions before taking any statement made by the interviewer at face value. A researcher needs to work with an honest acceptance of these shortcomings of the process before (s)he can proceed with rigorous analysis, especially using softwares like NVivo.

7.2. Conclusions on findings

The informal institutions are credited mostly with the maintenance of balance between demand and supply and provide a high level of service where the formal institutions have no role. Informal operators with or without affiliation to these institutions, work for individual interest and self-regulate to balance between individual needs and cooperative need. Mutual trust is crucial to inculcate self-discipline and self-monitoring among individual operators where no legal authority is available or effectual. Their specific mechanisms of achieving that balance and trust are predominated by the following activities.

Adaptive capabilities

As a result of the constant interaction and personal rapport with formal bodies (traffic police, RTO, municipalities), political bodies, individual operators and passengers, the informal institutions are privy to real time data and not accountable for their decisions. In absence of official data, their knowledge and influence is valuable. Being a new mode, the individual operators are yet to find a comfort zone that the auto and rickshaw operators have already become habituated to. The informal institutions use this situation to provide timely solutions, albeit often *ad hoc*, like controlling fleet size during a given timeframe, diverting vehicles and controlling queue on days when needs are specific, like festival, disruption etc.. The oversupply of totos makes resource allocation even easier. Modes like autos are more rigidly regulated and regimented, even if by semi-formal management, and as a result are incapable of responding to needs in real-time.

Recognising opportunities

The government policy of limiting the number of autos (closed permits system) have actually increased the number of illegal autos that cannot be controlled. It has not taken cognizance of the increased number of passengers over a period of 20-30 years. Government sponsored research and private industries have also failed to provide with a marketable vehicle. The toto has appealed to the nature of improvisation that Indians are famous for, providing the manufacturers and operators opportunities to experiment with greater freedom and break a monopoly of existing modes. At the personnel level, personal leadership skills can be honed and utilised leading to effective self-regulation at different levels. The informal institutions can act as motivators and guides.

Identification of service gap and utilisation of flexibilities

Autos are preferred due to their higher speed and ergonomic design and the totos are preferred for their easy availability at all times and location, flexible routes and on call availability. Buses are preferred for longer journeys but the uncertainty of seat availability and discomfort of carrying luggage, especially fragile ones make is perceived as a disadvantage. However, the freedom to manufacture and operate have exposed the service gaps in the existing system and the vehicle-design drawbacks of totos are compensated for by the soft services (Dhingra, 2011), increasing the advantage of totos. The passengers were taken for granted by the existing modes which had the opportunities to provide these soft services. New routes have been identified and developed, early and late hour services have been provided through the informal and self-regulatory system. Lack of routes and availability of cell-phones have worked as a catalyst in the customisation of services at a personal level and increased accessibility of individual vehicles. The development of footpath that acts as a terminus at Ballykhal (figure 20, appendix A) is a source of income for Bally Municipality and it was developed by interaction of informal institutions, Municipality and Police. The terminus at Konnagar station increases the dignity of toto as a mode in the eyes of operators and

passengers alike. In future, the present oversupply of SCFM can be further balanced once the metro station at Dakshineswar is operable but the territory division based on municipality boundaries will turn into a hindrance. Institutions can also be used to inculcate order among passengers, to follow queue and patronise vehicles using stands otherwise situation on road turns chaotic. The stand may be made to be shared by both the vehicles since a walk between auto and toto stand consumes time and the passenger does not get full information. The spirit of cooperation needs to be developed between formal, semi-formal, informal institutions and individual operators.

Building trust

In addition to bringing order among isolated operators by making their own rules, internal trust between the individual operators and informal institution are built in mainly three more manners that link the informal individual to the formal policy makers, i.e. liaising : (1) where the government regulations are explained and information is transferred to individual operators, (2) when the associating helps to subvert or bypass the rules and (3) when the institutions negotiates between the law-enforcement and individual operators, representing each section to the other.

The informal institutions need to create and maintain trust among operators and passengers in order to sustain their influential role. There is no formal way for the institutions to control the vehicles and coercion is the last resort. However, the individual operators feel alienated any financial burden, lost work hours and arm-twisting methods which eventually cause membership and enrolment in informal institutions to fall, finally ending in chaos. The operators become wary of the demand for political alliance sought in return for “facilities” provided by the informal institutions. When they are required to attend rallies and meetings to increase the head-count, they lose a day’s earning. Seeking special fees or favours for enrolment, forcing to buy vehicles, parts or services from certain agents result in eventual loss of authority and give rise to *ad hoc* remedial methods that are informal as well. Transparency in maintaining internal records, interaction with authorities and facilitation of registration, release of impounded vehicles etc. work effectively to gain the trust of operators. The operators are also benefitted when surge fares, festive fares, reserve fares, late-night or early-hour fares daily rent is centrally regulated by institutions, rather than left to being personally negotiated. At present there is no regulation regarding garage rent and electricity charge nor are there charging points provided by formal authorities. While the ward-rule remains vague, it has been promptly been rejected by individuals and supported by the informal institutions as impractical. The heuristic method of policy making will benefit from lessons from informal institutions.

The personal and group interviews show that totos are used as family assets by low income households. The legal requirement of binding a vehicle to one exclusive owner in order to provide livelihood to the poor can be more effective if the toto can be owned by a family or jointly and driving permits can be shared. Rules of ownership and permit are strictly formal activities and the institutions can negotiate the terms by explaining the grass-root level scenarios to the policy makers.

Even though “integration” of formal and informal modes are considered to be the jurisdiction of formal agencies, it needs to be appreciated and acknowledged that the informal modes and systems are *already* integrated, sometimes better than it could be with formal intervention.

Passenger trust is generated by a visible and respectable stand and office and with vehicles marked with ID numbers. Whereas the government policy is encouraging totos due to their zero-emission design, passengers are not particularly concerned about the environmental impact or safety or insurance, especially for mere 5 to 20 minute long trips. Passengers are more concerned about availability and accessibility of vehicles. As the union members request passengers to patronise vehicles in queue, to report rogue vehicles and misbehaving operators the antisocial image of totos can be improved and a better culture of cooperation can develop. Personal rapport at grass-root level of the little educated operators cannot be fully replaced by mobile devices and softwares. As seen from the user feedback on SmartE apps cannot not necessarily control the discipline and fares of cabs (Facebook, n.d.).

Improving level of service

Decongesting roads, identify practical termini or collection points increase the availability of vehicles to passengers. Building of trust is also instrumental in improving level of service. Two passenger totos can be more suitable for interiors roads as they are slightly smaller and be reserved like rickshaws. Thus increased trip length serving multiple ODs need not occur.

Self-predatory and conflicting interests and lowering quality of service

In spite of the incomplete survey, it can be said that even if informal institutions try to minimise competition and maximise profit for the informal sector entrepreneurs, unless their actions are beneficial for the end-users, the forcefully implemented regulations will not benefit the entrepreneurs. The unions need to rethink their stand on the splitting of the most important route in the study area and try to find a solution that will not victimise the passengers. While congestion lowers the service of the roads to other users, territory division without sufficient regards to market requirement reduces quality of service for the passengers and operators.

The usefulness of loose formal management simultaneously with flexible informal management was demonstrated by Kurokawa and Iwata (1984)…"*The effectiveness and efficiency of jeepneys have been achieved not only by their flexible operation but also due to flexible utilization attitudes of passengers and flexible or loose enforcement of regulations and control by the public sector"* resulting in "*relatively high level of services for a nation at the Philippines' level of economy ; good system coverage, high frequency of services, good availability of seats, reasonable waiting time and travel speed in most locations, reasonable walking distance, good affordability to the majority of people etc.*" even though average speed of jeepneys (due to frequent stops) are much less than that of buses. Informal institutions and individual informal operators perform intuitively and without any rule, control and accountability and enjoy the flexibility to experiment. They also work with commercial agenda, political agenda or agendas other than that of service provision. It is inaccurate to say that the informal institutions and self-regulation fill the gaps or make up for the shortcomings of the formal institutions. A good quality of service requires a combination of rigid and flexible methods to meet the ever-changing and heterogeneous micro level requirements. Informality cannot be abolished, especially for a new mode that captured the market almost organically. Both the institutions need to take each other in confidence for policy making ad execution.

Appendix A : Photographs

Figure 1. Association number and vehicle+ward no. stage1 side by side (UKM)

Figure 2. Association number in Bengali overwriting vehicle+ward no. stage-1 (UKM))

Figure 3. Municipality's temporary no. and old association no. side by side and same - UKM

Figure 4. Municipality's temporary no. overwriting vehicle+ward no. stage-1 (UKM))

Figure 5. Post-split station route label next to old association no. (UKM, July 2018)

Figure 6. Bhadrakali association label (UKM, May 2018)

Figure 7. Post-split station route label (UKM, July 2018)

Figure 8. Vehicle displaying RTO temporary number next to municipality's temporary number–UKM (Jul-18)

Figure 9. Vehicle with RTO number registration number and HMC parking tag displaying old association number (used for parking fee collection Aug-17 onwards) – UKM (Feb 2017)

Figure 10. Same vehicle with rear RTO number plate overwriting old municipal number and ward number – UKM (Feb 2017)

Figure 11. Vehicle displaying RTO registration and post-split route number (top right) – UKM (July 2018)

Figure 12. Same vehicle displaying RTO registration number plate next to municipality's temporary number – UKM (July 2018)

Figure 13. HMC parking sticker showing old association number used for fee collection – UKM (June 2018)

Figure 14. Ballykhal-Bagkhal route sticker, prominent, highly visible and route highly identifiable – UKM (July 2018)

Figure 15. Old association number commonly mistaken as Municipality TIN on a vehicle that was member of the old association but present status unknown - KM (August 2017)

Figure 16. TIN freshly received from municipality for the same vehicle – KM (August 2017)

Figure 17. Post-split, KPEA number above old municipality number-cum-old association number – KM (May 2018)

Figure 18. Municipality number-cum-old association number on a vehicle that is member of the old association but present status unknown - KM (June 2017)

Figure 19. Post-split, KPEA number on a vehicle with blank RTO number plate signifying it is a model compliant with MoRTH specifications – KM (May 2018)

Figure 20. A brand new vehicle from (Mahindra Arnesta, launched Nov 2017) with RTO registration number and ward number – KM (June 2018)

Figure 21. Ballykhal Toto stand and notice wall (left) on railway pylon (Oct 2017 after a holiday, 9-30am)

Figure 22. Ballykhal bus stand seen from Auto stand (Sunday, 1pm)

Figure 23. Ballykhal Toto stand on the day of the visit of the H'ble President (Wed 27 Jan, 2017, 8am)

Figure 24. Ballykhal bus stand cleared on the day of the visit of the H'ble President (Wed 27 Jan, 2017, 8am)

Figure 25. Ballykhal Auto stand typical workday (2017-2018 7pm)

Figure 26. Ballykhal Auto stand typical workday (2017-2018, 3pm)

Figure 27. Ballykhal bus stand, typical workday (2017-2018, 7pm)

Figure 28. Ballykhal bus stand, typical workday (2017-2018, 7pm)

Figure 29. Konnagar Station designated stand, typical workday (June 2018, 7am)

Figure 30. Konnagar Station Toto stand, July 2018, 3pm

Figure 31. Ramghat Crossing, July 2018, 1pm

Figure 32. Hindmotor Toto Stand, typical workday (June 2017, 7pm)

Figure 33. Hindmotor Rickshaw Stand, typical workday (June 2017, 7pm)

Figure 34. Konnagar Station non-stand toto October 2017, 7pm

Figure 35. Konnagar Bata Oct 2017, 1pm

Figure 36. Undesignated stand, Uttarpara College

Figure 37. Auto Stand, Uttarpara station

Figure 38. Konnagar bata - station bound auto stand, Oct 2017, 3pm

Figure 39. Uttarpara Station Toto stand, July 2018, 7pm

Figure 40. Fare Chart (as seen in Kolkata buses), Ballykal-Dharsa Toto (Aug 2017 onwards)

Figure 41. For comparison, auto rickshaw rates painted on board in Ballykhal stand

Figure 42. Ballykhal stand fee book, Ballykal-Dharsa Toto (Aug 2017 onwards)

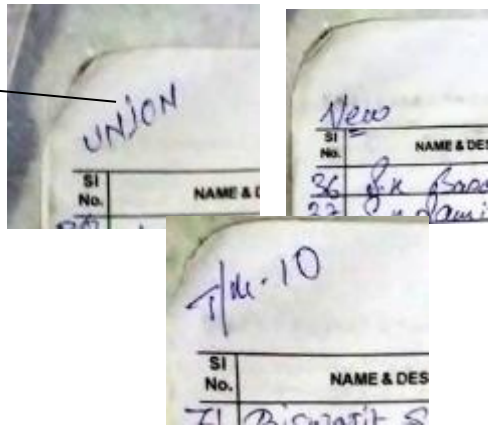


Figure 43. Three different types of number for vehicle identification by unions – this number is also mentioned in the HMC parking sticker (Ref figures 9 & 13)

Figure 44. KPEA owner register at association office (May 2018)

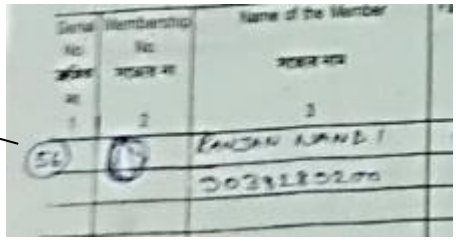


Figure 45. Vehicle number and owner's name maintained in the KPEA register

Figure 46. KPEA driver register at association office (May 2018)

Figure 47. KPEA Fee register (May 2018)

Figure 48. KPEA membership fee receipt book at association office (May 2018)

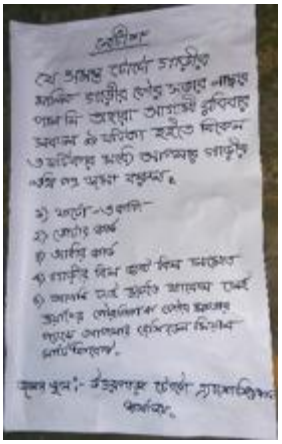
Figure 49. Copying of register at KPEA office April-May 2018)

Figure 50. Konnagar Station designated stand – log (May 2018)

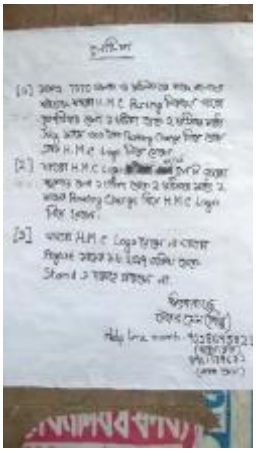
Figure 51. Konnagar Station designated stand – log (May 2018)

Figure 52. Konnagar Station designated stand, a driver checking log, typical workday (June 2018, 2pm)

Figure 53. KPEA members' register, three volumes and drivers' register, one volume (June 2018)

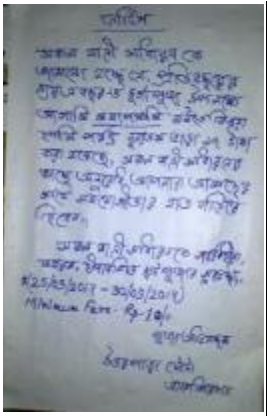


(a) Jan-2017, A2 size : call for Municipality registration



(b) August 2017, A2 size: Call for HMC logo

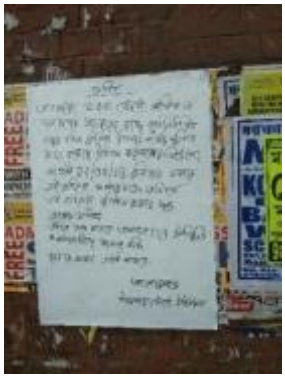
(c) August 2017, A3 size : Call for HMC logo



(d) September 2017, A2 size : Special increased fare for festive season (Durga Puja)

(e) Dec 2017, A2 size: restriction of using Ballykhal stand without HMC parking logo

(f) April 2018, A2 size : call for enrolling for HMC parking logo



(g) May 2018, A2 size : Enrolment of new members with the municipality not to be held on a said day until further notice.

(h) July 21, 2018 : Notice printed on an A4 paper stuck on a movie poster, asking all toto owners to gather at union office in the morning to participate in a state level political gathering and informing the owners and passnegers that toto operation will remain suspended from 9am to 4pm

Figure 54. Notices at Ballykhal Toto Stand

Figure 55. Uttarpara Idle Toto parking (Gouri Cinema)

Figure 56. Uttarpara toto parking at night (Gouri Cinema)

Figure 57. During a political gathering, toto drivers come to attend and park their vehicle on road at Gouri Cinema (May 2018)

Figure 58. Makeshift rain-guard on a non-standard vehicle – UKM (July 2018)

Figure 59. Makeshift rain-guard (umbrella) on a non-standard vehicle – UKM (July 2018)

Figure 60. "Open" auto rickshaw, easy to board yet almost as ventilating as totos at Uttarpara, G T Road (May 2018)

Figure 61. "Open" auto rickshaw, easy to board yet almost as ventilating as totos at Uttarpara, G T Road (May 2018)

Figure 62. Pedal rickshaw retrofitted with battery – UKM (July 2018)

Figure 63. Pedal rickshaw retrofitted with battery – UKM (May 2018)

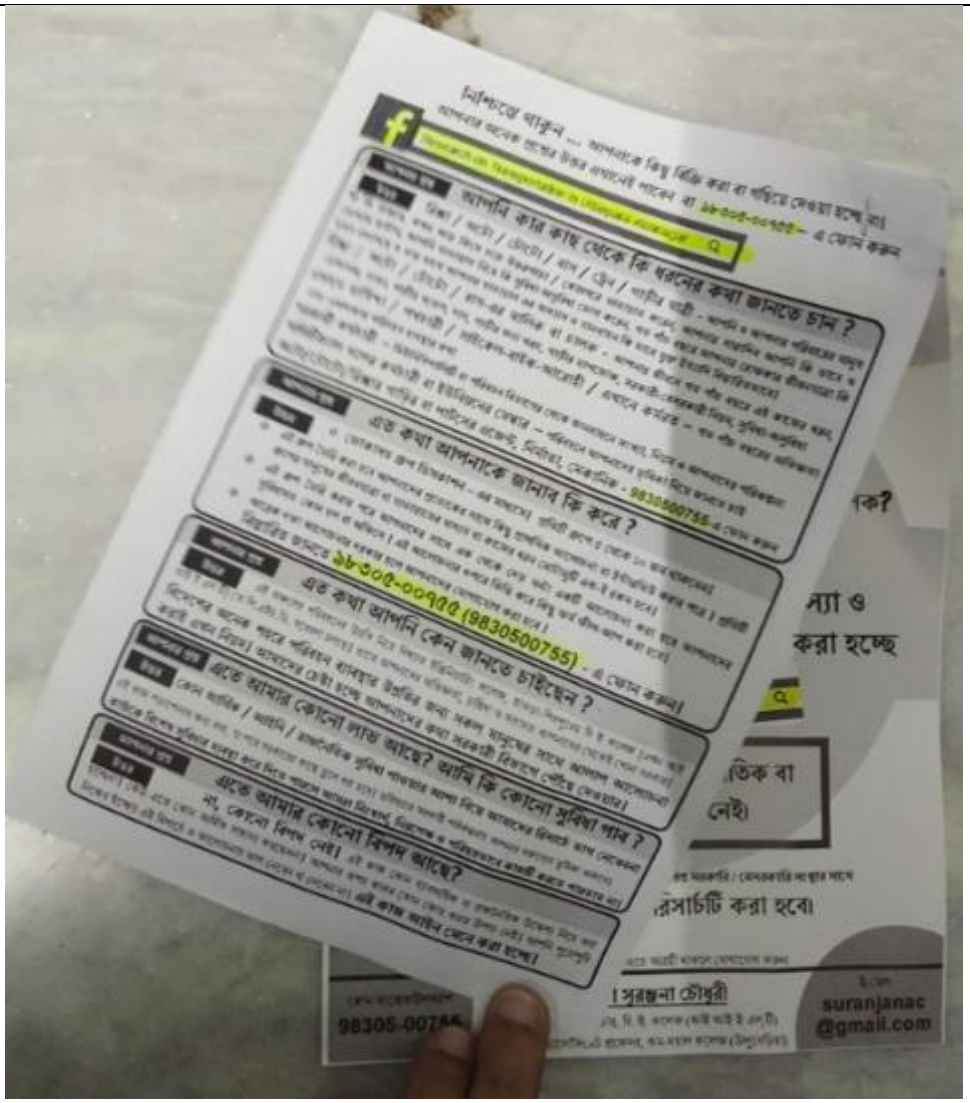


Figure 64. Printed pamphlet and FAQ

Appendix B : tables

Table 1. Secondary data on Totos in India

Sl. no.	City (State)	Total no. of elec. rickshaws in the study area	Drivers' sample size	Data colleced in	Context of study	Reference
1.	Delhi	NM	220	NM	RG	(Khanna et al., 2016)*
2.	Delhi	1,00,000	140	NM	OP, US	(Singh, 2014)#
3.	Delhi	NM	NM, 11 spots		RG	(CapaCITIES, 2017a)#

Sl. no.	City (State)	Total no. of elec. rickshaws in the study area	Drivers' sample size	Data colleced in	Context of study	Reference
4.	Delhi	1,00,000+ in 2010	400	2017 June	OP, US, RG	(CapaCITIES, 2017c)#
5.	Delhi	NM	NM	NM	RG	(Harding, 2015)
6.	Delhi	NM	NM but 53 vehicles tested for power	NM	RG, technical specifications of vehicles, emission rate	TERI study - (Kumar et al., 2017)#
7.	Barddhaman Town (West Bengal)	4000 (official records) 6000-7000 (author's survey), 565 among them with RTO registration	NM	2015	general	(Arindam Roy, 2016)*
8.	Delhi, Kanpur, Amritsar, Agartala, Rookee	NM	NM	NM	OP, US	(IUTI, 2015)#
9.	Siliguri (West Bengal)	NM	200	2017, Jun-Jul	OP, UN	(CapaCITIES, 2017b)#
10.	Siliguri (West Bengal)	8000 to 10000 in 2013	400	2017	OP, US, ST, RG	(CapaCITIES, 2017c)#
11.	Howrah (West Bengal)	20,000	Not applicable			(Anandabazar Patrika, 2018a)**
12.	India	NM	Not applicable			(Zielinski, Abraham, Thomas, Abraham, & D, 2014)
13.	Tripura State	NM	Not applicable		Statute	(Govt. of Tripura, 2014)
14.	Chandigarh Union Territory	NM			Press release	

OP = operator, UN = Informal Associations or "Union" US = User, ST = other stakeholders, RG = regulations, NM = not mentioned
* = peer reviewed, ** = newspaper report # = report,

Table 2. Different estimations of number of totos in Uttarpara and Konnagar

Municipality →	Uttarpara-Kotrung Municipality				Konnagar Municipality		
Association name →	UTA	UTA(S)	BTA	I and / or U	KPTA	KJTA	I and / or U
2013, November	first toto bought in Uttarpara (I)						
2014, January	12 totos in Uttarpara (I)				50-60 totos in Konnagar (I)		
2014 end to 15	Inception of UTA				NE	Inception KJTA	unknown
2015 January	213		unknown	unknown		unknown	
2017, January	300 documented + 25 undocumented but familiar to UTA		NE and unsure whether any totos plied based on route	44 to 50 in Hindmotor area, interior	NE	200 increased to 400 under KJTA,	unknown
	UKM documentation (225)			75+ U, I, mainly Hindmotor interior roads		300-320 in April 2017	
2017, Sep 17	Reorganisation of route and (informal jurisdiction)						
	Ballykhal-Dharsa route (200)	Ballykhal-Station route (25 to 30)	Kanthalbagan Stand (5-6)	Ousted to Makla (40 or 70)	Konnagar Station stand (125-150)	Other (200)	Ex-KJTA and unregistered with KPEA (50-60)	Ousted from Municipality area (unknown)

2018, July, 17	Ballykhal-Dharsa route (200)	Ballykhal-Station route (20-30)	Kanthalbagan Stand (50-70)	Ousted to Makla (40*, 70**)	Konnagar Station stand (60)	Konnagar interior, cruising (396-60) = 336	Ex-KJTA and unregistered with KPEA Old Union (50-60)	Operating in KMA, may or may not be from KMA (50 to 200 by various estimates)

* 2017, September general discussion, ** 2018, April 26, KJTA chairman, NE = non-existent, I = Independent, U = Unaccounted for

Table 3. Milestones regarding totos in the study area

Sl. No.	Event	Time period	Implication	Initiating agency	Role of government body	Role of toto union
1.	1st toto	2013, November	Introduction of toto	Individual	none	none
2.	Establishment of association in Uttarpara (a branch of political party in power)	unknown		Ruling party union in Municipalities	none	none
3.	Establishment of association in Konnagar	unknown		Ruling party union in Municipalities	none	none
4.	Parking stand construction	Q1, 2017	Queuing system and splitting for totos as per passenger's destination introduced in Ballykhal	Uttarpara Toto Association (person)	Facilitator, executor	Initiator
5.	Parking permit issuance	Q1, 2017 onwards	Restriction on totos to ply till terminus	Howrah Municipal Corporation and Bally Municipality		Facilitator
6.	Fare revision in Ballykhal-Bagkhal route	July 1, 2017		Auto and TOTO Unions	unknown	Initiator and negotiator with auto drivers
7.	Restriction on carrying 5th passenger next to driver			Toto Union	Police and civic police used to impound totos carrying fifth passenger	Initiator and negotiator with auto drivers
8.	GST tax levied, fare revision	July 1, 2017		Central government	none	none
9.	Hindmotor stand for totos (5-6 totos, figure 29 in appendix)	2016	Totos were to take passenger from station and return, even if empty so that next passengers can avail the service	Uttarpara Toto Union, Councilor in charge	none	Initiator & Negotiator with rickshaw drivers
10.	Kanthal Bagan stand for totos	Q2/3, 2017	2-3 totos parking space			The first rickshaw owner to become secretary of the union
11.	Starter employment at Ballykhal Toto stand	2017 April				
12.	Municipality number issuance (Uttarpara – twice)	Q1, 2017 onwards		Central government, enacted by Municipalities (Deendayal E-Rikshaws Scheme)	Initiator, enactor	facilitator
13.	Municipality number issuance (Konnagar)	Unknown				

Sl. No.	Event	Time period	Implication	Initiating agency	Role of government body	Role of toto union
14.	RTO Raid(s) in major junctures, Crown Gate, Konnagar Bata	2017 Q1 onwards	Expediting RTO registration	RTO, Police	Initiated and implemented	Negotiation between police and toto operators
15.	First RTO registration as per discussion with RTO official	24 Nov 2014 in Hooghly, Arambagh	unverified			
16.	First RTO registration (newspaper article)	March, 2017 in Serampore RTO	unverified			
17.	Split of association and route	September 2017				Initiation and negotiation
18.	Introduction of Winger shuttles at Ballykhal	Q1 2017	Increased demand for feeder service to Ballykhal	State government	Unknown	Unknown
19.	Introduction of retrofitted cycle rickshaw with battery in Hindmotor (Kotrung)	Q1 2014, now here are about 20-30 in Uttarpara and Konnagar combined	New competition to totos	individual	x	x
20.	Introduction of “ward rule”	Unknown	Restriction of area of operation	Unknown	Unknown	Unknown
21.	Repeal of “ward rule”	Unknown	Restriction removed	Unknown	Unknown	Unknown
22.	Prohibition on carrying 5th passenger on Toto	2017, July		Police	Impounding errant vehicles	Negotiator, facilitator, Initiator
23.	Notice on special increased Toto fare for festive season issued	2017, September	Last year it was not announced this “formally”, passengers were requested while on board	Uttarpara Toto union	none	initiator
24.	In Konnagar : Capping of rent to 300 per day for full day (10-12 hours) instead of a variable 300-350/- per day	2017, September	Relief	KPEA	none	initiator
25.	Konnagar station stand construction	Q1, 2018	Convenience of totos in Konnagar	KPEA	facilitator	initiator
26.	KPEA new union office at Konnagar Station	April 2018	Full time employee attends office to collect fees, address grievances and liaise between union leaders and drivers (no starter at station stand, drivers maintain their own log, see figures 47-49 in appendix)	KPEA	unknown	initiator
27.	Introduction of new bus on G. T. Road (Baidyabari-Ecospace)	2018 May	New competition to totos	State government	Unknown	Unknown
28.	Introduction of Uttarpara-Bhagabatipur bus route	Q2, 2017	New competition to totos	State government	Unknown	Unknown

Sl. No.	Event	Time period	Implication	Initiating agency	Role of government body	Role of toto union
29.	Extension of Uttarpara Bhagabatipur bus till Dakshineswar	Q4, 2017	New competition to totos	State government	Unknown	Unknown

Table 4. Journey time comparison in morning rush hour - best, average and worst case scenarios - Konnagar to Ballykhal trip

Stop, route, distance in km	B	A	W	B	A	W	B	A	W	B	A	W	B	A	W
	Auto									Toto					
	pre-toto			post-toto, pre-split			post-split			pre-split			post-split		
Bagkhal stop (W)	5	7	15	5	5	5	5	10	15	2	3	3	15	15	20
Bagkhal to Bata (IV) - 1.5	5	5	8	5	7	8	5	6	7	10	10	10	9	9	11
Bata stop (W)	0	0	0	0	0	0	0	0	0	0	0	0	20	30	40
Bata to Dharsa Petrol Pump (IV) - 1.48	5	7	10	5	10	12	6	8	11	8	12	15	5	7	15
Dharsa Petrol Pump Stop (W)	0	0	0	0	0	0	0	0	0	0	0	0	5	10	20
Dharsa Petrol Pump to Ballykhal (IV) - 4.22	15	18	20	15	20	25	15	20	23	20	25	30	20	25	30
Waiting time (min) for entire trip	5	7	15	5	5	5	5	10	15	2	3	3	40	55	80
In-vehicle time (min) for entire trip	25	30	38	25	37	45	26	34	41	38	47	55	34	41	56
Total time (min) for entire trip	30	37	53	30	42	50	31	44	56	40	50	58	74	96	136

W = waiting, IV = in-vehicle,,
B = best scenario, A = average or most common scenario, W = worst scenario, split = split Ballykhal-Bagkhal route at Dharsa Petrol Pump

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