

# **AN ANALYSIS OF SOUTH AFRICAN LONG DISTANCE PASSENGER TRANSPORT: CROSS-BORDER PASSENGER MOVEMENTS**

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## **ABSTRACT**

Passenger transport in South Africa, just like in many other developing countries has many characteristics that are generally absent from public transport systems in the first world countries. The first and prime characteristic is the high volume of low capacity vehicles (less than 20 seaters) in commuter services and the dominance of this form of public transport in the overall public transport sphere.

It is estimated that minibuses (taxis) account for 70% (based on market access permit volumes) of modal share in the cross-border road transport industry within Southern African Development Community (SADC) region. The minibuses operate on fixed corridors and in most cases for distances longer than 1000 kilometres a single trip. The fact that the minibuses have limited carrying capacity yet they travel such long distances raises key questions in regard to the economics of cross-border operations particularly in respect to the sustainability, viability, cost-effectiveness and productivity thereof. Furthermore, it also raises questions in regard to safety of services given that only one driver is assigned to drive over such long distances.

This paper looks at the economics of long distance minibus passenger operations focusing on cross-border road transport between South Africa and neighbouring countries. It is partly based on findings from a study entitled "Market Access Regulation" (CSIR & C-BRTA, 2013) conducted by the Cross-Border Road Transport Agency (C-BRTA) in partnership with the Centre for Scientific and Industrial Research (CSIR). Quantitative and qualitative methodologies were utilized in executing the study. Furthermore, consultations were conducted with relevant stakeholders in the regulatory environment in SADC region.

It was established that some routes are already over-saturated and sustainability of operations is under threat. Despite the fact that minibuses are more flexible than conventional buses, passengers are shifting preference towards the latter for safety and comfort amongst other reasons. Furthermore, it was also established that viability and productivity in cross-border minibus operations are on the decline thus, a new regulatory regime is required in the industry.

This paper also provides interventions that can be deployed to close the gaps in the cross-border long distance passenger transport with a view to enhance operational efficiency and productivity.

## **1 INTRODUCTION**

The minibus (taxi) industry in South Africa has grown from a negligible informal sector activity in townships to be a dominant mode of public transport. However, according to Fourie (2003) the expansion did not occur in a smooth and organic manner. A closer evaluation of the progress reveals distinct periods of development mainly influenced by government intervention and legislation (Fourie, 2003). He further asserts that the period from 1977 to 1987 was characterised by the struggle of the minibus industry to be recognized as a public transport operator.

In 1998, the government of South Africa established the C-BRTA through the Cross-Border Road Transport Act 4 of 1998, as amended (the Act) to regulate market access and facilitate cross-border road transport movements between South Africa and neighbouring countries, facilitate unimpeded flow of cross-border movements and reduce operational constraints faced by transport operators amongst many other tasks.

The C-BRTA regulates freight and passenger (bus and minibus) transport through various instruments that include the Act and bilateral cross-border road transport agreements concluded with respective SADC countries (Malawi, Mozambique, Zambia and Zimbabwe) and these agreements were concluded within the broader framework of the SADC Protocol on Transport, Communications and Meteorology of 1996. Since the establishment of the C-BRTA, there has been substantial growth in the volume of passengers using minibuses between South Africa and neighbouring countries, largely owing to increasing number of cross-border operators. Thus, the socio-economic contribution of cross-border minibus operations in South Africa in particular and SADC countries in general can no longer be overlooked.

Based on cross-border permits issued by the C-BRTA, it is estimated that minibuses account for 70% of the total modal share in the cross-border road transport passenger industry within SADC, whilst in South Africa it constitutes 85% with the remainder of 15% going to buses. The minibuses operate on fixed corridors and in most cases for distances longer than 1000 kilometres per single trip.

The fact that the minibuses have limited carrying capacity yet they travel such long distances per trip raises key questions in regard to the sustainability, viability, cost-effectiveness and productivity of cross-border operations. Furthermore, it also raises questions in regard to safety of services given that minibuses are driven by one driver over such long distances. This paper therefore responds to these key issues that affect cross-border road transport operations undertaken by minibuses between South Africa and SADC countries.

## **2 BACKGROUND**

The cross-border minibus service is defined as a service for the conveyance of passengers rendered by means of a motor vehicle with a carrying capacity of not less than nine persons and not more than 16 persons, including the driver, with no prescribed timetable or fares. The majority of these minibuses are not owner driven; they officially carry a driver and 15 passengers (CSIR & C-BRTA, 2013). The cross-border road passenger industry renders a service for commercial gain like any other business and should therefore comply with government regulation (the Act).

Meanwhile, passenger transport in South Africa just like in many other developing countries has many characteristics that are generally absent from the public transport systems in the first world countries. The first and prime characteristic is the high volume of low capacity vehicles (less than 20 seaters) in commuter services and the dominance of this form of public transport in the overall public transport sphere.

In the cross-border industry, the role of transport operators is strictly that of business and that of government through regulatory authorities, is regulation. For aspirant operators to enter the cross-border road transport market, they need a cross-border permit issued by the C-BRTA (in the case of South Africa). In this regard the practice in South Africa is that an applicant intending to conduct minibus operations need to belong to a cross-border minibus association. The permit issued remains the property of the C-BRTA. The cross-border permit cannot be regarded as a right, but a privilege and therefore no single association in the country can claim absolute route ownership.

There is evidence that minibus operations between South Africa and other SADC countries are on the rise. The cross-border minibus operations, unlike bus operations are not scheduled i.e. within provisions of both the National Land Transport Act of 2009 as well as respective cross-border road transport agreements. As such, minibus operations do not have time-tables whilst bus operations are assigned timetables to ensure the provision and spread of adequate services on one hand and mitigation of potential congestion at the border posts on the other hand.

The minibuses are designed to carry limited capacity with limited luggage space. Meanwhile, the conditions of operation include undertaking operations on specific assigned route, one passenger pick-up point from a specified ranking facility in South Africa and one drop-off point at a predetermined ranking facility in the destination country. On the return trip the reversal of the route description applies.

The legislated mandate of the C-BRTA imposes a task on the C-BRTA to ensure that the transport market is not oversaturated thereby leading to destructive or unhealthy competition and even conflicts. Oversaturation of minibus routes which relates to the excessive supply of transport services in relation to the number of passengers (demand) to be conveyed is probably one of the main reasons for the instability and low productivity in some corridors. The oversaturation often results in large parts of the minibus industry being economically unsustainable.

### **3 THE STUDY DESIGN**

The quantitative component of the study comprised field surveys that were undertaken to establish the peak and off-peak travel demand profiles and peak and off-peak cross-border service profiles. The peak and off-peak travel demand profiling surveys were carried out at Beitbridge, Lebombo, Oshoek and Mahamba border posts (South African side). The surveys entailed interviewing a sample of passengers that were entering and exiting South Africa to establish such elements as reasons for travelling, frequency of travel, travel costs, trip origins and destinations.

In addition to the passenger interviews, the surveys included 24 hour vehicle occupancy counts for vehicles entering and leaving South Africa, including number plate observations for public transport vehicles. The dates of the surveys were carefully selected to capture the peak and off-peak dynamics. After a number of considerations including the statements from public transport operators during focus group discussions, four survey periods were selected as follows:

- 28 to 31 October 2013 and 01 November 2013 to capture month-end off-peak demand;
- 15 to 17 November 2013 to account for mid-month off-peak demand;
- 20 to 24 December 2013 to capture the Christmas holidays related peak demand; and
- 02 to 06 January 2014 to capture post New Year's Day peak period demand.

Peak and off-peak cross-border service profiling entailed interviews with the drivers of cross-border public transport vehicles to establish such elements as service frequencies, permit types, affiliated associations and capacity of vehicles used. The actual number of vehicles observed at border posts over 24 hours during the border surveys was used as a proxy to indicate the permit split per mode.

The qualitative component also entailed face-to-face interviews with the C-BRTA Regulatory Committee members mainly with a view to probe the way the committee makes decisions when considering permit applications and additional information needed to aid effective and efficient decision making in regard to issuing cross-border permits. Meanwhile, focus group discussions were held with cross-border operators and associations to understand operational constraints and get suggestions on how the constraints could be overcome from the point of view of the operators.

#### **4 DISCUSSIONS AND FINDINGS**

The minibus industry has displayed great levels of resilience and innovation in the face of shifting political and socio-economic conditions and has become the dominant mode of public transport in South Africa. However, the industry is plagued with violence, poor road safety and low financial margins (Fourie, 2003). The government of South Africa has for many years been experiencing pressure from a wide spectrum of stakeholders to improve the performance of the industry through some sort of reform or regulation.

The upside of a minibus is that it can provide a high flexibility and service frequency. They are also generally associated with less waiting time due to low capacities. However, the low capacity also means that they can only take a limited number of passengers which affects revenue generation. To this end, it would be ideal to conduct cross-border operations by minibus for shorter distances on either side of the border, a strong case which can be advanced in the case of adjacent border towns.

The major concerns affecting cross-border minibus operations between South Africa and other SADC countries revolve around:

- Long distances that the minibus travels between countries and in most cases the distances are longer than 1000 kilometres a single trip;
- The fact that the minibuses have limited carrying capacity yet they travel such long distances affect sustainability, viability, cost-effectiveness and productivity of the operations;
- The fact that there is only one driver assigned to a minibus, yet they travel such long distances raises questions in regard to safety of services;
- Many minibus operators regularly overload trailers to recover the loss due to unoccupied seats, fixed costs related to the vehicle and semi-variable costs related to the vehicle and driver; and
- Sometimes luggage is mixed with passengers, which does not only reduce passenger comfort but also potentially reduces safety.

#### 4.1 Productivity in cross-border minibus operations

The productivity of an economic unit is typically defined as the ratio of its output to its input and is a function of many factors such as technology, the environment and efficiency. The output of public transport is usually indicated as passenger-kilometres or daily passengers. Passengers carried per vehicle per day is computed as total number of passengers carried divided by the total number of vehicles with respect to the number of days in the period. It is also influenced by vehicle capacity, length of operating day, length of route, average distance travelled per passenger and the extent to which demand varies between peak and off-peak periods, and the kilometres operated per vehicle per day (Iles, 2005).

The CSIR & C-BRTA (2013) used load factor as an indication of the extent of service productivity, where higher load factors indicated that there were more passengers per vehicle kilometre. However, some cross-border operators asserted that higher peak period demand does not necessarily translate into higher load factors because of increased number of illegal operators (pirate operators) targeting peak periods and increased number of temporary permits which are issued during such periods. The harsh reality is that the illegal operators further reduce the economic viability of the existing legal cross-border operators. Table 1 shows the average directional load factors for minibus and bus operations that were observed.

**Table 1: Aggregated vehicle load factors for peak and off-peak periods**

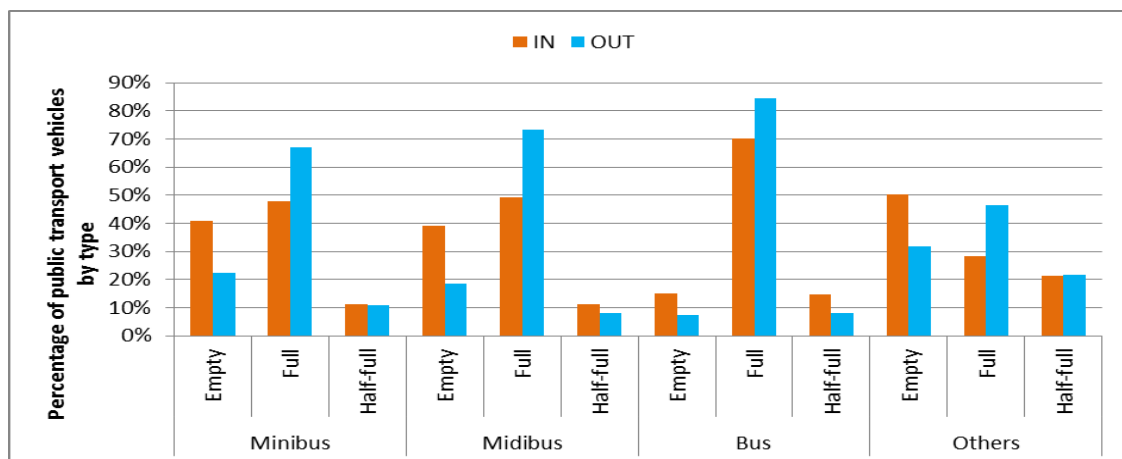
Month		Inbound (to South Africa)		Outbound (from South Africa)	
		Minibus	Bus	Minibus	Bus
October	Off-peak	48%	79%	56%	78%
November		51%	79%	70%	86%
December	Peak	35%	57%	90%	96%
January		79%	94%	51%	88%
<b>Average</b>		<b>53%</b>	<b>77%</b>	<b>72%</b>	<b>88%</b>

Source: 2013 C-BRTA Market Access Regulation Report

Based on the data, it was deduced that:

- Buses generally have higher load factors than minibuses;
- Inbound trips in December have significantly less load factors than outbound trips, indicating directional strength of the peak demand;
- Contrary to some of the claims made by operators that increased peak demand does not necessarily translate into higher load factors as a result of increased illegal operators and temporary permits during the peak period, load factors in the direction of the peak are significantly higher than in the off-peak periods;
- For minibuses the January inbound peak has lower load factors than the December outbound peak possibly indicating increased supply of services from neighbouring countries in this period;
- Demand is more elastic in the off-peak than in the peak period; and
- There are also significant peaks during the holiday season, long weekends and to a lesser extent on weekends.

Figure 1 shows the average load factors by vehicle type and direction of movement.



**Figure 1: Overall load factors by vehicle type**

Based on the data, it was deduced that generally:

- Outgoing vehicles have higher load factors than incoming vehicles. Outbound buses in particular have higher load factors (over 80% of them being full) than minibuses;
- Essentially, Figure 1 shows that load factors are significantly asymmetric and play an important role in controlling seat availability; and
- Seat availability also reflects the demand for the service. If vehicles are always full, it means that demand equals or exceeds supply. In such a case more vehicles should be assigned to the route instead of increasing fares to manage the demand as it often happens in public transport.

#### 4.2 Economies of vehicle size in minibus operations

For the cross-border road passenger service, the cost of transporting one passenger may decrease considerably as the vehicle size increases. For instance, by going from a minibus (16-seater) to a 35-seater midibus or 64-seater bus the number of seats may be doubled or be four times, but the labour costs and the vehicle operating costs do not multiply at the same rate. Thus, significant reduction in unit

costs may be achieved at maximum vehicle performance, whilst ensuring unbeatable comfort and improvement in safety through larger high capacity vehicles.

Table 2 illustrates the income generated from cross-border bus and minibus operations during peak and off-peak periods for operations between Johannesburg in South Africa and Maputo in Mozambique (as an example).

**Table 2: Average load factors for peak and off-peak periods**

Off-peak		Peak	
In-bound to South Africa	Out-bound from South Africa	In-bound to South Africa	Out-bound from South Africa
Minibus (average 16-seater)			
49%	63%	57%	71%
R 2,508.80	R 3,225.60	R 2,918.40	R 3,635.20
Bus (average 60-seater)			
79%	82%	76%	92%
R 15,168.00	R 15,744.00	R 14,592.00	R 17,664.00

According to the average load factors for the off-peak period for a minibus loading from Johannesburg to Maputo in Mozambique with same fare of R320.00 per passenger, the inbound load factor for the minibus was 49% against 63% outbound. Meanwhile, the minibus generated revenue of R2,508.80 for the inbound trip against R3,225.60 for outbound. For a similar trip during peak period the minibus generated trip revenue of R2,918.40 at 57% load factor and R3,635.20 at 71% load factor for inbound and outbound trips, respectively.

According to the average load factors for the off-peak period for a bus for a similar trip, the inbound load factor for the bus was 79% against 82% outbound. Meanwhile the bus generated revenue of R15,168.00 for the inbound trip against R15,744.00 for outbound. For a similar trip during peak period the bus generated trip revenue of R14,592.00 at 76% load factor and R17,664.00 at 92% load factor for inbound and outbound trips, respectively.

It was deducted that the cost of operating a minibus compared to a standard bus is lower, but so is the revenue per kilometre. This effectively reduces the viability, sustainability and productivity of minibus operations in the cross-border road transport environment.

The deductions are aligned to the findings made by Glaister (1985) through a computer simulation model of minibuses-operation in comparison to buses. This model did show quite clearly that the use of minibuses was unlikely to be beneficial, not merely because of their relative high operating costs per seat-kilometre, but also because they would have to be operated in very large numbers to provide adequate capacity, and this would severely aggravate the existing traffic congestion along the corridors and at border posts.

### 4.3 Cross-border minibus permits and bus permits

The statistics of the cross-border permits issued by the C-BRTA in the 2013/14 and 2014/15 financial years is illustrated in Table 3.

**Table 3: Cross-border passenger permit by destination and vehicle class**

Destination	2013/14 Financial Year		2014/15 Financial Year	
	Minibus	Bus	Minibus	Bus
Botswana	437	484	430	116
Lesotho	2,718	506	2,093	410
Mozambique	4,390	542	4,907	319
Namibia	154	53	81	43
Swaziland	422	73	539	71
Zimbabwe	2,882	877	3,521	1,047
<b>Total</b>	<b>11,003</b>	<b>2,535</b>	<b>11,571</b>	<b>2,006</b>
<b>Modal Split</b>	81%	19%	85%	15%
<b>% Change</b>	Minibus	5.16%	Bus	-20.87%

**Source: 2014/15 C-BRTA Annual Report**

According to the data obtained, it was deduced that out of the permits that were issued, minibuses accounted for 81% and 85% in 2013/14 and 2014/15 respectively while buses accounted for the remainder. The statistics in Table 3 also signifies that there was a 5.16% increase in the minibuses permits whereas bus permits dropped by 20.87% between 2013/14 and 2014/15.

The following observations were made during the study conducted by the CSIR and C-BRTA in 2013:

- The permits issued to foreign operators by regulatory authorities in respective SADC countries are generally more than those issued to South African operators. This contributed to the high congestion of minibuses on the N1 and N4 corridors from Gauteng Province in South Africa to Zimbabwe and Mozambique respectively; and
- Johannesburg is the largest trip originating point with the highest production and attraction probabilities that confirm it as the primary hub for cross-border public transport travel in SADC region.

### 4.4 Cross-border minibus operations profitability

Profitability is without doubt critical to ensure the survival of any business. The Moving South Africa (MSA) financial model revealed that the minibuses industry is currently re-investing only 40% of capital requirements for long-term sustainability (MSA, 1999) and identifies low profitability as the main reason for the low rate of reinvestment.

Meanwhile, the low profitability creates an impediment on the day-to-day performance of the industry as it impacts maintenance of vehicles, quality of vehicles purchased, drivers' salaries and overall viability of the business. In addition, the low profitability consistently leads to: owners deferring or even ignoring essential maintenance, the use of cheap and inferior vehicle parts and inferior services undertaken by unqualified mechanics which further result in the deterioration of overall condition of the industry's fleet.



The low profitability of the industry can also be attributed to a number of factors that include the destructive competition and poor financial management. The key distorting factor in the cross-border passenger road transport is that in addition to the effects of destructive competition, the modal hierarchy is most often the reverse of what would be regarded as economically efficient.

Based on the arguments presented in this paper, it was deduced that in line with Shaw (1998), in the current cross-border passenger road transport environment, most of the destructive competition that exists is a result of cross-border minibuses operating long distance trips often more than 1000km trip. This is exacerbated by the high demand for bus services. The fact of the matter is destructive competition results in diminishing cost recovery for all operators and has a negative effect on profitability, productivity, viability and sustainability.

Inadequate financial management is a second source of low profitability in the cross-border minibus industry. Research on the economic role of the minibus industry revealed that minibus owners are commonly unfamiliar with concepts like profit, budgets, depreciation and return on investment (Ford, 1989). The same can be argued in the case of the minibus industry in the cross-border environment.

## **5 CONCLUSIONS**

Based on the arguments presented in this paper, the following conclusions were derived:

- There are more minibuses than buses undertaking cross-border long distance operations between South Africa and most SADC countries;
- Based on the cross-border permits issued by the C-BRTA, it is estimated that minibuses account for 70% of the modal share in the cross-border road transport industry between South Africa and other SADC countries;
- The permits issued to foreign operators by regulatory authorities in respective SADC countries is generally more than those issued to South African operators. This has contributed to the oversaturation of some routes;
- The minibuses operate on fixed corridors and in most cases for distances longer than 1000 kilometres per single trip. The longer distance and competition from buses and other modes reduces the viability of minibus operations. This is exacerbated by the fact that minibuses are not always full;
- The fact that there is only one driver assigned to a minibus, yet they travel such long distances increase chances of fatigue for the driver which may affect the safety of services;
- Unlike buses, minibuses are designed for shorter journeys, and minibuses can operate profitably on shorter cross-border trips like in the case of adjacent border towns where they can do more trips at any given time;
- There is increased decline in the viability and productivity of cross-border minibus operations between South Africa and SADC countries; and
- The low profitability of minibus operations create an impediment on the day-to-day performance of the industry as it influences maintenance of vehicles, quality of vehicle purchased as well as drivers' salaries. In addition, the low profitability of minibus operations consistently lead to owners deferring or even ignoring essential maintenance, the use of cheap and inferior vehicle

parts alongside services undertaken by unqualified mechanics, which further result in the deterioration of overall condition of the industry's minibus fleet.

## 6 RECOMMENDATIONS

Based on the findings and conclusions of this study the following is recommended:

- Minibus operators should consider replacing minibuses with higher capacity vehicles (midibus and bus fleets) for cross-border operations;
- Funding should be mobilised for cross-border minibus operators to procure high capacity vehicles. This would go a long way towards enhancing profitability, productivity, viability and sustainability;
- Minibus operators need to be supported in order to improve management of operations and business in general;
- Regulatory authorities in respective SADC countries should investigate and implement measures to address oversaturation in the minibus industry for some routes;
- Regulatory authorities should consider prioritising issuing of permits to buses for cross-border operations for long distances, as in principle they are more efficient than small low capacity vehicles; and
- Regulatory authorities should regularly consult one another before granting cross-border permits to minibus operators in order to ensure that permits are only issued where and when there is sufficient demand.

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