Urban Design Research Briefing Note

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**Executive summary**

1. In Asia and China, at sub city level and neighbourhood level, there is a lack of research* on the relationship between climate change preparedness, liveability, wellbeing, sustainable transport, and Built Environment (BE) dimensions such as high, and very high density, in particular around TOD service areas.

2. Recent meta-review of worldwide research* in placemaking-urban design shows a disproportionate level of US and EU studies and a lack of knowledge in Asia and China – APAC.

3. Recent meta-reviews of worldwide research* shows that there are knowledge deficiencies about TOD communities design and TOD service areas design in general and in Asia in particular - APAC.

4. New towns (NT), new districts (ND), new extensions (NE) in China are now maturing. There is a lack of understanding of their performance. In the light of the national policy agenda moving from quantity to quality, NT, ND, NE performance should be better understood.

5. Recent meta-review of worldwide research* on the benefits of urban density shows a disproportionate level of US and EU studies and a lack of knowledge in Asia and China – APAC.

*in English

**Recommendations**

1. To create research prize strands distinguishing research from practice and from academia
2. HKIUD research prize(s) should incentivise APAC urban design research
3. Research prize should be thematically branded for example:
   a. Liveable TOD communities
   b. Liveable new town
   c. Liveable high density
MEGA THREAT: CLIMATE CHANGE

Average temperatures are projected to increase in many parts of Asia.

Increase in average annual temperature,¹
°C shift compared with preindustrial climate (based on RCP 8.5)

Today → 2030 → 2050

Note: See Technical appendix, Climate risk and response: Physical hazards and socioeconomic impacts, McKinsey Global Institute, January 2020, for why we chose RCP 8.5. Projections based on RCP 8.5 CMIP 5 multi-model ensemble. Heat data bias corrected. Following standard practice, we typically define current and future (2030, 2050) states as average climatic behavior over multidecade periods. Climate state today is defined as average conditions between 1988 and 2017, in 2030 as average between 2021 and 2040, and in 2050 as average between 2041 and 2060.

¹Taken from KNMI Climate Explorer, 2019, using mean of full CMIP5 ensemble of models. Preindustrial levels defined as period between 1880–1910.
Source: KNMI Climate Explorer, 2019; World Bank Climate Research Center; McKinsey/United Nations (disputed boundaries); McKinsey Global Institute analysis

Sources:
https://www.carbonbrief.org/explainer-the-high-emissions-rcp8-5-global-warming-scenario
MEGA TREND: ASIA & SOUTH ASIA - POPULATION & URBANISATION, 1980-2016 /2020-50

Population increase 1981-2016

Urbanisation rate in 2016

Urbanisation rate increase 1981-2016


Urbanisation 2020

Urbanisation 2050
MEGA TREND: AGING POPULATION 2020-50
Source: https://ourworldindata.org/grapher/median-age

Median age 2020

Median Age, 2020
The median age divides the population in two parts of equal size: that is, there are as many persons with ages above the median age as there are with ages below the median ages.

Median age 2050

Median Age, 2050
The median age divides the population in two parts of equal size: that is, there are as many persons with ages above the median age as there are with ages below the median ages.
TREND – TOD - 2020

Source: adapted from Wikipedia https://en.wikipedia.org/wiki/List_of_metro_systems#A
CHINA: URBAN RAIL 2000-20

TOD Transit Oriented Development
TAD Transit Adjacent Development
TED Transit Environment Development
TID Transit Inducing Development
DIT Development Inducing Transit

National Policy move:
- From quantity to urban quality
- To experiential and knowledge economy
- To smoothing socio-economic and spatial inequity

TREND: NEW TOWN 1960-2017

NT 1960-69 (> 1)

NT 1970-79 (>1)

NT 1980-89 (>1)

NT 1990-99 (>1)

NT 2000-09 (>1)

NT 2010-17 (>1)
TREND: HIGH DENSITY & HIGH LIVEABILITY?

Based on the Mercer’s Liveability index
“There is no precedent of high density and high liveability cities”
Hong Kong 2030+ p.23, 2016
Singapore, Centre for liveable cities

Sources: Mercer’s Liveability Index 2019 – 231 urban areas
Demographia 2019 World urban areas 15th edition – 211 urban areas matched
UN World Happiness report 2020 - 106 urban areas matched

Association liveability ranking (Mercer) vs city population size

- Urban areas (> 10,000,000) that have very large population, do not have high liveability, exception Boston?
- Smaller city (<5,000,000) can have any rank of liveability.

Association liveability ranking (Mercer) vs density (211)

- Downward association, lower density associated with high level liveability
- Are high density city doomed? Exception Singapore.
- Density “explains” between 22% and 38% of the liveability variance
Association liveability ranking (Mercer) vs density: USA & Canada (22), Western Europe (34)

US, Europe, Asia are different in relation to liveability and density

- Upward association between density and liveability, the higher the density the higher the liveability rank – the density upper range is about 3,000/km²
- Density “explains” 50% of the liveability variance

- Downward association between density and liveability, the higher the density the lower the liveability rank – the density lower range is about 3,000/km²
- Density “explains” 15% of the liveability variance

Association liveability ranking (Mercer) vs density: Asia

Mercer’s Liveability rank

- Upward association between density and liveability, the higher the density the higher the liveability rank – the density upper range is about 3,000/km²
- Density “explains” 50% of the liveability variance

Mercer’s Liveability rank

- Downward association between density and liveability, the higher the density the lower the liveability rank – the density lower range is about 3,000/km²
- Density “explains” 15% of the liveability variance

Association liveability ranking (Mercer) vs density: Asia
Mercer’s Liveability rank

Liveability ranking (Mercer) and GDP/Capita

- Liveability increases with the City’s GDP/capita, yet **highest liveability cities do not have highest GDP per capita**
Liveability ranking (Mercer) vs UN World Happiness report ranking 2020

\[
y = -0.0006x^2 + 0.8001x + 4.1423 \\
R^2 = 0.6621
\]

WHR 2020 Well Being ranking vs Density

\[
y = -0.1947x^2 + 77.276x + 1570.7 \\
R^2 = 0.2587
\]
TRENDS: URBAN DESIGN RESEARCH


Urban design research articles (274) by theme
Urban design research articles (274) by theme and by country

A disproportionate number of research are from the US and the UK (76%)
TRENDS: TOD RESEARCH

TOD worldwide, 71 articles, themes, and study location

A disproportionate representation of the US & EU (82%)

TOD articles (630) by theme
Lack of research on TOD community, TOD Urban Design

![Bar chart showing the percentage of TOD articles focusing on various aspects of community development and urban design.](image)
TRENDS: DENSITY RESEARCH

What is the scientific evidence that density contributes to sustainable urban development and how do the results vary across various outcome categories?

Distribution of the studied outcome categories discussed in scientific papers

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount of articles</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical infrastructure</td>
<td>9</td>
<td>5%</td>
</tr>
<tr>
<td>Resource efficiency</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Service</td>
<td>5</td>
<td>3%</td>
</tr>
<tr>
<td>Economics</td>
<td>23</td>
<td>14%</td>
</tr>
<tr>
<td>Climate &amp; ecology</td>
<td>16</td>
<td>9%</td>
</tr>
<tr>
<td>Urban environment</td>
<td>7</td>
<td>4%</td>
</tr>
<tr>
<td>Transport</td>
<td>70</td>
<td>41%</td>
</tr>
<tr>
<td>Social</td>
<td>20</td>
<td>12%</td>
</tr>
<tr>
<td>Human health</td>
<td>19</td>
<td>11%</td>
</tr>
</tbody>
</table>

Study location
40% North America
29% Asia
23% Europe
8% Others

Positive
54% US 41% Europe 37% Asia

Transport
US 51% Asia 41% Europe 25%

Economics
US 13% Asia 8% Europe 25%

Health
US 10% Asia 7% Europe 13%

Ecology
US 10% Asia 10% Europe 8%

Social
US 10% Asia 7% Europe 16%

Distribution of the studied effects of density
From left to right: outcomes related to transport, economics, and social effects.

Top-20 of studied outcomes
Amount of positive effects on sustainable urban development are in green and negative ones in yellow.