Smart Cities –
A Move Towards Sustainability

SMU
Presentation

FROST & SULLIVAN

Workshop : From Macro to Micro: Mega Trend Impact Analysis on Your Industry, Your Products and Services

Macro | **Micro**

Mega Trend
Selected Trends That Impact Your Business And Markets

Example: Urbanization, Satellites

Sub Trend
A Sub Layer of Trends that Has Wide Ranging Impact

Example: Three concepts of urbanization will emerge: megacities, mega regions and mega corridors. Smart Cities. Civilian satellites means high speed broadband, wireless and 4G and free wi-fi in public places/cities

Impact to Your Industry
Visualizing The Roadmap Of These Critical Forces Through Scenario Building and Macro Economic Forecasts

Example: People in future will need "personal mobility" not necessarily cars to commute to work. This will lead to need for integrated mobility combining all forms of transport including cars

Impact on Future Product/ Technology

Example: New Product Opportunity - New Mega City Cars, Car sharing, New Technology Opportunities – Connected car , e.g. Internet Radio

Analysis of Opportunities and Unmet Needs

Example: Mega City electric cars with small turning radius, autonomous parking in busy cities, Facebook on wheels, seamless switching from home to car

Three Main Trends in Urbanization

Development of Mega Cities, Mega Regions and Mega Corridors

Evolution of Megacities: Three Main Urbanization Trend (Global), 1950 - 2025

MEGACITY

City With A Minimum Population Of 10 Million

EXAMPLE: Istanbul

MEGA REGIONS

Megacities combining with adjacent cities to form mega regions. (Population over 15 Million)

EXAMPLE: "Jo-Toria" (Johanessburg/Pretoria and Gautang region)

MEGA CORRIDORS

Transport corridors connecting two or more major cities or mega regions

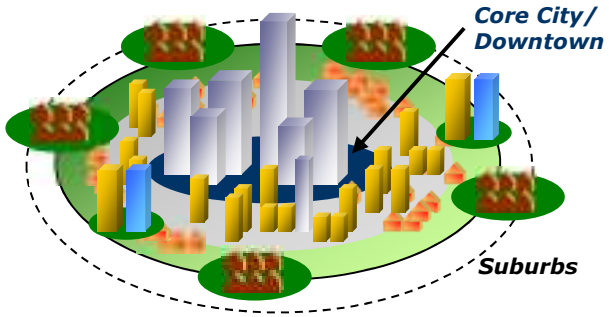
EXAMPLE: Hong Kong-Shenzhen-Guangzhou in China (Population 120 Million)

Source: Frost & Sullivan

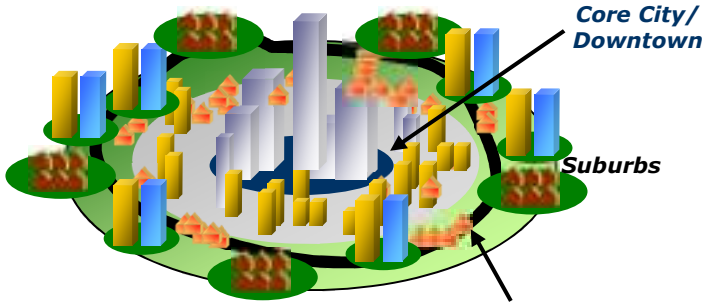
Megacity - Structure and Key Trends

Urbanization leading to rapid expansion of city borders into neighboring suburbs resulting in the formation of Megacities.

1950s Urbanisation

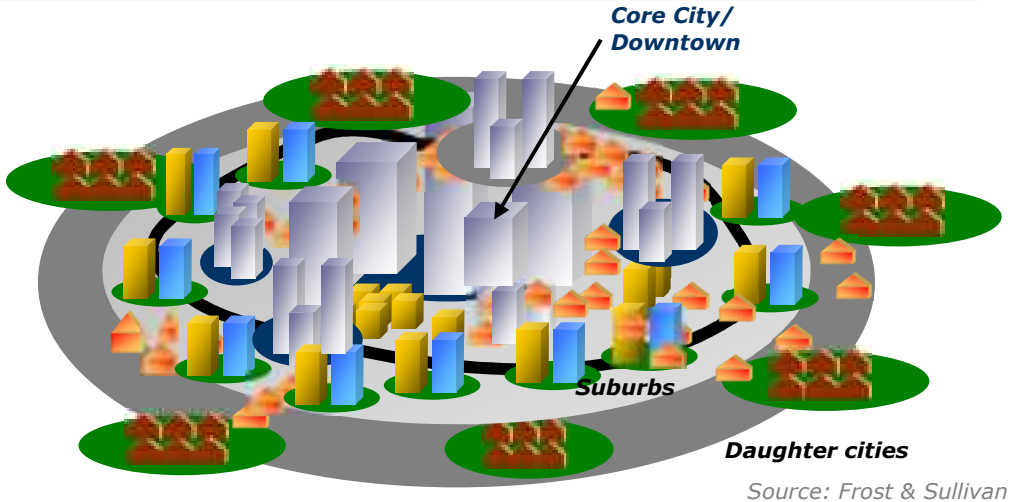


2000 Suburb-anisation



Ring roads and underground rails connecting all towns with the core city

2020s: Megacity



Source: Frost & Sullivan

Megacity Trends

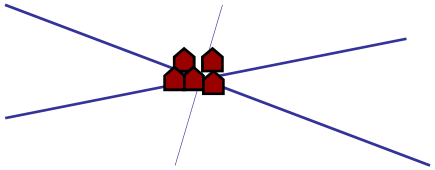
- City borders will expand out of suburbs to include daughter cities
- The Core City will enclose multiple downtowns.
- Multiple and integrated Transportation Models will be used and more than 50% will use public transportation

Multi Utilization Concept | **Residential** | **Commercial Buildings** | **Houses** | **Downtown** | **Condominiums**

By 2020, We Will See Development of Mega City Corridors and Networked, Integrated and Branded Cities

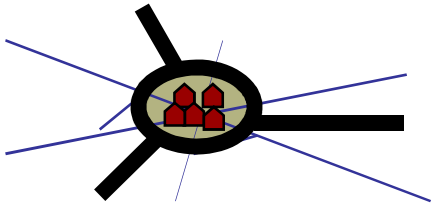
Evolution of Megacities: Urbanization Trend (Global), 1950 - 2025

1950s Urbanisation



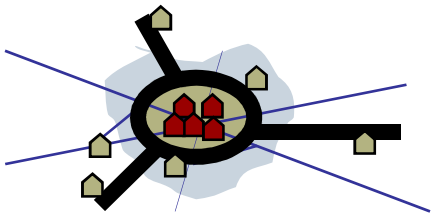
Creation of the historic centre and districts

2000s Suburb-anisation



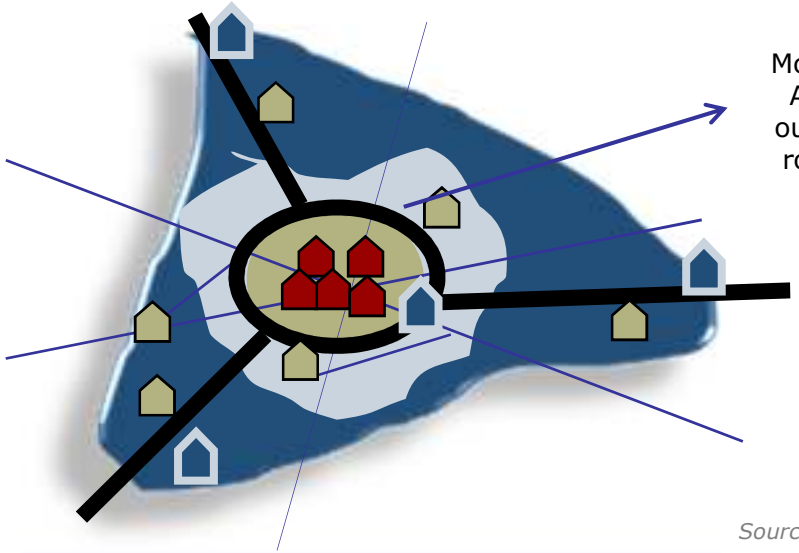
Urban sprawl, first highways and ring road

2015s Network City



Third suburban area and cities along the highways created, ring road overblown by the urban sprawl

2020s : Branded Cities



Ring Road Motorway, Living Areas growing outside the ring road as seen in London

Source: Frost & Sullivan

- Most offices moved to the first belt suburbs except non cost-sensitive activities: city centres becoming shopping areas (small scale deliveries) for expensive goods and living areas for "double income, no kids" households.
  - cars needed to go to the working areas/malls outside first and second belt.
- Industry offices moved out to the first belt area as also medium income families while manufacturing facilities and low-medium income families relocated in the second and third belt areas with logistics centres created on 2nd belt periphery.
- 'Green wave' families living outside cities in outer suburban area. Hypermarkets and malls mostly created inside the third belt low cost area (large scales deliveries).
  - cars needed to go from outer suburban areas to join the inter-modal public transport and working areas in third and second belt.

Over 40 Global Cities to be SMART Cities in 2020 - More than 50% of smart cities of 2025 will be from Europe and North America.

China and India to see over 50 New"Sustainable" Cities

Evolution of Megacities: Key Smart Cities (Global), 2009 - 2025

Source: Frost & Sullivan

Top 20 Megacities - Ranking

Tokyo, NY, LA and London will continue to maintain the top 4 megacitie position in 2025.

Evolution of Megacities: Top 20 Megacities - Ranking (Global), 2009 - 2025

2025 Ranking	2009 Ranking	Rank Trend	Megacities	Population CAGR	GDP (PPP) CAGR
1	1	↔	Tokyo	0.88%	1.20%
2	2	↔	New York	1.03%	1.30%
3	3	↔	Los Angeles	0.38%	1.53%
4	4	↔	London	0.13%	2.21%
5	6	↑	Chicago	0.52%	2.85%
6	8	↑	Mexico City	0.31%	3.59%
7	5	↓	Paris	0.07%	1.28%
8	17	↑	Shanghai	0.58%	6.62%
9	9	↔	São Paulo	0.47%	2.60%
10	11	↑	Buenos Aires	0.40%	3.02%
11	19	↑	Mumbai	1.33%	5.98%
12	7	↓	Osaka-Kobe	0.88%	1.45%
13	10	↓	Philadelphia	0.59%	1.63%
14	24	↑ NEW	Beijing	0.80%	6.70%
15	12	↓	Hong Kong	1.30%	2.76%
16	23	↑ NEW	Delhi	1.90%	6.40%
17	13	↓	Moscow	0.26%	2.04%
18	26	↑ NEW	Guangzhou	1.56%	6.69%
19	14	↓	Seoul	-0.48%	4.54%
20	15	↓	Miami	0.60%	1.72%
21	20	OUT	Rio de Janeiro	0.65%	3.81%
22	16	OUT	Toronto	0.64%	1.96%
27	18	OUT	Madrid	0.26%	1.96%

Legend

↔ Stable ↑ Upward Movement ↓ Downward Movement

↑ NEW — New Entrant in the top 20 ranking in 2025 and moved up in ranking compared to 2009

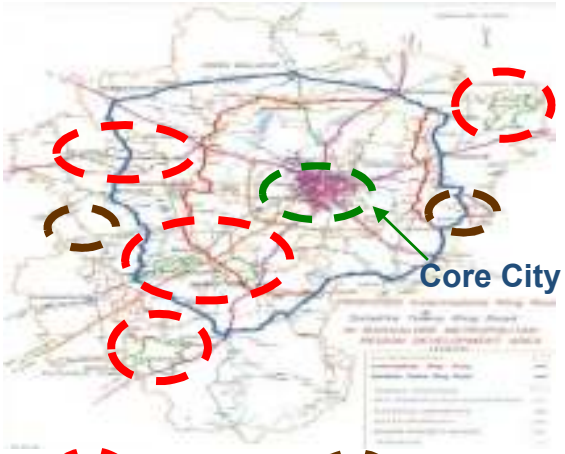
OUT — Out of the top 20 ranking in 2025 and moved down in ranking compared to 2009

CAGR: 2009 to 2025

Source: Frost & Sullivan

India Will See Development of 7 Mega Cities Which Will Have World Class Infrastructure and Development of Sub Satellite Towns (e.g. Chennai)

2000 – Satellite Towns Developing



Satellite Towns

Commercial hubs

2015 – World Class Infrastructure (Equals Tier 2 city)

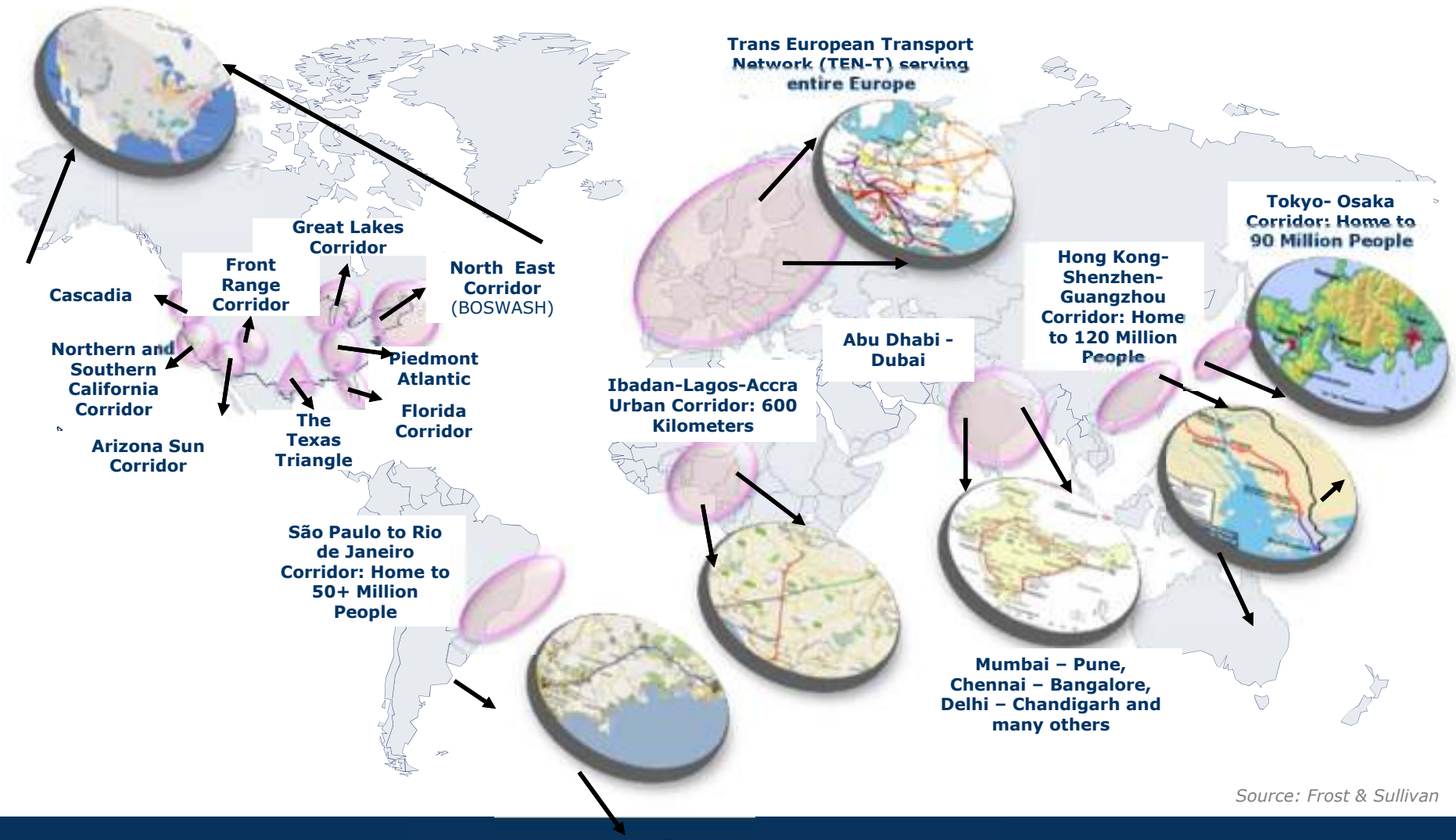
Outsourcing companies (non IT), like research healthcare, auto manufacturing will increase number of satellite towns

2020 + Interconnectivity with Sub Satellite Towns

Development of outer ring roads around Satellite and Sub Satellite towns connected to Motorways

Mega Corridors in 2050

Global Snapshot of Future Mega Corridors Connecting Two Or More Large Cities or Mega Regions and Characterised by High Levels of Industrialisation/Urbanisation



Source: Frost & Sullivan

Smart Urban Planning : "Green being replaced with Smart"

Snapshot of a SMART Megacity Plan in 2020

SMART Buildings: Atleast 50% of **buildings** will be **Green and Intelligent** built with **BIPV**. 20% of the buildings will be Net Zero Buildings.

SMART Infrastructure: Multimodal Transport Hubs Providing Excellent Air, Rail, Road Connectivity to Other Mega Cities.

SMART Technology: Intelligent Communication Systems Connecting Home, Office, iPhone and Car on a **Single Wireless IT Platform.**

SMART Energy: 20% of Energy Produced in the City will be **Renewable** (Wind, Solar etc)

SMART GRID: Infrastructure to Enable Real time monitoring of power flow and **Provide Energy Surplus** Back to the Grid

SMART Governance Ability of the government to implement smart planning. Eg. China

SMART Mobility: In Mega cities 10% of new Cars can be Electric Vehicles. Access to fast charging

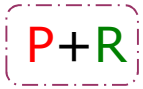
Source: Google Images

Case Study – Amsterdam Smart City: A Creative Economy Working Towards Deploying Smarter Technologies To Achieve A 40% Reduction Of CO_2 Emissions From 1990 Levels

SMART MOBILITY

- 39% commute by bicycle
- 400+ Km of dedicated cycle route
- To familiarise electric bicycle taxis

- 200 charging stations by 2012;
- 10,000 EVs By 2015
- Encourage car sharing

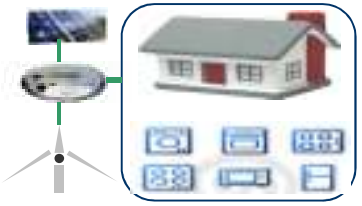


- Cheaper parking slots at public transit stations to park cars and board trains

- Yearly reduction of parking spaces and increase of tariffs inside the city.
- 30 kmph speed limits on 80% of roads inside the city - makes bicycles faster by atleast 50% on a A-B trip.

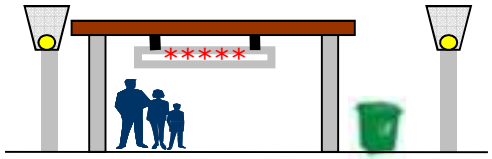
- 154 shore power connections to charge inland cargo vessels and river crusiers to be installed by 2012

SMART LIVING



- 1200 homes to feature smart meters and energy management systems.
- 14% reduction in energy use is expected of this smart meter project

SMART PUBLIC SPACE



- Utrechtsestraat – the popular narrow shopping street downtown is to feature energy efficient street lighting,
- Sustainable tram stops with solar powered displays and billboards
- Solar powered garbage bins with built in compacters will be installed on this street

SMART WORKING PLACE

- ITO tower is testing the use of smart meters and energy efficient appliances to cut energy consumption.
- Design aesthetics of building absorb natural light and air from the environment thereby keep artificial lighting and HVAC use to minimum.

SMART COMMUTE to WORK

- 25 MNCs have jointly signed to reduce home to work car miles by 10% by 2012.
- Incentive/free bicycles to employees
- Free & protected bike parks at offices to encourage cycle use.
- Work from home if necessary

Q&A