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Faculty of Engineering, Built Environment and
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Centre for Transport Development



CENTRE OF
EXCELLENCE

Benchmarking South Africa's BRTs

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SABOA Conference, August 2019

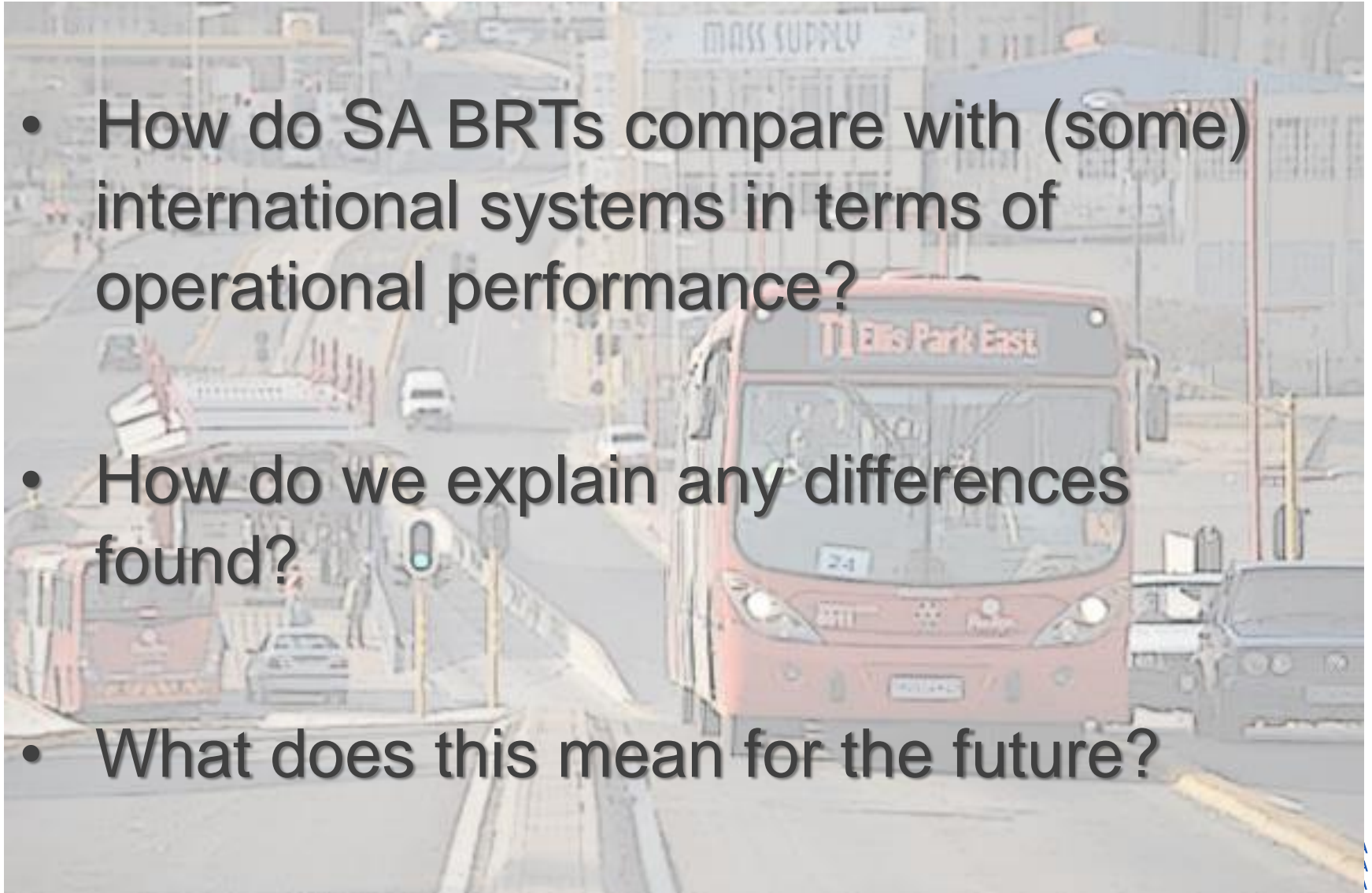


Key questions



Key questions

- How do SA BRTs compare with (some) international systems in terms of operational performance?
- How do we explain any differences found?
- What does this mean for the future?



About benchmarking

Data

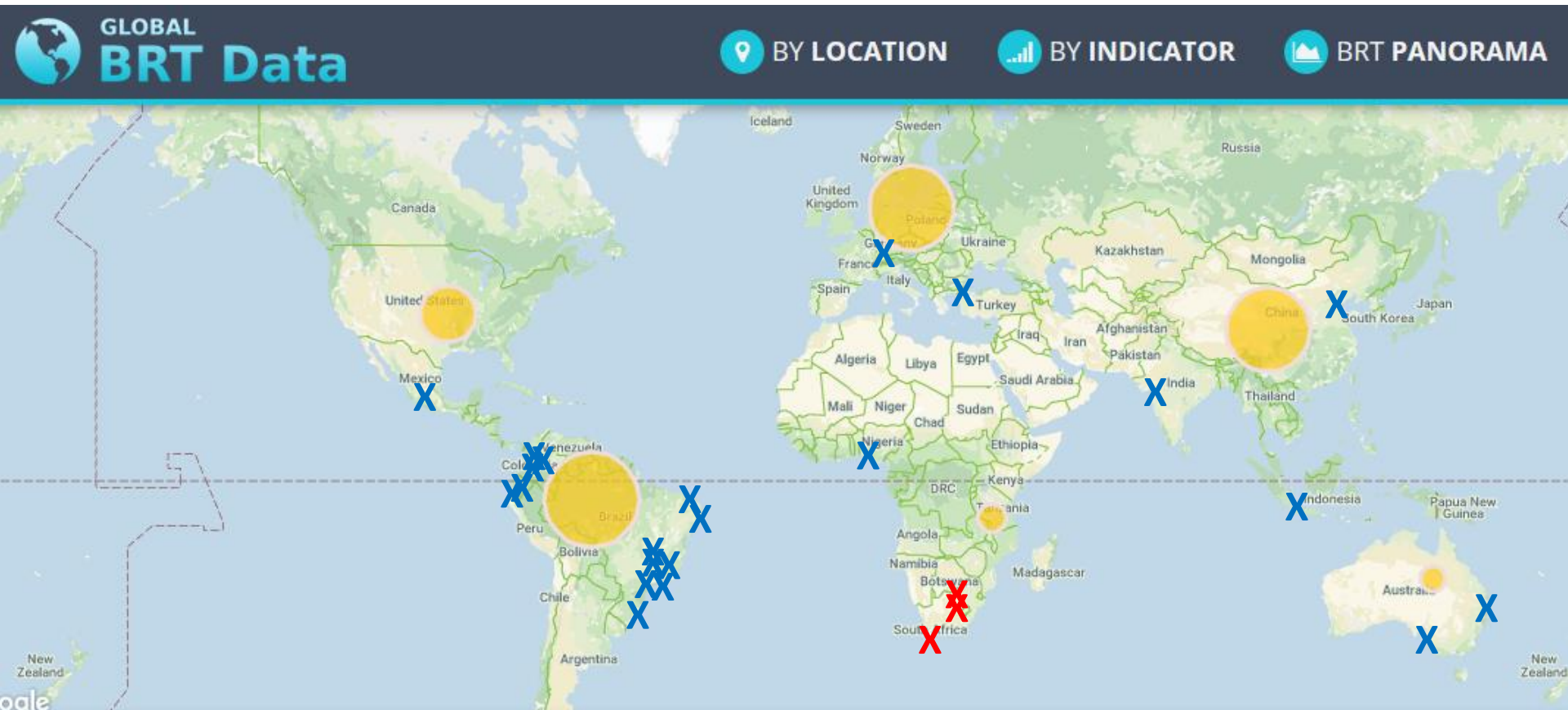
Indicators

Comparators



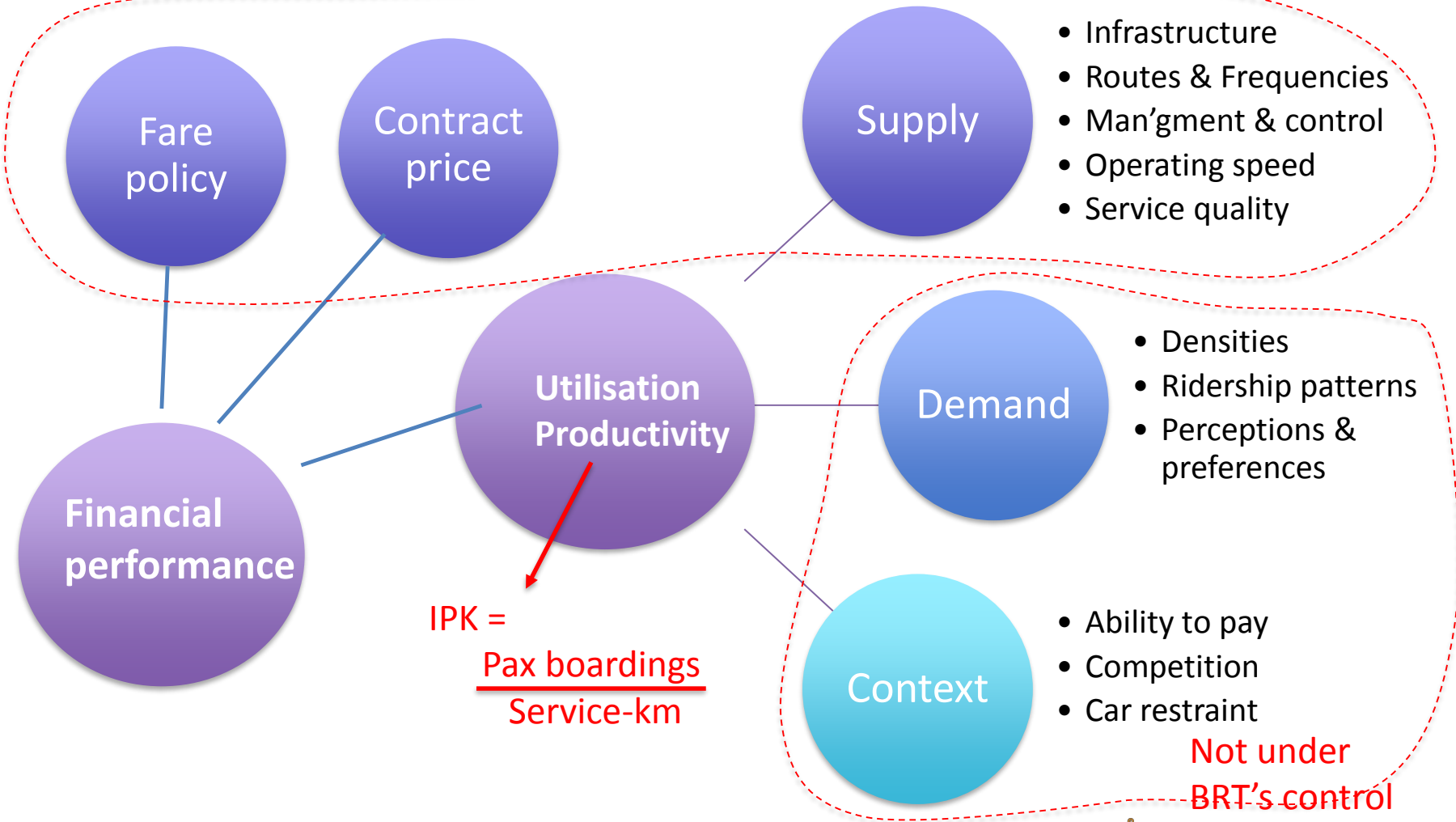
Data

- Brtdata.org
- Other published sources

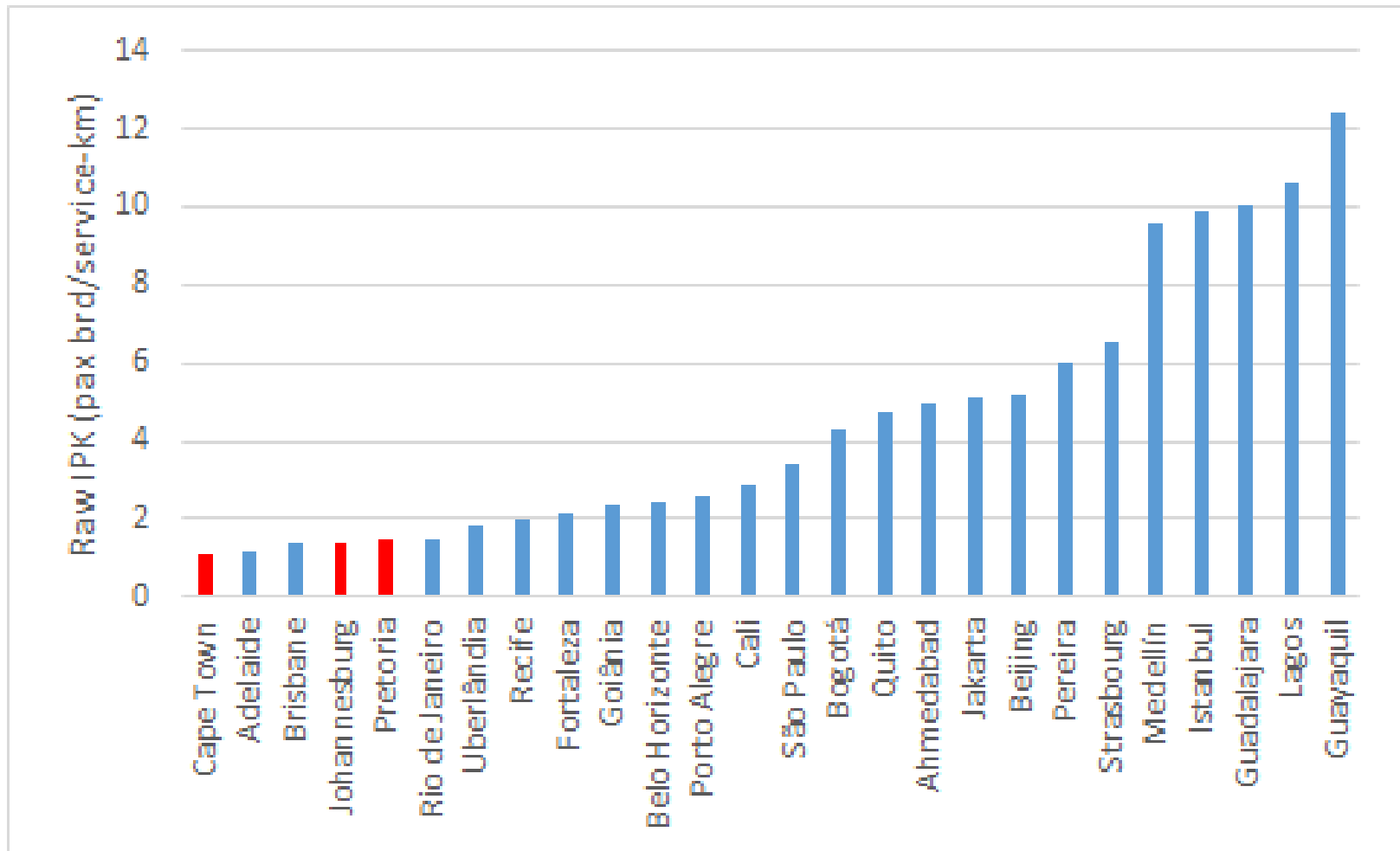


Approach

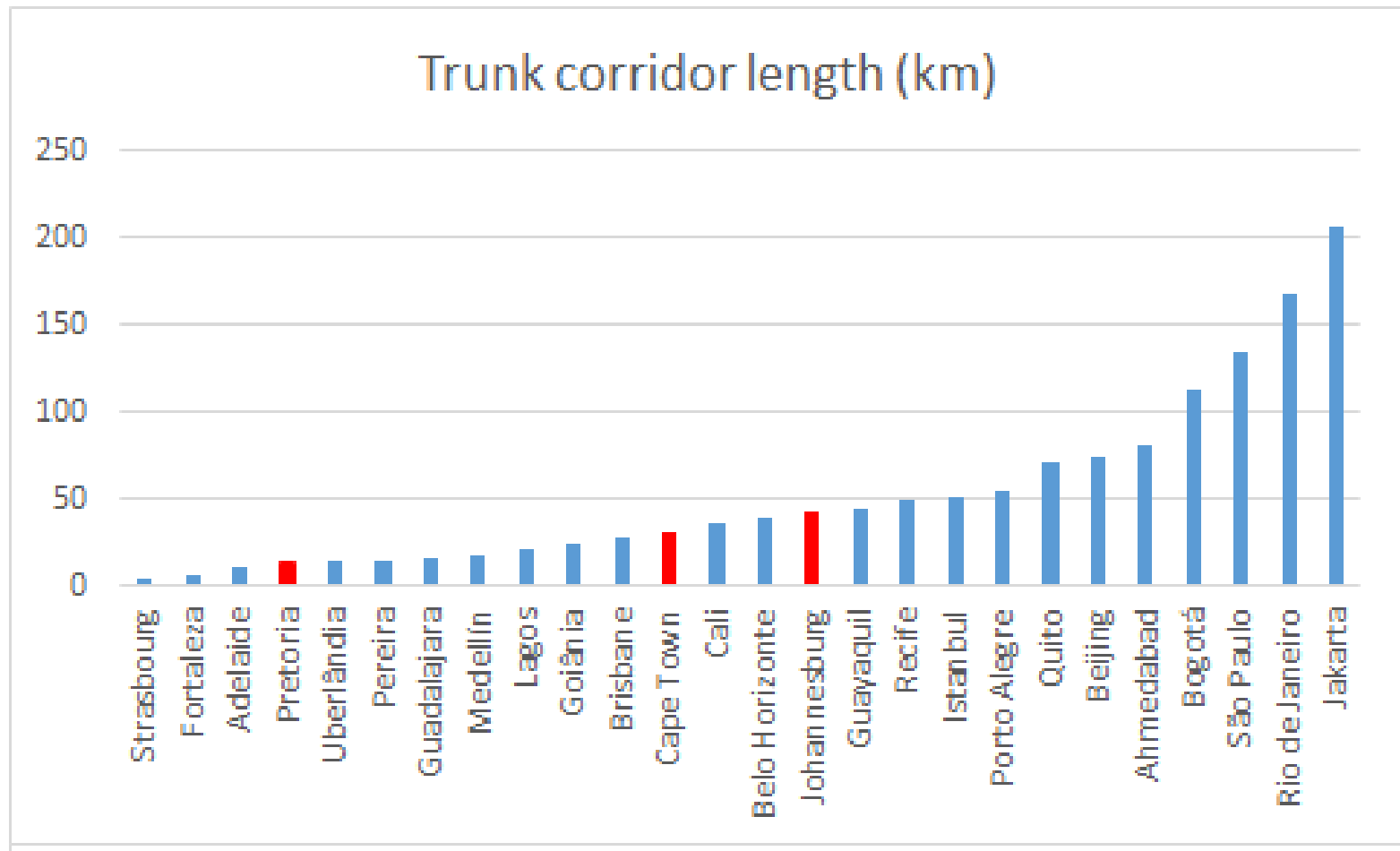
Under BRT's control



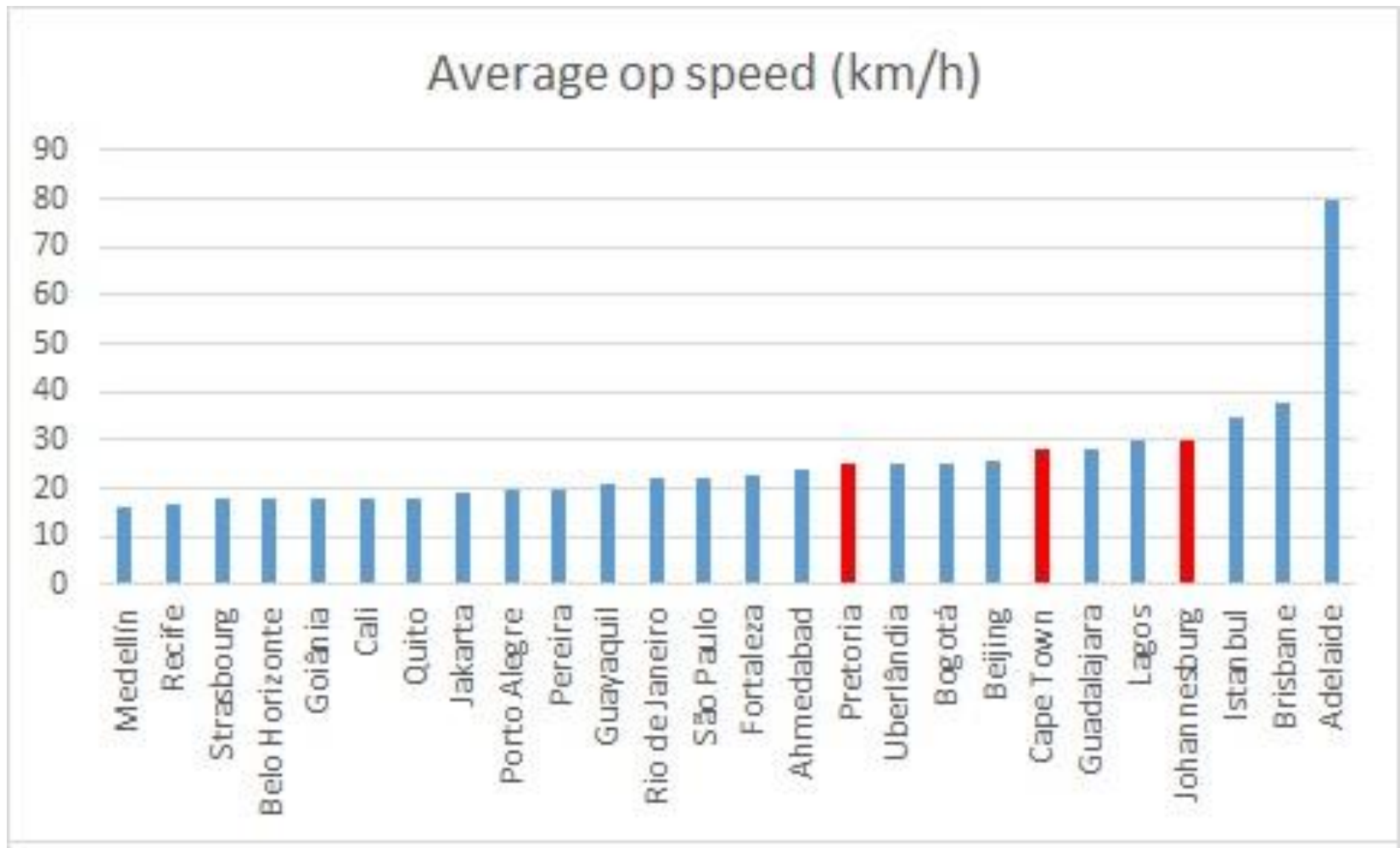
Comparison: Raw IPK



Extent of trunk corridors



Speed

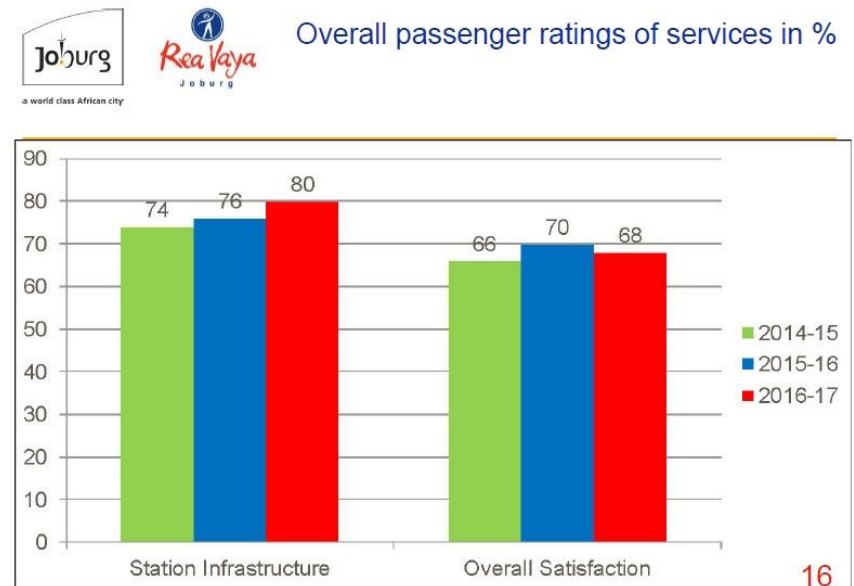


Service quality

Source: MyCiTi Benchmark Study, March 2017

Levels of satisfaction – BRT System (MyCiTi)		
Satisfaction Criteria	Mean Score (out of 10)	
Travel times (Arriving at your destination on time)	9.2	
Costs (Bus fare charged)	9.2	
Comfort (Comfort of the ride)	9.3	
Security (Feeling safe while waiting for the bus)	9.3	
Safety (Feeling safe when on the bus)	9.4	
Reliability (On time arrival/departure of the Bus)	7.5	
Appearance (Overall appearance of the bus)	9.3	
Accessibility (Ease of getting on/off the bus)	9.3	
Convenience (Ease of travelling with parcels/luggage/personal belongings)	9.1	

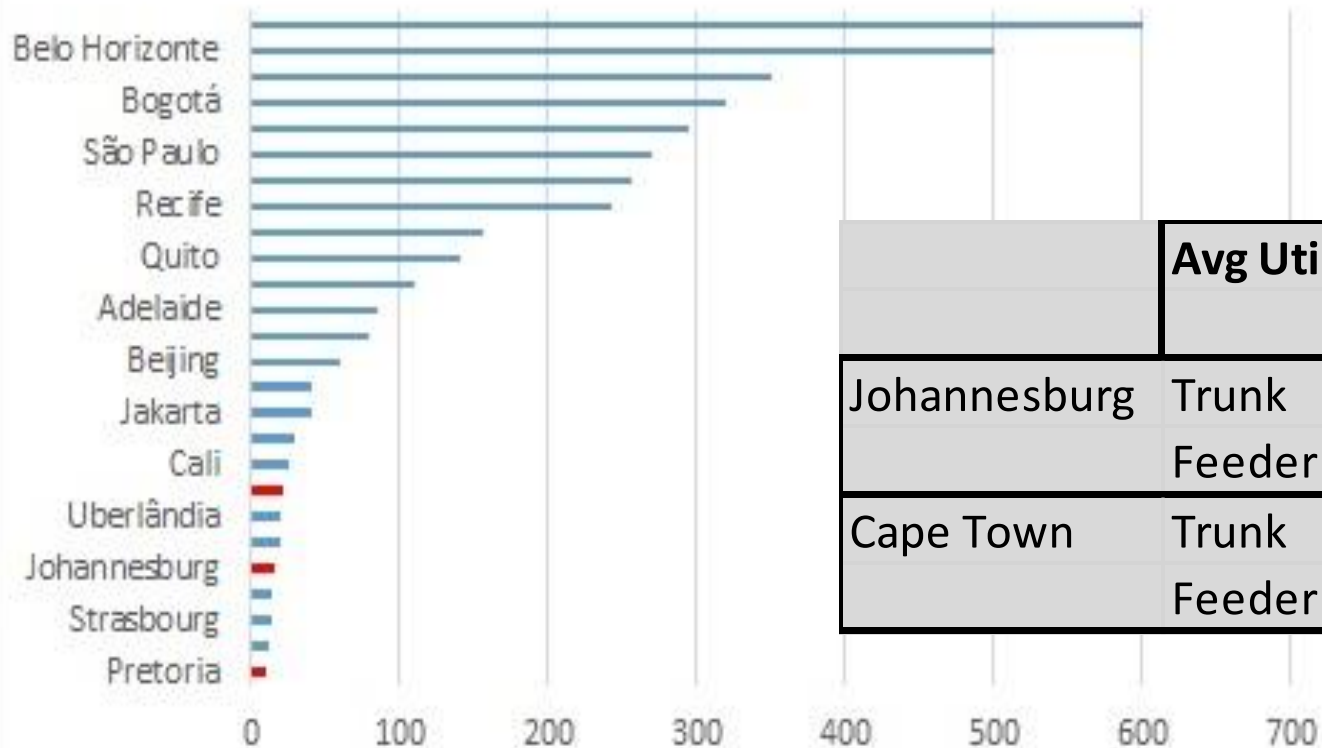
Source: CoCT CIP 2019-20



Source: Rea Vaya, 2017

Peak frequency & utilisation

Avg peak frequency (veh/hr)



		Avg Utilisation (% occupancy)	
		Peak	Off-peak
Johannesburg	Trunk	80-85%	60%
	Feeder	65%	30%
Cape Town	Trunk	97%	--
	Feeder	63%	--

Sources: brtdata.org; Rea Vaya; MyCiti



Model – controlling for external factors

Purpose:

To estimate the performance of SA's BRTs while controlling for factors that are not under their control

Do SA's BRTs perform similarly to other international systems *under the same conditions*?

→ Need to model the impact of external conditions on BRT performance internationally

Model – controlling for external factors

Dependent variable = pax boardings/service-km			
<i>Variable</i>			
Intercept			
Income	GDP per cap		
Competition	% PT users		
Op speed	Avg BRT speed		
Coverage	No of routes/pop		
Frequency	Avg peak frequency		
Land use	Avg metro density		
Extent	Corridor length		
Regional context	Latin America		
Regional context	Asia		

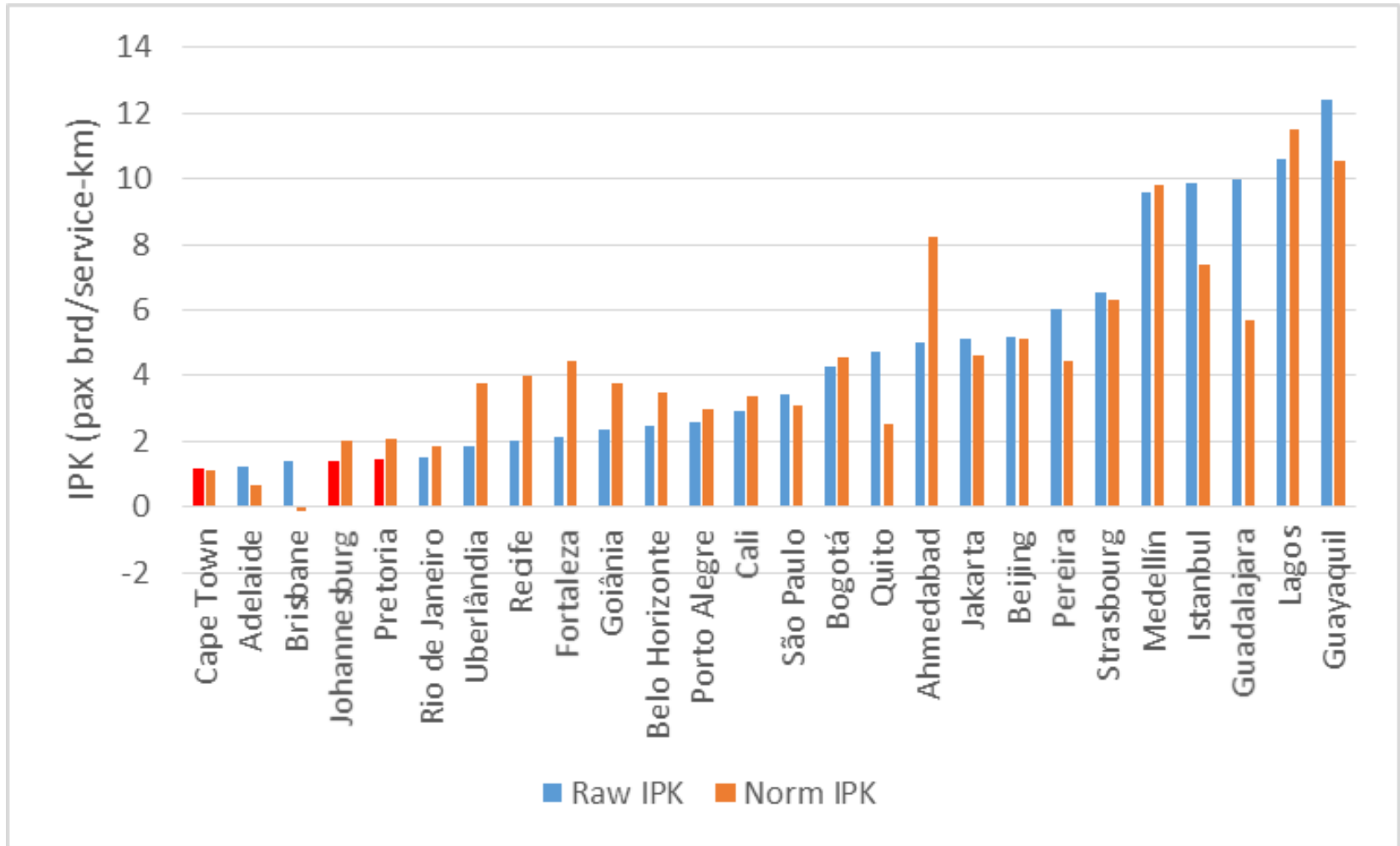
Model results – controlling for external factors

Dependent variable = pax boardings/service-km				
<i>Variable</i>		<i>Coefficient</i>	<i>t Stat</i>	<i>Effect?</i>
Intercept		-3.0535	-1.355	–
Income	GDP per cap	0.0001	1.357	NO
Competition	% PT users	0.0449	1.120	NO
Op speed	Avg BRT speed	0.0218	0.482	NO
Coverage	No of routes/pop	0.0111	0.397	NO
Frequency	Avg peak frequency	-0.0029	-0.932	NO
Land use	Avg metro density	0.0010	4.261**	YES
Extent	Corridor length	-0.0207	-2.159**	YES
Regional context	Latin America	4.2998	3.460**	YES
Regional context	Asia	6.4958	4.458**	YES
R-squared = 0.82				
N = 26 cities				

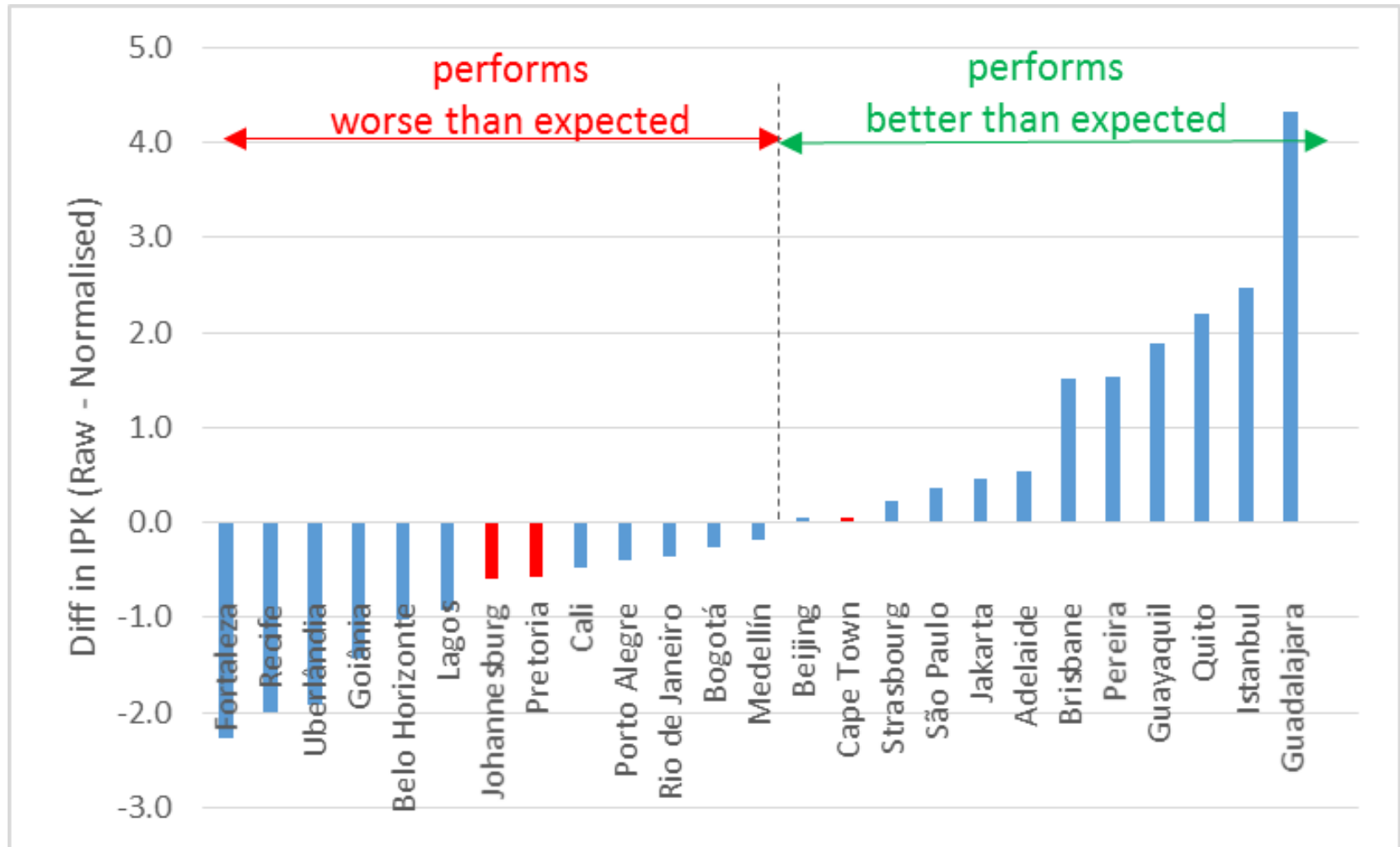
Source: Own analysis



Comparison: Normalised IPK



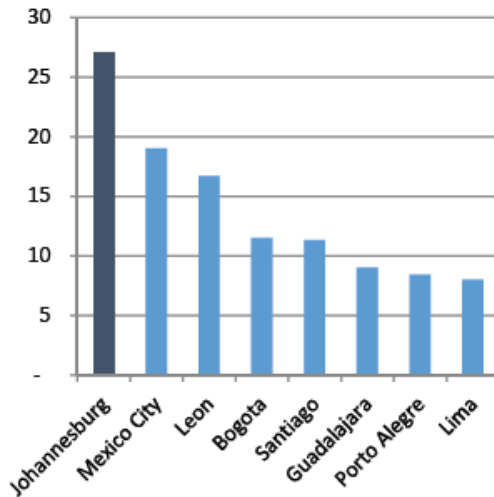
Comparison: Normalised IPK



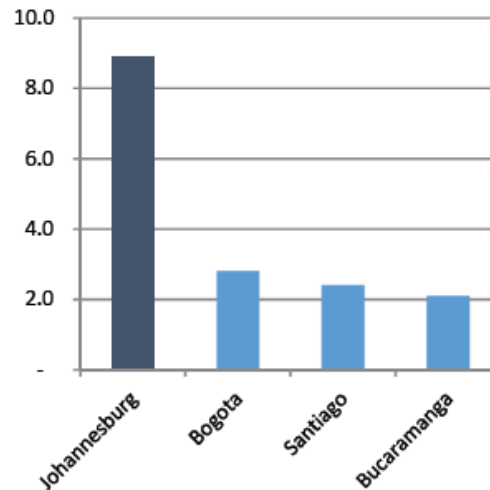
Contextual variables

- Land use and demand structure

AVERAGE TRIP LENGTH
(Km)



DEMAND PEAK-TO-BASE RATIO



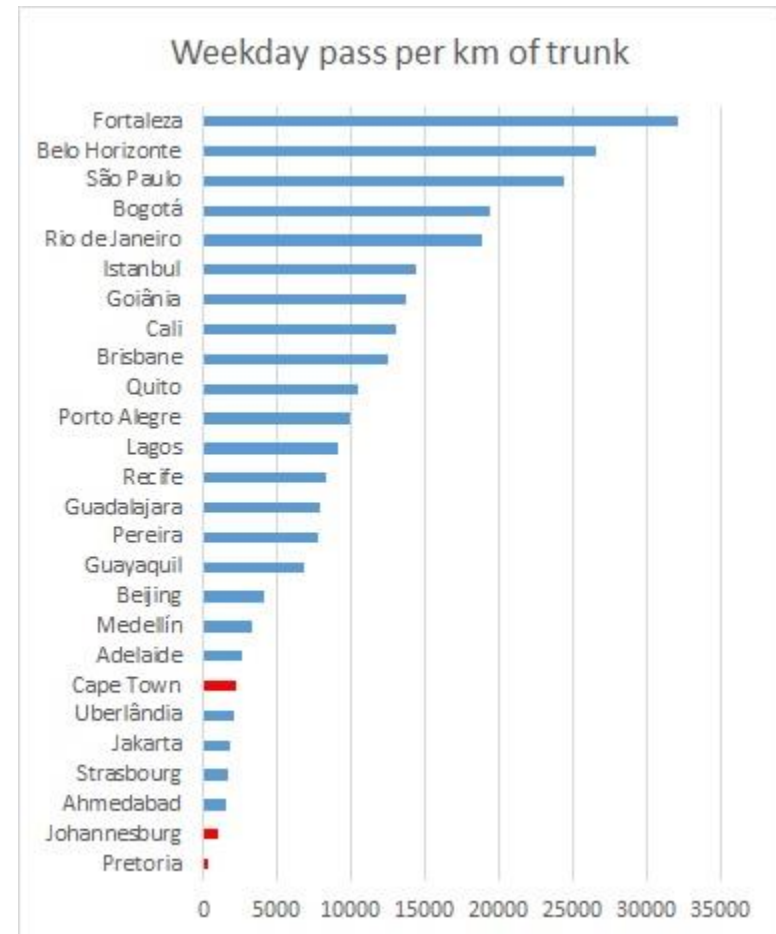
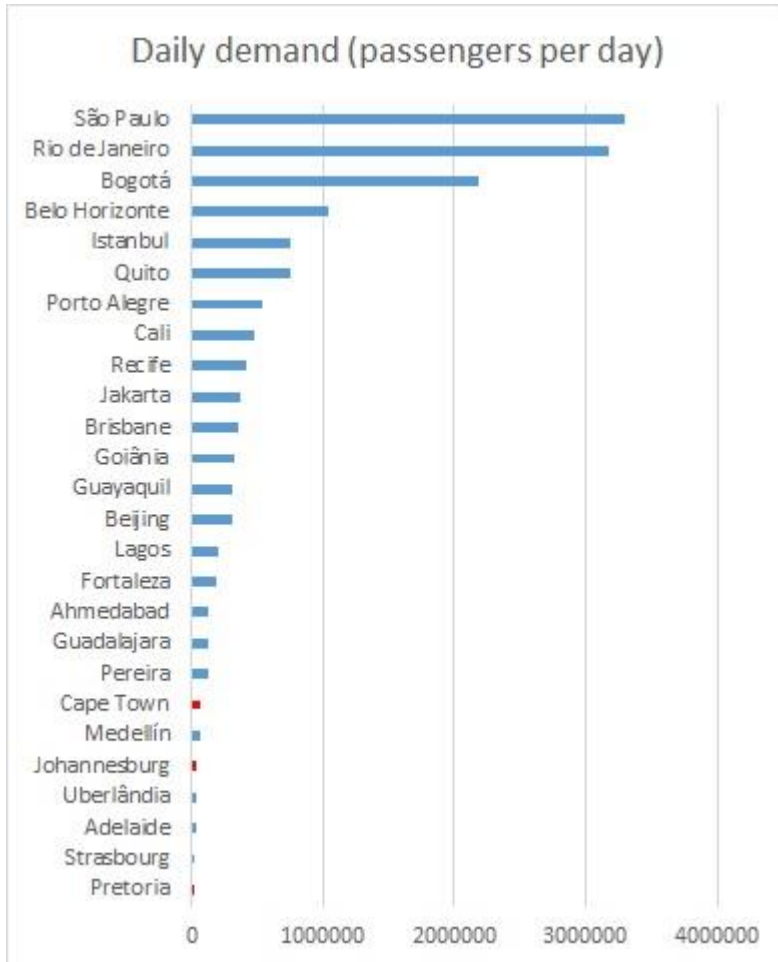
		Reverse Ridership %	
		Peak	Off-peak
Johannesburg	Trunk	10-20%	29%
	Feeder	39%	57%
Cape Town	Trunk	27%	--
	Feeder	32%	--

Source: brtdata.org

Sources: Scorcia & Munoz-Raskin, The World Bank;
Rea Vaya, MyCiti



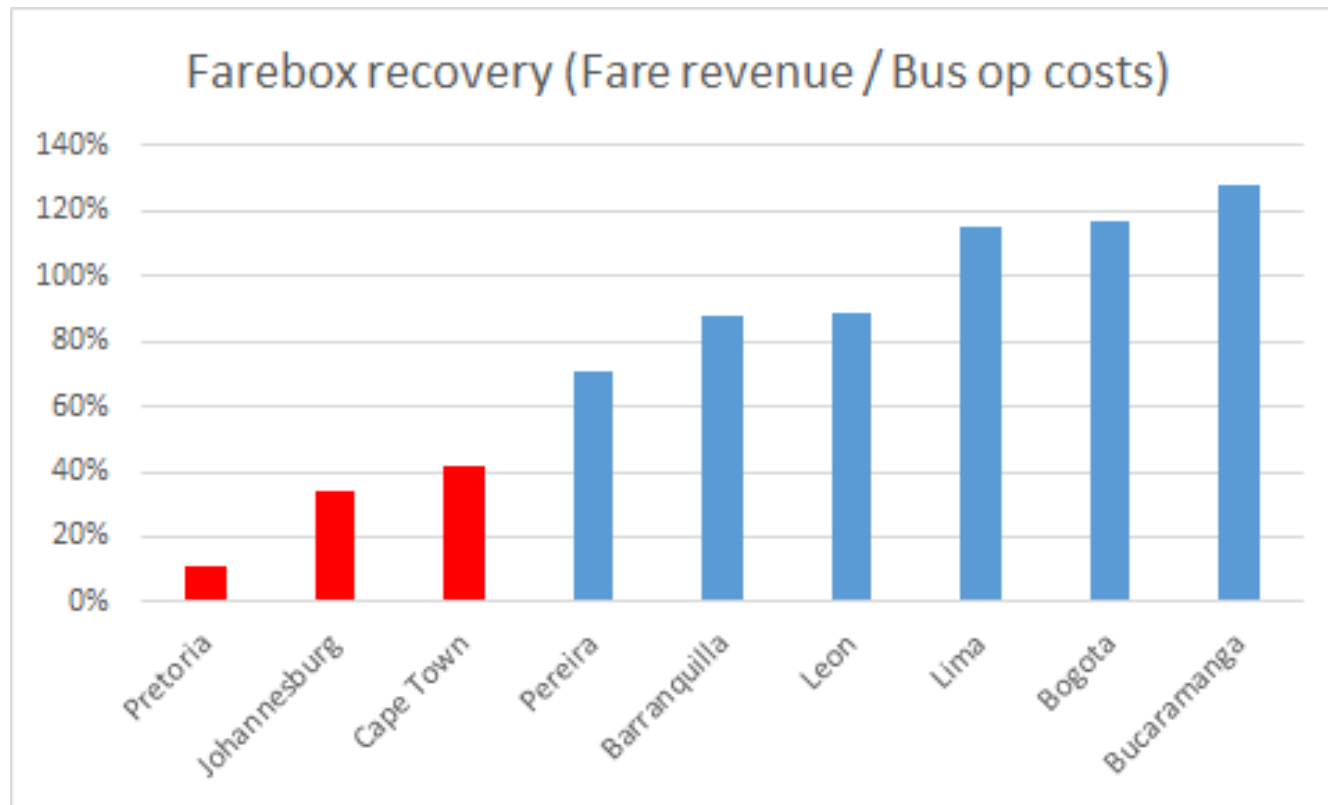
Infrastructure investment



Sources: brtdata.org; Rea Vaya; MyCiti; Treasury



Financial performance



Sources: Scorcia & Munoz-Raskin, The World Bank; Treasury

Conclusions

- SA's BRTs have very poor operational productivity (pax/amount of service) by international standards
- This is not primarily due to oversupply of buses or poor service quality
- Mostly explained by demand (land use, trip patterns) and contextual (competition, policy) issues outside BRT's direct control
- Under the circumstances, BRTs are largely doing as well as can be expected i.t.o. operational productivity
- Other improvements (integration, fare policy) might make (marginal?) difference
- Some evidence of over-investment in infrastructure
- Poor financial performance driven by poor operational productivity, and (indicatively) extra costs of formalisation



Conclusions (2) – lessons learnt

- Keep and develop operational excellence at BOCs/VOCs and cities
- We will have poor performing BRTs for as long as we serve poor land use patterns
- Relook infrastructure requirements – lighter, more flexible approaches?
- Report separately BRT cost and taxi transformation cost – clearer decisions about what we are paying for

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