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### *Visualizing commuting in Singapore*

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## Featured graphic. Visualizing commuting in Singapore

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Singapore's urban planning initiatives have garnered great interest from onlookers in the transportation and planning domains in the past twenty years (Vasoo and Lee, 2001). The government has implemented a number of schemes, such as congestion pricing (Santos, 2005) and high tariffs for automobiles (May, 2004), that have encouraged residents to use public transportation. According to the 2008 Household Interview Travel Survey (HITS), (LTA, 2008) 64% of peak AM trips (eg, travel to work, school, and morning errands) used public transit in 2008. In comparison, in the US, New York City ranks highest in public transportation rates (55% of commuters), followed by Washington, DC at 38% (US Census Bureau, 2008–12).

The featured graphic is a visual map of the morning commute in Singapore, reflecting planning initiatives to mix commercial and residential areas, a tactic encouraged by many planners (Coupland, 1997). The graphic maps the morning peak travel by all modes of travel, based on the HITS survey. Origins and destinations are at the geographic level of the center (centroid) of each of Singapore's thirty-five inhabited Planning Districts (delineated by Singapore's Urban Redevelopment Authority).

Though the Central Business District (CBD) (denoted by a density of districts and near the label 'Downtown Core') attracts many trips, trips are not concentrated in the CBD. Trip destinations are distributed in the 'far outer ring' of the island as well in the east: Tapines, Changi, and Bedok; north: Woodlands and Yishun; and west: Choa Chu Kang, Bukit Batok, and Jurong West. Importantly, predominantly residential districts, including Jurong East, Clementi, Bukit Timah, Bukit Merah, Straits Views, Ang Mo Kio, Serangoon, Toa Payoh, Geyong, Punggol, and Pasir Ris, form a small suburban ring, allowing residents to either travel towards the downtown or outwards for commuting and reducing a problem of heavy one-directional traffic seen in monocentric cities.

Many trips also start and stop in the same district (indicated by light grey circles in the featured graphic). Planning decisions towards integrated land use, demand management measures, and compact development on top the transportation infrastructure encourage nearby trips. These patterns are not surprising given Singapore's initiatives to create cultural 'bohemian' neighborhoods that offer compatible work, housing, activity, and shopping options within the same neighborhood, thus minimizing daily travel for residents (Wong and Bunnell, 2006).

In the far west, Tuas and Pioneer attract industrial workers to shipping docks, many of whom who travel from their homes in Jurong West by chartered company bus; the result is a visible pipeline. Peripheral areas such as Woodlands, Yishun, Pasir Ris, and Tampines exhibit high intradistrict flows, perhaps due to their distance from the CBD, although heavy traffic is also attracted to the downtown region. In fact, interdistricts trips are distributed throughout the country along key transportation corridors, providing evidence of urban planning that is neighborhood based, polycentric, and uses a variety of districts to both house and create jobs, schools, and amenities for its citizens.

Looking ahead, Singapore plans for major population growth in the future, and car usage is rising each year. Whether land-use planning, combined with public transit investment can continue to manage the future mobility implications of development is the next decade's big challenge.

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# Major AM Transit Flows by Planning District

The number of flows between planning districts, and within planning districts, is shown here. Strong connections like between districts Tuas & Jurong West, Outram & Bedok are shown with thick red lines. Districts like Woodlands, Tampines & Choa Chu Kang have a significant number of internal flows, as denoted by the relative size of the district center mark.

