Mediating Infrastructural Discipline: Established Practices and Changing Structures of Dar es Salaam's Transport Sector

Malve Jacobsen[1] (ORCID)

Abstract

This article discusses the interplay of urban transport infrastructures and their need to and of discipline. Drawing on participatory observation, ride-alongs, and interviews, it elaborates the case of BRT introduction in Dar es Salaam and illustrates how various humans and nonhumans needed to be disciplined so that the Dar es Salaam Rapid Transit system could become operational. Referring to the conceptualizations of mediating technologies (Latour, 1994) and disciplinary devices (Ureta, 2012), this article elaborates how the new transport system disciplines its environment, and how it is itself disciplined through different norms and materialities. However, discipline did not realize as planned. De-scriptions (Akrich, 1992) of the system's disciplining technologies occurred, as practices turned out differently. New forms and effective combinations of established practices and changing structures have led to fluid formations of urban transport. Two perspectives enable to deeply understand this transitional process. First, a sociotechnical perspective shows how agency has been (re)distributed and mediated through technologies and artefacts that were implemented to secure smooth bus operations. Second, a historical perspective elucidates how previous and prevalent practices of Tanzania's minibus system and other road users impacted the formation of DART. The article hence demonstrates that technological innovation and spatial reorganization do not only lead to new forms of discipline, but to ongoing mediations and negotiations of transport practices.

Keywords Bus Rapid Transit · Daladala · Dar es Salaam · De-scription · Discipline · Technology

✉ Malve Jacobsen
malve.jacobsen@uni-mainz.de

[1] Institute of Geography, Johannes Gutenberg-University of Mainz, Mainz, Germany

Introduction: a New Mode of Transport in Urban Africa

After decades of minibus systems shaping and dominating public transport, Bus Rapid Transit (BRT) systems are on the rise in urban Africa. BRT proponents present this mass rapid transit system as a tremendous upgrade of African urban transport, as BRT promises to bring comfortable, efficient, and reliable transport services to cities that have been predominantly shaped by minibus systems. Such a transformation entails new rules and practices, which need to be negotiated between the various road users, including the technology itself. This article discusses the interplay of urban transport infrastructures and their need to and of discipline. Taking the case of the introduction of BRT in Dar es Salaam, I illustrate how various humans and nonhumans needed to learn new forms of discipline to make the system work. I apply terms that have been shaped by works of Science and Technology Studies, which enable me to describe the new relations and practices in Dar es Salaam's transport sector. Thereby, I discuss to what extent the new mode of public transport requires other forms of infrastructural discipline than the prevalent minibus system.

First, to grasp the development of a technology, an infrastructural planning process, as well as the implementation and adaptation of a technology, I refer to Akrich's terminology of scripts, inscription, and de-scription (1992). In her work, she uses the case of a photoelectric lighting kit, which was designed in France and applied in Western Africa. She shows how the ideas of the designers, the political agenda behind such technological projects and the actual circumstances where the technology is used might differ, and shows how challenging but equally important it is to "to uncover the links between technical choices, users' representations, and the actual uses of technologies " (ebd., 208). Second, to understand the relationship between discipline and technology, I draw on the conceptualizations of mediating technologies (Latour, 1994, 1999) and disciplinary devices (Ureta, 2012, 2015). These two concepts help to grasp practices of adapting, mediating, and negotiating discipline of new transport systems. Whereby Latour analyzed different objects like the Berlin key or a speed bump, Ureta's work examines the reform of Santiago de Chile's metro system. What unites these conceptual terms is the understanding of technologies as actors that interact with its designers and users, or as Latour (1992: 225) puts it: "determine or compel certain actions"–but not necessarily in the way designers and planners inscribed discipline and control into them.

The Tanzanian BRT system Dar es Salaam Rapid Transit (DART) was neither planned nor built on neutral ground, which means that pre-existing transport systems, with their structures and practices, have shaped DART significantly. A key concern, and the most intensively discussed topic in Dar es Salaam, has been the degree of disciplining DART's users–to be able to clearly distinguish DART from the minibus system, to meet international BRT standards, and to enable safe and reliable operations. Moreover, I show that disciplining has not materialized as planned since newly created forms of infrastructural discipline and effective combinations of old and new practices have led to fluid formations of urban transport.

Initiated as a pilot project in Africa, Dar es Salaam's BRT system opened its first route in 2016. Since then, DART has led to multifarious transitional processes

in Tanzania's economic and political center. This public transport system has won fame particularly in cities of the Global South because it enables a comparatively fast and low-cost realization of mass transit for rapidly growing cities (Hensher, 2007; Pirie, 2014). BRT has become a global policy model, distributed by transport consultants and technocrats. This system aims for creating a metro-like condition on the surface. Along the lines of "Think rail, see bus!" (ITDP, 2018a), the idea is to combine the advantages of rail and bus systems to "high capacity at low cost" (Wood, 2015a), which means to operate independently of road traffic and congestion, as well as cost-efficient construction, maintenance, and operations. Through BRT's material and organizational characteristics like dedicated lanes, off-board fare collection, and centrally scheduled departures, urban transport is intended to become more efficient, reliable, and sustainable–particularly in comparison with minibus systems (Hertel, 2008; ITDP, 2018a, b). The BRT model hence promises to be the perfect solution for Dar es Salaam. The city is one of the fastest growing cities worldwide. It has serious congestion problems and limited financial resources to cope with the urban growth.[1]

Since BRT is a relatively new phenomenon in Sub-Saharan Africa, it has entered academic debates just in the last decade (c.f. Appelhans et al., 2020; Jacobsen, 2020; Wood, 2022). Works deal quite differently with this transport system, which arrives in cities whose transport sectors are mainly defined by deteriorated infrastructures, lack of funding, extended minibus systems, and high shares of non-motorized transport activities (Pirie, 2014; Sietchiping et al., 2012). More broadly, most BRT studies focus either on the rather practical sides of BRT planning (c.f. Ferbrache, 2019; Höhnke, 2012; Poku-Boansi & Mardsen, 2018) or on the political dimensions of global BRT diffusion and local implementation (c.f. Ardila, 2020; Sajjad & Javed, 2022; Wood, 2015b). The former are mainly informed by transport and governance studies, deal with questions of BRT's challenges and benefits, and use terms like "successful", "effective adaptation", and "potentials". The latter have shown that BRT is not a neutral transport model but that it is used as a political means to demonstrate or facilitate certain political action on both global and local scales.

A few works on BRT, inspired by theories and methodologies of Science and Technology Studies, are in-depth studies that offer an understanding of how BRT interacts with the context in which it is set, and how this technology acts as a social and political agent (c.f. Jacobsen, 2017, 2020, 2021; Ureta, 2012, 2014, 2015). In addition to an in-depth investigation of BRT practices in Dar es Salaam, this paper takes the historical context into consideration. Daladala[2] are still very much present in the urban landscape, doing their bit to influence DART's becoming. Investigating historical continuities and how they might change over time does not only inform us

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[1] Urban sprawl and an expanding middle class are the key factors of Dar es Salaam's rapid urbanization, including a rising private car ownership and general need for mobility. In the last decade, several car-centered transport infrastructure projects have taken place in the city: bridges and fly-overs were built to ease congestion.

[2] Minibus systems in Tanzania are called daladala. The term refers to the mode of transport, the service, or the buses themselves.

about the past, but also about the present, and they might give us an idea about the future. It is argued that only by approaching the structures, practices, discourses, and materialities closely, and searching for connections to previous ones, we can effectively grasp an infrastructural transition.

Ethnography: Gathering and Riding Along

Understanding DART and the deeper structures behind its controversial and prolonged implementation cannot be a straightforward process. Following traditions of Science and Technology Studies, I applied different ethnographic methods. According to my research subject, I took humans and technologies equally into account.[3] Ethnography is an orientation to explore the messy natures of the social world (Crang & Cook, 2007; Hine, 2007). By using the metaphor of "gathering," I took an iterative, multi-locale approach that includes ambiguity and incoherence. According to the Law, gathering means bundling, and helps us to phrase ramifying relations: "To gather is to bring 'to-gether'. To relate. To pick (as with a bunch of flowers). To meet together. To flow together" (2004: 100). Gathering is hence a way to detect how the nonhuman and human actors of an assemblage shape it (see also Latour, 2004).

I became mobile myself, adapting to the practices of DART's buses, drivers, and passengers, as well as to those of other road users. I followed several periods of planning, implementing, and operating DART, and joined inaugural events and everyday operations. In addition, I conducted 75 guideline-based interviews with managers of the bus operators, urban planners, politicians, transport consultants, etc., and since 2015, I have followed local media and chats of a WhatsApp group that serves as a DART discussion and information platform for politicians, consultants, and operators. Inspired by the methods go-along (see Bissell, 2010; Kusenbach, 2003) and ride-along (see Brown & Spinney, 2010; Spinney, 2015), I accessed lived experience in situ to find out how individuals engage with their social and physical environments. I spent numerous hours on the buses, at bus stations, and the bus depot, walking along the BRT corridor, using daladala and motorbike taxis on the same route. I carefully observed how the physical infrastructure changed shape over the years, and I talked to people doing the same as I did: being part of Dar es Salaam's urban transport system. Moreover, I joined the practical trainings of DART's new bus drivers for several weeks, which gave me irreplaceable insights into how people and the novel technology got to know each other, like for instance: the learner drivers' initial difficulties to approach the stations to be close enough for the passengers to embark and disembark, or the abrupt and hard braking, which did not comply with the driving teachers' understanding of passenger comfort. I documented my experiences by

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[3] The findings of this article are based on ethnographic research in Dar es Salaam in 2015 and 2016, as well as on digital ethnography carried out since 2015. I conducted interviews and conversations in English, German, and Kiswahili. I translated all quotes from interviews, field notes, pictures, and videos to English.

field diary entries and video and audio recording. Especially on the BRT corridor, I deeply understood how DART interacts with the manifold actors of the city's transport system.

Reorganizing Space and Mobility

With DART, a new sociotechnical understanding of urban transport has developed in Dar es Salaam. The city has become more complex–not only through new humans and technologies, but also through newly evolving logics and normativities of movement. The BRT system has created new spatialities and temporalities. DART is rapid indeed, but congestion has not disappeared. Residents and businesses have been resettled, daladala have been relocated to other routes, new companies and government units have been created, and new rules and laws have become indispensable. The components of DART's physical infrastructure have become actors themselves that materialize these normative policies. Technologies like the bus corridor, ticket scanners, and electronic displays are inherently political, just as low-hanging overpasses, parkways, and provincial roads (see Gandy, 2002; Harvey, 2010; Winner, 1980). By reorganizing the city, DART must meet bigger expectations than simply improving urban mobility. Since BRT is supposed to be "more than transport" (ITDP, 2018b), DART must contribute directly to urban development in socioeconomic terms.

The reorganization of society and space goes hand in hand with disciplinary techniques. Discipline, as a technology of power, is carried out from institutions. It targets individuals, often via their bodies (Foucault, 1979; see also Dale, 2005; Marquardt, 2017; Rabinow & Rose, 2003). Disciplining urban space and society comprises normalization and control, which has become a widely discussed topic in politics and academia, especially regarding technologies of surveillance and digitalization. Studies on smart cities describe how the dimension of power and knowledge is increasingly shaping the urban, and how it leads to new social and political questions of urban governmentality, e.g., by governing the city at a distance through control centers (Klauser et al., 2014; Vanolo, 2014; Wang, 2017). Control centers like the one for BRT operations in Dar es Salaam–inevitably showing similarities to Foucault's conceptualization of the panopticon–do not only manage traffic, but also govern infrastructural flows. Investigating the control center of Rio de Janeiro, Luque-Ayala and Marvin examine a "developing form of circulatory control through information technologies" (2016: 192). However, I will demonstrate that infrastructural control is not only exercised through big data and surveillance, but also materially and morally.

Point of Departure: Public Transport in Dar es Salaam

DART's practices are inextricably linked with daladala practices. Previous prevalent practices shape DART at least as much as DART's material and legal framework does. According to Ferbrache, BRT is "always already embedded in (and becomes

part of) the materialities and immaterialities of places and people associated with these urban spaces" (2019: 2). In addition, Emanuel et al. (2020: 3–4) claim that the long lifespan of urban mobility systems and their ideals is reflected in current mobility systems. Thus, to grasp the current reorganization, adaptation, and negotiation in Dar es Salaam's transport sector, it is crucial to cast a glance at the history of the city's public transport.

Daladala has been the main mode of public transport for decades, used by the large majority of urban residents (Kanyama et al., 2004: 68; Nkurunziza et al. 2012: 13). More than 7000 vehicles did approximately four million daily trips in 2015, i.e., before the opening of the DART system, which now offers around 300,000 daily trips. In 2013, daladala served 98 per cent of the city's road-based public transport (Behrens et al., 2016: 11). Daladala's history started in late colonial times. The privately owned British Dar es Salaam Motor Transport Company was founded in 1947 and nationalized in 1970 as part of Nyerere's socialist politics. Shirika la Usafiri Dar es Salaam, the successor of the Dar es Salaam Motor Transport Company, held a state monopoly in Dar es Salaam. It was not allowed to operate commercially and had to maintain low fares. Over the years, its service deteriorated and concurrently, private transport operators–daladala–started to offer transit services in the late 1970s. Only in 1983, the Tanzanian government officially allowed daladala to offer public transport services. From then on, the daladala sector was growing quickly and constantly (see also Kanyama et al., 2004; Rizzo, 2017; Sohail et al., 2004).

Many scholars and transport consultants refer to minibus systems as "paratransit"[4] or "informal" (see, e.g., Behrens et al., 2016; Cervero, 2013; ITDP, 2017) even though daladala is (at) the core of public transport, not only due to its high number of users, but also due to its fixed routes and transfer points. Furthermore, the Tanzanian government regulated daladala operations in 2004 through route licensing, coherent route signage, and standardized fares (see also McCormick et al., 2016: 61). In addition, despite minibus systems' high efficiency, transport consultants often claim that minibus systems are incapable to transport today's growing populations in African cities. In consequence, they are supportive of centralized public transport systems, with a strong preference of BRT: "planners either did not see daladala as a sociotechnical system that could be improved by existing users and makers and/or considered the vehicles so undesirable and inconsequential that they could be easily replaced by an RT model" (Grace, 2021: 292). To strengthen their argument, planners and consultants often describe minibus systems and BRT systems in binary terms. While BRT is attributed with comfortable, predictable, professional, and safe, minibuses are supposed to be uncomfortable, unpredictable, unprofessional, and unsafe. Politicians, consultants, and funders who were in favor of a BRT system for Dar es Salaam also used the rhetoric strategy of a supposedly malfunctioning daladala system and the metaphorical image of minibus versus BRT to realize a neoliberal technological order in which a centralized system is expected to be the better choice for a rapidly growing city (see also Grace, 2021; Rizzo, 2017).

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[4] "Para" means "alongside," "beside," or "at/to the side of.".

This dichotomy does not reflect the actual practices of daladala in two means. First, daladala have offered reliable services on high frequency for decades. Rizzo (2011, 2017) further depicts the underrepresented perspective of the daladala industry, which must sustain itself without direct public subsidies. He highlights the precarity and harsh working conditions of the daladala sector: no secure work contracts, no regulated working hours, and poorly maintained physical infrastructure. As we will see later, at times uncomfortable (and hence unsafe) journeys and unpredictable departures are even more an issue of DART than of daladala. Second, due to the historical paths of transport ideals in general and context-based mobility practices in specific, daladala and DART have quite a lot in common. Both systems operate on high frequency with similar operational hours and fares. Moreover, DART's network is inspired by daladala regarding routes and the location and names of the stops.

These two bus systems differ too; particularly regarding their operational model and concomitant operational ideals, for which disciplined technologies and humans are essential. For instance, in contrast to the dispersed private ownership of daladala (whose owners are only partially organized in companies or associations), DART is intended to run under an international public–private partnership. Moreover, the conductor's range of duties executed in the daladala system–collecting passengers and fares, announcing the next station, and letting passengers disembark and embark–is distributed among several actors of DART. DART's buses are equipped with station attendants (that give various kinds of information, sell tickets and smart cards), a GPS technology (that knows the location, next station, and destination of the bus), and several electronic devices of an intelligent ticketing system (that calculates fares and–assisted by electronic turnstiles–lets passengers into and out of the enclosed stations). Nevertheless, daladala operations and the sector's structure entail discipline too. For instance, passengers know they must squeeze during rush hour, drivers must let passengers disembark at each official stop, and conductors must hand out change on time. But as daladala's forms of discipline have evolved over the years and decades, they have been negotiated more subtly.

Discipline of the New System: Inscriptions and De-scriptions

The service providers of DART and the DART Agency, a semi-autonomous governmental entity that has been regulating and moderating the DART project from planning to operating, aim at disciplining the system's various users, who are bus passengers and other road users like pedestrians, daladala drivers and passengers, motorbike taxi drivers, and users of private vehicles. This has been a challenging task as the city's transport practices were already densely shaped by overlapping inscriptions and de-scriptions.

> September 2018. After more than two years of operation, the governmental DART Agency publishes the DART Documentary, in which two singers explain how to use DART in an orderly and respectful way (DART Agency, 2018). They address the special seats, the dedicated lane, and how to behave in situations of overcrowding. Ear worm guaranteed!

October 2018. After newspapers published a photo that shows how people were entering a DART bus from its windows, the service delivery manager of the bus operator warned their[5] colleagues in the WhatsApp group that DART might become a "modern daladala", losing its international reputation as a high-quality BRT system.

Understanding DART as an assemblage of various actors and relations, discipline is inscribed in DART. Signs and symbols, colors, and letters tell people how to behave. Assemblages are full of scripts, which assign different, but interrelated roles to the actors. According to Akrich, scripts are the products of planners' or innovators' visions about "the world in the technical content of a new object" (1992: 208). However, users do not necessarily comply with initially defined scripts. By employing technologies in a different manner than inscribed into them, users describe roles: "To be sure, it may be that no actors will come forward to play the roles envisaged by the designer. Or users may define quite different roles of their own" (ebd.). Ureta (2015) emphasizes that planning always involves the unexpected, as scripts are unable to capture everything. Whereby some scripts of transport assemblages–like the standardized platform height of a BRT station–cannot easily be altered, other scripts change throughout the process of design, operation, and maintenance (see also Pineda, 2010, 2011). Moreover, order, control, and discipline have also been delegated to and mediated through technologies themselves. Technical objects define and stabilize relationships between actors, and their political strength is inscribed into their materiality (ebd.: 220–222).

Discipline also played a central role in the trainings for future DART drivers, whose majority used to work as lorry drivers before. Initially, the DART Agency planned to employ daladala drivers for the DART system, anticipating that they would lose their jobs in the daladala sector due to the competing service that DART offers. But, in collaboration with the driving school, the DART Agency then decided to preferentially engage lorry drivers because they were experienced in maneuvering long and articulated vehicles. Driving according to the general traffic law and to DART-specific regulations turned out to be quite challenging for the new BRT drivers. During trainings, drivers were requested to readjust their driving skills and to internalize the behavioral ideals of DART's services, which the leading driving instructor repetitively recited: comfort, safety, and customer care.

I observed that restraining themselves to the operational speed limit was the most difficult task for the future DART drivers. Apart from safety concerns, the maximum speed secures the adherence of timetables and bus frequencies. Often, the driving instructors made their students aware of the speedometer, which gives them the opportunity to control their speed themselves. Most drivers underestimated their speed because they had not driven a bus with such a strong but silent engine (located at the rear of the vehicle) yet. Additionally, they had not been used to a functioning speedometer. DART's buses are equipped with another technology to prevent drivers from speeding: when buses exceed 50 km per hour, a highly beeping sound

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5 I use *they/them/their* as pronoun to include all genders without attributing gender to individuals.

rings out to remind the driver of that limit–another technology hitherto unknown to many drivers in Dar es Salaam. It has turned out that they simply ignore the noisy sound and speed wherever the corridor allows. Hence, the beeping is no longer a guarantee for maximum speed in Dar es Salaam. The CEO of the DART Agency joked that speeding drivers perceived this sound as music rather than as a warning signal. Thus, DART's drivers are more resistant to this disciplining technology than Latour, who could stand the alarm of his unfastened seat belt for only twenty seconds (Latour, 1992: 225). If Latour had gone to Tunis, he could have helped himself with a mere metal buckle, available on the city's markets. Circumventing the safety script of a vehicle, this artefact inactivates the alarm by fixing the buckle without the seat belt. This innovation enables drivers–who are apparently more sensible to beeping sounds than Tanzanian lorry and bus drivers–to not adapt their driving to the script of the initial technology. They can quickly (dis)embark their vehicles without being bothered by neither the seat belt nor the alarm.

During the trainings, DART drivers also learned a welcome and safety note (in Kiswahili), which explains to the passengers how to behave in the bus:

> Good afternoon, dear passengers. My name is Jason. I am your driver. Announcement: Those passengers who are standing, I beg you not to stand in the yellow marked door area because our doors open with electric sensors. I also ask you not to throw your waste on the floor. Put the waste into the dustbin. Thank you very much. Have a nice trip.

At the very beginning of operations, in May 2016, drivers still aimed at following these ideals of comfort and safety. Nevertheless, practices changed soon due to time constraints and a perceived lack of necessity on behalf of the drivers. After a few months of operations, DART drivers generally followed the traffic laws and DART-specific regulations, without taking much care of comfort, safety, and customer care. Their style of driving differs from lorry and daladala drivers though, who have to consider the actual road conditions more than existing traffic laws because they do not experience special treatment on the city's roads and because dedicated BRT lanes are in a much better condition than the mixed-traffic roads.[6] For instance, through offensive driving and frequent stopping, daladala drivers request the outer lane in many parts of the city because they slow down the average travel speed. This behavior makes it less attractive for other road users to drive on that lane. This practice has de-scribed the use of the outer lane and turned actual road and traffic conditions into unwritten traffic rules so that daladala receive traffic priority on the outer lane. This lane is not officially inscribed in the city's traffic law but inscribed into daily traffic practices. It moreover reminds of DART's dedicated lane, which, in contrast, is an official part of the city's new traffic law.

However, DART's designated lane, indicating that exclusively DART buses are allowed here, had to be enforced too. Drivers of private vehicles tried to de-scribe

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[6] The first DART corridor was built with concrete slabs. Concrete roads cannot get potholes and promise to last significantly longer than the other roads in Dar es Salaam, which are either tarmac roads or unpaved roads.

the dedicated lane but failed in the end. The DART Agency reacted with additional traffic laws, crash barriers, and curbstones, and publicly denounced those who performed "matumizi mabaya ya barabara": bad road usage. The script of the dedicated lane had been under negotiation so intensively because it was the first lane with dedicated rights at all in the city. Additionally, people were tolerated when using this lane during the prolonged construction time.

Hence, pre-existing transport experiences and skills continuously impact DART's script of discipline despite the script's strong material and legal character. In addition to drivers' action, traffic laws and public campaigns addressing the users' conscience and reason were established. One challenge was that certain DART-specific traffic laws were passed only after launching DART operations, i.e., when certain daladala practices had already been taken over and stabilized. Moreover, public information campaigns only followed after accidents, overcrowding, and fare evasion had become serious issues. As discipline has been introduced intermittently during operations, the process of disciplining DART involved uncertainty, on the one hand, and made flexibility necessary, on the other hand. Inscription as well as de-scription can therefore be understood as a form of negotiation and adaptation.

With its ongoing construction, DART is gradually becoming a system on its own. Nevertheless, daladala has become a part of DART because the BRT system heavily relies on daladala's route network without which using DART would not be an option for most passengers. Until DART will operate as a networked system of its own, many new BRT corridors and feeder routes have to be built. In this way, the description "modern daladala" could be read as a new, fluid form of public transport in Dar es Salaam instead of a warning to lose international reputation.

Mediating Technologies and Disciplinary Devices

Disciplining DART's various users is inscribed into the materiality of DART's infrastructure: curbstones, displays, fences, speed bumps, barcode scanners, zebra crossings, signs, turnstiles, and hydraulic doors enforce BRT-specific normativities of urban mobility and connectivity. Evidentially, enforcing discipline does not always occur as planned. Taking three examples from DART that involve shoes, seats, and concrete in the following sections, I depict how the new mode of urban transport is not only characterized by discipline, but also by fluidity.

That both Latour (1994, 1999) and Ureta (2012, 2015) illustrate their concepts–mediating technologies and disciplinary devices–by using moments and materialities from the transport sector, point to the high need of disciplining mobility and transportation. The concepts describe how agency is mediated to materials and things to enforce discipline. Particularly in dense areas, discipline is a precondition for safe, reliable, and comfortable travelling. Even though both concepts have much in common, they differ in detail. Following his work with Akrich on human and nonhuman assemblies (Akrich & Latour, 1992, 1992), Latour (1994, 1999) defines the exchange of properties between society and matter as technical mediation or technical delegation. Mediating technologies have agency that humans delegated to them by inscribing it into the technologies' materiality. Latour distinguishes

between moral (exercised by signs and words) and force (exerted by these mediating technologies). For instance, a sign can only call someone's moral to slow down or not to cross the road, whereas material technologies leave the person no choice: a fence prohibits the crossing of a road, a speed bump prohibits speeding. Also Ureta emphasizes the agency of nonhumans and materials (2012, 2014, 2015). He describes disciplinary devices as being sociotechnical, performative, and heterogeneous. Drawing on Foucault's conceptualization of discipline (1979), disciplinary devices are "designed with the explicit aim of disciplining users' bodies in accordance with certain predetermined programs or plans" (Ureta, 2012: 596). They encode scripts so that "the abnormal components start self-governing; materially enforcing their alignment" (Ureta, 2014: 371–372). Hence, forms of graphical information like advertisements and signage, on the one hand, and physical components like fences and turnstiles, on the other hand, act as self-governing powers that discipline the users and their bodies. A significant difference between these two concepts is that Ureta includes the dimension of resistance and conflict: passengers of Santiago de Chile's metro system found ways to not comply with the devices' scripts (Ureta, 2012: 606).

Single Shoes: Vigorous Overcrowding

May 2016. A friend of mine posts on Facebook: "Free rides for everyone!" Offering free rides in the beginning is a common strategy of public transport operators, aiming at increasing the infrastructure's public acceptance. DART's buses are heavily overloaded. Some passengers ride up and down the corridor, just for fun. What an experience! On the second day of operations, the CEO of the bus operator declares in front of the public: "All passengers have to disembark at the terminus so that other passengers have a chance to get into one of the buses." The day after, I experience how passengers–being used to daladala practices–spare no pains to get into one of the new buses. At Kimara Terminal, I try to get on a bus. I finally make it inside, paying for the ride with a sore left foot because other passengers trod on it. Before setting off, the bus driver shows three single shoes to the passengers: who lost them in the scramble? After the shoes found their ways back to their owners, the driver turns on the music and starts the journey to Mbezi Louis.

September 2016. I finally catch an overcrowded bus at Jangwani Station after two buses passed without stopping at the station. It is peak hour. A few stops later, the bus driver calls the passengers to squeeze a little more because he sees in his mirror that, at the center of the bus, is a bit of space left. Then, abruptly, the driver stands on the brakes, probably because someone unpredictably invaded or crossed the corridor. The braking pushes the passengers to the front. A passenger jokes: "The driver tried to squeeze people to the front." While some passengers laugh, other remain quiet, silently counting the stops until they can finally disembark the crammed bus.

March 2019. I watch a video that one of DART's stakeholders just sent me. It shows how a DART bus approaches a station, and how people make a spring

Fig. 1 Overcrowded DART bus. Author's photo (2016)

at it. As the driver cannot move further, they opens the door, and people try to squeeze into the bus. Indeed, travelling with DART has become something to fight for, something valuable.

May 2022. International consultants tell me that overcrowding has decreased since the bus operator introduced 70 additional buses recently. What a relief! They wonder whether overcrowding would be prevented in the next phases of DART's implementation.

As these ethnographic notes illustrate, overcrowding has been an issue in Dar es Salaam's public transport practices for long. DART's overcrowding (see Fig. 1), particularly during peak hours, is not only due to a continuously increasing ridership of passengers, but also due to a lack of substantial scheduling and a too small bus fleet. This situation is based on profound political negotiation between the project funder, national government, and service provider. DART passengers and Tanzanian journalists are continuously remonstrating against the ongoing overcrowding, which they describe as "vurugu tupu," sheer chaos (Lyatuu et al., 2018; Mang'oha, 2018; Uhuru, 2018). Since overcrowding had not been inscribed into DART initially, this situation needed reinforced discipline and new forms of order and control. For now, overcrowding brings various disadvantages for the passengers like bus delays, reduced safety, and limited comfort. Thus, these practices contradict the value of reliable urban transport and high-quality BRT services.

Special Seats: Changing Forms

May 2018. A famous Tanzanian comedian publishes a video clip in Kiswahili that humorously reflects the current situation on a DART bus. The clip shows how a young passenger ignores the drivers' announcement, pictograms, sheets of paper and the criticism of fellow passengers; all of them indicating them to leave the special seat to an elderly passenger. Another passenger, called Mtanzania (Kiswahili for Tanzanian citizen), solves the situation by hitting the

Fig. 2 Note in a bus: "These seats are for people with disabilities." Source: Author's photo (2016)

young passenger with a stick until they gives the seats to the elderly person. Mtanzania explains the buses' intention, values and regulations to all passengers on the bus: "This vehicle was built and designed under consideration of the needs of all people." (Bongoflix Star, 2018)

That BRT is supposed to be an integrative means of public transport materializes in the platform-level boarding and special seats. Certain artefacts that should guarantee people with disabilities a seat led to irritation and misunderstanding though. Pictograms showing a person in a wheelchair and a person holding a stick were intended to regulate the passengers' behavior. In contrast, daladala operations necessitate neither signs nor written elaborations because daladala passengers follow unwritten social rules on whether a physically underprivileged person gets priority seating or not. This form of discipline has yet been incorporated in DART's buses–maybe due to the more anonymous atmosphere in a much larger bus where a conductor is missing and the driver is far at the front of the bus, or because space in a DART bus is even more in demand than in a daladala, especially during peak hour.

Since the pictograms were not self-explanatory, users de-scribed the initial role that engineers allotted to the special seats (DART Agency, 2014; see also UDA, 2017). Some DART users did not understand the symbolism, whereas other users seemingly did not care about conforming to these practices. Since most of DART's

Fig. 3 Pedestrian crossing with speed bump at a station. Author's photo (2016)

passengers did not behave according to the initial meaning of these pictorial elaborations, the bus operator translated the pictograms back to words. The company taped sheets of paper on the buses' windows, explaining that these seats were for people with disabilities (see Fig. 2). Neither the initial sign nor its translation into words could enforce the special seats' intention. As the video playfully shows, more rigorous devices would be necessary to realize DART's value of social integration (c.f. Bongoflix Star, 2018). Moral is not enough in this case. Certainly, the moral landscape in DART's spaces continues to be negotiated between operator, passengers, buses, seats, paper, and other materials.

Thick Concrete: Initial Irritations

The 21-km-long corridor of DART symbolizes the new, which emerges in alternative practices and modes of behavior on Dar es Salaam's roads. These new practices yield numerous transitions, including tensions and conflicts because the corridor's materiality enables and disables certain usages. When Lefebvre talks about the technological transformation of space, which is rooted in history and political power, he argues that technology introduces a new form into the space that gives space (material) dominance. "A motorway brutalizes the countryside and the land, slicing through space like a great knife" (1991/1974: 164–165). Understood as a disciplinary device, the BRT corridor embodies normative politics and traffic laws. It regulates and disciplines the users through curbstones, pedestrian crossings, and speed bumps. Pedestrians are only allowed to cross the corridor using pedestrian bridges at the terminals or zebra crossings near the stations. The legal enforcement of pedestrians' right-of-way is hence another central feature of DART that illustrates the changing practices of urban mobility.

In contrast to BRT drivers who have ever noticed the stripes according to instructions given in their BRT-specific driving training, pedestrians did not take any notice of the white stripes on the ground in the first weeks of operations. Pedestrians were

used to being subordinate in the hierarchy of the road. Waiting for the bus to pass by so that they could cross safely, they were surprised to see this massive vehicle, full of passengers, brake to let them go first. Pedestrians then quickly started to accept this new bus-pedestrian relationship as it had been inscribed into DART. Concomitantly, passengers began to expect the same considerate behavior from other vehicles because these white lines embellish also the mixed-traffic lane, which is located between the BRT corridor and the pedestrian walkway (see Fig. 3).

To unfailingly make the traffic of private vehicles stop for pedestrians too, speed bumps were built in addition to the white stripes on the mixed-traffic lane. As mentioned earlier, the speed bump is one of Latour's examples to elaborate on mediating technologies' agency because it disciplines drivers by changing their behavior in a forceful way. The speed bump makes the driver to slow down by triggering "pure selfishness and reflex action" (Latour, 1999: 186), differently than a sign that tries to make the driver to slow down through morality and reflection: "The driver's goal is translated, by means of the speed bump, from 'slow down so as not to endanger students' into 'slow down and protect your car's suspension'" (Latour, 1999: 186). Hence, the program of action–to slow down vehicles–has been mediated from police officers to concrete and pavement. Latour jokes how a cop changes into a barrel of wet concrete because speed bumps are also called "gendarme couché" or "sleeping policeman". Full of engineers and lawmakers, "the characteristics of policemen become speed bumps" (ibid.: 190).

In Dar es Salaam, this mediation has been a successful endeavor too in terms of the BRT model. Speed bumps are non-negotiable, unlike negotiable signs or police officers. DART's speed bumps thus enforce the priority of pedestrians, a central characteristic of BRT ideals. However, other ferroconcrete components of DART's physical infrastructure have not stayed equally strong. Concrete barriers at pedestrian crossings, aiming at preventing smaller motorized vehicles like motorbikes and bajaji[7] from crossing the corridor, have been demolished. Due to vehicles squeezing through the barriers, the steel bars are crooked and concrete flakes off from the steel skeleton. In reaction, the Tanzanian government mounted signs indicating in Kiswahili: "Pedestrian Zone. Please walk your wheels" (DART Agency, 2018). Hence, not only inscription and de-scription happened on DART's corridor, but also re-inscription, as planners modified the initial script to capture unintended behavior after observing how the technology was used (c.f. Akrich, 1992). It has turned out that the presence of actual police officers is the most powerful way to prevent smaller vehicles from using pedestrian crossings on the corridor. Technical mediation happened gradually: first, from humans to concrete, second, from concrete to signs, and third, from signs back to humans (police officers). Only through these complementary layers, discipline can be enforced on the BRT corridor.

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[7] Bajaji is the expression for auto-rickshaws in Tanzania.

Conclusion: New Forms of Infrastructural Discipline

The introduction of BRT in Dar es Salaam has been a complex and intermittent process of infrastructural ordering and disciplining. Understanding the negotiations between various actors on changing structures and established practices was enabled by taking historical and sociotechnical perspectives into consideration. New forms and effective combinations of established practices and changing structures evolved because sociotechnical complexity and negotiation have not just started with DART. When DART became operational, years of overlapping practices, inscriptions, de-scriptions, and re-inscriptions were combined with new rules, laws, and expectations that took infrastructural discipline to a new level. Transport experiences and skills, which rely upon previous practices of urban transport and most notably on daladala, impacted DART's script of discipline despite DART's strong material and legal character. But rather than declaring recent mobility practices of using DART as being resistant or hesitant, I have shown that new structures were negotiated and adapted, creating effective combinations between past experiences and new rules.

Enforcing discipline worked in combination of moral and material forms, with options of de-scription, negotiation, and adjustment. DART's claim of high efficiency–i.e., by transporting the urban masses at high speed–leads to the need to and of discipline. First, DART needs to be disciplined in terms of flow, frequency, and capacity to be functional. Second, this mode of transport itself disciplines its users: through rules and moral, on the one hand, and through materials and force, on the other hand. Hence, DART has become a disciplining technology itself. DART is only operational under a certain degree of discipline: if solely DART buses use the BRT lane, DART can operate efficiently and reliably; if passengers accept the rules of the special seats, DART can be represented as an inclusive means of urban transport.

Increased infrastructural control and discipline has been necessary to realize BRT normativities and to enforce traffic laws. Values like comfort, reliability, and safety are translated to materials and practices like beeping sounds, driver announcements, special seats, pictograms, speed pumps, and white stripes. However, this reorganization has not only brought new forms of discipline, but also various forms of deviation and negotiation: a reduced bus fleet and inchoate scheduling make passengers fight to aboard one of the few buses and fight for a seat. In contrast to DART's bus drivers, drivers of smaller motorized vehicles find it hard to accept the rules of pedestrian crossings. Also the technology itself did not fit perfectly to its context. For instance, the ferroconcrete barriers were too soft and thin, and the beeping sound too gentle and quiet. Nevertheless, despite continuous overcrowding and the criticism that DART operations resemble those of daladala, the Tanzanian BRT system has disciplined urban transport in various ways.

Mediating technologies (Latour, 1994, 1999) and disciplinary devices (Ureta, 2012, 2015) can lead to new forms of order, but more importantly, they lead to de-scriptions: deviations of initial scripts. Users de-scribe technologies and

devices so that discipline is mediated from humans to signs and materials, and vice versa. The combination of different disciplinary devices helps to enforce discipline since the devices possess different forms of moral and material power. They are assertive in different means. Signs, police officers, or ferroconcrete barriers were not strong enough by themselves so that only combinations of actors and devices and a flexible replacement of technologies have made discipline effective in Dar es Salaam. This fluidity is not only an inherent and necessary characteristic of DART, but also advantageous for the system itself: the more adaptable or fluid a technology is, the more successful it can be (c.f. De Laet, 2000; De Laet & Mol, 2000). As the introduction of this new transport system in the Tanzanian metropolis demonstrates, new technologies give rise to more facets of infrastructural control and negotiation. To conclude, these ongoing mediations of infrastructural discipline between various actors have led to continuous reformulations of DART. They lead to new forms of discipline in Dar es Salaam's present and future transport practices, which represent a combination of established practices and new rules.

Declarations

Research Involving Human Participants and/or Animals: Ethics Approval and Consent to Participate All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. Oral consent for interviews and publication of my findings was collected in the course of interviews. Individuals were anonymized. Due to the protection of personal data and rights, the empirical data collected is not publicly available. All pictures were taken by the author and do not show people's faces. This article does not contain any studies with animals performed by any of the authors.

Conflict of Interest The author declares no competing interests.

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