Asian Transport Observatory

Davao City

Urban Transport - State of Play

Insights from the Asian Transport Observatory (ATO)

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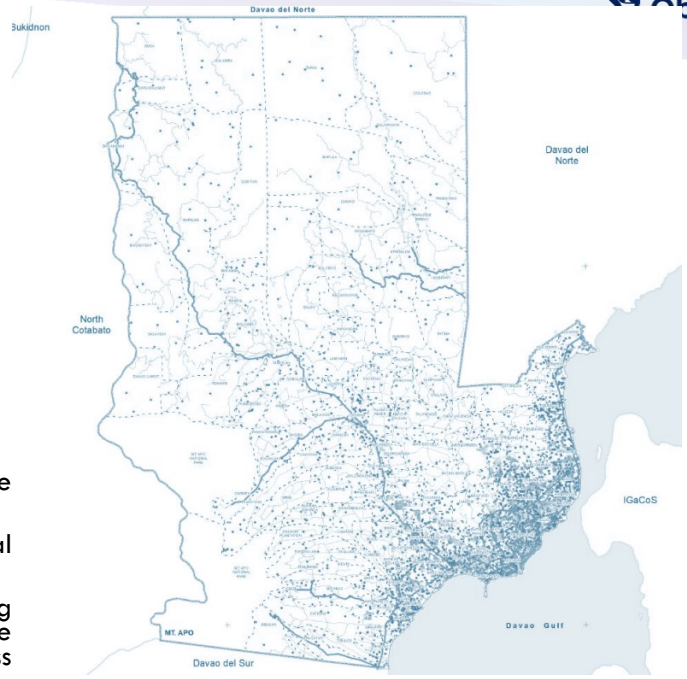
With the support of: Mobilise Your City

Davao City: Introduction

- **Population:** 1.9 million (2023) (Source: Macrotrends)
- **Area:** 99 sqkm (2015) (Source: GHS)
- **Population Density:** 8,298 people/sqkm (2015) (Source: GHS)
- **Main Transport features (Source: Comprehensive Development Plan 2018-2022):**
  - Air transport - Limited capacity of the F. Bangoy International Airport. There is also a rapid growth in air traffic volume both in cargo and passengers
  - Sea transport - Sasa Port needs upgrading. Facilities in the port are outmoded. There is an issue with the informal settlers.
  - Land transport - The terminal may not be relevant in the long run due to its size and location. There are tricycles plying the national streets and the regard for this type of transportation mode is very low. These modes of transportation are not maximized within CBD. Traffic congestion due to poor or lack of mass transportation system. The existing mass transport system is unreliable and uncomfortable.



Urban public transport

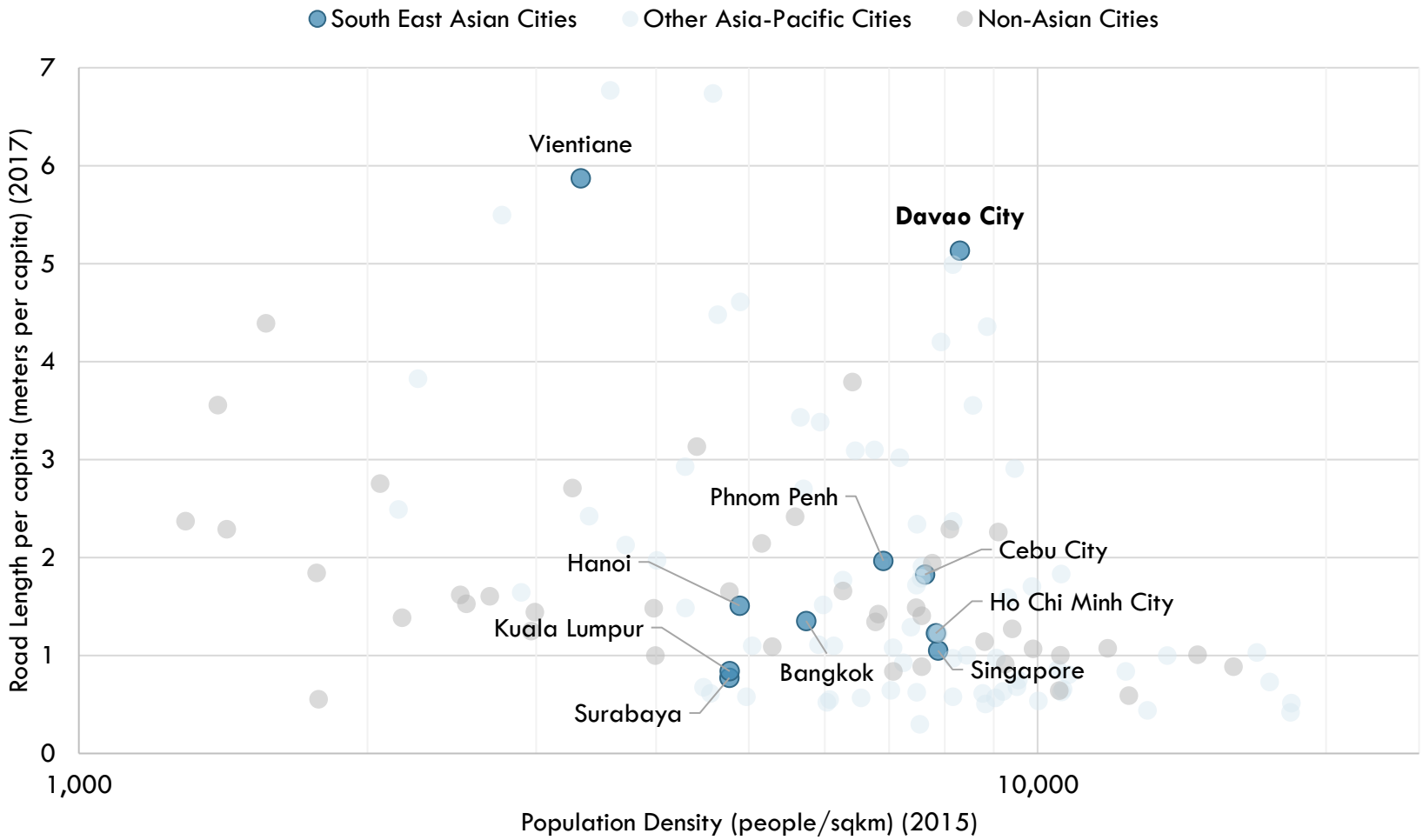
Urban private vehicle traffic

Airport

Seaport

High road infrastructure availability for Davao city

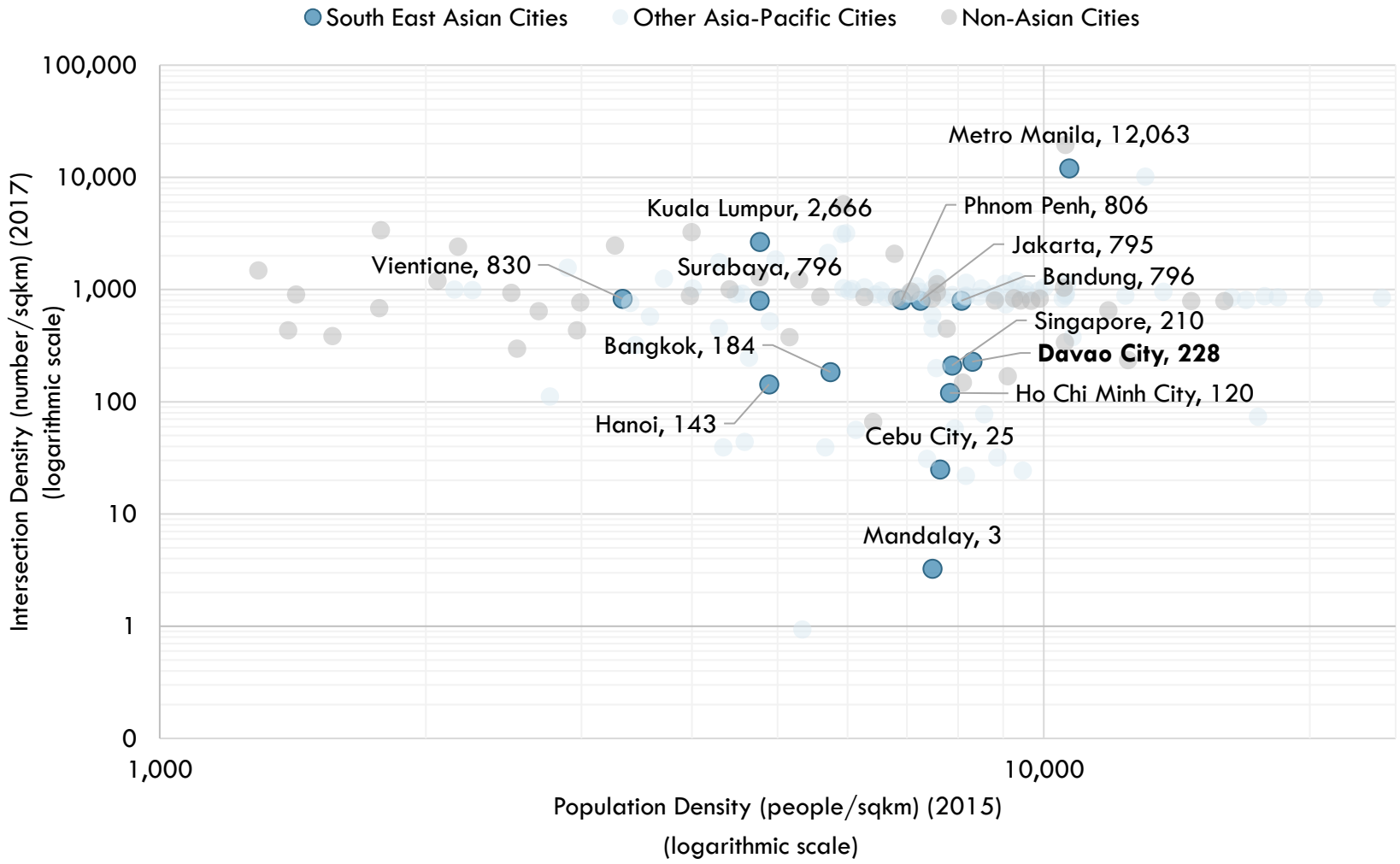
- Davao City exhibited a considerably higher availability of road infrastructure per capita (5.13 meters per capita) in 2017 compared to cities with similar population densities such as Singapore (1.05 meters per capita) and Ho Chi Minh City (1.23 meters per capita), despite similar population densities of around 8,000 people per square kilometer. It is important to consider that the data is sourced from OpenStreetMap (OSM), which may incorporate unpaved roads, and reflects total road length rather than lane kilometers.
- This trend suggests a crucial link between population density and road infrastructure needs. While denser cities might require less total road length per capita due to proximity, sufficient investment in roads remains essential to manage traffic flow effectively.



Sources: Oke et.al. (2019)(OSM), GHS (European Commission) | ATO Indicators: SEC-UDB-003, INF-UDB-004

Davao City has a higher Intersection Density compared to cities with similar population density levels

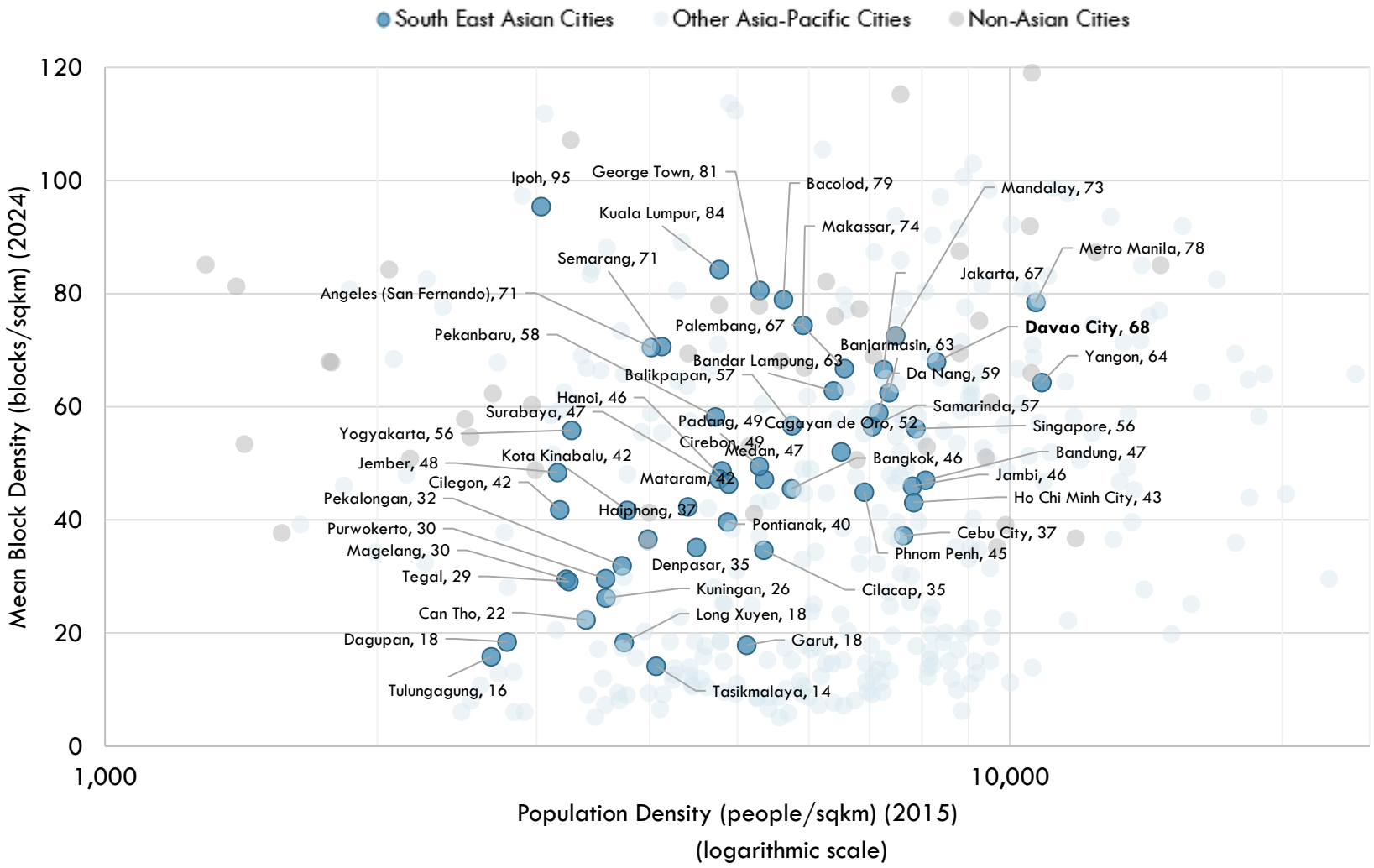
- Despite having similar population densities of around 8,000 people per square kilometer, a significant disparity exists in the road intersection prevalence across these Southeast Asian metropolises. Davao City has a denser intersection network, with an estimated 228 intersections per square kilometer in 2017 compared to Singapore (210), and Ho Chi Minh City (120). But Bandung has even denser network with 796 intersections/sqkm.
- High intersection density can promote walkability and cycling by creating a more fine-grained street network with shorter distances between intersections. Additionally, a dense network of intersections can provide greater redundancy and route options, potentially improving traffic flow and reducing travel times in case of incidents.
- On the other hand, high number of intersections can lead to increased traffic light frequency, potentially causing stop-and-go traffic and longer travel times, especially for vehicles.



Sources: ATO visualization using the data sourced from Oke et al. (2019)

Davao city's high Mean block density is higher compared to cities with similar population density levels

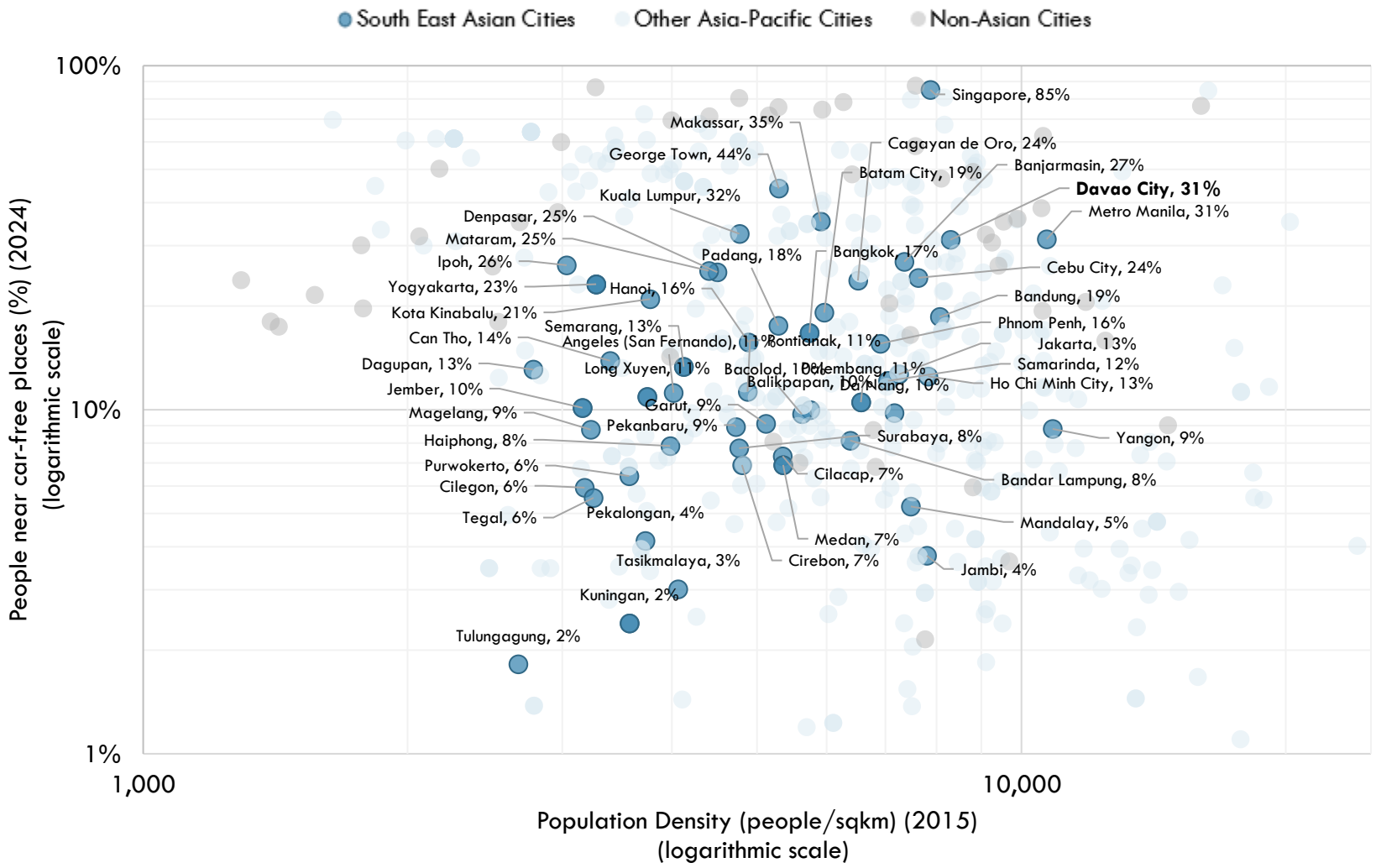
- Mean block density, which refers to the average number of blocks per square kilometer, is one of the key indicators of walkability. Denser block patterns typically translate to smaller block sizes, encouraging pedestrian movement with shorter distances and lower average traffic speeds.
- In this regard, Davao holds a decent advantage with a mean block density of 68 blocks per square kilometer.



Sources: ITDP, GHS (European Commission) | ATO Indicators: SEC-UDB-003, UFS-UDB-005

Less than a third people in Davao city live near a car-free place

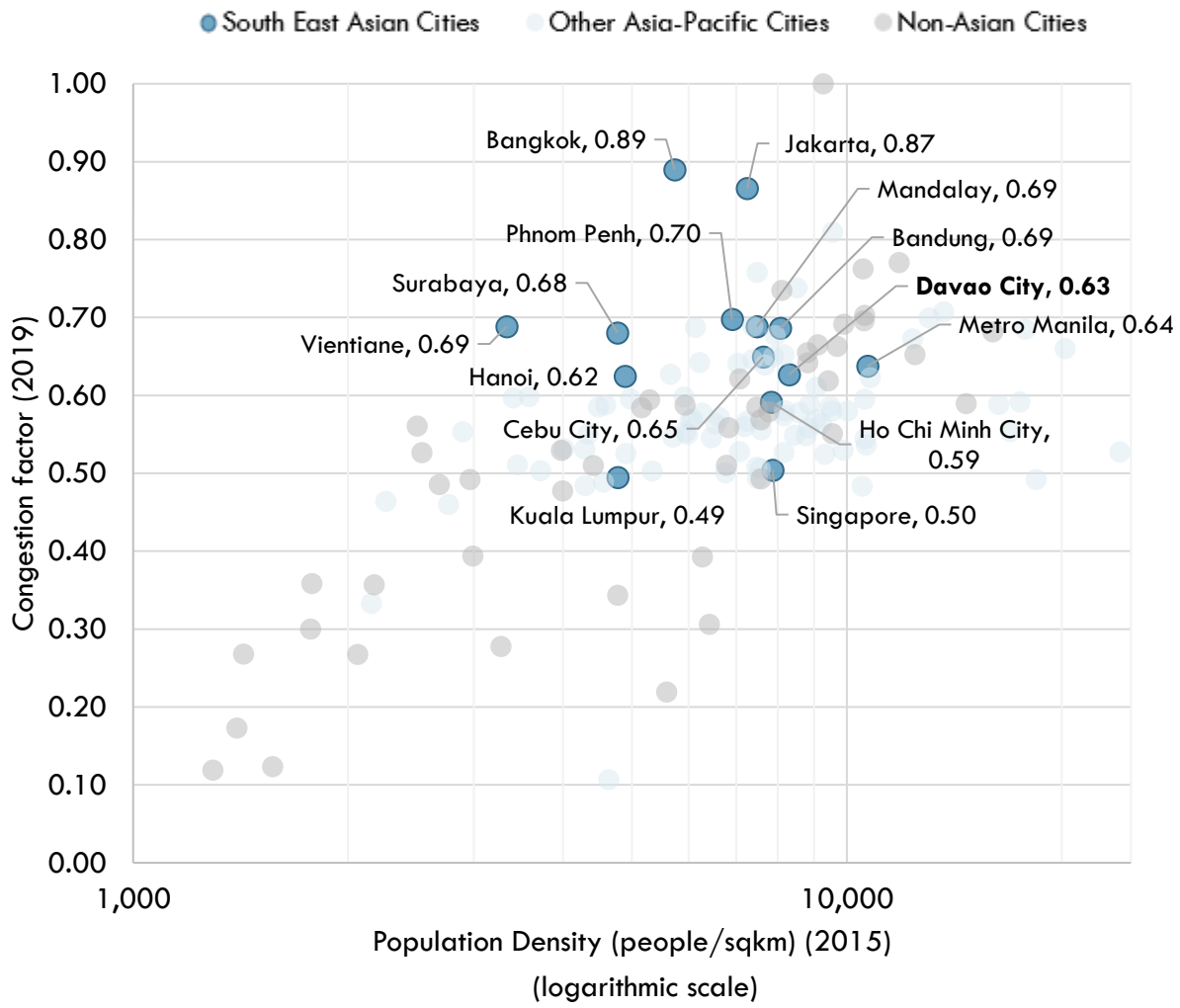
- People Near Car-Free Places measures the percentage of an area's population living immediately near (within 100m of) a car-free (vehicle – free) place. This includes parks, squares, car-free streets, recreation grounds, sports fields, and forests.
- Car-free public spaces become integral components of pedestrian infrastructure. By eliminating vehicle traffic, they create safe and often more direct walking routes
- Based on the ITDP Atlas data, Singapore ranks 12th in the world cities. Davao city ranks 3rd out of the 12 cities in the Philippines.

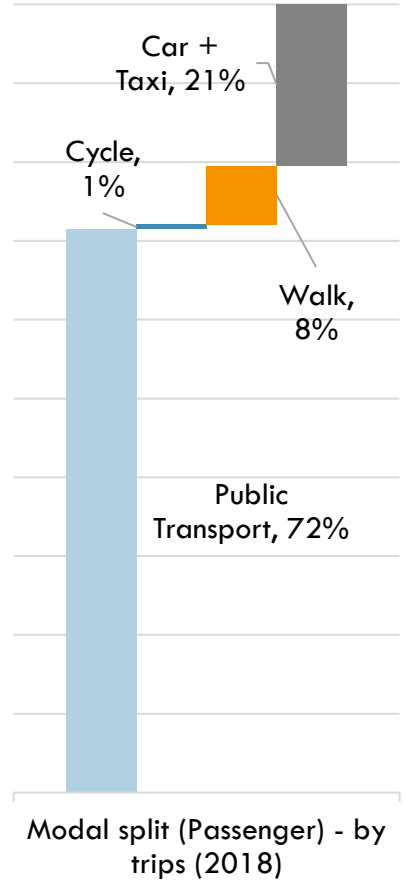


Sources: ATO visualization based on the data sourced from ITDP

Davao city demonstrates high congestion factor

- When comparing cities with similar population densities, Singapore and Ho Chi Minh City (HCMC) rank lower in terms of congestion compared to Davao City, while Bandung ranks higher.
- Singapore serves as a classic example of a city with higher intersection density and lower congestion.
- Although Davao City has a lower proportion of private vehicles in its passenger mode share (only 21% in 2018), other factors contribute to its higher congestion rate.
- According to the 'Davao Sustainable Urban Transport Project: Final Report,' the average trip length by public transport in Davao was only 7 km in 2013. In contrast, Singapore's average trip length is 12 km, as noted in the Land Transport Master Plan 2040, and HCMC's is 36 km by bus, according to the report "Winds of Change: East Asia's Sustainable Energy Future."
- These differences in trip lengths and transport infrastructure highlight the complexity of congestion issues and the need to consider multiple factors when evaluating urban transport systems.



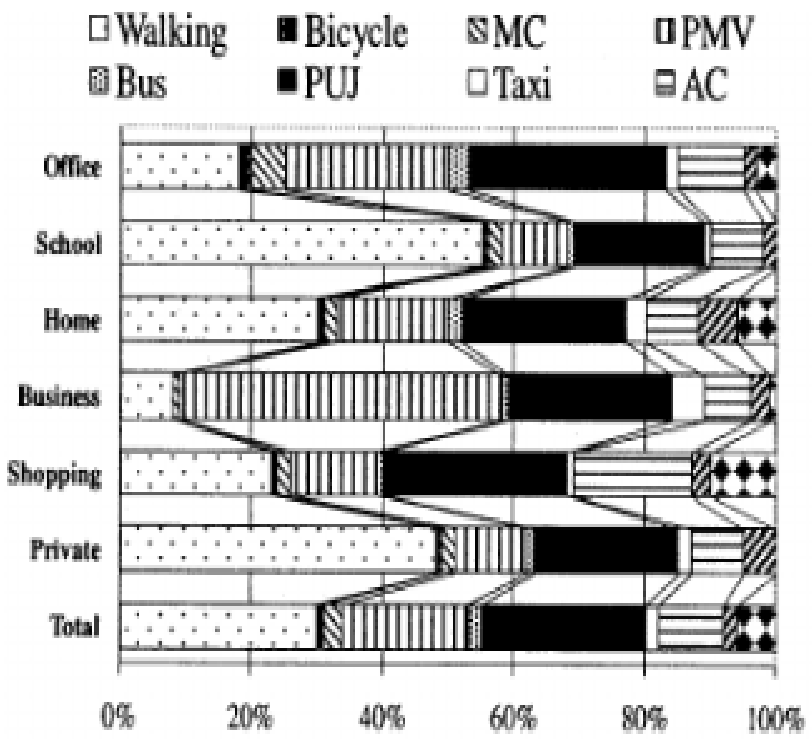


Sources: Oke et al., GHS (European Commission), City government official documents

Davao City has significantly shifted activity trip modal composition

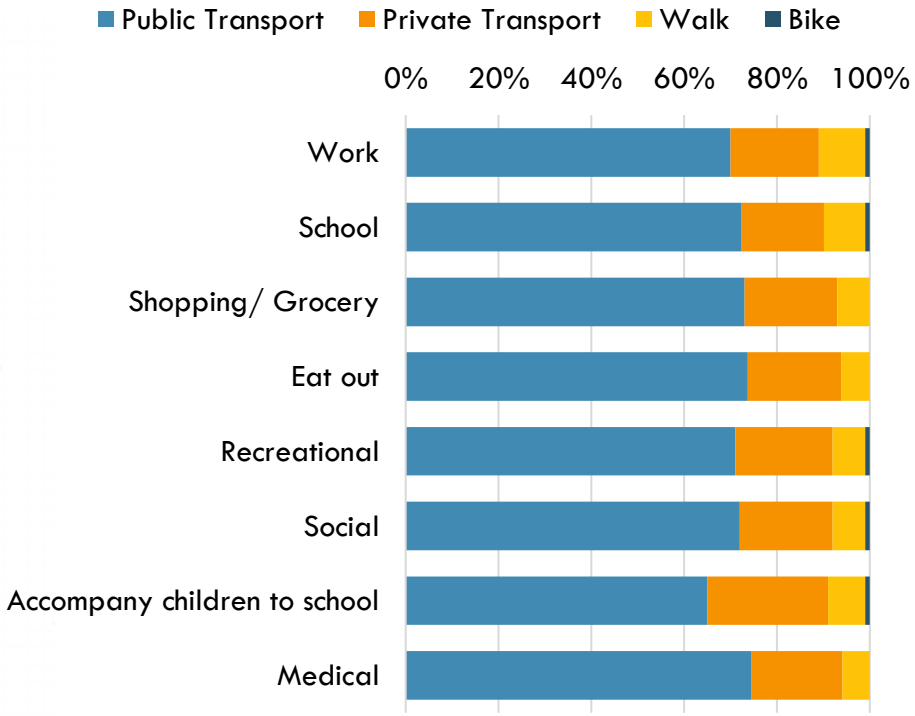
- Although the 2 charts derive data from different sources and hence the methodologies also differ, but overall, it can be analysed that the Davao City has significantly shifted activity trip modal composition.
- From historical high private modal shares, it has shifted to public transport. Walking has also lost a significant share.

Activity Trip composition, 1979



Source: Guillen et al. (https://www.researchgate.net/publication/216064240_Understanding_the_Informal_Public_Transport_Presence_along_the_Mintal-Tugbok-Calinan_Route_in_Davao_City_Philippines_An_Exploratory_Study)

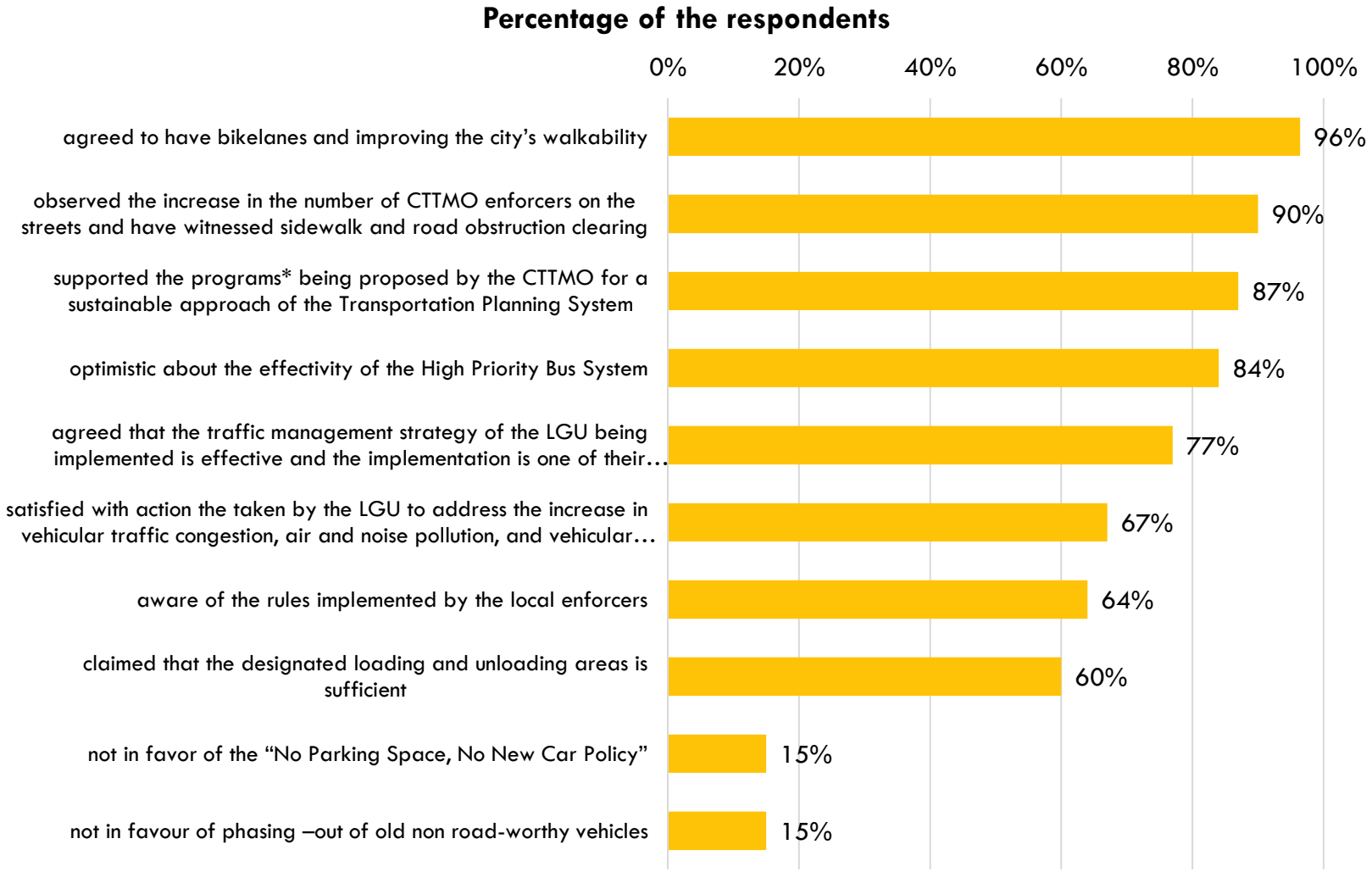
Activity Trip composition, 2018



Source: Davao city transport roadmap (https://www.davaocity.gov.ph/wp-content/uploads/2019/04/Davao-City-Tranport-Roadmap-Summary-Report.pdf)

Transport Planning System and Management of Davao City: A Perceptual Study

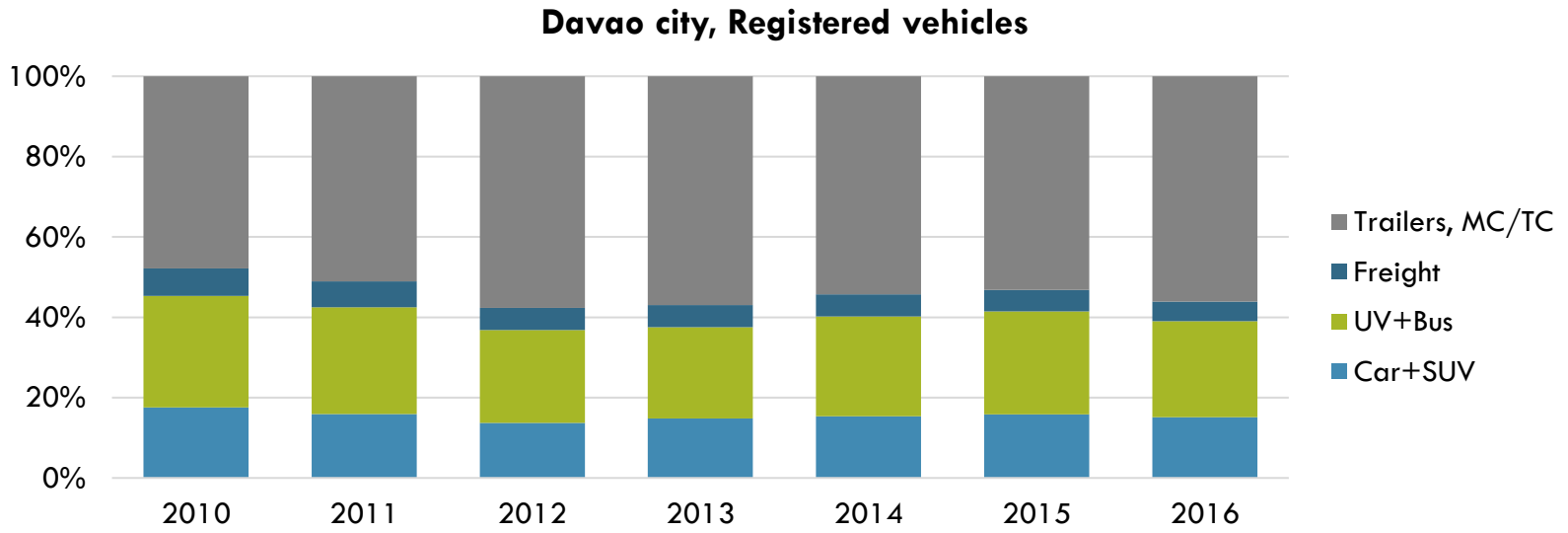
- "Davao city transportation planning system and management has taken off and being implemented. Although compliance is not satisfactory high, the community in general is aware of the implementation of the rules and regulations. However, there is so much room for improvement in educating the public of the traffic ordinances in the city. The strategies and management as well as its manner of implementation are very satisfactory and acceptable to the general public. Even with a greater support from the city people are the strategies yet to be implemented and developed by the city planners. Issues and challenges are noticed during the engagement of the implementation of policies and programs that is embedded with the transportation planning."(Source: Arcillas et al., https://ijiset.com/vol6/v6s9/IJISET_V6_I9_02.pdf)

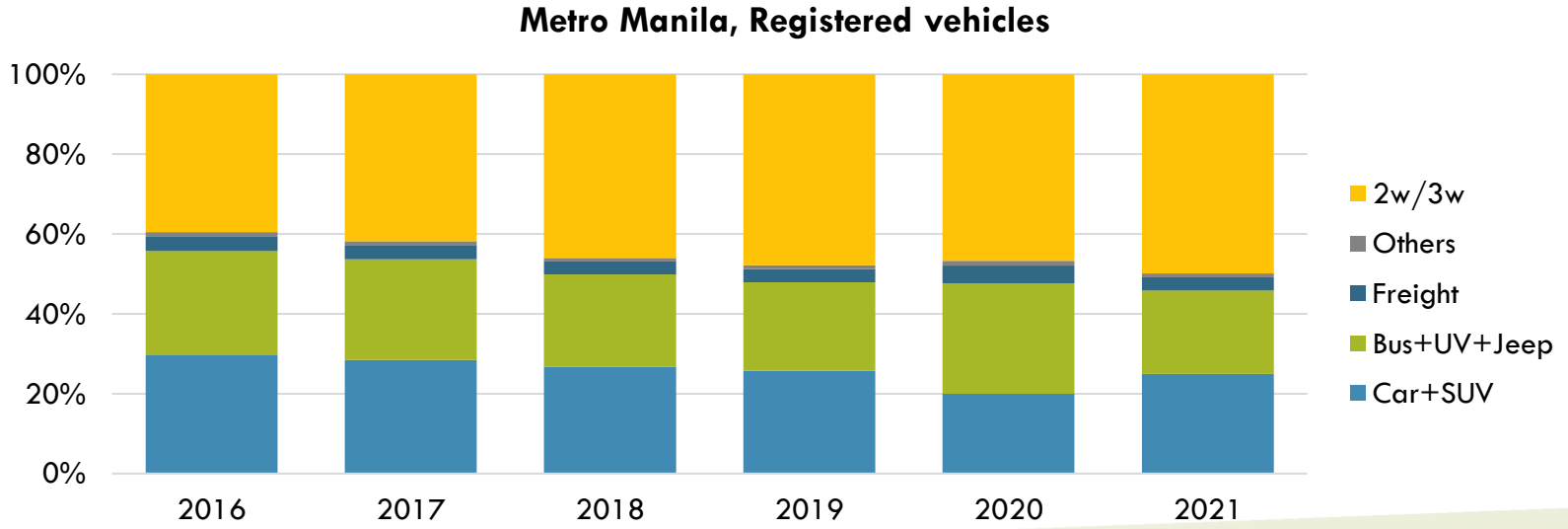


*New policies such as "No Parking Space, No New Car Policy" and phasing out of very old vehicles, implementation of the High Priority Bus System and the development of the city's walkability and bikeability Sources: ATO visualization using the data sourced from Arcillas et al. (https://ijiset.com/vol6/v6s9/IJISET_V6_I9_02.pdf)

Registered Vehicles trend see an uptake of 2/3 wheelers

- In the case of Davao city, considering that MC and TC are the major components of the 'Other registered vehicle' category, it can be said that the share of registered motorcycles and tricycles have increased at the cost of 'Cars + SUV' in the city. Similar is the story with Metro Manila.
- The share of buses + UVs keeps fluctuating but is within the range of 20-30%, while the private vehicles (including freight vehicles) constitute 70-80%.
- The number of vehicle miles travelled by passenger cars and light-duty trucks increased 35% from 1990 to 2013. (Source: https://ipindexing.com/journal-article-file/11572/issues-and-challenges-on-transport-modernization-the-case-of-davao-city-Philippines)

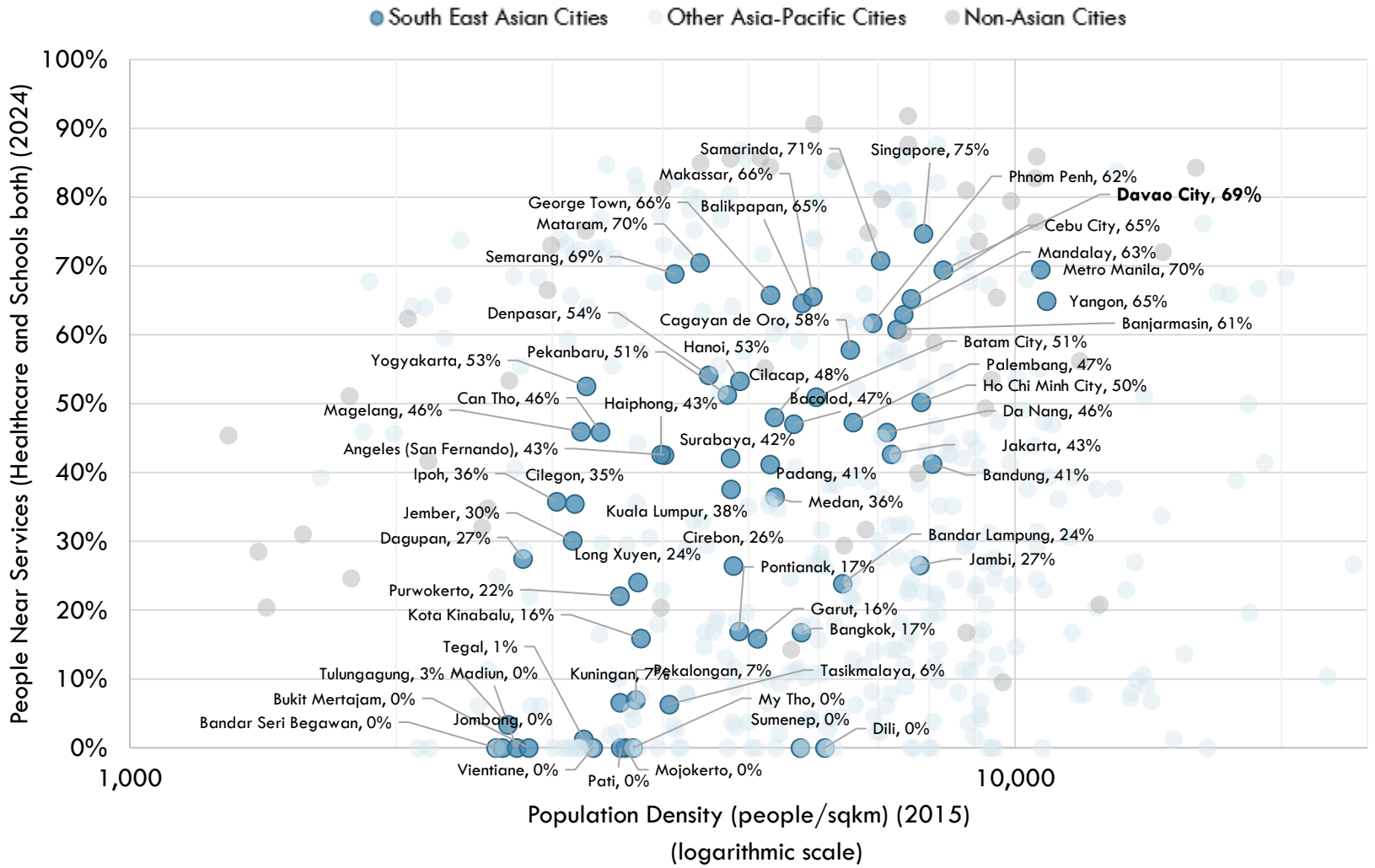




Sources: City government official documents

69% of the urban population in Davao city have access to healthcare and educational services

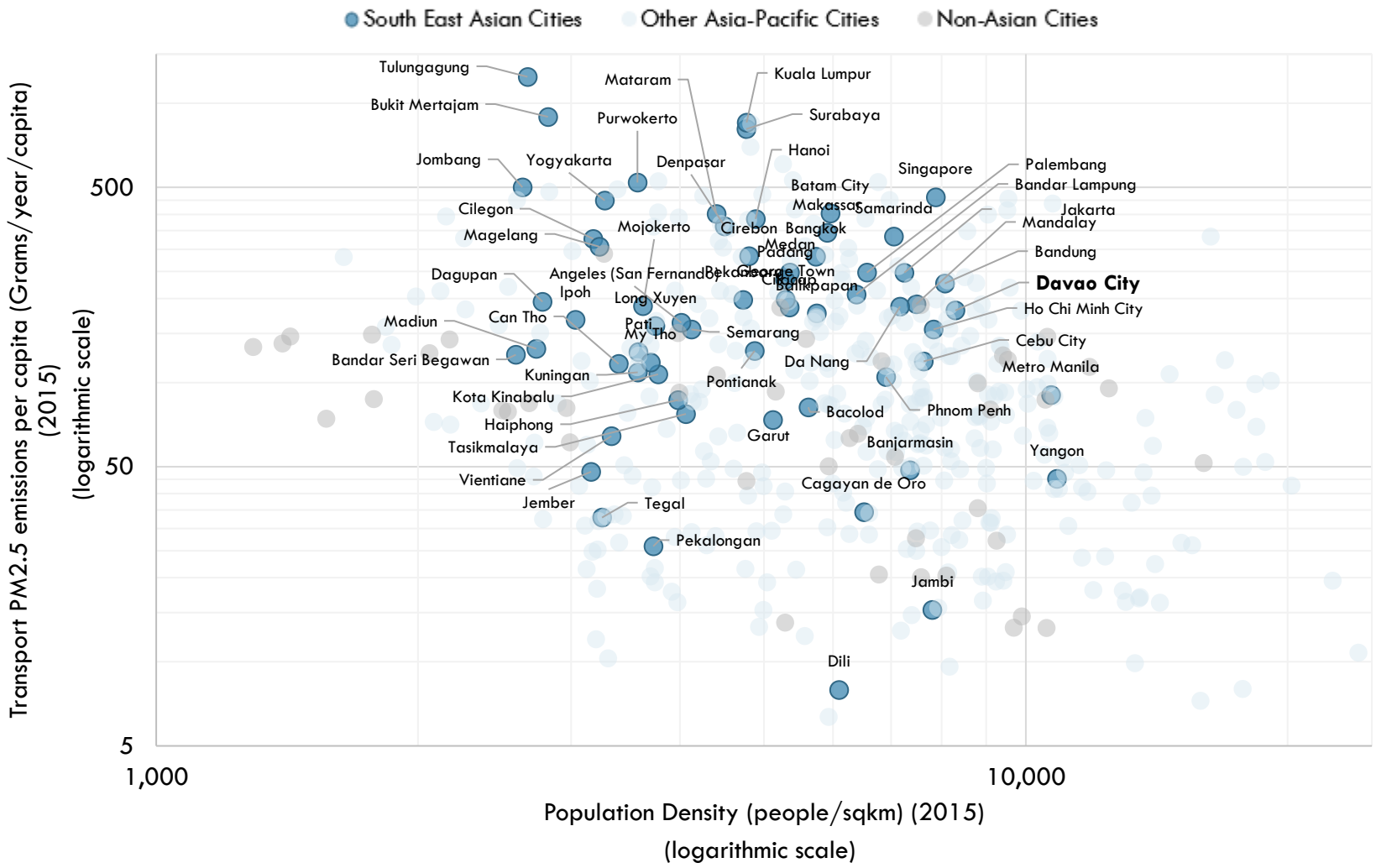
- People Near Services measures the percentage of an area's population living within walking distance (1km) of some form of both healthcare and education services. Proximity is the first requirement for walkability. In a city where people live within a 15-minute walk of their daily needs, they will be able to live without a car.
- Davao city has a decent access to services at 69% (slightly lower than Metro Manila at 70%), while the Philippines stands at about 32%. Davao's better performance is also attributed to its high population density compared to many South East Asian cities.



Sources: ITDP, GHS (European Commission) | ATO Indicators: SEC-UDB-003, ACC-UDB-002

Davao city is estimated to have high Transport PM2.5 emissions per capita

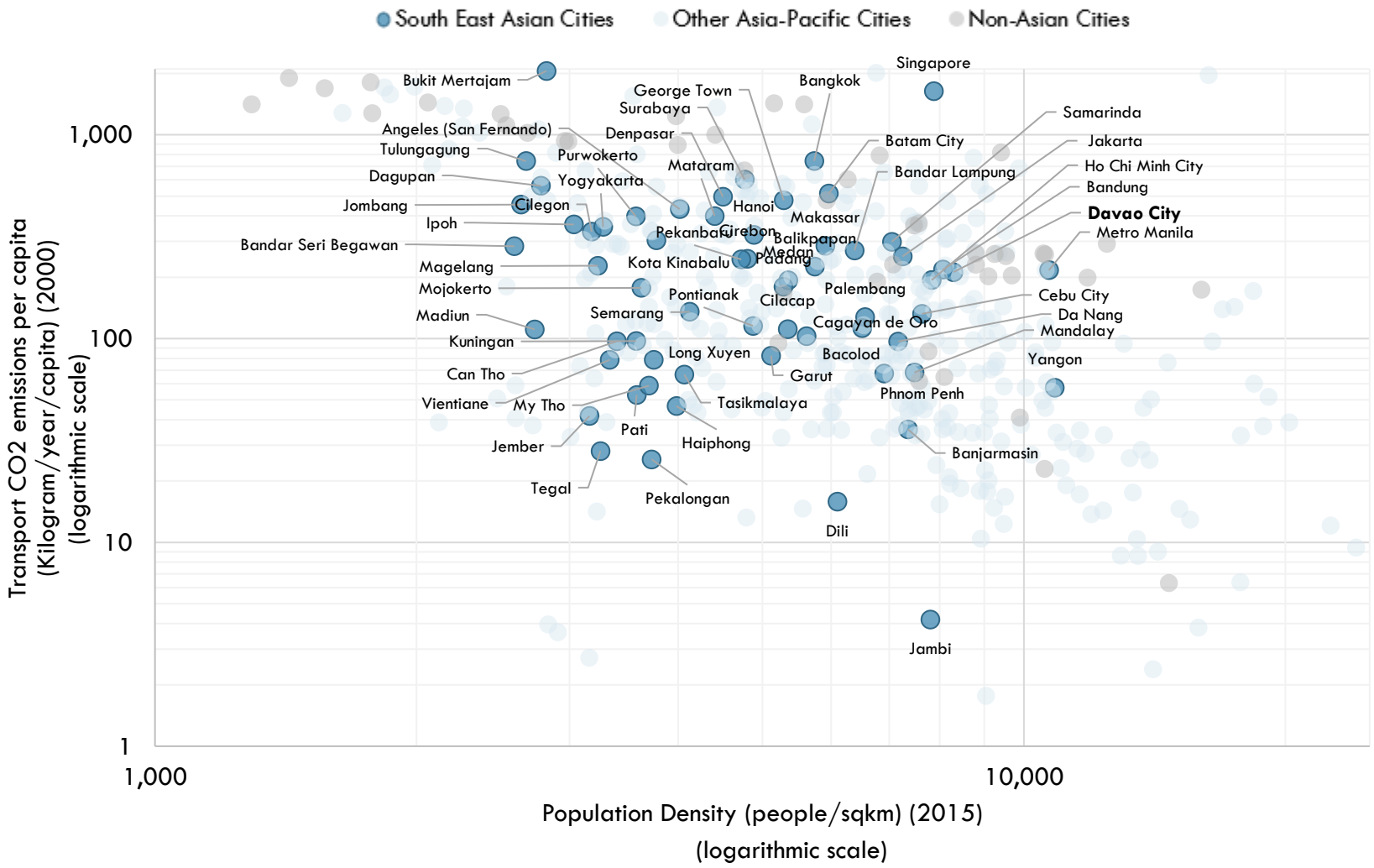
- Davao city (188 g/year/capita) ranks higher compared to Metro Manila (90 g/year/capita) in terms of transport PM2.5 emissions per capita.
- Although the levels have reduced by 33% compared to the 2000 levels.



Sources: GHS (European Commission) | ATO Indicators: SEC-UDB-003, APH-UDB-003

Davao city is estimated to have high Transport CO2 emissions per capita

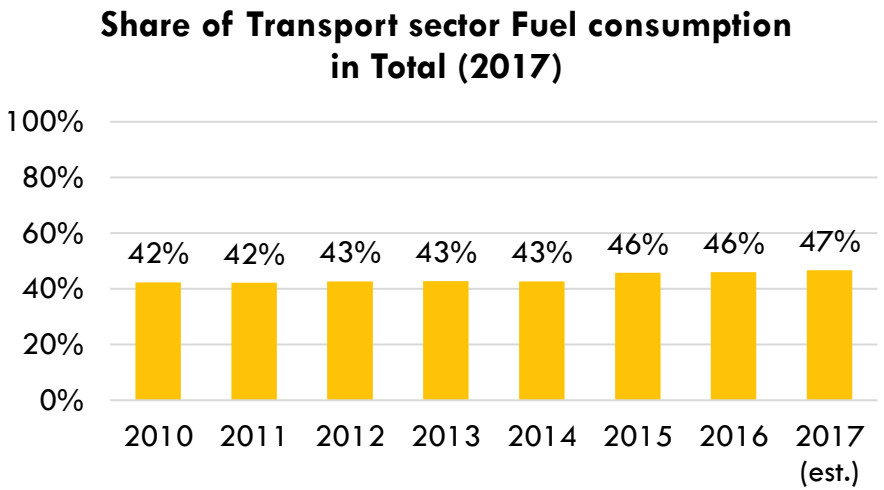
- There have been no recent/ updated data for the transport CO2 emissions per capita for Davao city.
- As of 2000, Davao city (212 kg/year/capita) ranks similar to that of Metro Manila (217 kg/year/capita) in terms of transport CO2 emissions per capita.
- In Davao City, PUJs alone currently emit 232,000 tons of carbon dioxide equivalent (tCO2e) per year. (Davao Public Transport Modernization Project, ADB)
- According to a report (APEC Low Carbon Model Town (LCMT) Project Dissemination Phase 2 Feasibility Study Report – Davao City, Philippines), the 2017 level for Davao city is 292 kgs of Road Transport CO2 emissions per capita per year.

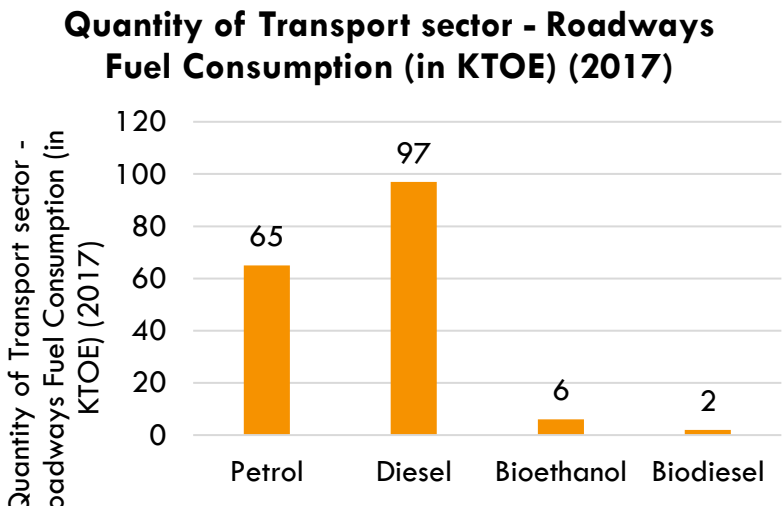


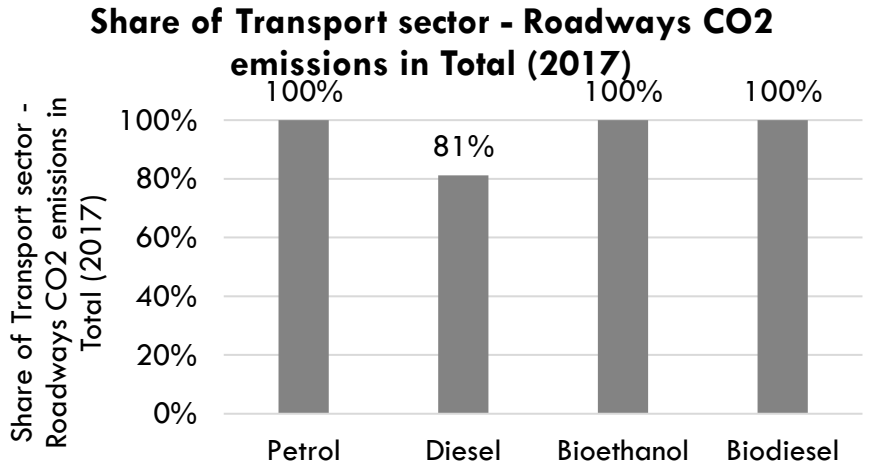
Sources: GHS (European Commission)| ATO Indicators: SEC-UDB-003, CLC-UDB-002

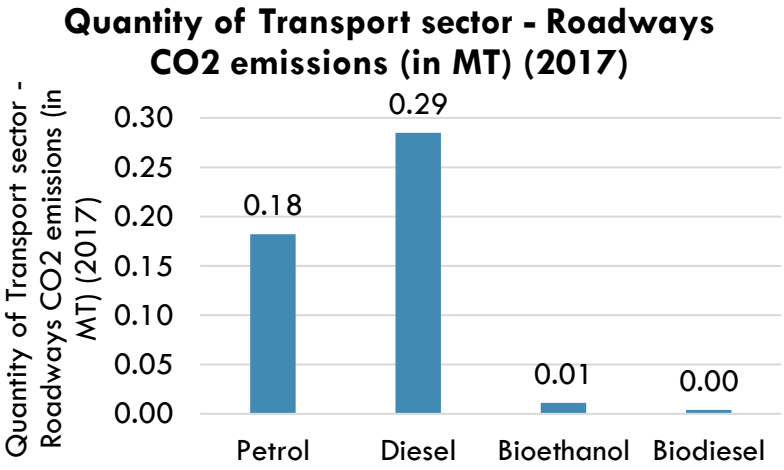
Share of alternative fuels is significantly low in the road transport sector

- Between 2010 and 2017, the road transport sector accounted for an average of 45% of fuel consumption, surpassing sectors such as buildings and agriculture.
- The use of alternative fuels like bioethanol and biodiesel remains notably low within this sector.
- Notably, road transport is associated with significantly high CO2 emissions, primarily attributed to the widespread use of diesel fuel.







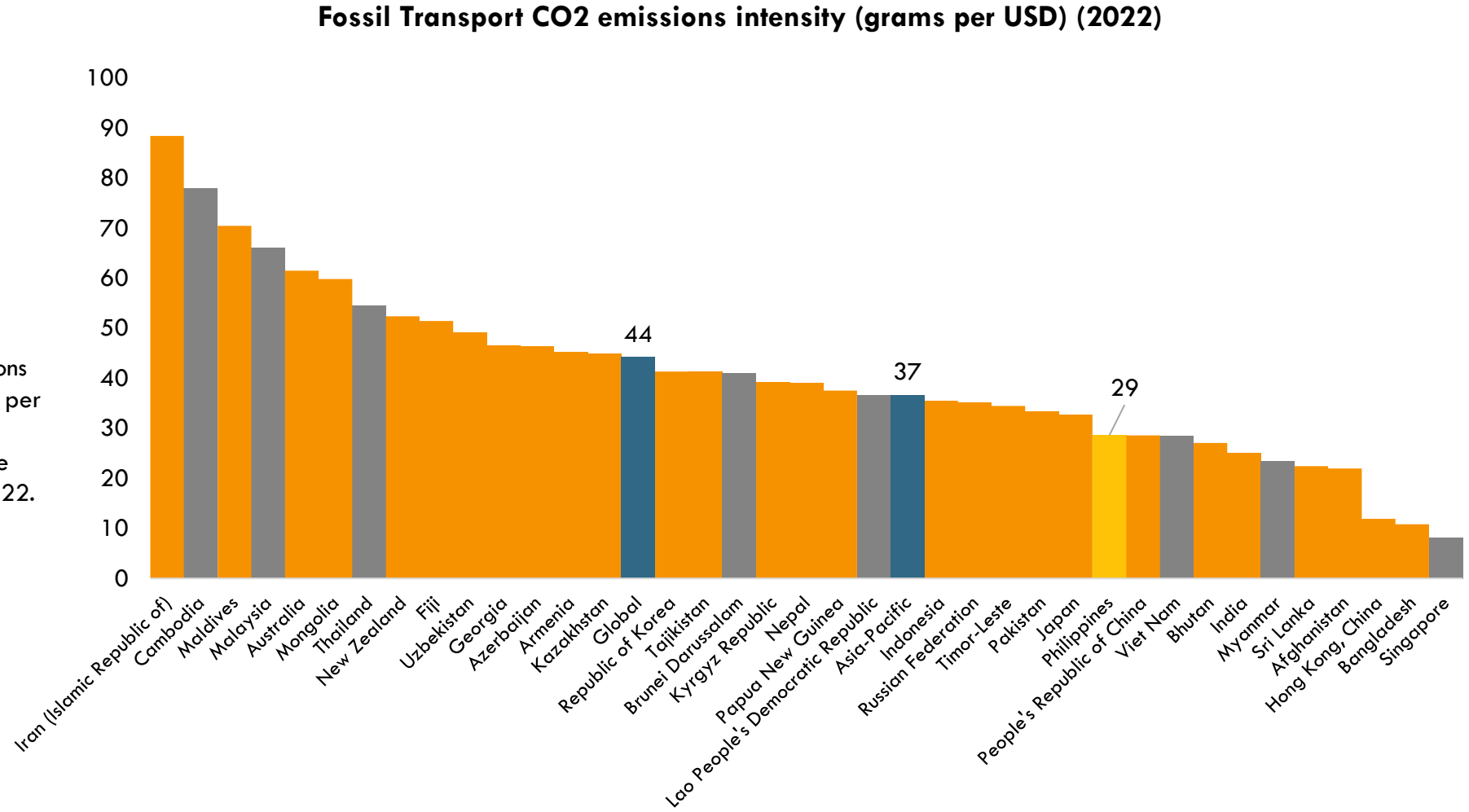


Sources: APEC Low Carbon Model Town (LCMT) Project Dissemination Phase 2 Feasibility Study Report – Davao City, Philippines

Note: *Sectors considered - Buildings - Residential, Commercial, Transport-Roadways, Agriculture-Fishery, Crop production

Davao city has significantly higher Transport CO2 emissions intensity compared to the Philippines

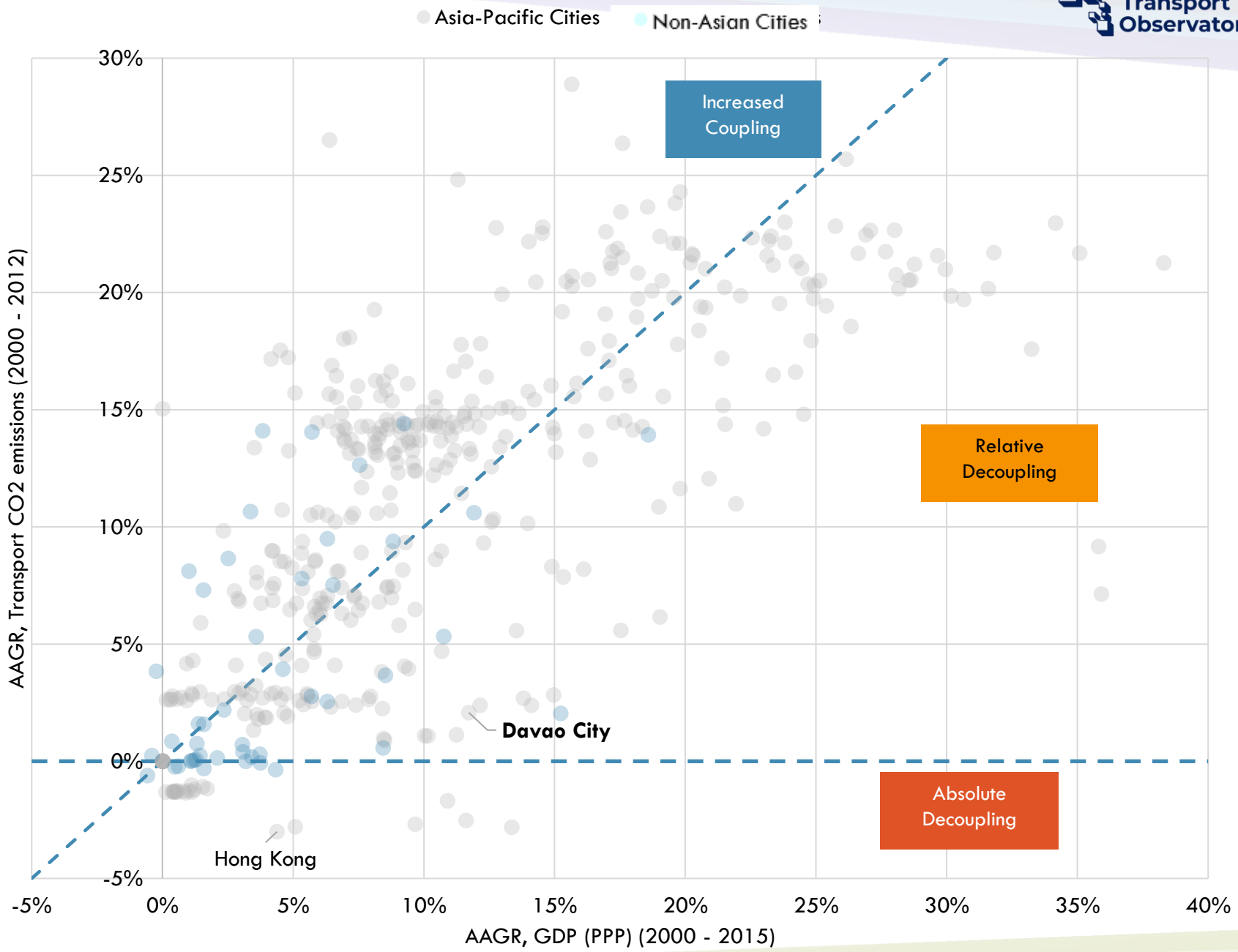
- As of 2012, the transport CO2 emissions intensity for Davao city was 69 grams per USD (Source: GHS – EC).
- Compared to that, Philippines average number is 29 grams per USD as of 2022.



Source: ATO Analysis using the data sourced from EDGAR

Davao city exhibits relative decoupling of Transport CO2 emissions with GDP

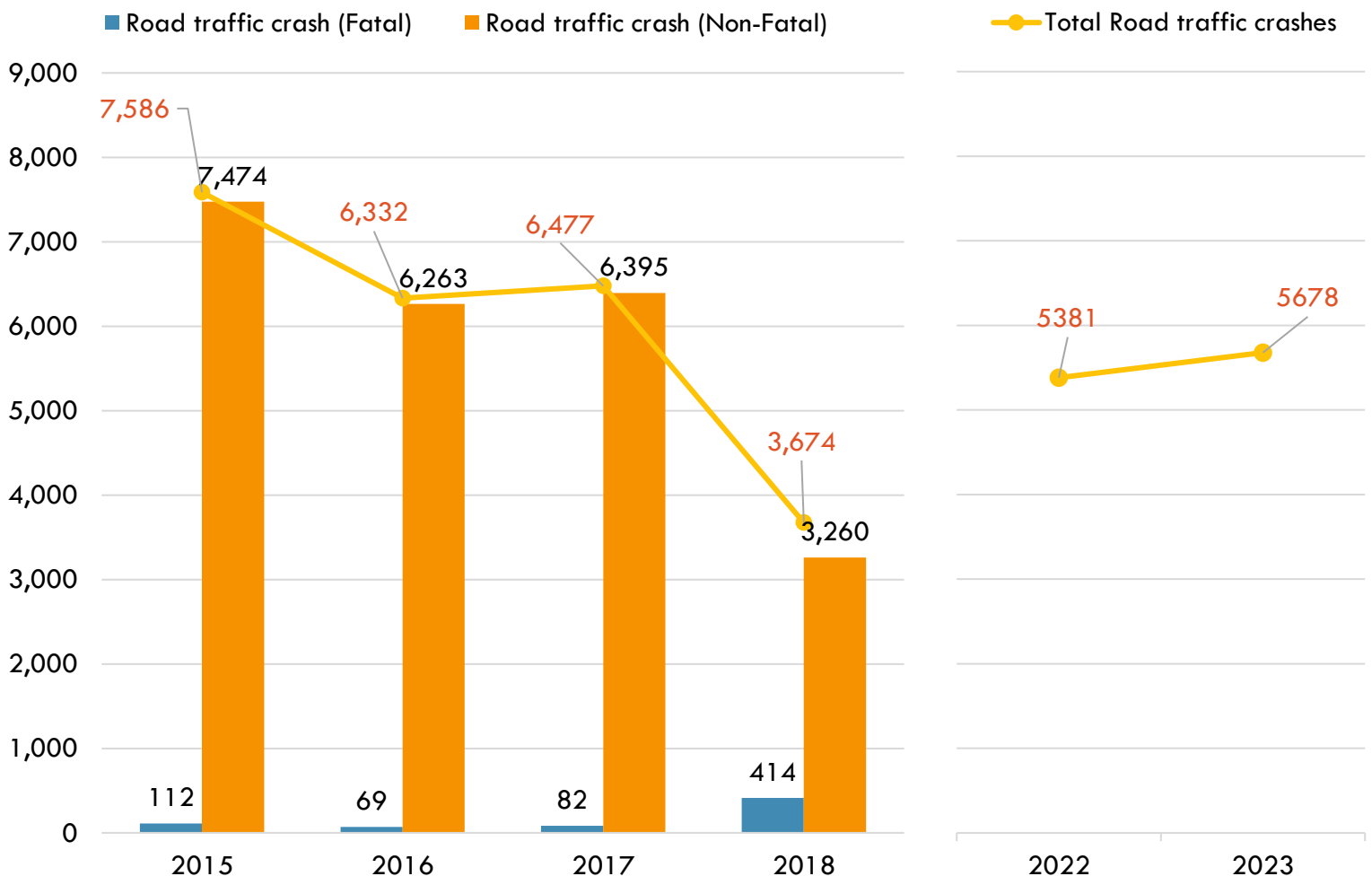
- Davao city is relatively decoupling the transport CO2 emissions with the GDP.
- The AAGR of transport CO2 emissions between 2000 and 2012 is 2% whereas the GDP increased by 12% during the period 2000 and 2015.
- Philippines is also in the relative decoupling zone with 7% increase in GDP and 1% increase in the transport (fossil) CO2 emissions in the period 2015 to 2022.



Source: ATO Analysis using the data sourced from GHS - EC

While total crashes have been decreasing, the fatal ones almost quadrupled in the period

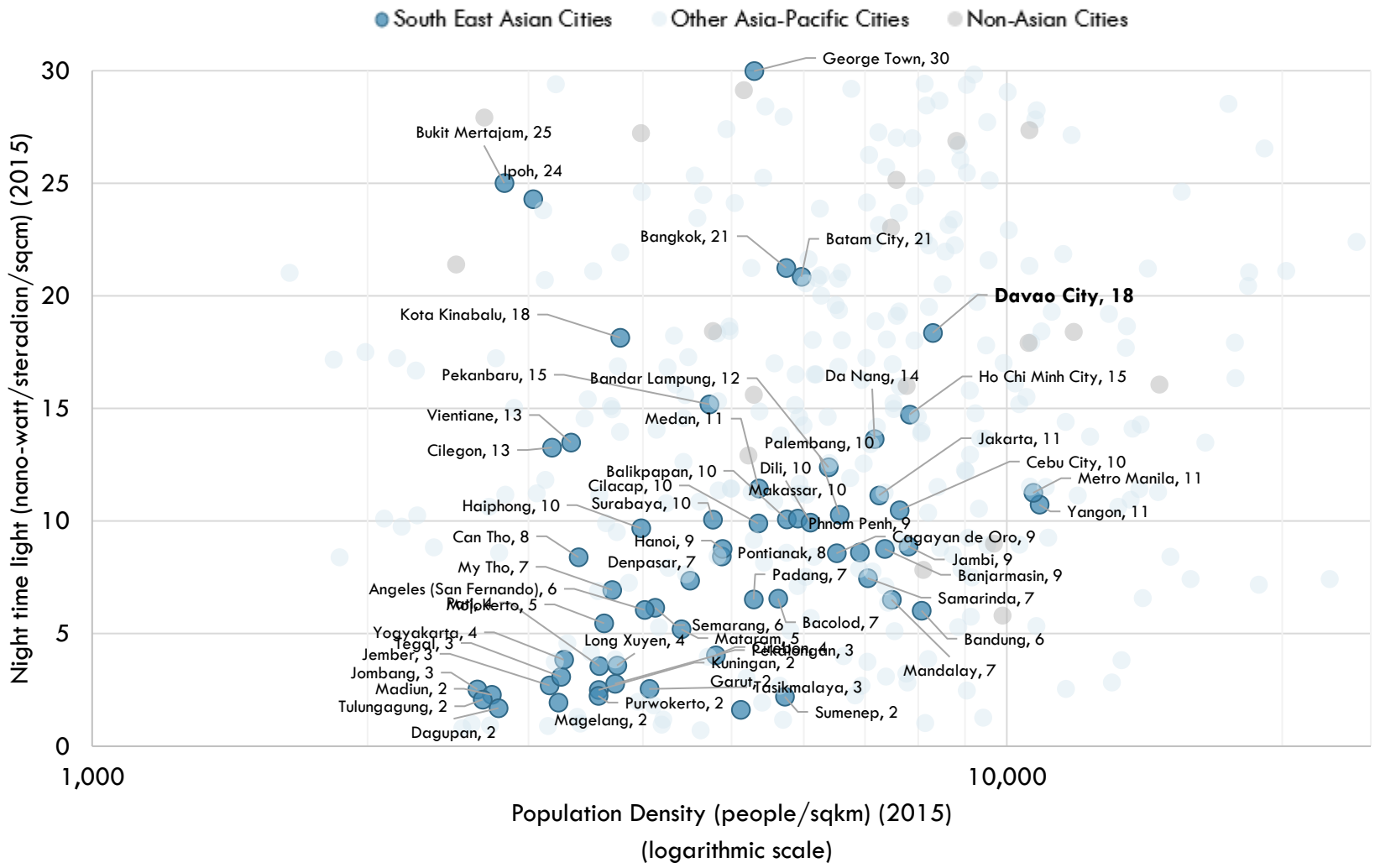
- The total road traffic crashes are decreasing but in the year 2018, fatal crashes accounted for 11% of the total crashes compared to 1% in the previous years. In absolute terms, the fatal crashes almost quadrupled in the period.
- Although a recent report indicates that the number of crashes have increased in the year 2023 to 5,678 (https://www.pna.gov.ph/articles/1216613). In 2023, vehicles in road crashes reached 10,169 compared to 9,172 in 2022.



Source: ATO Analysis using the data sourced from City government official documents

Night time light analysis indicates high urbanization concentration in Davao city

- Nighttime light analysis is a technique that involves studying satellite imagery of Earth at night to analyze the patterns and intensity of artificial lights.
- It reflects the urbanization trends, potentials of transport hubs, traffic and movement patterns etc.
- In comparison with the peer South East Asian UCs, Davao city shows a slightly higher level of urbanization concentration. It can be a reflection of high population densities compared to the peer cities.



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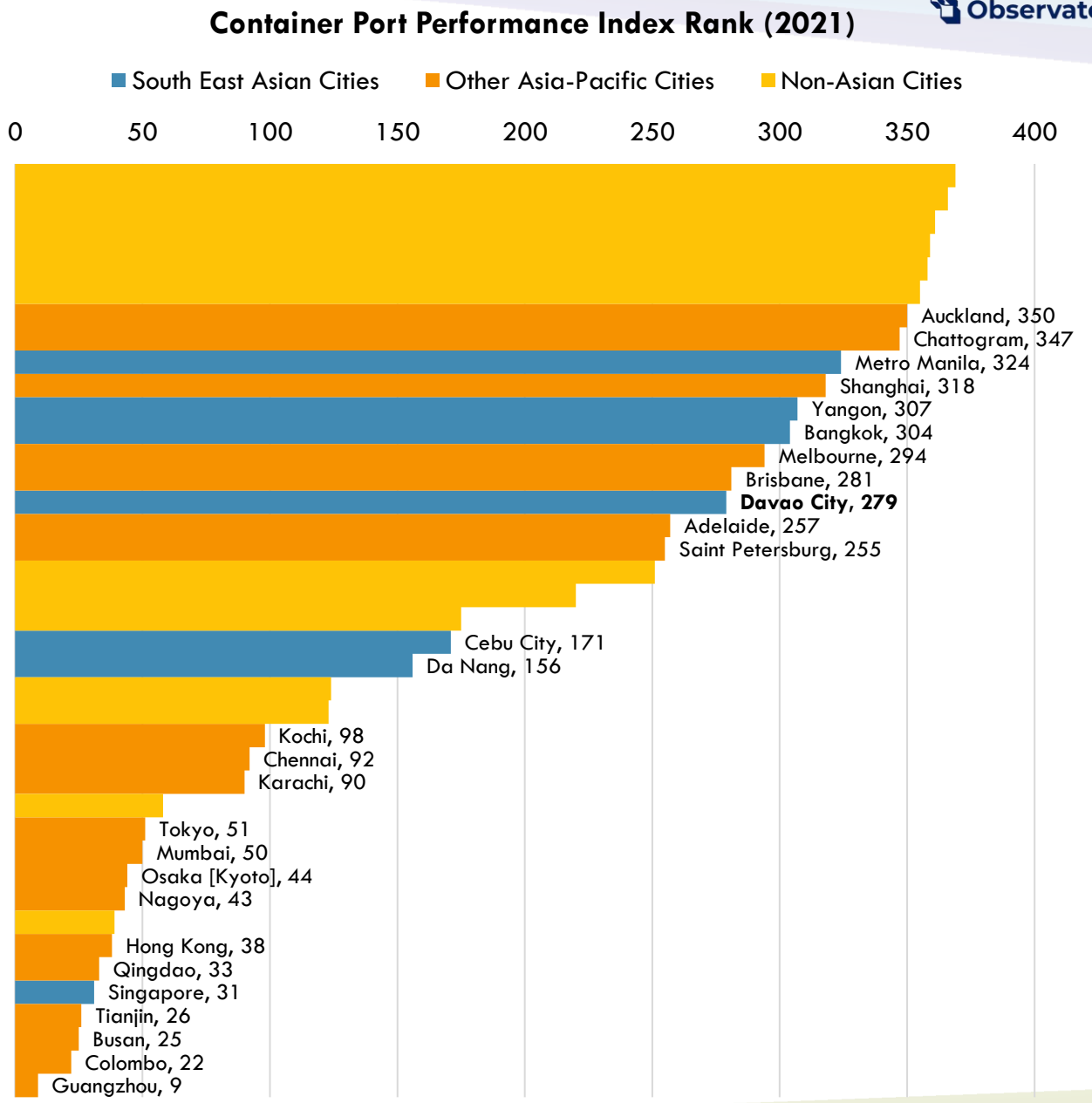
Sources: GHS (European Commission) | ATO Indicators: SEC-UDB-003, MIS-UDB-005

Container Port Performance Index

- The Container Port Performance Index (CPPI), developed by the World Bank in collaboration with S&P Global Market Intelligence, addresses the need for a reliable, consistent, and comparable measure of port performance. The CPPI 2021, which includes data from 370 ports, uses two methodological approaches—administrative and statistical—to ensure robustness. The index identifies gaps and opportunities for improvement, benefiting stakeholders from shipping lines to governments. Lower rankings indicate better performance. The CPPI aims to guide improvements in port operations, ultimately enhancing global trade efficiency and economic growth.
- According to the 2023 update, Davao city maintains its rank at 279.
- The Index is resultant of the sum of a weighted average of indices for each of the five vessel sizes: feeders (<1,500 TEUs), intra-regional (1,500–5,000 TEUs), intermediate (5,000–8,500 TEUs), neo-Panamax (8,500–13,500 TEUs), and ultra-large container carriers (>13,500 TEU).
- Davao city ranks at 279 within the within the whole set of 370 global ports while Singapore ranks 31 out of 370 among the sample of 7 South East Asian cities.



Sources: IBRD, IDA, WB | ATO Indicators: MIS-UDB-006

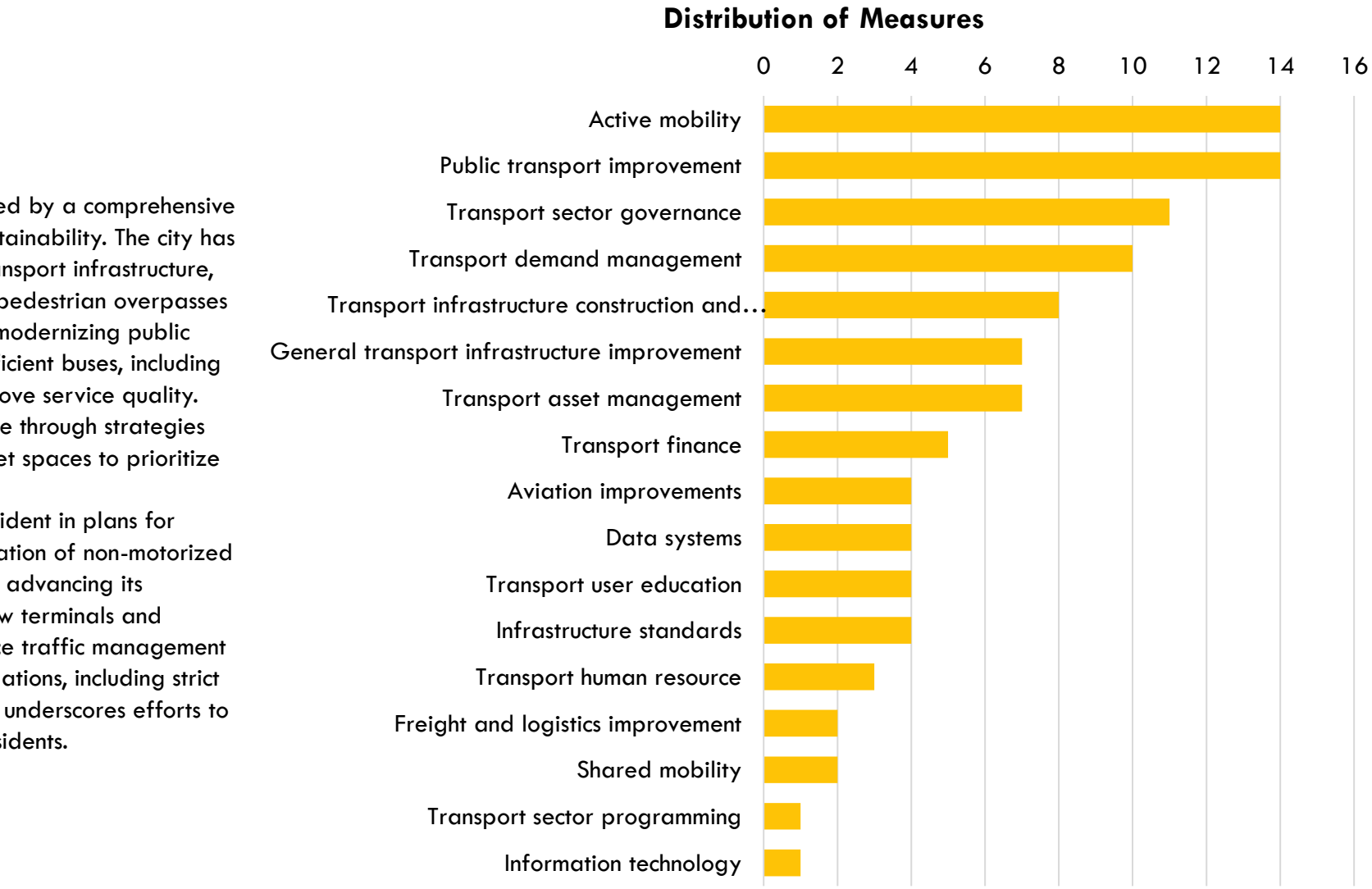
Davao city transport relevant policy documents

- The Asian Transport Outlook (ATO) project has established a comprehensive methodology for tracking and analyzing transport-related policy measures and targets across the Asia Pacific region. Central to this methodology is the development of detailed policy trackers. These trackers meticulously document transport-relevant policy measures and targets specific to each country. The documentation process involves a thorough review of various policy documents, including Nationally Determined Contributions (NDCs), Long-Term Strategies (LTSs), national transport policies, and a variety of secondary reports. This exhaustive collection ensures that the policy trackers encompass a holistic view of each country's transport policy landscape.
- Each recorded measure or target within the policy trackers is categorized based on multiple criteria. These include the mode of transport (e.g., road, rail, air, maritime), the category of the policy, the policy framework under which the measure or target falls, and the Avoid-Shift-Improve (ASI). Furthermore, the measures are analyzed across different sectors, ensuring a multi-dimensional perspective on transport policies and their impacts.
- The structured documentation in the policy trackers facilitates detailed analysis. By categorizing each policy measure and target comprehensively, the ATO project can conduct nuanced analyses that reveal patterns, gaps, and opportunities within and across countries in the Asia Pacific region. This analytical process is systematically recorded and presented in subsequent slides.

Document Name	Year Published	Document Type
Bicycle Ordinance	2010	Urban Transport Subsector Policy
Davao City Transport Roadmap	2018	Urban Transport Policy
Davao City Infrastructure Development Plan and Capacity Building Project	2018	Urban Development Policy
Davao Comprehensive Development Plan 2018-2022	2018	Urban Development Policy
Comprehensive Landuse Plan (CLUP) (2019-2028) – Volume 3: Sectoral Studies	2019	Urban Development Policy
Comprehensive Landuse Plan (CLUP) (2019-2028) – Volume 4: Climate and Disaster risk Assessment	2019	Urban Development Policy
Davao Public Transport Modernization Project	2023	Urban Transport Subsector Policy
Davao Regional Development Report	2024	Urban Development Policy

Davao city policies priorities active and public transport measures

- Davao City's policy landscape is characterized by a comprehensive approach to urban transport, safety, and sustainability. The city has prioritized pedestrian and non-motorized transport infrastructure, including the construction of climate-resilient pedestrian overpasses and dedicated bike lanes. Efforts extend to modernizing public transport with the procurement of energy-efficient buses, including electric models, to reduce emissions and improve service quality. Policies also aim to discourage private car use through strategies like congestion pricing and re-allocating street spaces to prioritize pedestrians and cyclists.
- Environmental sustainability is a key focus, evident in plans for climate-resilient road projects and the integration of non-motorized transport into urban planning. The city is also advancing its transport infrastructure with proposals for new terminals and logistical hubs, alongside initiatives to enhance traffic management and road safety. Enforcement of traffic regulations, including strict penalties for illegal parking and obstruction, underscores efforts to improve urban mobility and safety for all residents.



Policy measures exhibit diversity

Access restriction by corridor/ road	Active transport infrastructure expansion	Bus fleet renewal	Complete Streets design development	Congestion charging	Coordinate planning across government agencies	Cycling measures
Cycling/ Bike Lanes	Development of active transport plan/ policy	Development of other transport-related plan/ policy	Disability access planning/ Barrier free design	Employment in transport, communication, and storage	Express lanes / public transport priority	Freight Intermodality measures
General Aviation improvement	General capacity building	General data & modelling	General data repositories and data collection	General education and behavior change	General enforcement	General freight and logistics
General infrastructure improvements	General inland waterways improvement	General Institutional/ governance	General IPT/ paratransit measures	General Parking administration	General parking measures	General public transport
General reference to finance mechanisms in the urban area	General Training and workshops	General transport asset management	General transport finance	General transport infrastructure resilience	General urban freight consolidation centres	Integrated ticketing
Intelligent transport systems	Parking Pricing	Passenger Transit hub	Port infrastructure improvements	Public Private Partnership (PPP)	Public transit expansion	Public transport branding
Public transport information	Road geometry improvement	Road infrastructure expansion	Road space repurpose to allow access for other modes	Stakeholder involvement	Technical standards for general transport infrastructure	Technical standards for road infrastructure
	Traffic flow improvement	Traffic monitoring system	Traffic signaling	Vehicle speed	Walking measures	

Access restriction by corridor/ road

Policy formulation on big SUV's entering CBD

(Comprehensive Landuse Plan (CLUP) (2019-2028) – Volume 3: Sectoral Studies)

Bus fleet renewal

Procure about 1,100 more energy-efficient buses that will be leased out to bus operators, of which 380 will be articulated electric buses to service metro Davao routes, while small and regular-sized

(Davao Public Transport Modernization Project)

Freight Intermodality measures

Construction of Logistical Hub in strategic areas leading to

Davao City

(Comprehensive Landuse Plan (CLUP) (2019-2028) – Volume 3: Sectoral Studies)

Port infrastructure improvements

Preparation of Sasa Port Modernization Plan Consider PPP scheme for improving port facilities

(Davao Comprehensive Development Plan 2018-2022)

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