

Battle of the Neighborhoods – A Study of the Guangdong-Hong Kong-Macao Greater Bay Area

Coursera IBM Applied Data
Science Capstone Project



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Introduction

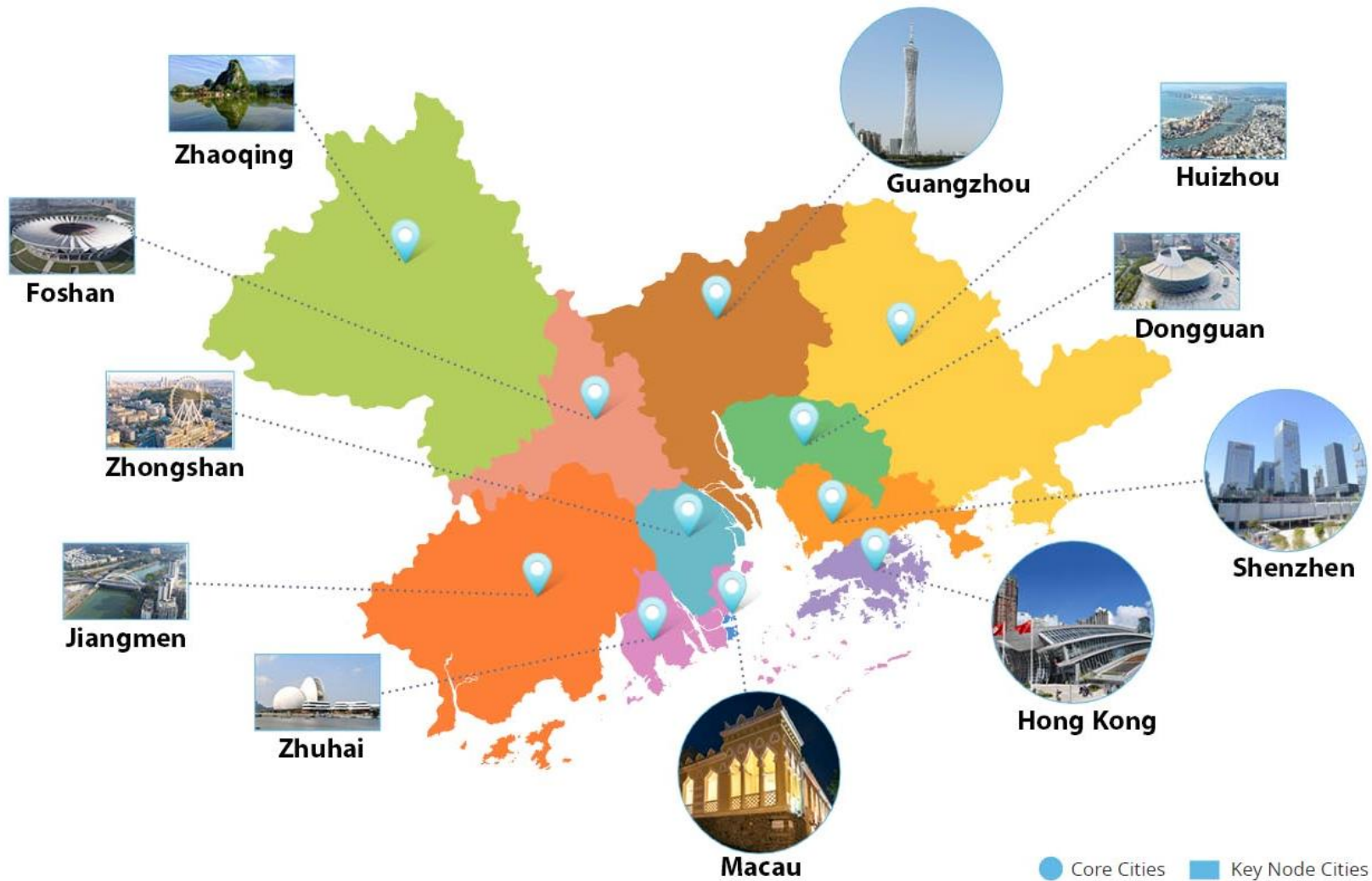
- The Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) was promulgated by the Chinese Government in 2019
- Strategic Development Plan for an international first-class bay area ideal for living, working and travelling
- The GBA comprises two Special Administrative Regions and nine cities in the Guangdong Province
- The study undertakes to study the characteristics of individual GBA cities to identify strategic clusters with a view to harnessing the potential synergy between the cities to take forward the GBA's development

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The 11 GBA Cities

- Total Population: over 71 million
- GDP: US\$ 1,642.5 billion
- GDP per capita: US\$ 23,342

The Cities





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Data

- Foursquare Location Data
 - Venue recommendation nearby the 11 GBA cities obtained through the “explore” endpoint
 - Limit: first 100 venues
 - Radius: 10 km
 - [Coordinates data](#)
- Demographic Data
 - [Thematic GBA website maintained by the Hong Kong Trade Development Council](#)
 - Land Area (km²)
 - Population (million)
 - GDP per capita (US\$)
 - GDP share of tertiary industry (%)
 - Export (US\$ billion)
 - Foreign Direct Investment (US\$ billion)

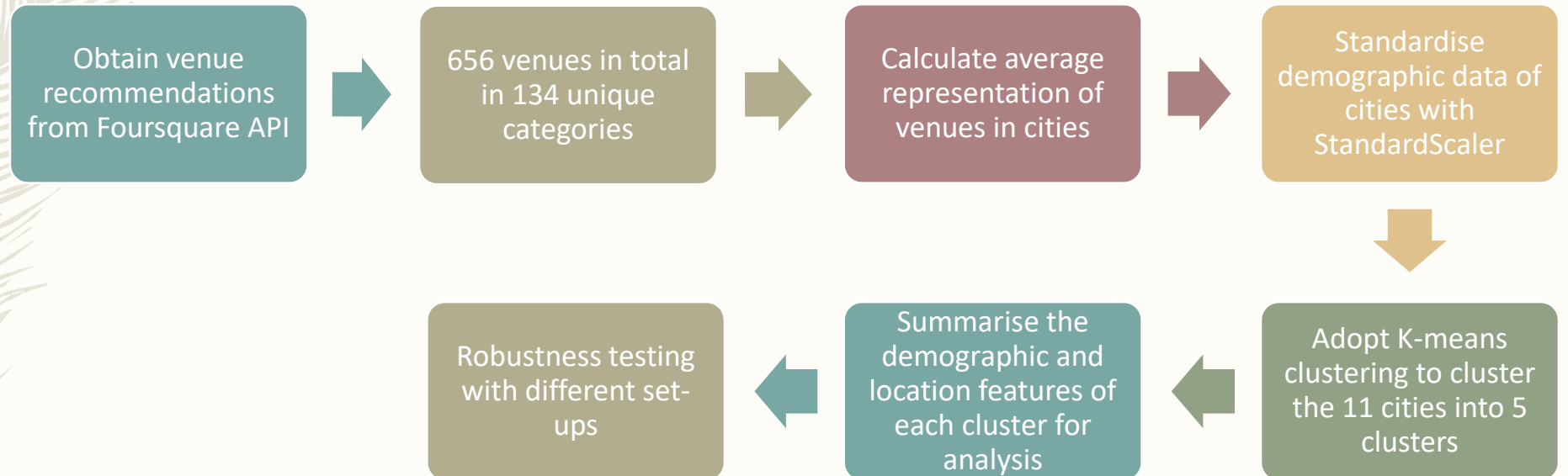
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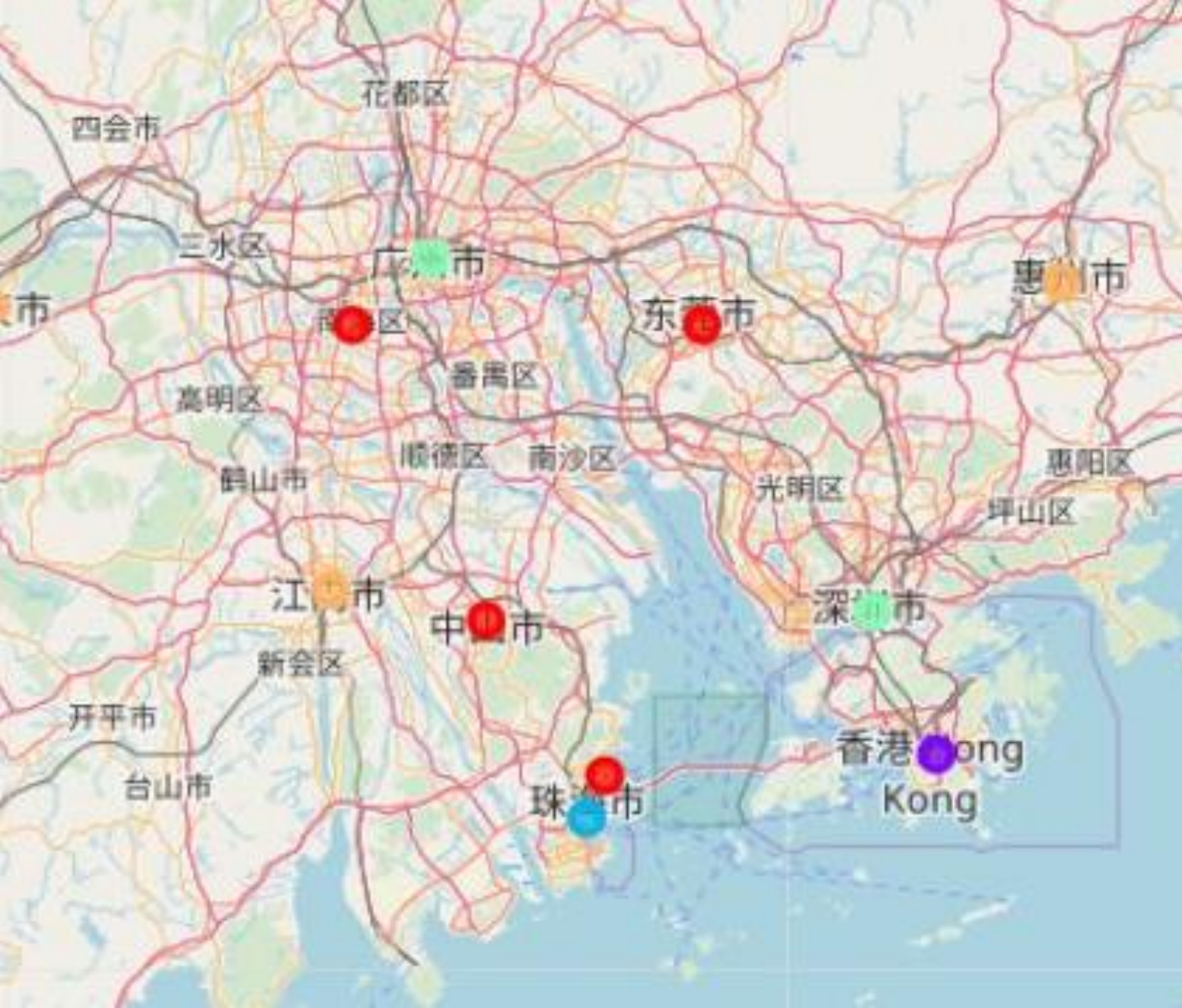
Demographic Data

City	Land Area (km ²) (Area)	Population (million)	GDP per capita (US\$) (GDP_pc)	GDP Share of tertiary industry (%) (Tertiary)	Export (US\$ billion)	Foreign Direct Investment (US\$ billion) (FDI)	Latitude	Longitude
Hong Kong	1,107	7.48	48,673	92.43	530.44	110.73	22.302711	114.177216
Macao	33	0.67	82,609	94.93	1.51	0.3753	22.198746	113.543877
Guangzhou	7,434	14.9	23,497	71.8	84.74	6.611	23.129110	113.264381
Shenzhen	1,997	13.03	28,647	58.8	245.94	8.203	22.543097	114.057861
Foshan	3,798	7.91	18,992	42.0	53.30	0.691	23.021479	113.121437
Dongguan	2,460	8.39	14,951	51.1	120.22	1.361	23.020674	113.751801
Huizhou	11,347	4.83	12,908	43.0	33.38	0.959	23.091181	114.400681
Zhongshan	1,784	3.31	16,711	49.3	27.23	0.527	22.527470	113.361526
Jiangmen	9,507	4.6	9,570	44.5	16.97	0.734	22.580391	113.080009
Zhuhai	1,736	1.89	24,100	49.1	28.52	2.391	22.270979	113.576675
Zhaoqing	14,891	4.15	8,050	38.6	3.59	0.143	23.047192	112.465091

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Methodology





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Results

- Map demonstrating the clusters in different colours

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Summary Table of Clustering Results

Cluster	City	Area	Population	GDP_pc	Tertiary	Export	FDI	Most Common Venues									
								1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
0	Foshan	3,798.00	7.91	18,992.00	42.00	53.30	0.69	Coffee Shop	Hotel	Fast Food Restaurant	Shopping Mall	Furniture / Home Store	Pizza Place	Restaurant	Italian Restaurant	Dim Sum Restaurant	Diner
0	Dongguan	2,460.00	8.39	14,951.00	51.10	120.22	1.36	Coffee Shop	Fast Food Restaurant	Italian Restaurant	Pizza Place	Hotel	Resort	Bar	Shopping Mall	Thai Restaurant	Sandwich Place
0	Zhongshan	1,784.00	3.31	16,711.00	49.30	27.23	0.53	Coffee Shop	Fast Food Restaurant	Hotel	Cantonese Restaurant	Shopping Mall	Spa	Park	Motel	Golf Course	Asian Restaurant
0	Zhuhai	1,736.00	1.89	24,100.00	49.10	28.52	2.39	Coffee Shop	Hotel	Chinese Restaurant	Café	Italian Restaurant	Portuguese Restaurant	Fast Food Restaurant	Church	Plaza	Steakhouse
1	Hong Kong	1,107.00	7.48	48,673.00	92.43	530.44	110.73	Hotel	Café	Dumpling Restaurant	Park	Clothing Store	Coffee Shop	Japanese Restaurant	Chinese Restaurant	Shopping Mall	Electronics Store
2	Macao	33.00	0.67	82,609.00	94.93	1.51	0.38	Hotel	Café	Portuguese Restaurant	Chinese Restaurant	Coffee Shop	Resort	Italian Restaurant	Historic Site	Church	Plaza
3	Guangzhou	7,434.00	14.90	23,497.00	71.80	84.74	6.61	Hotel	Park	Coffee Shop	Shopping Mall	Turkish Restaurant	Middle Eastern Restaurant	Chinese Restaurant	Cantonese Restaurant	Restaurant	Cocktail Bar
3	Shenzhen	1,997.00	13.03	28,647.00	58.80	245.94	8.20	Hotel	Coffee Shop	Shopping Mall	Park	Japanese Restaurant	Lounge	Chinese Restaurant	Café	Electronics Store	Spa
4	Huizhou	11,347.00	4.83	12,908.00	43.00	33.38	0.96	Hotel	Shopping Mall	Coffee Shop	Fast Food Restaurant	Japanese Restaurant	Lake	Fish & Chips Shop	French Restaurant	Furniture / Home Store	Electronics Store
4	Jiangmen	9,507.00	4.60	9,570.00	44.50	16.97	0.73	Hotel	Bus Station	Fast Food Restaurant	Coffee Shop	Train Station	Shopping Mall	General Entertainment	Gym / Fitness Center	Grocery Store	Golf Course
4	Zhaoqing	14,891.00	4.15	8,050.00	38.60	3.59	0.14	Hotel	Playground	Park	Big Box Store	Zoo	Gym / Fitness Center	Grocery Store	Golf Course	Gift Shop	German Restaurant

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Cluster 0 – Moderately developed cities for residents



Dongguan



Foshan



Zhongshan



Zhuhai

- Moderate GDP per capita level
- Relatively low contribution from tertiary industry
- Relatively low FDI
- Similar distribution of venues: coffee shops, restaurants, parks, hotels

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Cluster 1 – International Centre of Commerce and Trade



Hong Kong

- One of the two Special Administrative Regions with unique systematic advantages
- Highly service-oriented economy
- High GDP per capita
- Highest export and FDI levels
- More shopping-oriented venues: various stores, shopping malls, etc.

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Cluster 2 – International Centre of Tourism



Macao

- One of the two Special Administrative Regions with unique systematic advantages
- Highly service-oriented economy
- Highest GDP per capita
- Smallest Population and land area
- More cultural and tourism-oriented venues: churches, plaza, hotels, etc.

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Cluster 3 – Developed, Young, Innovative Manufacturing Cities



Guangzhou



Shenzhen

- Largest population
- Relatively high level of FDI
- Moderate contribution of tertiary industry to GDP
- Still partly manufacturing-based
- Relatively high GDP per capita
- Niche and unique establishments: Turkish restaurants, cocktail bars

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Cluster 4 – Less Developed Agricultural Region



Huizhou

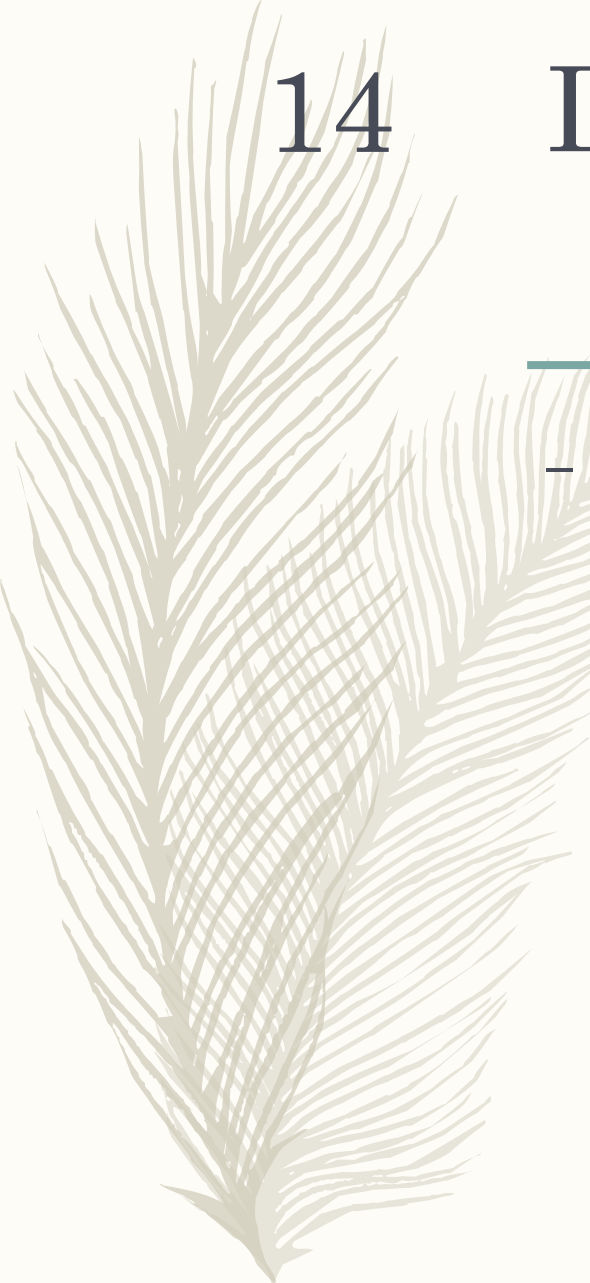


Jiangmen



Zhaoqing

- Largest land area
- Lowest GDP per capita
- Minimal tertiary industry contribution
- Moderate population level
- Least number of venues recommended with more nature and transport-oriented spots: parks, lakes, train stations

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- Without data standardisation
 - Significantly different results
 - Only Hong Kong cluster remains unchanged
 - Demographic data dominate the results
 - Cities clustered by land area and population in principle
 - Sheds light on importance of standardising data
 - With only venue data
 - Drastically different results
 - Only Guangzhou-Shenzhen cluster remains unchanged
 - Jiangmen given only cluster given its transport-dominated venues
 - Demonstrate importance of using a balanced database for analysis

- Limited dataset size with only 11 cities
- Foursquare data may not be readily available for less developed cities in the Mainland
 - Less complete documentation of venue types other than those more commonly accessed by tourists
 - Unable to reflect true difference in venue types in cities
 - Part of variation may be due to arbitrary selection of coordinates to represent the cities

- Segregated the 11 GBA cities into 5 clusters based on their unique positioning and characteristics
 - Moderately developed inland cities with focus on domestic residents
 - International centre of commerce and trade
 - International centre of tourism
 - Developed, young, innovative manufacturing cities
 - Least developed cities with agricultural focus
- Certain limitations to be aware of when interpreting the results
- Useful exploratory study to shed light on areas for further study and strategic directions to take forward the GBA development



The End

Thank you