

User Needs Assessment – City Report

City: *Dar es Salaam*

Project SOLUTIONS+

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Authors: Mirko Goletz (DLR), Jacqueline Senyagwa (UEMI), Edmund Teko (UEMI), Shauri Shau (ITDP)

1. Approach & Team

The User Needs Assessment was carried out in the months of November and December 2020 and in January 2021. The assessment was carried out in line with the concept that was provided by the SOLUTIONS+ project as described in Deliverable D 1.3, in order to harmonize the assessment approaches over the demo cities that are part of the project. As primary method interviews with key stakeholders were carried out and the results and findings of these are presented below. Due to a very low response rate at the time of writing this report (n=2), the results of the complementary online survey are not considered in this report.

The following team carried out the assessment: Jacqueline Senyagwa, Edmund Teko (both from UEMI), Shauri Shau (ITDP) and Mirko Goletz (DLR Institute of Transport Research). All team members were involved in the assessment process and carried out stakeholder Interviews, the KPI assessment and report writing.

Stakeholder Group	Stakeholder name	Stakeholder abbrev.	Method (Interview, Survey, KPI)	Date
National & regional authorities	Dar es Salaam City Council	a1	Interview	10 Dec 2020
	TBS	a2	Interview	11 Nov 2020
	LATRA	a3	Interview	27 Nov 2020
Public transport companies	DART	b1	Interview, KPI	11 Dec 2020
NGOs and Eco-Organisations	TATEDO	c1	Interview	12 Nov 2020

Academia	NIT	d1	Interview	24 Dec 2020
OEMs, Private companies, Start-Ups	ELICO	e1	Interview, KPI	26 Nov 2020
	RISE / Sollatek	e2	Interview	20 Nov 2020
	Jiwe Kubwa	e3	Interview	13 Nov 2020
Service Providers	TANESCO	f1	Interview, KPI	17 Nov 2020

1.1 Results – Expert Interviews

1.2 Aims of the city and Expectations of Stakeholders

a. Expectations:

On a demo level, Stakeholders b1, c1, e3, b1, d1 expect that the demo project will create awareness, open opportunities, build capacities and will be a source for stakeholders networking. Furthermore, stakeholders b1, a3 expect the project to help integrate the various transport modes in the city with e-mobility feeder services and thereby promote sustainable transport. Stakeholder e1 expect the demo to increase the private sector involvement in e-mobility, thereby promoting it as a whole in the country. Stakeholders a3, e3 expect that at the demo level, the project will be a catalyst/stimulus to the business community to venture into e-mobility.

On a scaled-up level the project will reduce emissions, fight climate change, reduce importation of fossil fuels, venture/spill into other cities, reduce pollution, efficient use electricity/energy, and create employment (Stakeholders a1, c1, a3), create new business opportunities and allow for investments (a1, a3, c1, e3,) and also lead to improved health conditions (Stakeholders a3, d1). It will furthermore generate economic benefits – more jobs, reduce transport cost, generate profits for operators, and also increase reliability due to the use of electricity (Stakeholders a3, b1, d1, e3).

Stakeholders b1, f1 made suggestions how the above-mentioned expectations could be met, for instance by creating an enabling environment (rules and regulations, policies, guidelines, also mentioning the need for collaboration between private and public sectors on e-mobility infrastructure development and investment, while ensuring that all all key stakeholders and players from the transport sector are involved at the very beginning/start of the project. This will also create the need for training on necessary aspects of e-mobility for local stakeholders – vehicles, operations, maintenance. Stakeholder b1 particularly mentioned the need for a proper institutionalization to manage the e-mobility services.

b. Users

Regarding users of the proposed e-mobility solutions under the demonstration, stakeholders a2, c1, d1 expect that it will be used by people of all classes in the business industry community, public sector servants, commuters and the general public. Apart from passenger transport, delivery services will increasingly use bajaj services as online business is booming, where motorbikes are currently used but are regarded as an unsafe mode (d1). Special user groups might be school children who currently face the challenge of the timing of the school buses, with children leaving home very early and coming back very late; in a scaled-up scenario, the electric bajajis will offer an option to such parents (d1). Furthermore, public services may use e-bajaj that are owned by institutions as an official transport means to serve their employees, something which is already done by Stakeholder d1 and was suggested to be applied on a wider scale by a2, e1. Stakeholder e1 also stated the high price sensitivity of users in Dar es Salaam, meaning that the price will determine who will end up using e-bajaj.

In general, e-bajaj were considered as a means of passenger transport and for freight (delivery services and logistical services) with equal importance in the future, despite freight not being part of the SOLUTIONS+ demo project.

c. Where

For the demonstration as well as a scaled-up scenario, stakeholders opined that e-bajaj could be used in urban as well as in peri urban areas (outskirts of the city). Due to the ban of 2- and 3-wheelers in the CBD of Dar es Salaam, stakeholder b1 however indicated that currently a service provision there would not be possible. Stakeholder b1 also stated that areas in the city where the operation of busses is not possible due to narrow or other improper road conditions could be considered to be served by e-3-wheelers. In the future, e-bajajis may become popular in port authorities to facilitate movement of staff within the area, in industries to deliver goods (Stakeholder a2). Looking beyond the city scape, e-bajaj may be highly suitable to be used in rural areas, where there is electricity and/or renewable energy available (Stakeholders a2, b1, c1, f1).

1.3 Regulation

In Tanzania or Dar es Salaam, at the time of the interviews there was no regulation in place that addresses e-mobility directly, however there are current regulations that implicitly address questions related to e-mobility. Generally, policies and regulations exist that promote sustainable urban transport modes such as BRT (Stakeholders a3, b1, f1). Another example is the Tanzania Energy policy, that generally mentions that renewable energy should be diversified to reduce dependence on conventional energy sources, whilst investing in clean technologies for environmental protection (Stakeholder d1).

Positive examples however do already exist, and there are already private persons that have imported a limited number of e-mobility vehicles to Tanzania, showing that its theoretically possible (e2). But despite these positive examples, the current regulations have several drawbacks that may not encourage e-mobility in the country, such include absence of tax exemptions for the import duties or running of e-vehicles (Stakeholder e2).

Regarding the energy side, existing policies and regulations generally allow using “clean” energy sources such as electricity and natural gas in the transport sector/system (Stakeholder d1, e3). Stakeholders in the field of transport are becoming more and more active towards the topic of clean energy sources in transport, with DART having signed an MOU with UNEP recently to help develop guidelines on different energy efficiency technologies including e-mobility, that is also supported by the Ministry of Finance (Stakeholder b1). Also, Tanzania’s Bureau of Standards (TBS) already has a standardized process to certify new vehicles, that could also be applied to electric vehicles leading to a control of quality of the vehicles themselves and their spare parts (Stakeholder a2).

Stakeholders agree that, despite the fact that policies generally allow for e-mobility to be brought in, there is the need for specific e-mobility regulations and rules that cover topic such as import and duties, standardization, incentives that would allow a commercial, large scale importation and usage throughout the country. Further topics mentioned that need regulation are tariffs, tax exemptions / overall tax regime, licensing and creating awareness. Stakeholder e2 mentioned that the ban of bajaj in the city center, that is being enforced today, should be revised for e-bajaj thereby creating a strong incentive for adoption (Stakeholder d1). Highly important, also is the issue of recycling of old vehicles which should be addressed as soon as possible, especially regarding batteries (Stakeholder c1, e1). Already happening is an import of 2-wheelers, mostly originating from China, that however is not sufficiently regulated to date (Stakeholder e1). Future policies should therefore touch topics related to training as well as charging infrastructure and energy grid development (Stakeholders a3, b1, f1). As an ongoing activity, Tanzania’s Land Transport Regulatory Authority (LATRA) is in the process of reviewing their regulations to accommodate other cleaner technologies in the transport sector (Stakeholder d1). Stakeholder e2 suggested a KPI for the project that measures the clarity for businesses how importing vehicles works, how much it costs, what’s happening if you import them.

1.4 Obstacles, limitations, barriers

Challenges

One of the main challenges that needs to be overcome is the adoption barrier that typically comes with new technologies, such as e-mobility. Overall, it was stated by all stakeholders that there is currently limited knowledge on EVs and associated technologies. As such, there is almost no e-mobility existing to date in Tanzania, meaning a lack of experience and no positive examples showcasing that it works. For the case of our demo project, Stakeholders a2, c1, e1, e3 mentioned this adoption barrier that would lead to resistance to adopt e-mobility. Furthermore, challenging weather conditions (hot climate, wet rain season) in Dar es Salaam were mentioned (Stakeholder a1, d1), maybe requiring a special robust vehicle design. Stakeholder d1 also mentioned that e-bajaj should accommodate the fact that it is not uncommon to overload bajaj today, for instance by carrying up to four passengers in vehicles that have been designed for two passengers, thereby requiring a sturdy vehicle design and sufficient power of the electric drivetrain.

Another challenge mentioned is associated with the high initial investment cost to buy EVs, compared to conventional vehicles (Stakeholders a2, c1, e1, e2, e3, f1). Making this even more costly is the need to build up a public charging infrastructure (which is currently not existent, Stakeholder c1, d1, a3). Additionally, Stakeholder c1 mentioned that the high initial cost of investment into electric vehicles

could be adequately addressed if financial institutions see a strong business case, nevertheless, this is not yet the case in Dar es Salaam and Tanzania. Another obstacle mentioned is the non-reliability of the energy grid (a1), due to frequent blackouts. However, the overall power of the current electricity grid was also described as being sufficient in most cases for home-charging single e-bajaj overnight (Stakeholder e2). There is therefore a strong need to build up a public charging infrastructure in Dar es Salaam.

Stakeholder a1 expressed the opinion that a possible dominance of the EV sector by a few companies could lead to limited competition in the future. Stakeholder b1 expressed that the multiplicity of institutions involved in the urban transport sector could hinder a proper project coordination. Stakeholder e2 mentioned that the planning of the project would be very challenging in relation to deciding which routes should be served, which ownership model for the vehicles would be adopted, how drivers should be selected and the overall business model development.

Solutions

To overcome the aforementioned obstacles, a number of suggestions were given by the stakeholders. Stakeholders a1, d1, e2, e3 mentioned the need for political support for a successful project implementation, the need to engage the government for assured commitment towards the project and ensure well-established project management structure. Furthermore, the involvement of all stakeholders at an early stage of implementation was suggested (Stakeholders a2, d1), such early engagement could be fostered by creating a stakeholder platform for the exchange of information and knowledge sharing about challenges and solutions (Stakeholder b1).

Looking at the institutional landscape, the establishment of a department under an existing institution or even a separate institution that is responsible for urban mobility was suggested by Stakeholders b1, e1. Creating a framework of a free market environment where competition will thrive to improve services in the sector was suggested, likewise the institutionalization of laws, by laws and regulations to support e-mobility (Stakeholder a1). This would hopefully lead to the presence of investors who will ensure availability of EV and spare parts (a1) and create an enabling environment for businessmen in terms of financial resources, allowing them to shift/venture in the newly emerging business opportunities (Stakeholder c1). Having lower fares for e-bajaj over regular fueled bajaj was also suggested (Stakeholder e1).

Another topic mentioned was awareness raising at all levels of the community, from national leaders to community members and the advocacy of e-mobility (Stakeholders a1, a2, a3, b1, c1, f1). Campaigning at bus stations was suggested by stakeholder e1. Testing the e-bajaj during the demonstration phase for comfort, safety and performance to suit the needs of the users was suggested by Stakeholder d1.

The overall topic of training was frequently mentioned: Stakeholders b1, a3, f1, e1 suggested to provide the necessary training on e-mobility for key stakeholders, stakeholder c1 added the need to retrain current workers of the 3-wheeler market.

Stakeholder a2 mentioned the need to have a survey on this project to end up with a mobility solution which accommodates owners and users' needs, leading to a robust product with the same or better

requirements, capacity in terms of space and energy that can deal with the situation of the existing infrastructure (poor roads).

1.5 Sustainability of the e-Mobility solutions to be implemented

a. Achieve sustainable mobility

Amongst the stakeholders, there was a general consensus that the planned e-mobility solutions are useful to contribute to the goal of sustainable urban mobility in Dar es Salaam. As at the moment all bajaj running in Dar es Salaam are driven by combustion fuel; therefore, switching to electricity as a power source will help to significantly reduce CO₂ emissions and air pollution.

Stakeholders also mentioned the aspect of safety, with 3-wheeled bajaj are considered to be safer than 2-wheelers (Stakeholders a1, d1), that are currently very frequent. Stakeholder e1 expressed concerns that e-vehicles due to being very silent may lead to more accidents. Furthermore, improved accessibility, also to social services, and a reduction of equity related issues in access to transport were named (Stakeholders a2, a3, d1, b1, f1). Bajaj were named as being particularly inclusive as they easily allow for the transport of people with special needs (e.g. disabilities, elderly, children) much better than with 2-wheelers or in crowded buses (Stakeholders d1, f1).

b. Contribute to plans and schemes

In Tanzania, government efforts have been geared towards promoting cleaner fuel for the transport sector such as CNG for hybrid-vehicles, electricity for trains and mass transport systems such as the BRT system in Dar es Salaam. Stakeholders were of the view that the planned e-mobility-solutions will contribute to these government initiatives and plans. (Stakeholders a2, b1, d1, e1) Specifically, the integration with other modes was mentioned by Stakeholder b1, as the demonstration activities will link feeder services with the BRT in Dar es Salaam.

1.6 Impact on existing business models

The current 3-wheeler market in Dar es Salaam is dominated by private operators that are engaged by various forms in the market. Ownership is horizontally fragmented, with lots of different owners of bajaj being active in the market today, ranging between owners who are also drivers and only own one vehicle up to owners who own dozens up to hundreds of vehicles and rent them out. Typically, drivers of vehicles are organized in associations that try to control access to the market on a geographical basis, for instance by claiming certain street junctions exclusively. The implementation of a feeder service may therefore directly challenge the business models of those operating in the area it is being implemented in, creating the need to consider how to deal with that.

To increase the acceptance of the demo project, bringing on board all stakeholders who are involved in the business is required (Stakeholders a2, a3, e1, b1, e3). Stakeholders brought up concerns that all people working in the current 3-wheeler market, ranging from drivers, mechanics, spare part dealers, fuel sellers will be threatened. Stakeholders a3, b1, e3, f1 expect jobs lost in the "old" bajaj sector will be compensated by newly created jobs, for instance fuel attendants' posts will be replaced by jobs for people working at charging stations. Stakeholder d1 mentioned that e-bajaj may also affect

investments into other means of transport, as more people will move to EVs leading to negative effects and business failure for instance in the dala-dala minibus sector.

To overcome this, Stakeholders b1, e3, f1 for instance proposed that the project can engage mechanics on the type of technologies they can work with, and provide training to them to deal with e-bajaj. Stakeholders a2, c1, f1 mentioned that the current distributors of conventionally fueled bajaj should be helped to become e-bajaj distributors to speed-up the transition. Stakeholder e3 suggested that existing groups of bajaj drivers could be surveyed before the implementation of the project.

Stakeholders e1, e2 proposed to test and monitor different business models during the demonstration phase. Three different operating models were proposed by Stakeholders e2: (1) proof-of-concept with DART where operators bid for concessions, (2) keeping the current ownership-driver-structure for a small group of drivers and (3) to offer a small group of drivers e-bajaj with a loan (good conditions), thereby mitigating cannibalization of their current business model. Stakeholder b1 suggested that e-bajaj should not face competition from conventionally fueled bajaj, similar to BRT which is not allowed to face competition from dala-dalas.

1.7 Implications for Planning and Urban Development

The interview touched on implications of the demonstration and an upscaled project on planning and urban development.

a. urban development

Stakeholders a3, f1 reflected on the fact of urban growth, where e-bajaj could make cities become more liveable, open transport opportunities and provide better access to public transport, however both stakeholders as well as stakeholder d1 were concerned that this could lead to urban sprawl. Stakeholder d1 reflected on the problems that came up when new means of transport, 2- and 3-wheelers for instance, came up in the past in the city without proper allocation of parking space. Stakeholder b1 mentioned that they are aware of such effects when planning the BRT and the entire transformation of the urban mobility sector towards e-mobility. For instance, the Dar es Salaam Transport Master Plan is designed with the concept of transit-oriented development, whilst the city's service plan is designed to accommodate trunk lines and feeder services, that could also comprise the location of charging points (Stakeholder b1). Increasing charging points, according to stakeholder a1, could trigger demand for electric vehicles, but will also change the cityscape (Stakeholder a1, e1). Stakeholder e2 suggested that building charging infrastructure for e-bajaj at BRT stations could also allow upscaling these charging stations to accommodate for e-BRT in the future.

b. transport system

Regarding implications for the city's transport system, stakeholders were of the view that the demonstration and a scaled-up scenario will require that the existing road transport infrastructure is designed to accommodate the different means of transport, including the e-bajaj. Expanding the road infrastructure to the outskirts to accommodate all modes of transport, including cars, bajaj,

motorcycles and buses was mentioned by Stakeholders a1, a2, a3, b1, d1, f1. Stakeholder b1 mentioned that in phase 2 of the BRT development, plans already exist to include bajaj terminals.

c. energy system

Energy systems are key for the development of electric mobility. In Tanzania, ongoing projects seek to expand the electric power generation and distribution capacities (Stakeholders a2, b1, f1), also for renewable energies (Stakeholder b1). In Dar es Salaam, there are no notable external implications as reliable power is now available in many areas of the city (Stakeholder a3). Stakeholder f1 expressed the view that the country's energy policies encourage use of electricity for economic purposes, which stakeholder d1 said could help increase government revenues. Stakeholders a1, a3, b1 indicated that the development of the e-mobility sector could engender the need to expand other energy sources such as CNG and foster the development of micro-grids. Stakeholder d1 furthermore mentioned opportunities for the private sector to supply energy for e-bajaj through solar and small hydro's in other parts of the country.