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A historical overview of enhanced bus services in Australian cities: What has been tried, what has worked?

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ABSTRACT

Enhanced bus services that aim to attract potential car users by offering qualities of services more closely aligned with those offered by the private car tend to emphasise frequency, connectivity, speed and travel time reliability. "Full" Bus Rapid Transit (BRT) is one end of the spectrum of such services that requires substantial investment in dedicated infrastructure to provide fast services but examples of enhanced services that do not require such infrastructure are more common in Australia and Europe than full BRT. This paper uses historical evidence to provide an overview of the development of these services in Australia and documents the existing evidence for the success of these initiatives taking into account the trade-offs that naturally occur as a result of the inherent constraints of network design with limited financial resources. This paper uses the concept of the passenger supply chain to describe which service attributes were targeted by the implementation of the enhanced service. It adds to the bus service literature by looking at aspects of quality of service rather than how the vehicles traverse the physical infrastructure.

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1. Introduction

Services that aim to attract potential car users by offering qualities of services more closely aligned with those offered by the private car are defined here as 'enhanced bus services'. Such services tend to emphasise frequency and connectivity and to minimise the costs to users in terms of travel time. "Full" Bus Rapid Transit is one end of the spectrum of such enhanced bus services that requires substantial investment in dedicated infrastructure to provide fast services but examples of enhanced bus services that do not require such infrastructure exist (e.g. Brisbane's Cityxpress and BUZ networks and Adelaide's Go Zones) as discussed in this paper. The potential benefits of networks of enhanced bus services are recognised by government proposals to reform bus networks by introducing networks of cross regional bus routes that offer direct, frequent services with fewer stops and faster travel times, thus allowing spending on bus priority measures to be concentrated on a smaller number of corridors leading to further reductions in travel times. These proposals note that by concentrating bus capacity onto

more limited number of corridors, it is expected that patronage should increase along with revenue of operators. Examples of such proposals (only some of which have been fully implemented) include the Unsworth Review ([New South Wales Government, 2004](#)) and Sydney's Bus Futures ([New South Wales Government, 2013](#)) and Queensland's TransLink Network Plan ([TransLink, 2007](#)) and South East Queensland Bus Network Review ([Queensland Transport and Main Roads, 2013](#)).

This paper is structured as follows. Section 2 provides a brief description of the development of bus services in Australia. Section 3 discusses the traditional approach to bus network design, which is contrasted in Section 4 with various approaches proposed in the literature towards enhancing bus services. Section 5 introduces the concept of the Passenger Value Chain as a way to define and classify enhanced bus services, incorporating the various definitions from the literature. In Section 6 the concept of the Passenger Value Chain will provide the framework for a survey of a number of enhanced bus services that have been implemented in Australia. Section 7 discusses commonalities in the Australian experience and the evidence of success or otherwise from the various schemes, although this evidence is not always made available by the regulators or operators of services. It is shown that while the while the surveyed

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innovations to bus networks result in improvements (that is savings in time or effort) in some components of the passenger value chain, this tends to be at the expense of changes to other components of the passenger value chain (that is an additional burden is placed on passengers). However, the benefits of frequency and connectivity appear to outweigh the additional burden for the majority of passengers, given the higher patronage levels achieved.

2. Australian historical context

Table 1 below presents the development of demand for public transport in Australian capital cities over the post-World War II period with figures taken from [Australian Government \(2014\)](#), car passenger kilometres are also included for comparison purposes. The year 1960 was selected as this was after the end of petrol rationing (1950) but prior to the closure of most of the Australian tram networks, 1984 represents the nadir in demand for public transport.

Prior to the growth in affordability of the motor car, competition for public transport was mostly between public transport modes and between operators. This led to regulations to place limits on competition between modes and/or operators and to a network design that aimed at minimising the distance that passengers had to walk ([Walker, 2008](#)).

For most of the period following World War II, however, Australian public transport operators, in line with the experience in North American and some Western European countries, faced declining patronage ([Australian Government, 2014](#); p. 32) and most competition was between public transport and the private car. Operators responded by either eliminating services that were not cost effective or recasting such services as a safety net for those without access to a private car. Such network designs again sought to maximise spatial coverage in order to minimise the distance that potential passengers had to walk.

Commuter services remained cost effective for operators and these were extended into new suburbs as the urban areas of Australian cities expanded. Commuter service was extended in two ways. In many cases existing trunk bus or tram routes were extended into the newly developing outer suburbs (see for example [Brisbane City Council Department of Transport, 1970](#) for an extension of a bus service or [Keenan, 1985](#), p. 57 for details of the extension of the Melbourne Tram system from Preston Bundoora in stages from 1983 to 1995). In other areas the emphasis was on increasing level of service on existing train lines and providing feeder bus services to and from local train stations, this was the

model that predominated in Sydney and the outermost suburbs of Melbourne but examples exist from all mainland capital cities.

Demand for public transport in the capital cities of Australia has increased since the early 1980s. Absolute passenger numbers declined until 1984 for both bus services and total public transport (pages 14 and 18 of [Australian Government, 2014](#)). The low point in terms of passenger kilometres was earlier in around 1980 ([Australian Government, 2014](#), p. 32) as measured by both the annual number of bus passenger kilometres and total public transport passenger kilometres.

Since 1984, the number of public transport passenger kilometres travelled has grown by 87 per cent. However, this growth is mostly due to the growth in population of Australian capital cities (52 per cent growth from 1984 to 2013) and the growth in average trip length from 10.4 km to 12.5 km (for buses the average trip length grew from 7.7 km to 10.1 km) reflecting population growth in outer suburban areas. The number of public transport trips per head of population has only grown by an average of one round trip per person per year. This is driven by a 24 per cent increase in the number of rail trips per person, with the number of bus trips per person continuing to decline over the 30 years from 1984 to 2013. The growth in rail trips is likely to reflect the large investments made in this mode by state governments over the time period.

The decline in bus patronage up to the early 1980s, longer average trip lengths and growth in outer suburban areas created incentives for operators to try new models of service provision and these new models of delivery are the focus of this paper. The growth in absolute numbers of passengers since then has encouraged further experimentation and led governments to generally invest in greater service levels. The next section defines the traditional approach to bus network design which is contrasted in Section 4 with the various definitions for an enhanced bus service.

3. Traditional bus services defined

[Giannopoulos \(1989, p.97\)](#) defines two major types of traditional bus services: those composed of radial routes and those composed of orthogonal routes. Radial routes service the 'major corridors of movement' to and from a focal point, usually a central business district (CBD) whereas orthogonal routes operate to and from dispersed nodes or in a grid-like pattern. This pattern creates the need for either a substantial amount of terminal space in CBDs or the need for through routing of services that can result in less reliable travel times due to the greater potential for delays ([Giannopoulos, 1989, p. 110](#); [New South Wales Ministry of](#)

Table 1
Growth in metropolitan population of Australian cities and demand for travel, 1960 to 2013.

	1960	1984	2013	Growth 1984 to 2013	Source
Metropolitan population	6438.5	10,083.8	15,342.8	52%	Australian Government (2014, p. 21)
Total trips by public transport (millions)	1384.7	1008.8	1564.7	55%	Australian Government, (2014, p. 18)
Of which rail	462.0	349.4	659.1	89%	Australian Government, (2014, p. 15)
Of which bus	593.4	537.2	691.5	29%	Australian Government, (2014, p. 14)
Car passenger kilometres (billions)	22.5	89.5	150.9	69%	Australian Government, (2014, p. 32)
Public transport passenger kilometres (billions)	12.2	10.5	19.6	87%	Australian Government, (2014, p. 32)
Of which rail	7.1	5.7	11.7	105%	Australian Government, (2014, p. 32)
Of which bus	3.5	4.1	7.0	70%	Australian Government, (2014, p. 32)
Public transport trips per person	215.1	100.0	102.0	2%	ratio
Of which rail	71.8	34.6	43.0	24%	ratio
Of which bus	92.2	53.3	45.1	-15%	ratio
Car passenger kilometres per person	3488.4	8878.6	9833.3	11%	ratio
Public transport passenger kilometres per person	1894.9	1043.3	1278.8	23%	ratio
Of which rail	1099.6	565.3	763.2	35%	ratio
Of which bus	543.6	407.6	454.9	12%	ratio
Public transport average trip length (kilometres)	8.8	10.4	12.5	20%	ratio
Rail average trip length (kilometres)	15.3	16.3	17.8	9%	ratio
Bus average trip length (kilometres)	5.9	7.7	10.1	32%	ratio

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