Internet of Things in Smart Cities

By: R. Srinivasan

L&T Construction
Smart World & Communication

1. Introduction to L&T & SW&C
2. Internet of Things and its Potential
3. IoT's role in Smart Cities
4. Benefits of IoT
5. L&T SW&C – Smart Projects

1 Introduction to L&T & SW&C

2 Internet of Things and its Potential

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4 Benefits of IoT

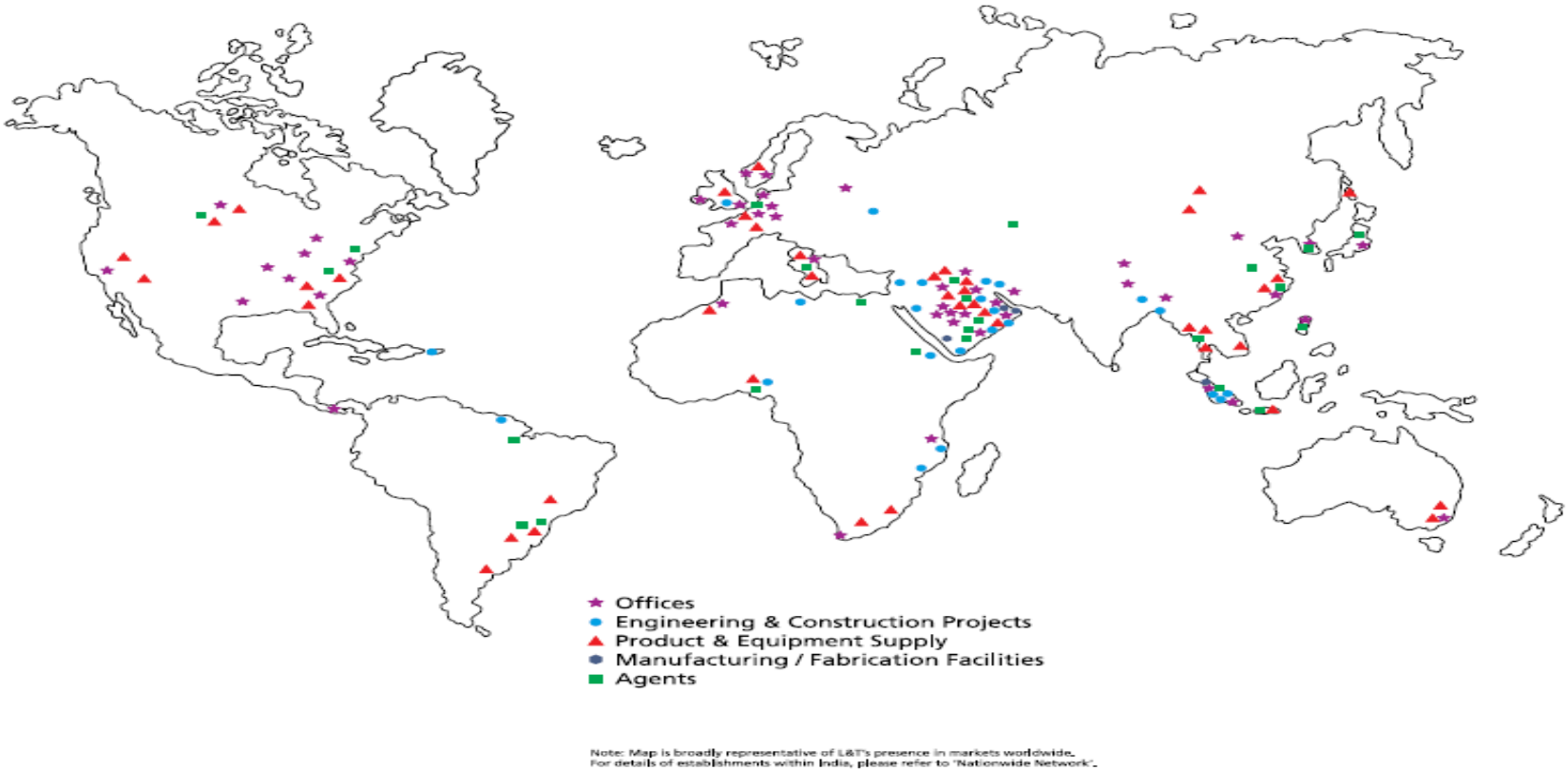
5 L&T SW&C – Smart Projects

About: *Larsen & Toubro*

One of the largest and most respected Indian Multinational Company

- **Headquartered in Mumbai, India**
- **Revenue FY 15-16: US $ 16.5 Billion**
- **Global Presence : India, US, UK, Canada, Russia, Japan, Europe, Malaysia, China & Middle-East**
- **Factories : 30 nos. at 23 Locations in India, 7 nos. at 5 Location outside India incl. 1 in Malaysia**

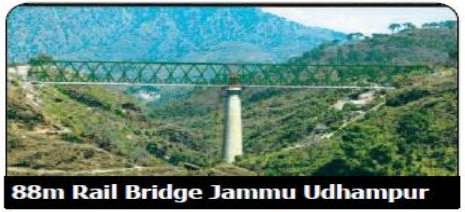
About: *Larsen & Toubro – Global Presence*



L&T : *Builders to Nation*


Maruti Manesar (Haryana) Expansion


1320 MT FCC Regenerator – for RIL

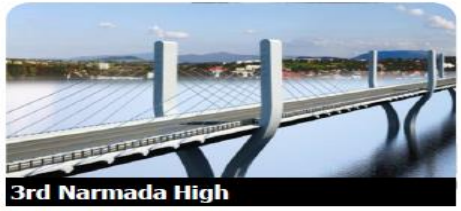

88m Rail Bridge Jammu Udhampur


Wankhede Stadium, Mumbai


Baha'i Temple, Delhi


Mumbai International Airport

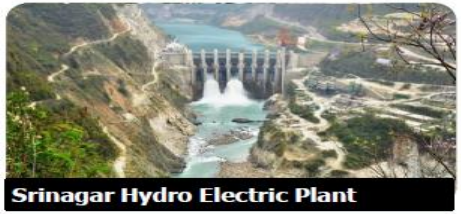

Oil & Gas Offshore Platforms


3rd Narmada High


Kakrapar Nuclear Power Plant, Guj


ITC Grand Chola Hotel, Chennai


Sri Sathya sai Whitefield Hospital


Srinagar Hydro Electric Plant


300 mtr Minerva Tower, Mumbai


2x384 MW CCPP, Vemagiri, A.P.


Transmission Lines in Himachal


Water Treatment Plant, Barmer

L&T : *International Footprint*


Stadium at Barbados


Salalah Airport, Oman


Twin Towers, Dubai Marina

NMC Speciality hospital, Abu Dhabi


Bhukara Hotel, Uzbeckistan

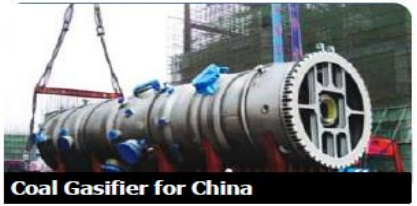

World's Longest Conveyer, Bangladesh


Bulk Cement Terminal, Colombo


Fabrication Facility, Oman


Punatsangchhu HEP, Bhutan


Sheikh Khalifa Interchange, UAE


Coal Gasifier for China


Transmission Lines, Fujirah, Dhaid


Water Treatment Plant, Doha


Petronas Refinery, Malaysia


Bi-metallic Urea Stripper for Saudi

MV Switchgear Factory, Malaysia

L&T : *In Malaysia*

SAMALAJU 275/33 kV GIS SUBSTATION

PETRONAS REFINERY

LAMBIR 275/33 kV AIS SUBSTATION

500 KV D/C TL YONG PENG

MV SWITCHGEAR FACTORY

++ Many More

L&T : *Segment Composition*

Infrastructure
Buildings & Factories
Transportation Infra
Heavy Civil Infra
Water & Effluent Treatment
Power T&D
Smart World & Communication

Power
EPC - Coal & Gas
Thermal Power Plant Construction
Electrostatic Precipitators

Heavy Engineering
Process Plant Equipment
Nuclear Power Plant Equipment
Defence & Aerospace
Piping Centre

Electrical & Automation
Electrical Standard Products
Electrical Systems & Equipment
Metering & Protection
Control & Automation

Hydrocarbon
Onshore
Offshore

Developmental Projects
Roads*
Metros
Ports
Power

IT & TS
Information Technology
Technology Services

Financial Services
Retail & Corporate
Infrastructure
Mutual Fund Asset Management

Others
Shipbuilding
Realty
Metallurgical & Material Handling
Construction & Mining Equipment
Machinery & Industrial Products

Smart World & Communication : ***Business Portfolio***

SMART INFRASTRUCTURE

- Smart Cities
- Integrated Command & Control
- Smart Communication
- Smart Mobility
- Smart Energy
- Smart Lighting
- Citizen Apps

SECURITY SOLUTIONS

- City Surveillance
- Traffic Management System
- Security of Critical Infra
- Coastal Security
- Homeland Security

COMMUNICTION NETWORK & TELECOM

- Fiber Optic Backbone
- Microwave and Satellite Communication
- Network Infrastructure (incl. Bharatnet & NOFN)
- Early Warning Dissemination Sys.
- Emergency Response Sys.
- Metro Communication

1 L&T & SW&C Overview

2 **Internet of Things and its Potential**

3 IoT's role in Smart Cities

4 Benefits of IoT

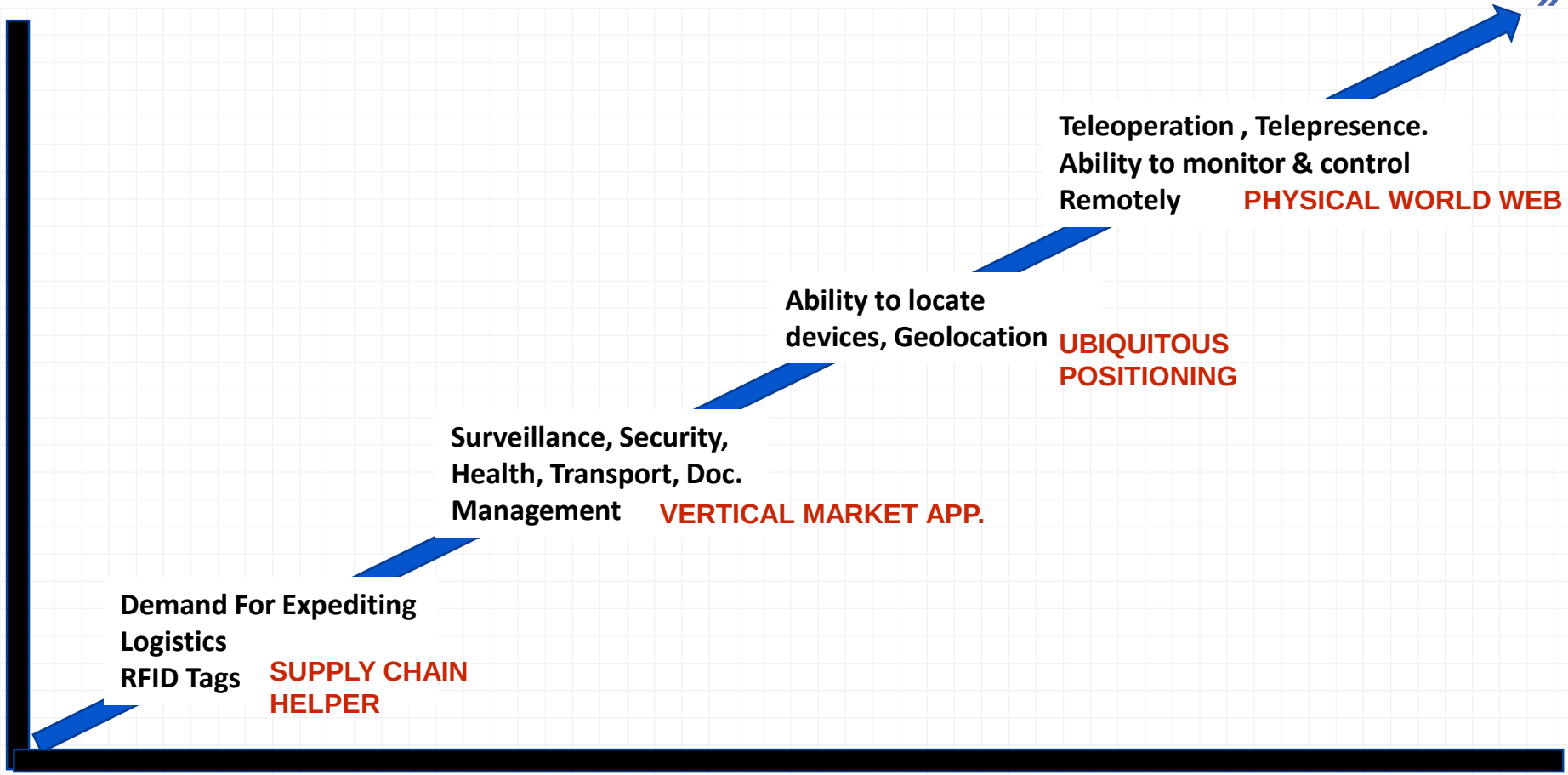
5 L&T SW&C – Smart Projects

IoT: ***Definition***

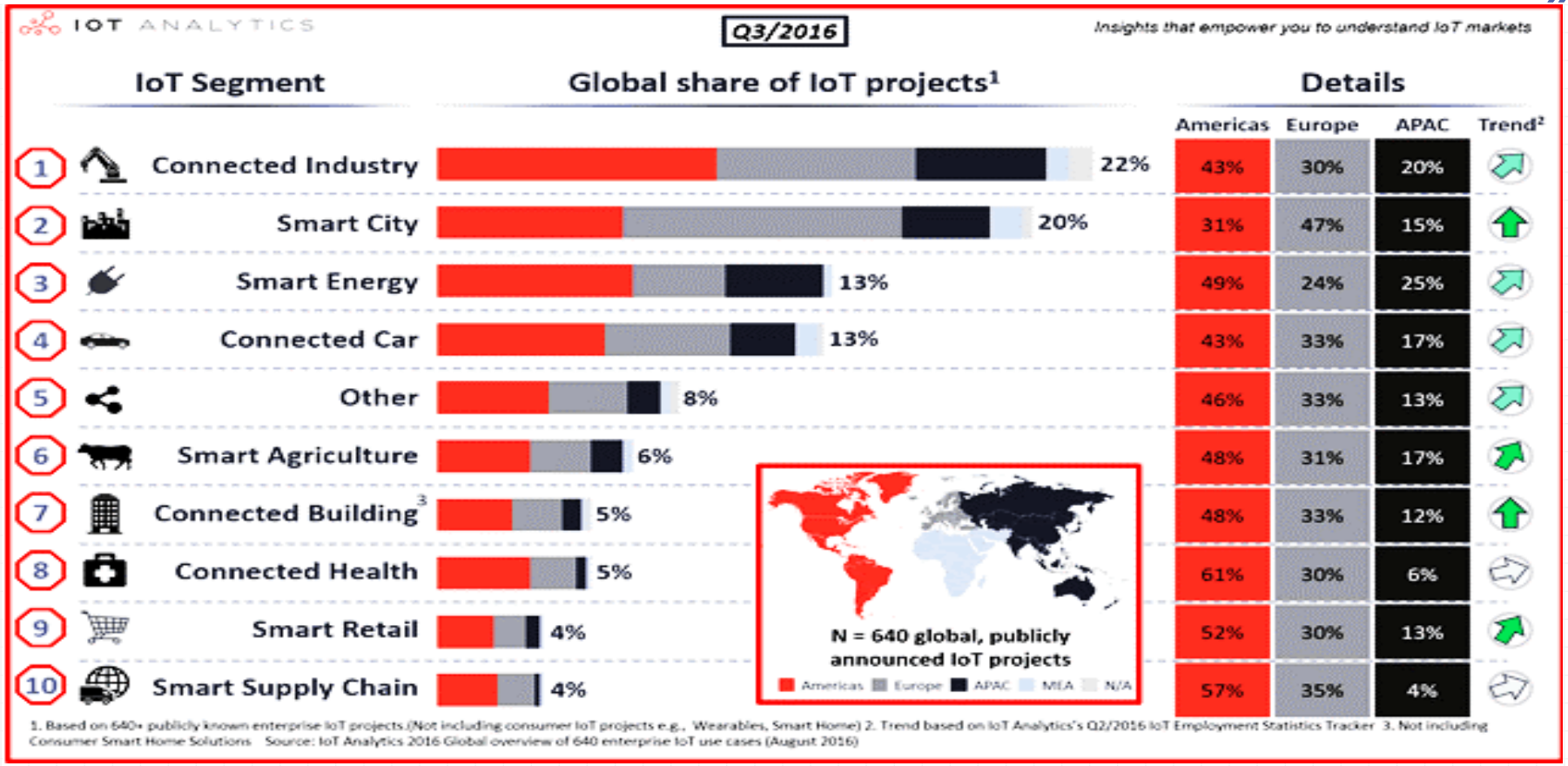
IOT @ OFFICE

"The Internet of Things (IoT) is a scenario in which everything is provided with unique identity and is equipped with ability to automatically transfer data over network without human-human or human-computer interaction. Simply put, everything is connected over IP and interacts on pre-defined logic.."

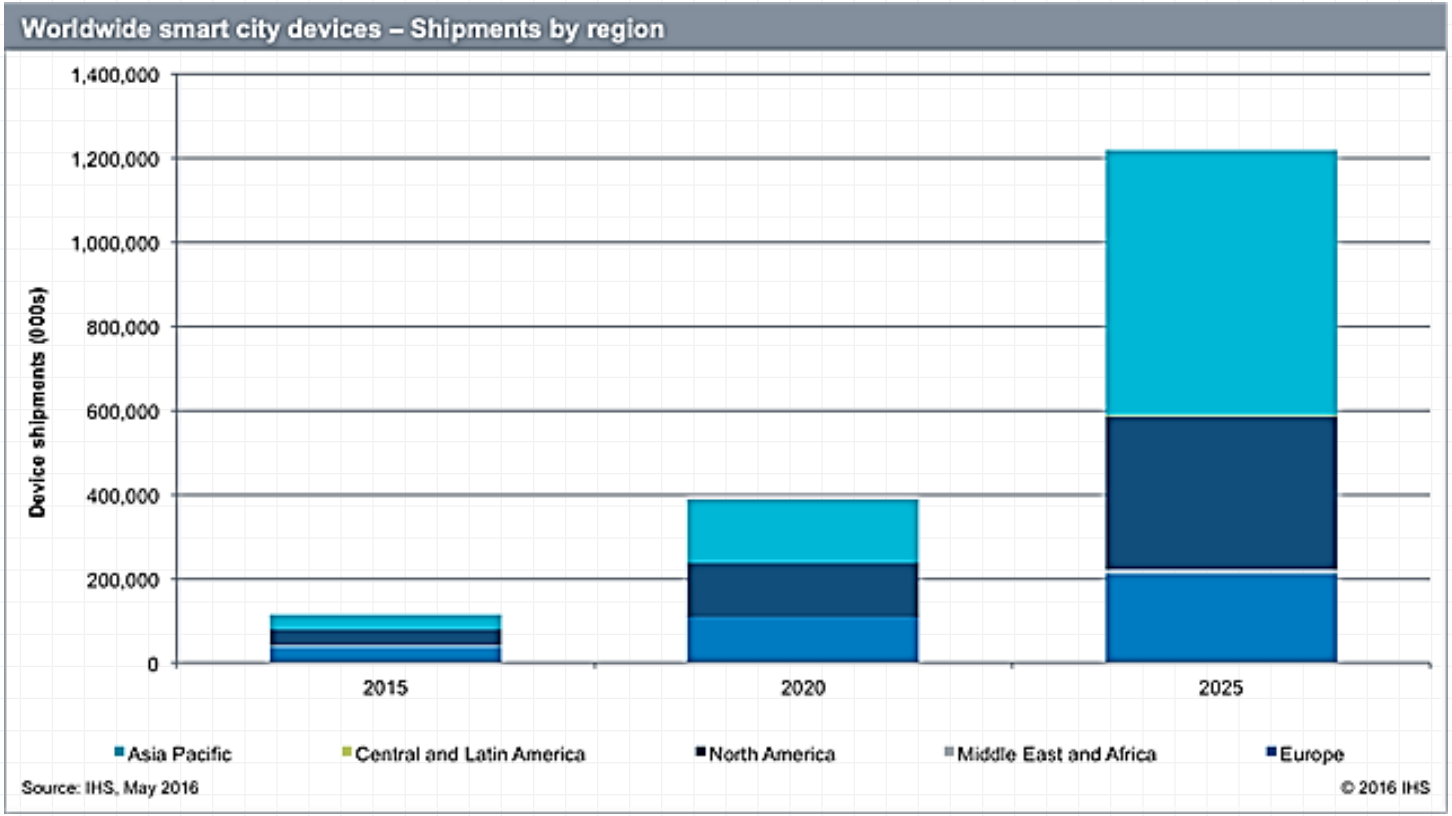
IoT: *Technology Roadmap*



IoT: ***Analytics***



IoT: *Smart City Devices*



IoT: *Economic Potential -$930 bn to $ 1.7 tn pa by 2026*

Air & Water Monitoring	$ 403-603 bn	Lives lost in pollution - $ 7.6 tn/yr	15% reduction
Adaptive traffic Mgmnt.	$ 223-504 bn	Time spent in looking for parking $3.9 tn	10-15% less time; 10% redn in congestion
Infrastructure Mgmnt	$ 204-235 bn	$1 tn/yr for electricity/water/ lighting maintenance	35% lower power outages; 50% redn in water leaks; 10% redn in theft
Public Transport Mgmnt	$ 13- 63 bn	Upto 70% of commuting hours are buffer time	Reduction in buffer time via connected bus/train data
Human Productivity	$3 -6 bn	$670bn in mobile and knowledge worker wages	5% productivity gain for mobile workers; 3-4% for knowledge workers
Crime Detection & Monitoring	$ 14-31 bn	$440 bn cost of crime	20-22% reduction
Solid Waste Mgmnt.	$50 9 bn	$65 bn /yr cost	23% productivity improvement

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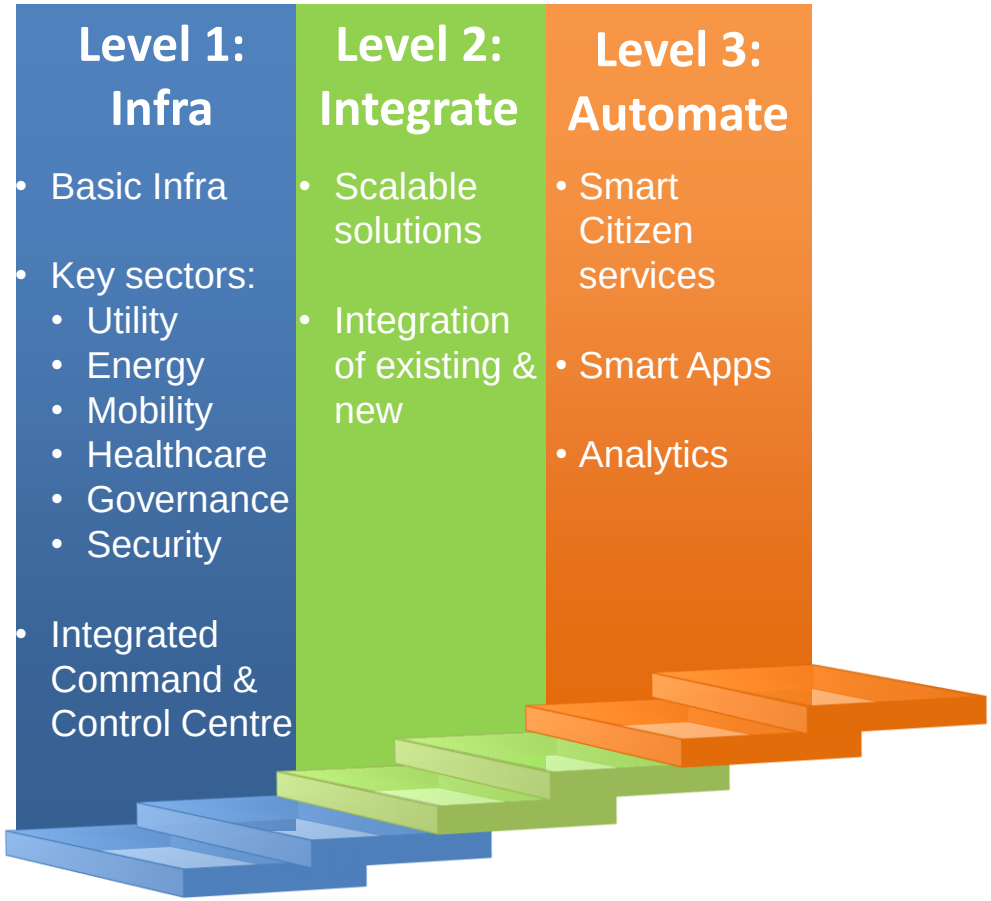
Smart Cities : ***Definition***

"A Smart City is an innovative city that uses Information and Communication Technologies (ICTs) and other means to improve quality of life, provide digital connectivity, increase efficiency of urban operation & services and enabling better decision making, while ensuring that it meets the needs of present and future generations with respect to economic, social & environmental aspects."

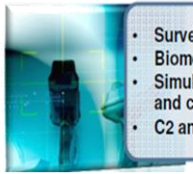


Smart Cities : *A Global Mega Trend*

Smart Mobility: Intelligent Mobility

- Advanced traffic management system (ATMS)
- Parking management
- ITS-enabled transportation pricing system

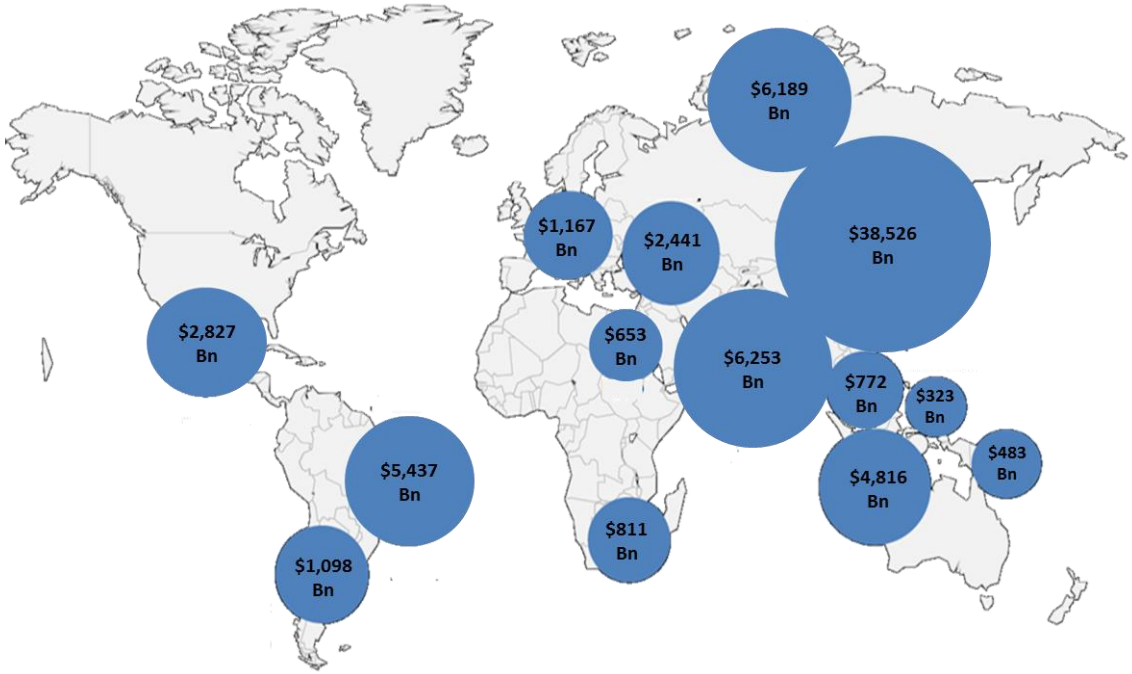
Smart Security: Next Generation 911



- Surveillance
- Biometrics
- Simulation modeling and crime protection
- C2 and response

Smart Energy: Digital Management of Energy

- Smart grids
- Smart meters
- Intelligent energy storage

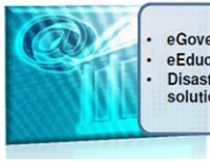


Source: International Monetary Fund, Oxford Economics, Frost & Sullivan, 2012

Smart Infrastructure: Digital Management of Infrastructure

- Sensor networks
- Digital water and waste management

Smart Governance and Smart Education: Government-on-the-Go



- eGovernment
- eEducation
- Disaster management solutions

Smart Healthcare: Intelligent Healthcare Technology

- Use of eHealth and mHealth systems
- Intelligent and connected medical devices

Smart Buildings: Automated Intelligent Buildings

- Building Automation
- Intelligent Buildings: Advanced HVAC, Lighting Equipment

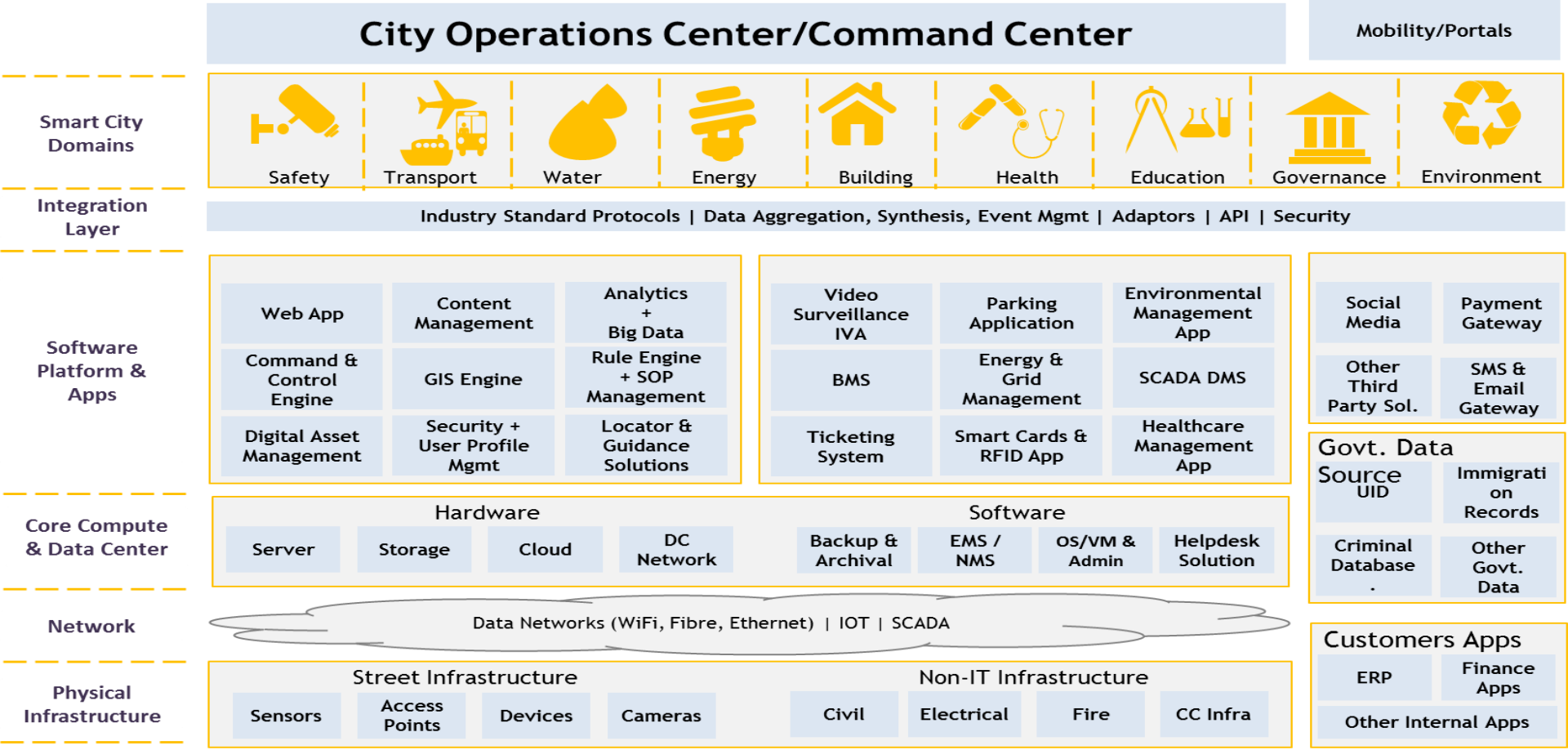
Smart Technology*: Seamless Connectivity

- 4G connectivity
- Super broadband
- Free Wi-Fi
- 1Gbps download speeds

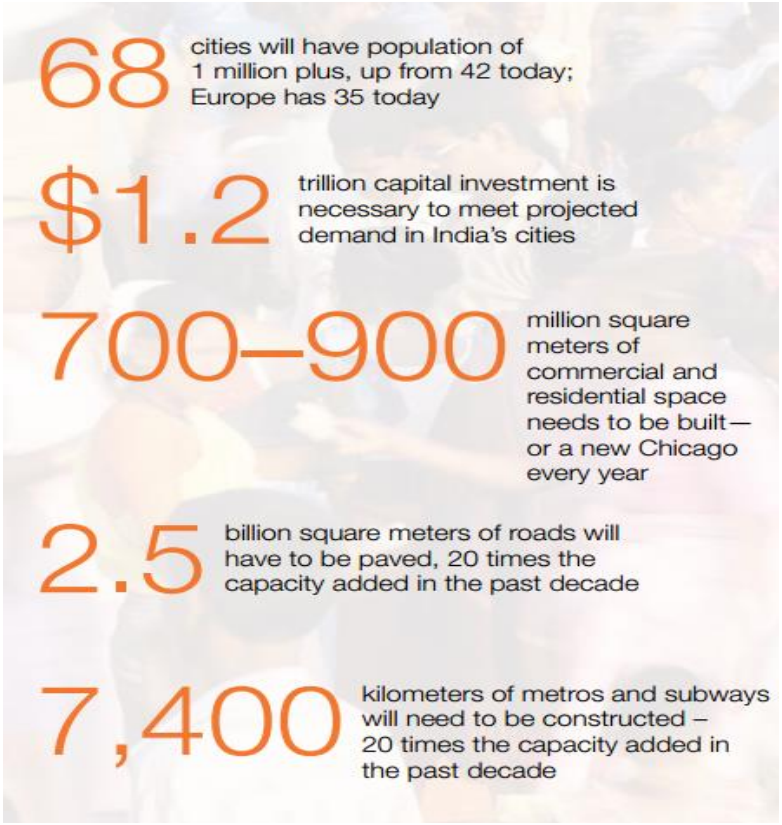
Smart Citizen*: Civic Digital Natives

- Use of green mobility options
- Smart lifestyle choices

Smart Cities : ***Framework***



India : *by 2030*



Source : MGI – 'India's Urban Awakening' Report

Smart Cities India : *Smart City Mission*

Winner Cities
60

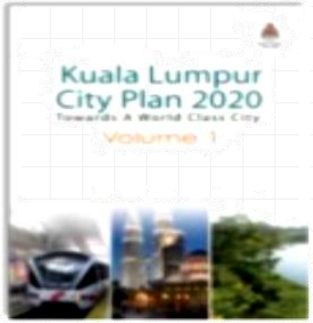
Total Urban Population Benefited
72 Mn

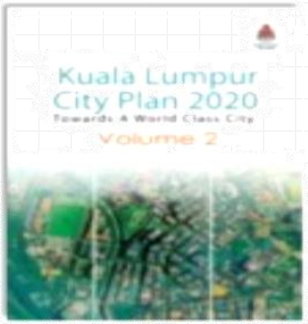
Total Project Outlay for Smart Element
$9 Bn

Draft Kuala Lumpur City Plan 2020

8 Development Thrusts

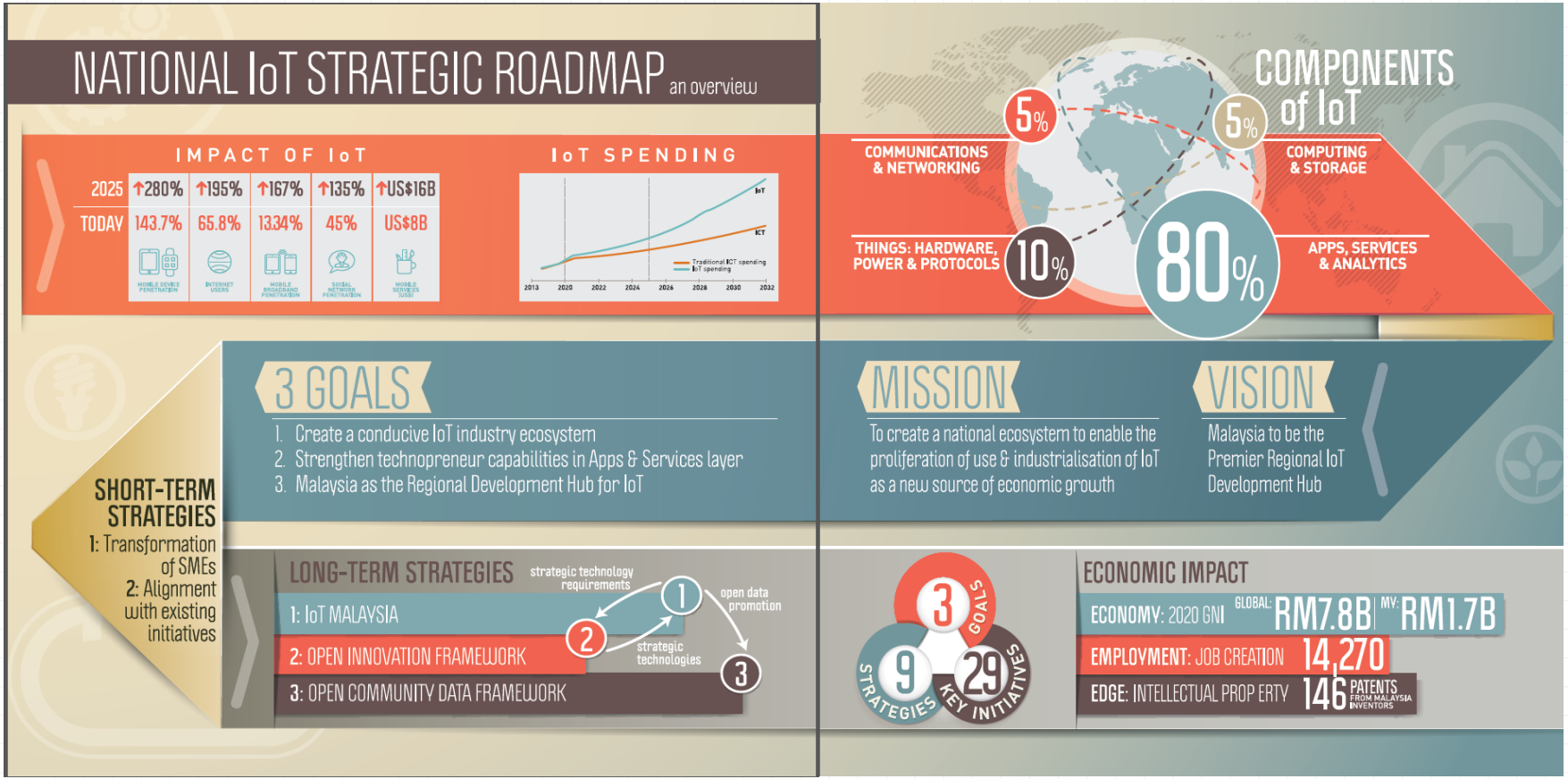
1. Dynamic World Class Business City
2. Connectivity & Accessibility
3. Sustainable Land Use
4. City Living Environment
5. Protecting & Enhancing the Environment
6. Enhancing Green Network & Blue Corridor
7. Distinctive Image & Identity
8. Green Infrastructure





24 Strategic Directions → **73 Key Initiatives**

Malaysia IoT Strategic Roadmap



Smart Cities : ***Typical Smart City Solutions***

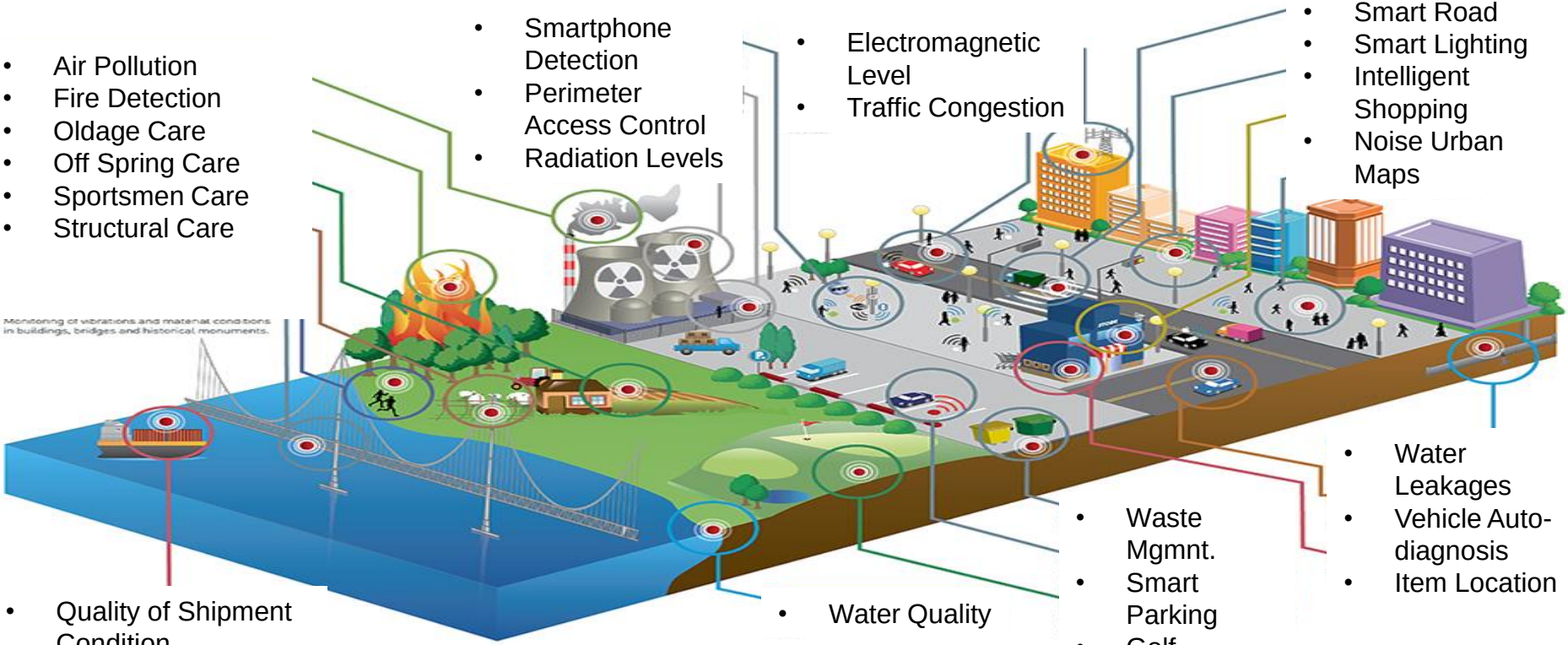
IoT: *Application in Smart Cities*

- Air Pollution
- Fire Detection
- Oldage Care
- Off Spring Care
- Sportsmen Care
- Structural Care

- Smartphone Detection
- Perimeter Access Control
- Radiation Levels

- Electromagnetic Level
- Traffic Congestion

- Smart Road
- Smart Lighting
- Intelligent Shopping
- Noise Urban Maps



- Quality of Shipment Condition

- Water Quality

- Waste Mgmnt.
- Smart Parking
- Golf Courses

- Water Leakages
- Vehicle Auto-diagnosis
- Item Location

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4 **Benefits of IoT**

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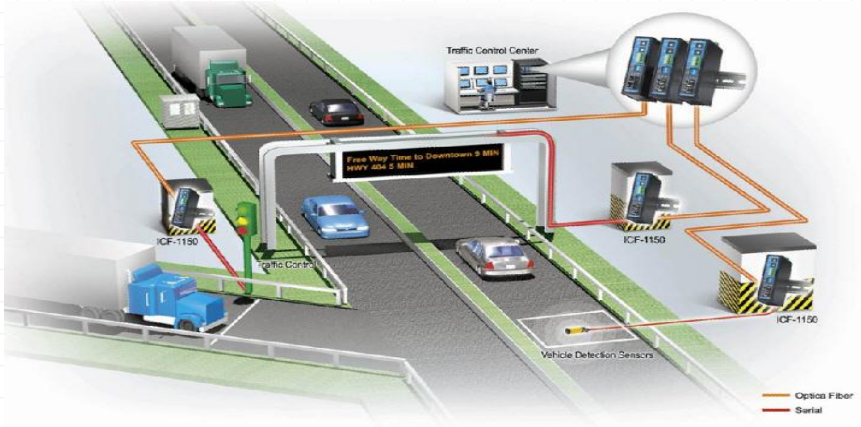
IoT: *Benefits*

SURVEILLANCE

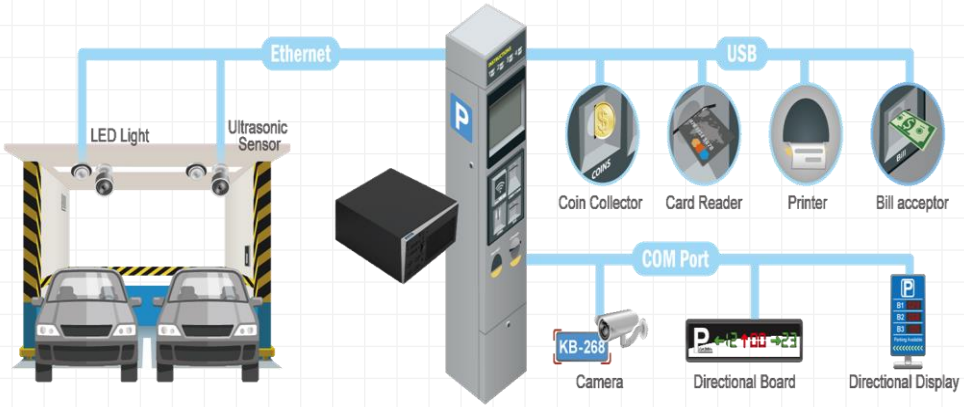
- Reduction of Crime
- Improved City Management
- Crime Detection and Resolution



CONNECTED TRAFFIC SIGNALS

- Reduced congestion
- Improved emergency services response times
- Lower fuel usage

IoT: ***Benefits***



PARKING

- Increased efficiency
- Reduction in Pollution
- Fuel and cost savings
- New revenue opportunities

LIGHTING

- Increased Efficiency
- Reduced Maintenance
- Power and Cost Savings
- New revenue opportunities

IoT: *Benefits*

CITY SERVICES

- Efficient service delivery and response system
- Increased revenues
- Enhanced environmental monitoring capabilities
- Access to Connectivity
- Access of Information to citizens

IoT Benefits : *Use Cases*

CCTV network: Overstepping zebra crossing most caught traffic offence in Mumbai

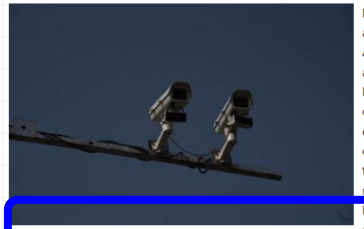
NDTV

CCTV Challan Facility Launched In Mumbai

Mumbai Traffic Police's new CCTV portal generates 324 challans within 24 hours

CCTV, speed cams bring down Holi drunk driving

V Narayani TNN | Mar 14, 2017, 05.52 AM IST



MUMBAI: This year's Holi was a shade better than last year's. At least where traffic offences are concerned. Till 8 pm on Monday , a total of 4,621 traffic offences were reported and echallans issued during drives carried out the traffic p report released on Monday .That's a dip of 31% compared to 6,700 traffic offences registered on Holi last year.

31% dip

Chain-snatching fell by over 50% in 2016

V Narayani TNN | Mar 7, 2017, 06.14 AM IST

MUMBAI: The number of chain-snatching cases lodged in the city in 2016 dropped by more than 50% as compared to the previous year, revealed data released by the police.

As many as 909 cases were filed in 2015 in the city, the figure dipped to 443 last year.

Experts said the government's move to install CCTV cameras in parts of the city is bearing fruit.

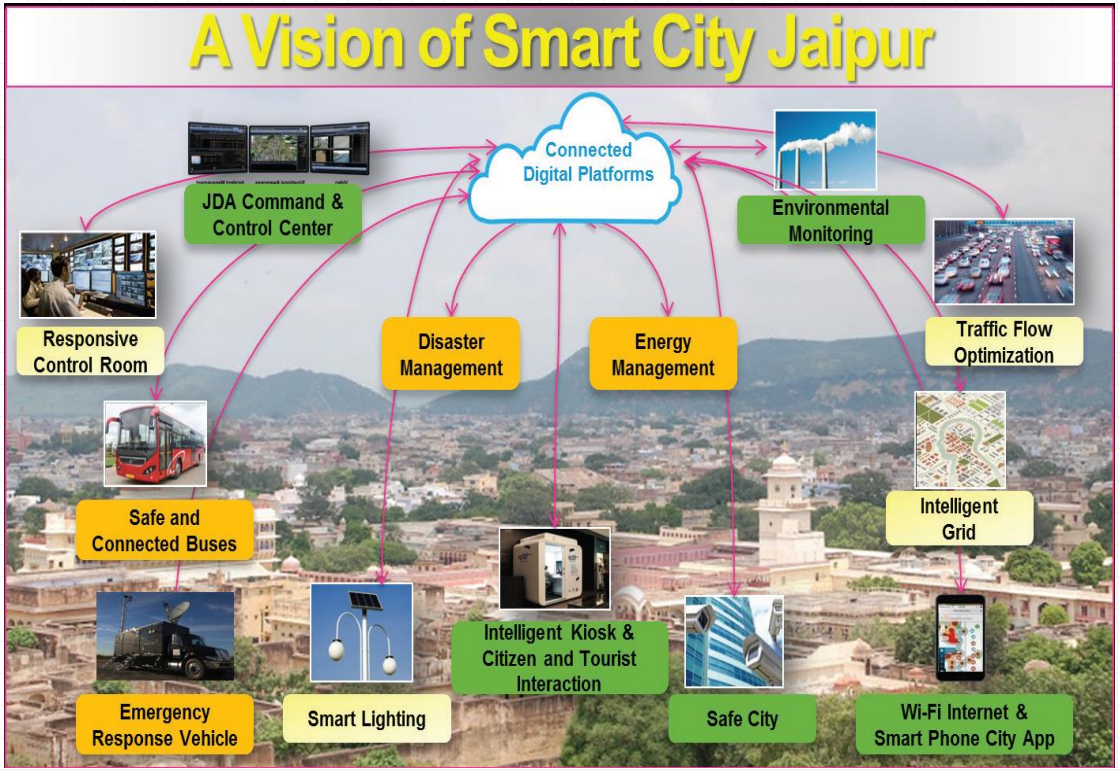
MumbaiMirror

CCTV NETWORK CATCHES 14,000 TRAFFIC OFFENDERS

CHAIN-SNATCHERS DONE IN BY CCTV FOOTAGE

By Munish Pandey, Mumbai Mirror | Dec 21, 2016, 02.18 AM IST

IoT Benefits : *Used Case*



- Improved Mobility from 10% to 15%
- Ensure 100% Monitoring
- Increase Share Public Transport to 45%
- Provide Information to Citizen

IoT: *Challenges in Adaption of IoT by Cities*

Ubiquitous connectivity

Security and "trustability"

Interoperability

Lack of "role models"

Return on Investment (RoI)

Adaptability

1 L&T & SW&C Overview

2 Smart Cities

3 Digital India

4 **L&T SW&C – Smart Projects**

5 Areas of Collaborations


Beautiful Jaipur
jaipur
SMART CITY

Jaipur Smart City: *India's First Smart City*

Interactive Kiosk

CCTV Surveillance

REGS

Wi-Fi Network

Parking

- **Surveillance Solution -** 150 Cameras
- **Wi-Fi Connectivity & Services -** 250 Wi-Fi Access Points
- **Information KIOSK:** 15 Interactive Kiosks
- **E-Governance -** 2 Remote Expert Government Services (REGS)
- **Green City –** 15 Environmental Sensors
- **Smart Parking** Management Solution
- **Central Command Control Center**


Nagpur
India’s First Integrated
Large-Scale Smart City

Nagpur Smart City: *India's First Integrated Smart City*

Interactive KIOSK's

Setting up of Interactive Kiosk at 100 locations across the city

CCC & COC

City Operation Center for Civic Services and Central Command control for security solution

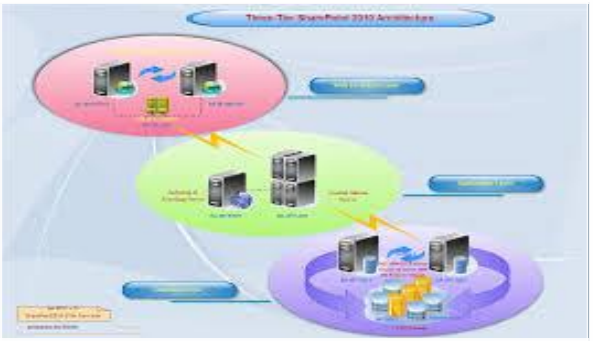
City Surveillance & ITMS

City Surveillance and ITMS with approx. 3800 camera at nearly 700 junction locations

Nagpur Smart City: *India's First Integrated Smart City*

6km Smart 'Strip'

- Smart Lighting
- Smart Transport
- Smart Parking
- Environmental Sensors
- Smart Traffic
- Solid Waste Management



City Wi-Fi

- 1360 Access points for 136 Hotspot locations across city,
- Centralized core Infrastructure

City Network Backbone

Creating City Network backbone with approx. 1200 Km fiber


Pune
India’s First Smart City under
GoI Smart City Mission

Pune Smart City: *India's First Smart City under Smart City Mission*

PUNE SMART CITY DEVELOPMENT CORPORATION LTD.

City Wi-Fi

Environmental Sensors

Public Add. Sys.

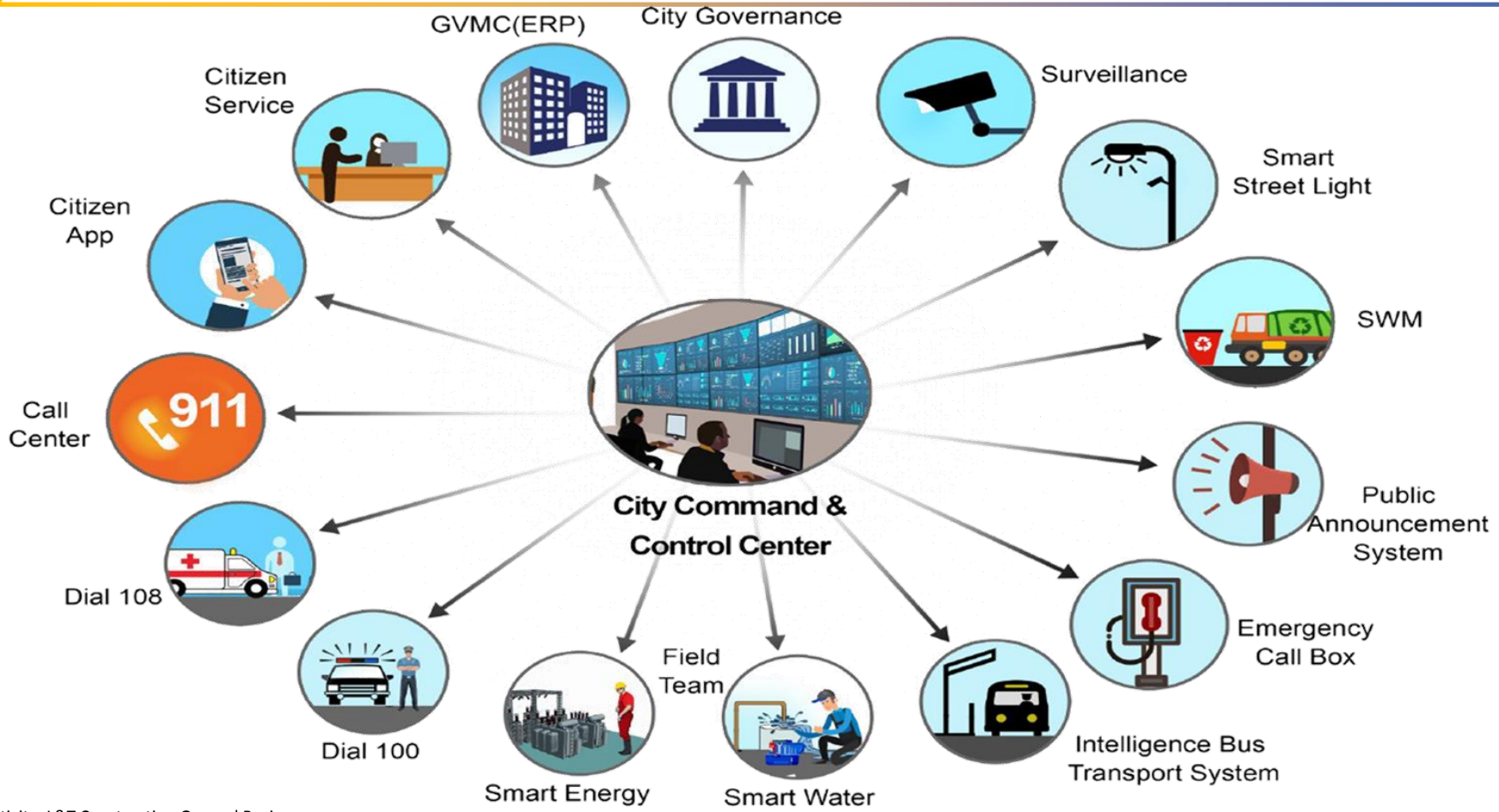
Emergency Call Box

Smart City Op. Centre

Variable Msg. Board


Vizag
Smart City with ERP
Implementation

Vizag Smart City:




City
Surveillance
Empowering Vigilance

Mumbai City Surveillance Project : *India's Largest Surveillance System*

- CCTV & Number Plate Cameras
- Picture Intelligence Unit
- Data Centers
- Vehicle Tracking System
- Video Management / Video Analytics
- Collaborative Monitoring
- Multiple Command/ Viewing Centers
- Help Desk

Hyderabad Project : *Safe & Smart City*

Surveillance & Collaborative Monitoring

Traffic Management System

E-Challan

Dial 100 & Hawk-Eye App

HCS Command Control Centre

Body Worn Camera Sols

Portal & Web Site

Smart City Sensors

Apps, Social Media, SMS


Digital
India
Providing Digital
Connectivity

L&T Project Snapshot : *Digital India*

Wi-Fi

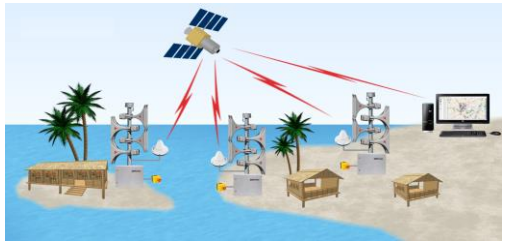
Pan India Wi-Fi Offload System
Wi-Fi System for Colleges & Universities in Bihar
Citywide Wi-Fi for Mumbai & Chennai City

DIGITAL CONNECTIVITY

Pan-India Gigabyte Passive Optical Network

CONNECTED NETWORK

Smart Connected Grid (RRVPNL)



EMERGENCY RESPONSE SYSTEM

Early Warning Dissemination System for AP & Odisha

L&T : *IoT in Construction*

P&M Monitoring & Tracking

Workmen Productivity & Safety

Elimination of M-Book / Log Book at Sites

Material Tracking & Optimization

Survey, Engineering & Design

Project Monitoring & Control

Customer Interactions

Optimization of Shared Services Centre

Data Warehouse & Analytics

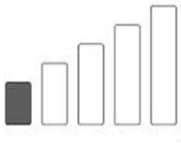
Employee Involvement & Engagement

L&T SW&C : *Bringing Transformation through Technology*

Existing

Parking

Connectivity



Lack of Information

Street Lighting

Lack of Surveillance

Water

Energy

Traffic Congestion

Smart

Smart Parking

Wi-Fi

Citizen App

Smart lighting

Integrated Surveillance

Smart Water

Smart Energy

Smart Mobility

Interactive Interface

Command Control Centre

L&T & Malaysia : ***Collaboration for Smart***

THANK YOU