

TEMPORALITIES OF ASSEMBLING TRANSPORT SYSTEMS: PRESENCES AND ABSENCES IN A PLANNING PROCESS

DOING RESEARCH ON A PROCESS

If you want to investigate a process, it is not far-fetched to seek to employ a perspective of temporality. But how exactly is this done? “You never complete an infrastructure in the way you complete a novel; it is always and ever in the making. [...] It is difficult to study things that do not have a singular identity at any one moment, that do not have clear life cycles” (Bowker, 2015). Therefore, Bowker suggests developing new historiographical skills, which fit into the complex nature(s) of infrastructures. Especially when we do research on processes, or more generally on the temporal dimension of infrastructures, we need to be careful not to fall into the trap of wanting to understand its temporality in a linear or chronological way. Therefore, I will utilise the term ‘temporalities’ in order to emphasize the multiple dimensions of temporality.

The following essay will focus on a number of objects¹ belonging to a bus: beeping sounds, number plates, closing doors, and the numbers 76 and 140. Those, and many other objects, are part of the assemblage of the public bus system *Dar es Salaam Rapid Transit* (DART).² The DART system exists in a constant (re-)making by its (non-)human actors. Since the early 2000s, diverse actors are planning, designing, implementing and operating the bus system. I will demonstrate what objects might tell about the socio-political dimensions of this planning process.

SCRIPTS

Building upon STS scholarship and Akrich’s work on ‘de-scribing’ technical objects (ibid., 1992), objects have roles that are inscribed in their material composition. Roles might change over time – from initial design to actual employment – and be de-scribed in practice by encountering a user. In line with Akrich, objects participate in building heterogeneous networks that bring together actants. By employing the

¹ As it will be elaborated in the following, objects are not necessarily material; they can have different shapes.

² DART is Dar es Salaam’s Bus Rapid Transit (BRT) system. BRT is a model of public bus service that operates on dedicated lanes of the existing road network. BRTs contain ITS (Intelligent Transport Systems) technology, e.g. bus scheduling is carried out by a control centre, and an electronic ticketing system includes off-board fare collection and an integrated fare structure. Therefore, BRTs combine two relevant factors of transport systems: high passenger capacity at low costs. During the last two decades, BRT systems have been promoted and implemented mainly in the Global South.

concept of 'assemblage' rather than 'networks', I will work with the objects of DART as 'scripts' of an assemblage.

For example, the role of DART's buses differs in various scripts. They appear as models in policy papers of international consulting firms, technical descriptions for the manufacturer, materialised prototypes arriving in Dar es Salaam, a controversial number of 140, a modern means of public transport carrying passengers, a chassis with traces of usage, fast and huge vehicles involved in accidents, the types 'articulated' and 'rigid', flexible buses for different corridors, etc. But their overall role is to transport passengers and facilitate the operations of DART. Certain values are inscribed in these different roles, which are not just about transporting people, but more specifically about *how* to transport people and *how* to shape the public transport system. Those values will be better understood by looking at certain objects of the bus assemblage. In them, this *how* is inscribed in detail. For example, DART shall "provide a better, more modern and more efficient public transport service" (DART, 2014b). According to a dominant script regarding the materialisation of these policies, the *Bus Output Specifications*, the bus design "[...] shall be energy efficient, environmentally friendly, and safe and secure for transportation of passengers". Furthermore, since passenger comfort is a major concern, "particular attention must be taken to minimise noise, vibration and harshness transmitted to passengers" (DART, 2014a).

But actants do not necessarily comply with the initially defined scripts, and objects do not strictly execute their roles as inscribed. Akrich mainly refers to (human) users employing objects in a different manner than planned by the designers. Looking at assemblages, de-descriptions occur much broader within the assemblage between various actants. Taking for example the case of DART's passenger comfort, the planners' script of the buses has not been realised in several regards. In Dar es Salaam, the climate conditions (very hot and humid, temperatures almost all over the year above 30 degrees Celsius) do not comply with the climate control script of the buses. Due to money constraints, buses do not supply air conditioning, but only low air ventilation while the bus is moving, through the use of small windows that can be manually opened (DART, 2014a). On so-called feeder routes³, buses cannot drive continuously rapid as inscribed in operational plans due to two main reasons. First, transport planners have underestimated the high volume of traffic on this mixed-traffic road, which is slowing down any movements. Moreover, since the buses are quite low, they would be of better use on newly constructed plane corridors. The actual condition outside of dedicated lanes though is characterised by numerous

³ On feeder routes, buses serve outside the dedicated lane on a mixed-traffic road, between BRT terminals and feeder stations.

bumps and potholes, which make fast driving impossible since speeding would damage the buses' bottom chassis (DART, 2015b).

Consequently, objects are being de-scribed in their roles and scripts change over time, getting adapted to the actual situation. Scripts are present and absent at different points of time within the planning process, or rather: various scripts can co-exist; they can be present in one shape and absent in another. Coming back to the *Bus Output Specifications*, this script had not disappeared by the time the materialised version of the buses appeared. Both scripts were present, either physically or in discourse.

PRESENCE AND ABSENCE

In addition to considering co-existing scripts, I will go deeper into the concept of presence and absence. Not only can different scripts of an object or assemblage co-exist; one script can also be present and absent – at the same point in time or at different points in time. In order to work with this perspective, we need to acknowledge and internalise the fact that presence and absence are not opposed to one another. Therefore, objects can be present in their (physical) absence. The questions are: which forms does this absent-presence have and how do these forms develop within the process, with the perspective of temporality?

Following Callon and Law, “times and spaces are in the making” (ibid., 2004, p. 3). Hetherington, who examines disposal as an integral part of consumption, writes: “Social relations are performed not only around what is there but sometimes also around the presence of what is not” (ibid., 2004, p. 159). We can go even further and argue that this co-existence of presence and absence is a necessary condition for the existence of every single thing. Without absence, there is no presence and vice versa. Though, many scholars⁴ only think about absence in terms of ‘there had been a presence before’. According to them, present absence is disposal and death. But isn't it vital to consider absences of objects which had never been physically present? For example, a lack of knowledge or information can be very present in a conversation. Or, if crucial elements for the materialisations of the buses had not been addressed in the *Bus Output Specifications*, this might have fundamental consequences for bus operations. The agency of the absent object further plays a role in research on (in)formality⁵ and infrastructure research. Star wrote in her famous paper on the ethnography of infrastructure that, for many users, infrastructures become visible upon breakdown. This can be interpreted as by the time the infrastructure does not follow its (temporal) script, the infrastructure becomes absent in terms of not being present (e.g. no

⁴ Scholars have been working on concepts of presence and absence not only in fields of STS, but also in fields of philosophy and cultural sciences (e.g. Homi Bhaba wrote on ‘absence’ referring to Jaques Derrida’s concept of *Différance*).

⁵ A widespread, one-sided argument is that the void of formality leads to informality.

water coming out of the tap, no buses running on the streets, no electricity coming out of the socket). At the same time, the infrastructure might become more present for its users, like in the case of Star's research: "This breakdown became the basis for a much more detailed understanding of the relational nature of infrastructure" (ibid., 1999, p. 382). I would add that infrastructures are also present in their 'all times absence'; If you never have running water from the tap, bus services or electricity (but you are aware that those infrastructures generally exist), they can also be very present – in their role of not being physically, materially, or effectively present. The same argument can be applied to the planning and implementation of new infrastructures. As the following section will demonstrate, the DART system has been present (for different actants of the assemblage) in many different, temporally changing forms. By the time that the construction of the physical infrastructure (corridors, stations, terminals and depot) had been finalised and a service provider had been found, the buses were actively missing in order to put the DART script into being and to start operations. However, the buses had never been there before in a material shape (and were not yet even manufactured), but only in their expected role of transporting people.

THE IMPACT OF BIG NUMBERS

In the following, I will illustrate how roles have been changing within the script of DART. They all have a numerical dimension in common, in terms of influencing the change of the whole script.

HIGHER AMOUNT OF BUSES

The local service provider, UDA-RT, and the governmental entity responsible for DART, the DART Agency, signed the Interim Service Provider (ISP) Agreement in April 2015. This document obliges the interim service provider to supply BRT services for two years until a 'full' service provider for the long term is selected. ISP should purchase 76 buses in total in accordance with the Bus Output Specifications. Two of the buses should be provided before the launch of ISP services in order to train drivers (DART, 2015a). But UDA-RT flouted this contract and ordered a total of 140 buses. This step had strategic reasons: UDA-RT counted on a stronger and more permanent position within the DART project through the increased amount of buses. Ironically, the Tanzanian government officially became aware of this almost doubled amount of buses only by the time the buses arrived from China at Dar es Salaam's port in September 2015 (Interviews October 2015 & May 2016). Consequently, the DART Agency had to amend the Interim Service Provider Agreement, along with the operational plans to this physical appearance. These amendments had further consequences on the whole operational design and the power structure of Dar es Salaam's BRT scheme. UDA-RT successfully enforced their long-term participation through this massive investment of 140 buses.

HIGH TAXES

After the arrival of the buses, national media expected DART to commence operations soon (Lugongo, 2015). But for a long period of time, only the two prototypes were running along the BRT corridor (Interviews May 2016, Observations September/October 2015). In order to avoid paying high storage costs at the port, the Tanzanian government allowed UDA-RT to move the newly arrived bunch of buses from the port to two bus terminals. Apart from that movement, vehicles were not allowed to use public roads and become operational before clearance and registration.⁶ It would have been much easier to park all buses at the depot, which has larger facilities. But by that time, the depot had not yet been part of the ISP Agreement. The script of ISP operations was changed a couple of weeks later in order to adapt to the new situation. Part of this ISP Addendum was to acknowledge all 140 buses and hand the depot over to UDA-RT. It became obvious that the interim service will be much more extensive than previously agreed.

In the meantime, UDA-RT tried to register itself as a public limited company instead of having the status of a private company (Interviews September 2015). The company asked Tanzania Revenue Authority (TRA; in charge of collecting import duties and other taxes) to obtain a tax exemption for the imported buses since the buses will serve 'for the public'. TRA refused their request after months of negotiations and standstill. Imported goods, especially motor vehicles, have been a highly political issue in Tanzania. On the one hand, Tanzania has a rather protectionist and rigid import policy. On the other hand, a lot of tax exemption had been conducted due to corruption and in order to attract foreign companies and ease international trade. Then, during the negotiation process between TRA and UDA-RT, Tanzania elected a new president. The president's topmost priority was to evict corruption and redistribute wealth from the big (foreign) companies to the people. It seemed like this case became the precedent for the new Tanzanian government, in order to prove that there was no longer extortion and corruption. Moreover, TRA only accepted full payment of the high amount,⁷ which led to further delays since UDA-RT had to take out another loan (Msikula, 2015). Only after the full clearance in April 2016 were buses allowed to leave the terminals, and operations started a month later, after all buses had been checked regarding safety concerns (Observations May 2016).⁸

⁶ The exact amount of import duties is not public and no involved actor responded to that. Estimated amounts range from USD 3.6 million to 1.4 billion (personal interviews; Lugongo, 2015).

⁷ UDA-RT asked for payment in pieces. UDA, one major shareholder of the UDA-RT, once made the same request to TRA. TRA agreed and UDA did not pay due taxes in instalments. Therefore, TRA became even more careful with the company's request (Msikula, 2015).

⁸ Also the clearance of the two prototype buses took much more time than expected and delayed the trainings for more than a month. UDA-RT tried to release the buses from the port without clearance.

Obviously, the only material difference between the two mobile buses and those 138 immobile ones was the physical presence/absence of number plates. Each bus has two place holders for the number plates: one in the rear and one in the front. The physical absence of number plates is also visually penetrating once this apparent gap is not filled (Observations September/October 2015). A bus which does not possess this item is immobile. It might be a global phenomenon that vehicles need to have number plates in order to use public spaces like roads. This is due to the fact that possessing a number plate means owning a registration. Indeed, a number plate is the materialisation of a formal registration and tax payment. Number plates restrict where vehicles can be physically present – and where not. They have the role in the DART assemblage as proving the legal status of the bus – as having been imported legally, meaning that import duties were paid. Only with that legal status can buses move and operate on public ground and fulfil their duty and take their role as transporting people within the DART service.

It is remarkable that the number plates appear neither in the *Bus Output Specifications*, nor in the *ISP Agreement*. Whereby, both documents describe the materiality and agency of the buses and inscribe roles to them. Generally, the documents ignore the necessity of licensing as a precondition for operations. Regarding the absence of number plates in the *Bus Output Specifications*, it is necessary to admit that a number plate is technically not necessary for moving the bus. In theory, an unregistered bus can comply with the script of a safe and comfortable bus service. This point strengthens the outstanding role of the number plates since it might be the only material component which is only legally, but not technically, necessary – e.g. in contrast to the steering wheel, doors, gearbox, axles, etc. By and large, this absence might be due to the fact that a valid license is so deeply inscribed into DART that it is indispensable. The producers of the documents probably assumed that this precondition is so clear that it is not necessary to be mentioned. Since the role of the number plate is deeply inscribed into the script, it is not flexible. A Tanzanian number plate cannot be replaced by a Chinese one without legal steps. But all other material components could be replaced, as long as they comply with the *Bus Output Specifications*. The salient point is: the material inscription of laws and state power is crucial for the functioning of the DART script. The state is materialised in the number plate and, therefore, the number plate directly connects the vehicle with the state.

The following two examples will illustrate the case of flexible, changing roles that embody another kind of de-description of the technology in which operations can happen even if the object is not installed or used as inscribed. By the time that drivers and passengers become active parts of the DART assemblage, it necessarily changes and adapts to the present practice. Those actors do not comply in all means with their roles that planners and politicians had inscribed previously.

OVERCROWDING AND SPEEDING

For safety concerns, the role of the doors was supposed to comply with two essential features. First, doors should not be able to close (even if the driver pushes a respective button) when passengers are standing in the door area, marked as 'No Standing Area' in every bus. Second, "[t]he doors on each Bus must [...] have a mechanism with safeguard to avoid opening of the doors while the vehicle is in motion or that the vehicles moves with open doors." In practice, both features are no longer present (Observations May 2016). Doors close even though people stand in the 'No Standing Area' and even when they stand right between the two wings of the doors, with one leg in the bus and the other one still on the platform. Beyond that, buses set off with open doors, the doors just closing once the bus accelerates. Both changes bring the new script of DART operations closer to common practices of minibus operations. Dar es Salaam's minibuses are highly overcrowded so that people squeeze and doors are many times opened during movements – in order to save time when passengers (dis)embark. Therefore, in trainings, drivers were instructed not to do so due to the BRT ideals regarding customer care, such as comfort and safety. Therefore, drivers were supposed to not change the DART script. In the initial beginning of operations, drivers still tried to follow this policy and many drivers even announced this safety note. But this behaviour has gradually ceased, and passengers followed the changing script and returned to stand in the 'No Standing Area' during peak hours (Observations May & September 2016).

Obviously, the service provider has changed the script. Due to high passenger demand and overcrowding, (dis)embarking takes much longer than scheduled and drivers try to take as many passengers as possible on board. Interestingly, different versions of the initial script were circulated: A manufacturer employee says that doors cannot close when passengers block them. By contrast, service provider staff claims that there has never been a technology to prevent these two kinds of doors from closing (Interviews May & November 2016).

A similar change in the script occurred regarding a technology that should prevent drivers from speeding. BRT buses are supposed to not exceed 50 km/h. If they do so, a high beeping sound rings out in order to remind the driver of that limit. In practice, it has turned out that many drivers speed in some sections of the corridor and simply ignore the annoying sound and do not change their driving according to the script (Interviews May & November 2016, Observations May & September 2016). An employee of the DART Agency put it in a funny way and meant that drivers perceive this sound rather as music than as a warning signal. Consequently, the beeping is no longer a guarantee for maximum speed. It is intriguing that the sound was only passively, in an absent-present way, inscribed. It should never ring out in practice, since the driver's role was to never exceed the speed limit of 50 km/h.

ETHNOGRAPHIC COMMENT AND CONCLUDING THOUGHTS

How did I become aware of these social-political dimensions of assembling? In how far did the focus on objects help me to understand controversies and changing scripts? I made various forms of participatory observations and conducted numerous interviews at four different points of time within two years.⁹ This methodological interplay helped me to come so close to the different scripts and made me understand how DART changes over time. For example, I saw the 138 buses without number plates parking at the terminals before anyone told me about clearance issues. I was wondering why they were not based in the depot, which has much better facilities. Over the next days, local actors told me, and newspapers reported, about on-going negotiations between UDA-RT and TRA regarding due import duties. Through my previous observations of the missing number plates and the dislocation of the buses, I was sensitized to this topic. Through the focus on the physical constitution and materiality of the buses, I was able to develop questions directed at this conflict between service provider and state.

Moreover, finding the balance between following the process chronologically, which is of big use for understanding, and the assumption of multiple, twisted temporalities of planning and implementation processes, is necessary. Wood criticized the allegedly linear and straightforward process of BRT projects when explaining that “[...] BRT circulation is a more convoluted and long-lasting process than ordinarily considered” (ibid., 2015, p. 11). Just coming back to the example of scripts existing in parallel regarding operations of UDA-RT based upon the role of the amount of buses shows that DART is not a stringent, linear process, but rather a process that continuously goes back and forth, and turns around. I noticed several times that various actors have very different levels of knowledge and already decided issues were repeatedly put back on the table. Also, different speeds need to be considered as the ISP Agreement first accelerated the process and then, negotiations between UDA-RT and TRA on the ISP Addendum slowed the process down yet again.

To conclude, not only presences, but also absences – both in material and discursive shapes – provide insights into the social and political dimensions of infrastructures and their planning processes. Regarding DART, a lot of controversies evolved around the actual implementation and the impact of local operators within bus operations. This actual implementation materialised in various ways and roles thus changed. The missing number plates can be interpreted not only as a symbol of missing tax payments and legal registration, but further as absent support by the Tanzanian government in regards

⁹ It is necessary to consider that my impressions though are very limited, basically due to the fact that I am not aware of where the gaps in my research are, and what I left out. It would never be possible to seamlessly describe a process. In my own research, the absent might be even more absent than the absent-presence in the DART script itself. On the other hand, my own research process reflects the shape of the DART process: rather multiple and unstable than (chrono)logical.

to the local operator's attempt to strengthen their position. Even the changing amount of buses and their physical absence on the BRT corridor for more than half a year indicates this conflict. The cases of speeding and overcrowding show in detail how scripts change when new actors enter the assemblage. Since DART's script is flexible (to a certain extent), bus operations do work under the modified script, e.g. when buses exceed their maximum passenger capacity so that passengers stand in areas which were not designed as standing areas.

Therefore, this closer look at several material components with a perspective on temporalities has proved that presence and absence can exist at the same time and that the scripts of an assemblage change over time. DART's objects temporarily have different shapes which are expressed through the presences and absences of material components and appearances, behaviours and discourses. Different forms of present-absence were determined, such as a divergence between the assemblage in discourse and its actual material shape, or perceivable consequences through that absence, which led to changes in the script and consequently of the object's agency itself.

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PHOTOS



Photo 1, September 2015: Buses with and without number plates at the bus terminal (Image source: own photo).



Photo 2, May 2016: Buses riding on the BRT corridor after clearance (Image source: own photo).



Photo 3, May 2016: Buses parking at the depot after clearance (Image source: own photo).