

# **Pathways to integrating paratransit and informal public transport: Case studies from Tshwane, South Africa**

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## **ABSTRACT**

At its core public transport integration is about the collaboration of actors. Collaboration is elusive and difficult to achieve, especially in developing countries where insufficient regulation and dispersed, quasi-formal public transport operations are common. Asymmetries in information and objectives between paratransit and formal sector actors create barriers and may prevent synergies from emerging. A simplified framework for assessing the collaboration of actors during the implementation of integrated public transport projects is proposed. The position of the framework is that it is critical to identify actors' objectives and barriers to collaboration, and then to action decisions to remove these barriers and achieve objectives at every step of the STO (Strategic Tactical Operational) decision-making process to maintain structural and horizontal consistency. The framework is tested ex-post on two public transport integration projects in Tshwane, South Africa: the Gautrain regional rapid rail and A Re Yeng Bus Rapid Transit (BRT), both of which are supported by paratransit feeders. The case study shows how collaboration is achieved when all the key actors' objectives and barriers are understood, planned for and implemented across the STO levels and how failure to do so can lead to failed integration outcomes. The framework may be useful to authorities pursuing collaboration with paratransit for the purposes of implementing integrated public transport in the Global South.

Keywords: Public transport integration; paratransit; collaboration; actors; strategy; decision-making

## **1. INTRODUCTION**

### 1.1 Background to public transport integration and collaboration

The need for efficient and seamless public transport systems has accelerated the adoption of policies promoting public transport integration in cities across the globe. A prerequisite for successful implementation of integrated public transport policy is the collaboration of multiple organisations (Pettersson & Hrelja, 2020). Collaboration is defined as an attempt to overcome problems with collective action and to transform a situation in which various organizations operate independently into a situation in which they act in concert to achieve shared objectives (Pettersson & Hrelja, 2020).

In the Global South the implementation of integrated public transport typically requires collaboration between paratransit operators and formal public transport providers. Paratransit in this context refers to a flexible mode of public transport that does not follow a fixed schedule, and typically uses small to medium-sized buses (Behrens, McCormick, & Mfinanga, 2016, p. 1). Paratransit is often provided by weakly regulated operators within the informal sector and thus referred to as 'informal transport' (Behrens, McCormick, & Mfinanga, 2016, p. 5). Formal public transport, by contrast, includes fixed-routes, scheduled bus and train services operated by formally regulated and managed organisations (either private companies or public sector). Since formal transport is historically undersupplied in developing cities, paratransit has become the majority mode and very important to mobility throughout cities of Africa, Latin America, and developing Asia (Hernandez, Behrens, & Chalermpong, 2021).

Partly as a result of these differences, it is common to find low levels of integration between formal and informal services in the same City. This is evidenced by poor spatial alignment of routes and transfer opportunities, uncoordinated hours of operation, and unintegrated fares (Andreasen & Moller-Jensen, 2017; Venter, Barrett, Zuidgeest, & Cheure, 2020; Behrens, Hawver, Birungi, & Zuidgeest, 2017). Despite the obvious need for integration, it remains elusive, as interventions will always take place within a pre-existing informal system (Macario, Spandou, & Filipe, 2016) that, by definition, evolved outside of formal planning processes. The challenge of integrating paratransit into the mainstream has been particularly salient in cities attempting to modernise public transport through investments in Bus Rapid Transit (BRT), and these have met with varying levels of success (Venter, 2013). It follows that moving towards more integrated multimodal networks requires cities to improve collaboration between paratransit and formal public transport providers.

When trying to understand the challenges and success factors of achieving collaboration in public transport, practitioners can draw on studies from a range of fields. These include transport planning, institutional economics and organisational psychology. Most scholarly work in this area has been carried out through case studies comprising interviews of key stakeholders in the Global North. Although the case studies are context dependent (Pettersson & Hrelja, 2020) common themes and conditions for collaboration emerge from the literature that might provide useful guidance to transport practitioners. There is consensus that collaboration begins with **shared goals or objectives** which organisations cannot achieve on their own. **Mutual understanding** of one another is critical (Pettersson & Hrelja, 2020) and honest, open **dialog and information sharing** is needed for **building trust**. Understanding the **conditions and constraints** under which other organisations operate is also recommended (Hrelja, Rye, & Mullen, 2018). The difficulties of collaboration are largely attributed to **large groups** (Hardin, 1982; North, 1990), **limited experience** with collaboration, and **weak governance** (Hidalgo, Munoz, & Velasquez, 2016). The **allocation of resources** including finance, knowledge and leadership is required. It is important to view collaboration as an **on-going decision-making** process (Hrelja, Rye, & Mullen, 2018) and **joint rules and structures** that govern the nature of the relationship (Pettersson & Hrelja, 2020) should be established.

A weakness of the body of knowledge on organisational collaboration is that it mostly emanates from the Global North. It does not adequately reflect the different conditions in the Global South, particularly with respect to the difficulties of dealing with informal organisations such as is found in the paratransit sector; and the fact that even formal public transport is often under-resourced. In South Africa; Plano, Behrens and Zuidgeest (2020) used stated choice experiments to determine paratransit operators' willingness to supply off-peak feeder services. Del Mistro and Behrens (2015) create a cost model that demonstrates

the profitability of paratransit operations converted into feeder and distribution services. In addition, research on public transport integration in the Global South often takes a static view, focusing on desired end states while ignoring the difficult questions of process: how can actors collaborate and transition between current sub-optimal unintegrated services towards more integrated ones? We concur with Pettersson and Hrelja (2020) who state that collaboration is a learning process that should be defined as an attempt to overcome problems by collective action to achieve shared goals. This paper offers an examination of processes of moving towards collaboration that are embedded in actual transport integration initiatives in South Africa.

## 1.2 Research Aim

This paper investigates the collaboration of paratransit and formal public transport in the implementation of integrated transport. The key research question is:

**How do we systematically understand the inputs, dependencies, and factors affecting the process of moving towards integrated public transport, with particular relevance to realities of the Global South?**

A simplified analysis framework is proposed for assessing the collaboration of actors when implementing integrated public transport. The strategic-tactical-operational (STO) decision-making levels is used to structure the framework so that assessment takes place across the planning horizon. We test the usefulness of the framework by looking at two case studies in the City of Tshwane, South Africa, where collaboration between paratransit and formal public transport was attempted. The projects yielded different outcomes; collaboration was successful in one case but not in the other. The insights from both the framework and the case studies lead to an enhanced understanding of potential pathways towards successful transport integration in the Global South, and how to avoid pitfalls along the way.

The paper has three parts. Section 2 describes the methodologies that are used to develop the simplified collaboration framework and the case studies. In Section 3 the simplified framework is presented, while Sections 4 and 5 describe the case study context and the application of the framework respectively. The final sections reflect on the effectiveness of the proposed framework in capturing the salient aspects of the case studies and its limitations, and conclusions and recommendations for future research.

## 2. METHODOLOGY

### 2.1 Simplified collaboration framework

A simplified framework for assessing the collaboration of actors during the implementation of integrated public transport is proposed. The framework is developed through a deductive analytical process, and informed by a close reading of the literature. A search of the published and grey literature using the keywords “public transport integration” and “collaboration” was undertaken. The key questions asked were:

- What are the key inputs into the collaboration process?
- What are the key decisions that various actors have to make to collaborate?
- How does learning reinforce the ability to improve the effectiveness of these decisions?

White literature were sourced from Scopus and Science Direct databases and online searches. Grey literature was sourced from various library catalogues. The retrieved publication dates ranged from 1982 to 2023. In order to structure the collaboration decisions we use the STO decision-making levels to describe the decision-making process. In short, the strategic level relates to planning for long term objectives and which means are needed to achieve these objectives. The tactical level refers to the decisions around acquiring the means and how to use them efficiently – these could include tendering, contracting, and staffing decisions-. At the operational level the decisions are implemented through short-term management and operational actions (Van de Velde, 1999).

## 2.2 Case studies

The case studies provide a way to test the developed framework by grounding it in actual experience in a certain context (Sorensen, 2018). We selected two cases from the City of Tshwane, South Africa, looking for cases with similar objectives but different outcomes, and implemented over the last 10 years. By looking at one City, we control for major spatial and contextual differences. The cases both involve integration of paratransit with newly-built formal transit, respectively high-quality rail, and Bus Rapid Transit (BRT). Where the cases differ is in terms of the actors involved in the project, the scale of the project, and the extent to which the paratransit feeder services were modified from existing routes.

Methodologically the case studies depended on reviewing publicly available documents and podcasts, and semi-structured qualitative questionnaires and interviews with persons associated with each project. The documents were sourced from the respective contracting authorities. A snowball sampling method was used to identify individuals knowledgeable with each project, and care was taken to include respondents with a wide range of roles and perspectives, including transport planners from the contracting authorities, external consultants who work with paratransit operators, and executives from the operating company. Data collection occurred between April 2022 and April 2023. The questions asked were in line with the simplified collaboration framework developed for the study. The questions unpacked the strategy implementation of each actor at the three STO decision-making levels to gain an understanding of the events that may have influenced collaboration outcomes throughout the project horizon. The interviews were recorded and transcribed for analysis. The sample yielded a total of 11 respondents (listed in table 1).

Table 1: Survey respondents.

Respondent: A Re Yeng (BRT) Case	Designation	Respondent: MFDS (Rail) Case	Designation
1	Transport Planner	7	Manager: Public transport integration
2	External consultant to paratransit bus company	8	Manager: Public transport integration
3	External consultant for affected paratransit	9	Manager: Public transport integration
4	Executive at paratransit bus company	10	Employee: Public transport integration
5	Manager at paratransit bus company	11	External Consultant: Transport Law expert
6	External consultant for affected paratransit		

Narrative analysis, the process of gathering insights from the experiences reported by the respondents is the applied research methodology. The quotations of respondents are used to highlight events that influenced collaboration.

### 3. SIMPLIFIED COLLABORATION FRAMEWORK

The departure point for the collaboration framework is the definition of collaboration which describes a simplified process to achieve collaboration. In Section 1, collaboration is defined as a learning process in which actors attempt to overcome problems by collective action to achieve shared goals (Pettersson & Hrelja, 2020). We thus identify actors, achieving goals (objectives), overcoming problems (barriers), and learning process as key inputs for the framework. The assumption of the framework is: for collaboration to occur, actors must have shared objectives and their barriers must be overcome through a learning process. Actors refer to the key stakeholders who are attempting to collaborate. An objective and barrier are defined as something that you plan to do or achieve and anything that prevents people from being together or understanding each other, respectively. The “learning process” can be defined as “a series of actions that people pass through to acquire new knowledge and skills and ultimately influence their attitudes, decisions and actions” (Chalil, 2023). The emphasis on learning as a process suggests that some structured approach is required to overcome problems and achieve shared objectives. We suggest that the STO (Van de Velde, 1999) provides a useful way of describing this structure. The key concepts and their theoretical bases are briefly described below.

#### 3.1 Actors

Actors are defined as organisations or groups of people bound by common objectives which motivate action. Three broad categories of actors are required to collaborate when developing integrated public transport systems: users who consume the service; public transport operators who provide the services (in this case, we focus on informal paratransit operators); and the state or government which is the policy maker, funder, implementor and regulator (Canitez, 2019). The number of actors is important: for collaboration to be effective, each actor requires information about the motives and capabilities of other actors (North, 1990); with more actors, more information is needed, and the likelihood of asymmetric

information gaps grows (Canitez, 2019). Sorensen and Hedegaard (2018) highlight a high risk of responsibility avoidance as a pitfall of trying to achieve collaboration amongst multiple actors.

### 3.2 Objectives

Canitez (2019) states that actors have interests, incentives, powers, and liabilities. Objectives vary across actors, and it is important for individual objectives to be understood. These might be in conflict with each other, for example the profit-maximisation objectives of private sector actors versus the goal of government to maximise overall welfare (which might include protecting vulnerable groups of users). Besides differences in inter-organisational objectives, there might be conflicting intra-organisational objectives over time. These differences can cause tension in the relationships of actors. When seeking collaboration, the expectation is not for actors to ignore their individual objectives, but rather to align them with the common collaboration objectives (Macario, Spandou, & Filipe, 2016). For this reason many authors have highlighted the importance of actors jointly defining the problem and developing a consensus about shared objectives (Pettersson & Hrelja, 2020; Sorensen, 2018; Alexandersson, Bondemark, Henriksson, Hulten, & Hulten, 2018). This includes establishing a shared understanding of the purpose and the benefits of the collaboration for the different organisations involved, so that actors can convince themselves that collaboration will yield greater benefits than individualistic action. This echoes Hardin's (1982) assertion that collaboration depends on the ratio of costs to benefits perceived by the actors involved.

### 3.3 Barriers

The difficulty in operationalising collaboration in integrated public transport systems is attributed to individual and institutional barriers (Preston, 2012; Macario, Spandou, & Filipe, 2016). Institutions refer to the "rules of the game" or the humanly devised constraints that shape the interaction of actors. Institutions, whether formal (regulations, contracts, economic rules) or informal (organisational behaviour) reduce uncertainty in human interactions, but they can also be restrictive through inflexible norms and conventions. Thus, insufficient regulation and governance is an example of formal institutional barriers (Hidalgo et al, 2016) which may create uncertainty around how disputes between actors will be resolved. Informal institutional barriers to integration may take the shape of mistrust borne of previous interactions between actors, or limited experience with cooperative arrangements. Lack of trust is a particular problem between paratransit operators and government, based on historic policies of suppression or neglect of the industry (Venter, 2013 (Wilkinson, 2010)). Conversely, long term positive relationships amongst actors, with established enabling institutions, may lead to increased collaboration and trust levels (Canitez, 2019). Lastly, the cost of collaboration may be a barrier if the additional expense of working together exceeds the benefit to an actor (Sorensen, 2018).

### 3.4 Enabling factors to overcome barriers and achieve objectives

The objective of collaboration is to remove barriers in order to achieve shared objectives. Once the barriers of actors are understood, two enabling factors have been identified to prepare the ground for overcoming them and for aligning strategies towards collaboration: communication and governance. The need for dialogue and face to face meetings of all participants from early on in the process is often brought up as a critical facilitator of collaboration (Pettersson & Hrelja, 2020; Hrelja, Rye, & Mullen, 2018).

Dialogue enables actors to understand each other and their different contexts, and the need for establishing shared objectives. Challenges pertaining to inequalities between actors, information gaps, and issues of trust can also be identified. Partnerships develop over time and if the initial steps are successful they become deeper and more effective as people gain knowledge of each other and organisations. The experiences of on-going relationships build trustworthiness (Hrelja, Rye, & Mullen, 2018). When communication platforms have been established, an agreed governance structure which is specific to the inter-organisational relationship should be created. The governance structure must accommodate contractual hazards and uncertainty, protect the gains generated by the agreement, and have mechanisms to solve disputes (Alexandersson et al, 2018). In order to minimise risk, it is critical for the governance structure to have clarity on accountability, transparency and performance incentives (Hrelja, Rye, & Mullen, 2018).

### 3.5 Collaborative decisions

In order to achieve shared objectives collaboration requires a process of on-going learning and decision-making throughout the entire course of a project (Hrelja, Rye, & Mullen, 2018). The decisions are differentiated according to the STO schema to reflect both difference in intent and in planning horizon (Van de Velde, 1999). The framework acknowledges that each actor has different decisions to make to remove barriers and to contribute to effective collaboration. In the case of government actors, these actions centre mostly around creating an enabling environment for collaboration to take place. Operators' actions involve organising and upskilling themselves and users are required to engage in participatory processes. The sequential progression of activities throughout the STO levels creates horizontal and structural consistency of decision making and actions throughout the planning horizon, ensuring that the key elements of collaboration are a priority throughout the course of a project.

### 3.6 Summary

The proposed simplified collaboration framework (Figure 1) serves as a structured approach to achieving collaboration. The position of the framework is that it is critical to identify actors' objectives and barriers to collaboration, and then to action decisions to remove these barriers and achieve objectives at every step of the STO decision-making process to maintain structural and horizontal consistency. The framework is firstly intended to be used descriptively – to examine and unpack the key aspects of a collaboration initiative, and to help identify shortcomings and strengths. It may also be used in a normative way, as a succinct summary of key success factors and approaches found in previous research, to help guide participants in a collaboration initiative through important milestones along their journey.

In order to test the applicability of the framework in actual cases in the Global South, we investigated two integrated public transport projects retrospectively in South Africa. The application is both descriptive and normative, with the ultimate intention of identifying potential strategies to improve the outcomes of future integration attempts in Global South cities.

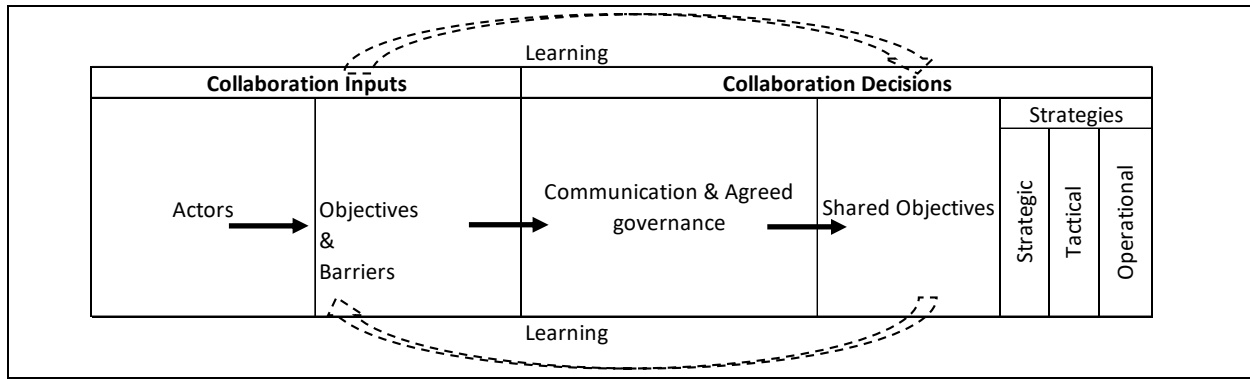


Figure 1: A summary of the main components of the collaboration framework.

## 4. INTRODUCTION TO CASE STUDIES

### 4.1 Context

South Africa has had public transport integration as a policy objective since 1996 when the first post-apartheid White Paper on National Transport Policy was adopted. The need for an integrated public transport system was an acknowledgement of the inefficiencies of the fragmented provision of public transport and the urgent need to transform and formalise paratransit (NDOT, 1996). With the introduction of deregulation in 1987 (Vegter, 2020), paratransit emerged as an integral part of South Africa's passenger transport industry (McCaul, 1990). By 1992 paratransit accounted for 46% (Vegter, 2020) of the public transport market; however, routes were soon overtraded resulting in congestion and turf wars (Barrett, 2003). Multiple efforts have since been made to upgrade and integrate paratransit with formal bus and rail systems (Schalekamp & McLachlan, 2016). Over 20 years later the paratransit market share had grown to 80% by 2020 (StatsSA, 2020), and the updated White Paper on National Transport Policy conceded that integrated planning has had limited implementation and success in the country (NDOT, 2017). The pathway to successful collaboration is yet to be found.

Two projects where collaboration between paratransit and formal public transport has been attempted in line with the policy vision, occurred in the City of Tshwane Metropolitan Municipality (Tshwane). Tshwane includes Pretoria, the administrative capital of South Africa, and is located in the urban conglomerate of Gauteng Province with a combined population of some 16 million people (Figure 2). The projects included the Gautrain Midibus Feeder and Distributor Service (MFDS) which is a rail and paratransit feeder scheme, and the A Re Yeng BRT and paratransit feeder scheme.

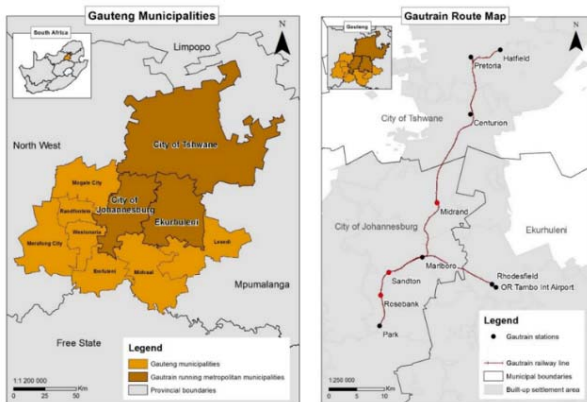


Figure 2: Locality of the City of Tshwane Metropolitan Municipality and the Gautrain rapid rail (Arnold, Le Roux, & Hattingh, August 2017)

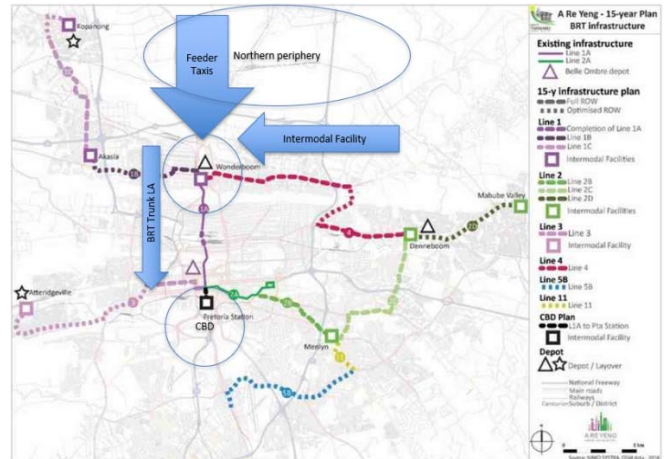


Figure 3: Line 1 A BRT and the proposed paratransit feeders (Mutasa, 2019).

#### 4.2 Gautrain Midi-bus Feeder and Distribution Service (MFDS)

The Gautrain is an 80 km rapid rail link, supported by bus and paratransit feeder services, that operates in three municipalities (Johannesburg, Tshwane, and Ekurhuleni) (Figure 2). Its primary function is to induce a modal shift from private car usage to public transport by providing an attractive offering in terms of travel time and cost savings. The Gautrain is therefore targeted at the middle class (Competition Commission South Africa, 2020). The Gautrain Management Agency (GMA) is a specialised regional public agency established under the GMA Act 2006 to manage, coordinate, and oversee the concession agreements for Gautrain. The concession agreement is a 20-year design, finance, build, operate and transfer (DFBOT) public-private partnership (PPP) contract, with GMA acting on behalf of the public partner, the Gauteng provincial government, and Bombela Consortium being the private partner. The provision of a feeder and distribution network is a key element in supporting train ridership (GMA, 2020) and creating an interface with existing public transport (GMA, 2017). The Bombela Consortium has operated the rapid rail and managed a subcontractor who provides dedicated feeder bus services since its inception in 2010. Armed with the experience of managing feeder services, the GMA successfully expanded its feeder coverage and increased its rail access by forming partnerships with paratransit which commenced in 2016. We focus here on the experience of collaboration between GMA and the paratransit industry at stations in Tshwane.

#### 4.3 A Re Yeng BRT paratransit feeders (A Re Yeng)

The City of Tshwane Municipality is one of the 12 cities in the country that is mandated to implement Integrated Public Transport Networks (IPTN). The City planned to restructure and integrate public transport by ensuring that rail is the backbone of the network, supported by high-capacity BRT corridors and bus and paratransit feeders. Integration would be enabled by an integrated fare and ticketing system. The establishment of Line 1A of a BRT system (named A Re Yeng), which is a trunk corridor linking the northern peripheral suburban areas to the CBD, was an opportunity to establish paratransit feeders

(Figure 3). Paratransit routes from the north converged along the planned BRT corridor and the City created a scheme where paratransit would stop and feed into the BRT at a new intermodal facility. The logic was that paratransit feeders offered greater value for money than extending the BRT further northwards, while limiting smaller vehicles in the CBD would reduce traffic congestion and improve air quality (City of Tshwane, 2016). The Line 1A paratransit feeder scheme for the A Re Yeng BRT was implemented by Tshwane in 2017. The performance of the paratransit feeder services is however far from desirable, with paratransit still competing with the BRT trunk.

The contrasting outcomes of the two schemes; despite similarity in the policy environment, close physical proximity of the projects, and actors with a similar history and culture, raises interesting questions about the factors for success for formal-paratransit collaboration. The following section examines these questions by discussing the results from the data collection using the structure of the simplified collaboration framework.

## 5. CASE STUDY RESULTS

This section presents the findings of the two formal-paratransit public transport collaboration projects in Tshwane. Data from the interviews, podcasts and reports are analysed and structured using the collaboration framework. The findings are narratives derived from the literature and they include quotations highlighting participants' experiences threaded together to explain the actor's decisions and actions in the pursuit of collaboration. The narrative of each case reveals how the components of the simplified collaboration framework influenced collaboration outcomes.

### 5.1 MFDS

#### 5.1.1 Actors and objectives

Four main actors were identified in the project: the GMA, the paratransit associations operating in the service area, the rail system concessionaire, and the customers (GMA, 2023). These actors differed substantially in terms of their objectives. The middle to high-income customers who can be categorised as choice users (Laabmayr, 2019) wanted **lower travel times and increased network coverage** on feeder services while maintaining Gautrain's **high service quality** (GMA, 2017). The GMA's objective echoes the GMA Act and national and provincial policy to **increase ridership and integrate with and empower paratransit** (GMA, 2017). During the survey the GMA respondents consistently focused on the empowerment objective, which is interesting since in itself the general empowerment of another mode is not normally within the purview of a rail-focused entity. However, it made financial sense: paratransit presented a cost-effective alternative to bus feeders due to its lower operating cost at short distances, while smaller vehicles would increase network coverage at a lower cost. The concessionaire's objective is to **minimise its risk and make a profit** (GMA, 2017) and paratransit operating in the area was open to opportunities to **increase its market share and profit**. When asked about paratransit objectives Respondent 09 mentioned, *"To increase their revenue"*, whilst 08 stated that paratransit wants, *"to transform the industry into a sustainable business. To be formalized into a business and get access to resources (funds, skills, infrastructure)."*

### 5.1.2 Barriers

Challenges across all actors were mainly attributed to the **informal nature of paratransit**. Firstly, users generally have a **negative attitude towards paratransit** due to the poor behaviour of taxi drivers towards passengers (GDRT, 2022). GMA also had to contend with getting the **buy-in** of paratransit who had a low level of trust for the government. Forming a partnership and organising **numerous individual operators into a paratransit entity was a challenge for GMA**. Respondent 10 mentioned that *“contractually the paratransit entity is an establishment that was set up by the two regional paratransit structures in Tshwane. It was difficult to deal with this challenge and several engagements were held with the structure to affirm the establishment before contracting.”* In addition, GMA had to **convince the concessionaire to manage the paratransit feeder operations** whilst the concessionaire did not want the additional responsibility (GMA, 2023). Managing paratransit operations was seen as a big risk, especially since such a partnership with paratransit had never been implemented (GMA, 2017). The paratransit operator’s barriers were its **general mistrust of government**; a former paratransit operator now employed as a manager of MFDS stated that, *“paratransit industry was neglected for a long time by the government”* (GMA Podcast, 2021). **Limited professional knowledge** of operating formal services was also a barrier. Respondent 07 and 08 commented on these issues respectively, stating *“Communication and contractual matters”* and, *“It was working with the GMA in a concession environment as well as operating a scheduled service. It was important for the GMA to ensure that paratransit understands the PPP environment as well as the roles and responsibilities of each party.”*

### 5.1.3 Decisions throughout STO process

Negotiations to get the buy-in of the paratransit operators and the concessionaire were the first step. An executive of GMA stated: *“it cannot be done alone, other stakeholders are needed and, Integration fails because we fail to execute together. It’s important to plan in a coordinated manner to ensure that the many different players and parts are working together”*. **Over and above that**, *“It was also important to understand the business rationale from each side”* (GMA Executive, 2021). *“The GMA has, as one of its strategic objectives, the integration of the Gautrain System with other public transport services. The GMA aims to achieve this objective through engagement with key public transport stakeholders to discuss and implement integration initiatives and to co-ordinate transport planning for the Province (Respondent 10).*

The activities that were actioned by the actors could easily be described by the STO levels. Strategically, when the MFDS was implemented, supporting structures and infrastructure were already in place to support the objective of integration. The GMA was legislatively set up to provide integrated public transport across municipalities; it was therefore empowered to create integrated multi-modal, land use and transport policy at a strategic level (Gauteng Province, 2017). It implemented integrated policies such as intermodal public transport stations and an integrated public transport management system that includes integrated information, pricing, and fare collection even before the MFDS was established. The network was also strategically designed to connect major land uses (GMA, 2017). The integration of paratransit services into the stations was therefore easy because the infrastructure was already in place. These mechanisms laid the foundation for addressing user objectives for lower travel times and increased network coverage.

At a tactical level, the MFDS model was created. The concessionaires’ risk of working with paratransit and paratransit’s mistrust of government was addressed through the provision of a Service Level Agreement (SLA) which was negotiated and formalised the partnership between the GMA, the concessionaire, and a

single paratransit company which was formed by the paratransit associations. A manager stated that, “what we did in the beginning was to make sure we do not overprescribe in greater detail. Our role was ensuring compliance with legislature. We empowered them on the SLA to do their work within the framework of legislature” (GMA Podcast, 2021). **Respondent 10 stated that**, “so far the model is well accepted by both parties and the GMA.” The SLA specified the obligations and performance measures of each partner. The GMA’s role is planning, stakeholder consultations, establishing the partnership, funding it as well as monitoring its performance. The concessionaire which had a good track record managing the rail and bus service would also manage the MFDS. The paratransit entity would be responsible for purchasing midibuses and branding them with the financial support of GMA, as well as adopting the service levels of Gautrain through training for operational efficiency and customer care and adhering to routes and schedules provided. The performance management system was extended to the MFDS (GMA, 2023) (GMA, 2017).

The strategic and tactical plans were actioned at the operational level. Midi-buses were purchased by paratransit with the financial assistance of GMA. Paratransit’s main objective to increase revenue is addressed through a financial model which was created to continuously review the financial sustainability of the system. The model is based on the number of passengers ferried at a set profit level. Operating subsidies are dependent on the patronage levels (GMA, 2017). This arrangement gave the paratransit partners assurance that their profitability would not be compromised. Respondent 09 stated boldly that, “GMA did meet this objective (To increase their revenue).” Barriers of skills development are addressed, not just for the paratransit entity but for GMA as well. Respondent 09 stated that “Skills development for GMA and paratransit employees is occurring.” The customer objective of maintaining the GMA level of service is upheld through the channels created for customer complaints and performance management. A customer feedback measure based on passenger satisfaction surveys and customer comments is incorporated into the performance management. “customer service complaints about vehicle accidents and bad driving behaviour caused by employees,” have been addressed, “by providing training on customer care and applying employee code of conduct to ensure compliance and good behaviour.” (Respondent 10). The risks for GMA and the concessionaire are minimised by continuous monitoring of the SLA. KPIs such as service availability, punctuality, and vehicle age are tracked and Respondent 07 and 09 stated that challenges are resolved by having “constant meetings”, and, “Having regular and focused sessions and agreeing on the communication channels” respectively. The objective to enter new markets was achieved through creating new licenced routes for the MFDS giving the paratransit entity exclusive property rights to feed into the Gautrain with no worry of competition (GMA, 2017).

#### 5.1.4 Collaboration outcomes

The integration of paratransit feeders and the rail system has been successful. There was a 60% year-on-year increase in MFDS patronage (from 2011 to 2021) with an average of 13,000 commuters every month compared to a ridership of 2,800 per month in 2011 (GMA, 2020). MFDS has also contributed to sustainable jobs, staff are remunerated above minimum wage (typical for paratransit drivers), there is economic empowerment of paratransit owners, and the promotion of sustainable transport. The respondents agree that MFDS has achieved its objectives and the barriers are continuously addressed. Respondent 10 stated that the “GMA ensured that the objectives were met by enabling the environment to be conducive for robust engagement and trust regarding the partnership” **two objectives**: “Objectives 1: to integrate the minibus taxi industry with the Gautrain system, 2: to empower the taxi industry to be a

sustainable business”, have been achieved. This is a case of collaboration between paratransit and the formal public transport system succeeding.

## 5.2 A Re Yeng

### 5.2.1 Actors and objectives

Five key actors were identified: the City, paratransit associations, owners and drivers and the users. BRT was a new transport system and in response, the City created a dedicated unit responsible for planning, implementation and operation of the integrated public transport network (City of Tshwane, 2015). Paratransit consisted of numerous operators operating long-established routes in the affected area. Users are characterised as low to middle-income commuters living in the northern periphery, travelling an average distance of 45km per direction to the CBD (Ngwira, 2020).

### 5.2.2 Objectives

The City had three main objectives: to **increase BRT coverage and ridership, integrate and transform the paratransit operators** on the route, and **improve the quality of service for users** (Respondent 02). Respondent 03 and 04 stated the following objectives for paratransit: “To make money in the process and participate in the BRT system,” and, “they (objectives) vary according to the associations but broadly they want to spread their wings beyond the industry and get more business opportunities elsewhere.” There was consensus from respondents (02,05,06, and 11) that the users travelling on the corridor expected **reduced travel times, lower fares, higher access** and an **improved quality of service** (Respondent 05).

### 5.2.3 Barriers

Some of the integration challenges that the City faced were related to **multi-level and fragmented governance** (CSP, 2022) and the **large volume of paratransit** (492 operators) that were affected by the integration scheme (City of Tshwane, 2016). Paratransit is not regulated by the City, but rather a provincial regulatory entity with limited administrative and enforcement capacity. The regulatory body did not have an accurate and complete repository of operators which made the process of identifying affected operators on the BRT line difficult for the City (Respondent 02) (City of Tshwane, 2016). **Monitoring and enforcement** of any agreements between the City and paratransit would also be a challenge. The City’s human capital challenges such as the **limited technical skills and experience** in implementing multi-faceted projects such as BRT and integration with paratransit would add to the complexity (CSP, 2022). Respondents 02, 04, 05 and 11 agreed that lack of skills was a challenge for the City and paratransit. A general mistrust of government by paratransit associations, owners and drivers was seen as a barrier for the project (Respondent 04 & 05). The proposed transfer arrangement would be an adjustment for users (Ngwira, 2020); the feeder scheme required shortening long-established direct minibus taxi routes by creating a transfer point 35km into the journey and 10 km away from the destination. The transfer between paratransit and BRT would be facilitated by an automated fare collection system which many of the users were not acquainted with. Respondent 05 identified users lack of skills also as a barrier to integration.

### 5.2.4 Decisions throughout STO process

The City planned a coproductive paratransit feeder system in line with the national policies and strategies for integrated land-use and multi-modal transport planning (City of Tshwane, 2015). Respondent 02 said

the City's strategy was aimed at achieving physical and systems integration of various modes at an intermodal facility. An intermodal facility was planned in a strategic location with existing rail, bus and paratransit routes. The proximity of these modes, the addition of BRT and systems integration would enable seamless and affordable travel for users. Communication across multiple actors would be facilitated by a project steering committee which included paratransit associations and other government actors who formalised the process by signing a memorandum of understanding (MOU) (Respondent 02). The project steering committee is a "communication forum between the City and paratransit" (Respondent 04), where signatories would be informed and consulted on project progress. "Consultants would be appointed to assist paratransit and the City," this was expected to improve the skills limitation of the actors. "The strategy focused on operators with operating licences and permits, illegal operators were not considered", however, this was a risk because the "majority of the members (paratransit) did not have permission to operate. Less than a third have operating licences" (Respondent 04).

The tactical plan for integrating paratransit feeders with BRT was governed by the Full Clearance and Compensation Strategy (FCCS) outlining the mechanisms for restricting and limiting access of paratransit vehicles to the BRT operational areas (City of Tshwane, 2016). This entailed working with the paratransit industry to identify affected paratransit operators, routes and vehicle numbers and the status and validity of Operating Licences (City of Tshwane, 2016). The affected paratransit operators were not permitted to compete with the BRT trunk but had the option to exit the market or continue as feeders. These two options would provide compensation to affected paratransit and would address their objective to increase revenue. The first option gave paratransit operators the choice to accept a permanent compensation value per vehicle which represented the loss of revenue when exiting the market, after which the operating licence would be terminated by the provincial regulatory entity. This amount excludes the capital value of the vehicle which the owner could sell on the open market (City of Tshwane, 2016). The second option was to remain in the market by forming part of the BRT feeder service. Paratransit vehicle owners would receive compensation for loss of revenue due to the shortened routes and they would also become shareholders in the BRT Bus Operating Company (TRT BOC). In addition, paratransit drivers would receive daily or weekly electronic payments for every passenger dropped off at the intermodal facility. Passengers dropped per feeder vehicle would be strictly controlled and monitored by an Automated Fare Collection system provided on the paratransit and the BRT. The provincial regulatory entity would amend the operating licences by shortening the routes accordingly (Respondent 02) and users would pay a lower combined fare once the paratransit feeder and subsidised BRT were integrated (City of Tshwane, 2016). A Corridor Protection Strategy to limit competition in the corridor was developed. It included the creation of by-laws, the review of operating licences and law enforcement by the City (City of Tshwane, 2016) (Respondent 06). The City and paratransit owners would enter into individual contracts that gave effect to the chosen options.

At an operational level, the City's objective to achieve physical integration by constructing a multimodal facility did not materialise. Upon the launch of the BRT service and its paratransit feeder scheme, infrastructure was incomplete, and a temporary low-capacity intermodal facility was created to accommodate transfers (Respondent 06). The limited capacity at the facility resulted in the provision of a restricted BRT fleet and a mismatch with the minibus taxi drop-off volumes which caused long queues at the facility (Respondent 06). Respondent 04 mentioned how "Minibus taxi drop-off was ineffective, due to infrastructure delays," and "paratransit drivers were restricted by incomplete parking facilities". Systems

integration was also not achieved; the automated fare collection system was not operational as some EMV equipment and software components were not ready. Users complained about the long queues for purchasing bus coupons at the temporary facility (Respondents 05). Respondent 03 commented on how, “the start-up phase was not planned properly and commuters were unhappy with transfers,”. Users complained about the unusable infrastructure at the intermodal facility (Respondent 04) and their objectives for **reduced travel times, lower fares, higher access** and an **improved quality of service** were not achieved. Eventually users demanded paratransit drivers to continue with their old routes (Respondent 05).

The revenue increase objective of paratransit drivers of owners who chose the BRT feeder option was threatened. Paratransit drivers earn their wages from fare revenue and a non-functional automated fare collection system meant that transfers could not be recorded and the planned payments per passenger could not be implemented. Respondent 03 said, “permits were not changed, payments to drivers were not made, the facility was not ready to accommodate the system.” Unchanged permits enabled the paratransit drivers to continue operating as before especially since their livelihood was threatened and the users were demanding the resumption of their old operations (Ngwira, 2020). Respondent 01 lamented that, “the challenges arose with the downstream of communication with the drivers and the commuters on using the hybrid type of system to travel from their origin to destination. The transfer plan was also a huge challenge and the ticketing plan (using cash and thereafter a cashless system)”. The financial impact of the operations was not as severe on paratransit owners. Shareholding in the BRT Bus operating company was not concluded; however, their revenue increase objectives were achieved because they received their compensation. “Owners were paid and they are not dropping passengers as a result they were paid for nothing” (Respondent 03). The corridor protection strategy was not implemented and pirate operators who did not form part of the agreement also continued to operate the full route (Respondent 11). Respondent 3 mentioned how the structure of the steering committee was ineffective, “Contracts were signed with individual paratransit owners. Discussions were taking place through a steering committee representing the associations. This is a cause for disconnect and the City did not meet its part of the deal and therefore the taxi associations reneged on the agreements.” Respondent 02 was also critical of the steering committee, “the strategy does not include commuters, owners, drivers, rail.”

#### 5.2.5 Collaboration Outcomes

The integration between paratransit and the BRT has not been successful (Respondent 05). The City expected 15,500 passengers to be dropped off per day however a survey of paratransit feeder drop-offs shows that monthly passengers reduced from under 70,000 to 2,500 between March and September 2018 (Figure 4). Interestingly, paratransit owners’ objectives to maximise revenue were met as they received lump sum payments for loss of revenue despite continuing to operate. Despite the money spent, most users are still confined to paratransit; they travel long hours and pay more. Respondent 01 and 02 said stakeholders must “revisit the conditions of agreement and enforce them”, and “both parties confirming and committing to the agreements” is what is required. However, Respondent 03 said, “There is no political will to address issues.”

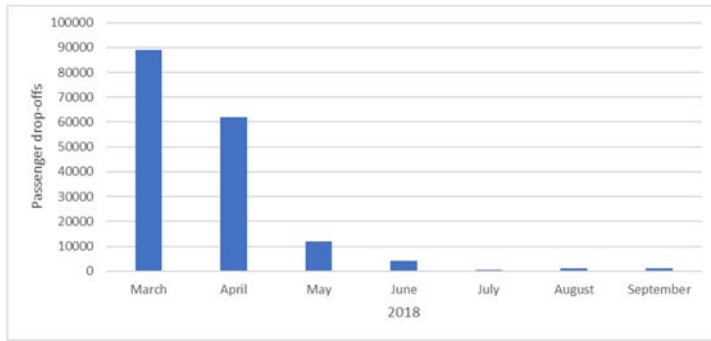


Figure 4: Survey of passengers dropped-off at the intermodal facility (Ngwira, 2020).

## 6. ANALYSIS AND DISCUSSION

The general learnings from assessing the case studies using the collaboration framework are discussed in sub-section 6.1. The objective is to highlight the success factors for collaboration of formal and paratransit and what we learn in general from assessing the case studies with the framework. The framework is critiqued in sub-section 6.2. The objectives are to determine whether the framework helps us to understand collaboration and what are its strengths and weaknesses as an analytical device?

### 6.1 General learnings

#### 6.1.1 Objectives

The broader objective of both GMA and the City was to collaborate with paratransit for the purpose of implementing an integrated public transport system to improve the services for users and to empower paratransit. The empowerment of paratransit is important and particular to the Tshwane context since paratransit is viewed as a marginalised industry in the country. The case study showed that identifying the individual objectives of actors is important since their behaviour was driven by the need to meet these objectives. Paratransit actors in both contexts seek to maximise their revenue, and leveraging on the complementarity of rail and BRT services was seen as a mechanism that enables this objective. Some paratransit operators view integration with formal public transport as a means to receive consistent income through state-guaranteed contracts as well as an opportunity to receive state support to grow and improve an existing business. Both projects identified and created plans to meet objectives but what led to the ultimate success of MFDS was the ability of the project to align individual objectives of actors with the broader objective of integration.

#### 6.1.2 Barriers

For an integrated public transport system to be attractive, it needs to meet user expectations: however, users are often taken for granted and they are given limited opportunities to collaborate in the development of integrated public transport. This is alluded to by respondents' accounts of limited involvement of users as well as paratransit drivers and owners in the City's integration project. An even greater challenge is breaking through the trust barrier between paratransit and the government and creating a partnership. Institutional barriers such as multi-level governance can lead to vertical fragmentation in decision making as seen with the City's limited coordination with the regulatory entity at a provincial level. Limited horizontal integrational across City departments is also a challenge for service

delivery. Veeneman and Mulley state that lack of vertical and horizontal integration can result in limited collaboration, unevenly distributed funding and agency of organisations (Veeneman & Mulley, 2018). Limitations in the skills required to negotiate, conclude, and deliver contracts that integrate paratransit to formal public transport makes it difficult to address challenges and may cause processes to stall. Rivalries amongst paratransit organising bodies or associations can limit the collaboration of operators, fortunately this issue did not arise in Tshwane.

### 6.1.3 Decisions throughout STO process

A key takeaway is the importance of consolidation of actors into manageable groups to improve communication and information symmetry. The creation of a paratransit entity that consolidated all operators made collaboration easier for MFDS whereas the City had a contract with each individual operator. Taking the time to test processes is also a recommended strategy. GMA had been piloting the paratransit feeder arrangements at two other stations 5 years prior the commencement of the Tshwane feeder service was launched therefore challenges could be anticipated and planned for. Effective communication is a critical factor of collaboration. Throughout the MFDS process there is a strong awareness and unfaltering commitment to effective communication. The communication platforms are inclusive and enable all the actor's voices to be heard. This inclusivity was a facilitator in building trust. During the day to day functions of the MFDS, user concerns are solicited and user experience forms a key component of performance management of the paratransit feeder service. Accounts from the interviews show that the City's steering committee was a top-down process that only included representatives of the paratransit associations. This structure resulted in a disconnect with paratransit owners, drivers and users. Literature supports active coproductive participatory processes where users engage on platforms that enable them to hold service providers accountable (Sagaris, 2016). The communication strategy of the City may have become a barrier to achieving collaboration.

The City's inclusion of other government actors in the steering committee could not resolve the lack of collaboration due to vertical and horizontal fragmentation. In contrast, the MFDS implementer is structured as a transport authority, characterised by Veeneman and Mulley (2018) as an institution dedicated to the integration of transport and flexible enough to accommodate market changes. The City has a fragmented structure with competing needs whilst the GMA was established to focus only on the integration of public transport in the region. GMA broke the chain of disfunction caused by competition for overtraded routes by creating new and exclusive feeder routes that ensured property rights for paratransit. The City integrated the BRT with existing routes without addressing the historical issues of illegal operations and conflict.

Mutual dependence, which is a factor critical for the advancement of collaboration, was created in the MFDS. GMA managed to achieve this by assisting the paratransit entity to purchase and brand vehicles. Hybrid operations develop because of the benefits that partners find in sharing some of their investments (Alexandersson, Bondemark, Henriksson, Hulten, & Hulten, 2018). The sharing of assets and risk created mutual dependence between paratransit and GMA. Another condition of collaboration is to ensure that the benefits outweigh the costs. Performance contracting with incentive and penalty structures that motivate the operators to adhere to agreements was implemented for the MFDS. The City's management of its arrangement with the paratransit operators did the opposite. A once-off payment, delayed shareholding in the TRT BOC and the lack of enforcement of pirate operators meant that

participating/legal operators could increase their revenue by simply operating their previous routes without consequences. Continuous learning and skills development on the MFDS are another key takeaway given that paratransit's objective was to improve and enter new markets. Skills development also ensured that customer objectives for a high-quality service were maintained. The flexibility of the contract gives paratransit the freedom to make operational decisions within the legislative framework; this arrangement enabled innovation and creativity which is also a learning experience for the GMA.

The outcomes of the case studies and the supporting literature were used to enhance the simplified collaboration framework introduced in Figure 1. In Figure 5, objectives, barriers and the decisions throughout the STO framework that are needed to overcome problems to achieve shared goals are unpacked for different actors. The three groups of actors (government, operators, users) are typically very different in these terms.

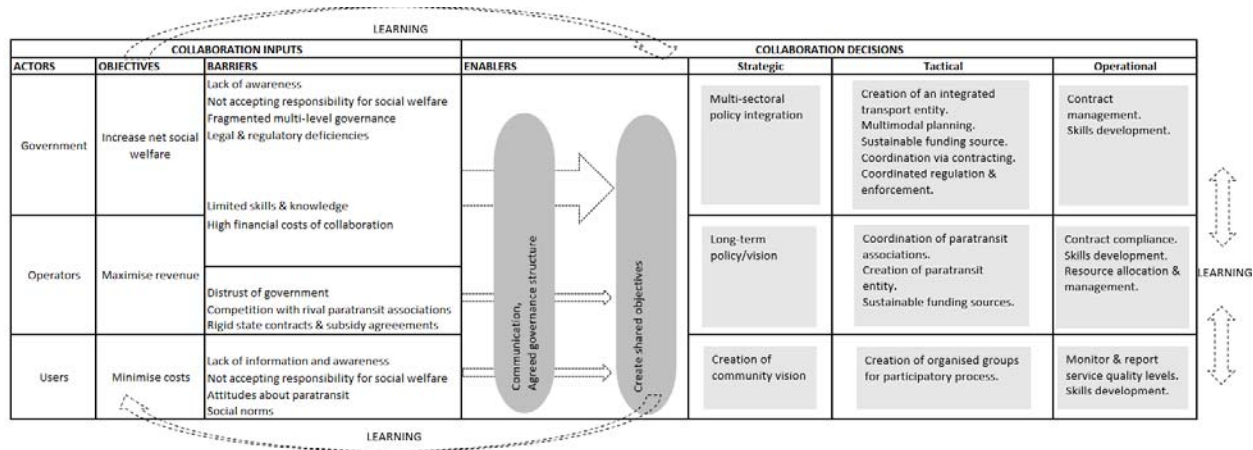


Figure 5: A proposed simplified collaboration framework for implementing public transport integration.

## 6.2 Framework critique and recommendations

Although case studies are context-specific the outcomes of the Tshwane case are supported by literature discussed in section 1, 3 and 6. The logic of the framework is supported by the two projects: the City's limited focus on collaboration enablers and a lack of consistency implementing collaboration decisions throughout the STO results in a less favourable outcome whilst the MFDS yields a positive outcome. We therefore argue that the simplified collaboration framework is a useful tool for planning and assessing the collaboration of paratransit and formal public transport for the implementation of public transport integration projects.

The limitations of this framework should also be noted. The elements identified are not the only factors of collaboration. The framework does not yet incorporate certain factors affecting collaboration that did not emerge in these case studies. These include contractual arrangements (Hrelja, Rye, & Mullen, 2018), coordination mechanisms in public transport (Sorensen, 2018) and coaction steps for building trust (Pettersson & Hrelja, 2020). In addition, the framework could be enhanced by paying attention more clearly to the evolution of trust relationships and arrangements over time. For instance, actors' objectives may change over time which can make achieving objectives and removing barriers difficult if long term strategies are already under implementation. The role of values, perception and attitudes both as barriers and strategies needs further investigation, as well as the element of learning and feedback in the

framework. Learning in the form of skills development is mentioned as an important facet of paratransit empowerment (contracting, empowerment, service quality improvement) in the MFDS. The GMA respondents also expressed the importance of learning from paratransit. This needs further elaboration as co-learning may be a very important aspects of building common views of the world. Lastly, it has to be acknowledged that collaboration may not always be possible due to the costs of the processes required for removing barriers and achieving actors' objectives. To improve the validity of the framework additional case studies in other developing countries are required to test the applicability of the collaboration framework in other contexts.

## 7. CONCLUSIONS

The implementation of public transport integration is elusive and this is particularly prevalent in developing countries with paratransit. Much of the research on collaboration emanates from the Global North, however, conditions in the Global South are entirely different. Public transport integration projects require the collaboration of numerous individual and less organised paratransit operators and formal public transport is often under-resourced. To help make sense of this complexity we propose a simplified framework for assessing the collaboration of actors during the implementation of integrated public transport. The position of the framework is that it is critical to identify actors' objectives and barriers to collaboration, and then to action decisions to remove these barriers and achieve objectives at every step of the STO decision-making process to maintain structural and horizontal consistency. The framework is tested on two formal and paratransit integration projects in Tshwane with opposite outcomes. The successful MFDS integration of paratransit and rail aligns with the position of the simplified collaboration framework. The case of integration between paratransit and the City shows a lack of focus on collaboration enablers and inconsistency decision making throughout the STO. The objectives and barriers of actors seem to be understood when reviewing the City's tactical strategies however the lack of vertical integration with the operational level results in these strategies failing. This can be seen as a reason why collaboration in Tshwane failed. The application of the case study highlights the importance of investing time in understanding collaboration objectives and barriers from the very beginning and making sure that these are addressed as part of the integration strategy. The chances of collaboration are higher when the individual objectives of actors are aligned with the broader integration objectives.

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