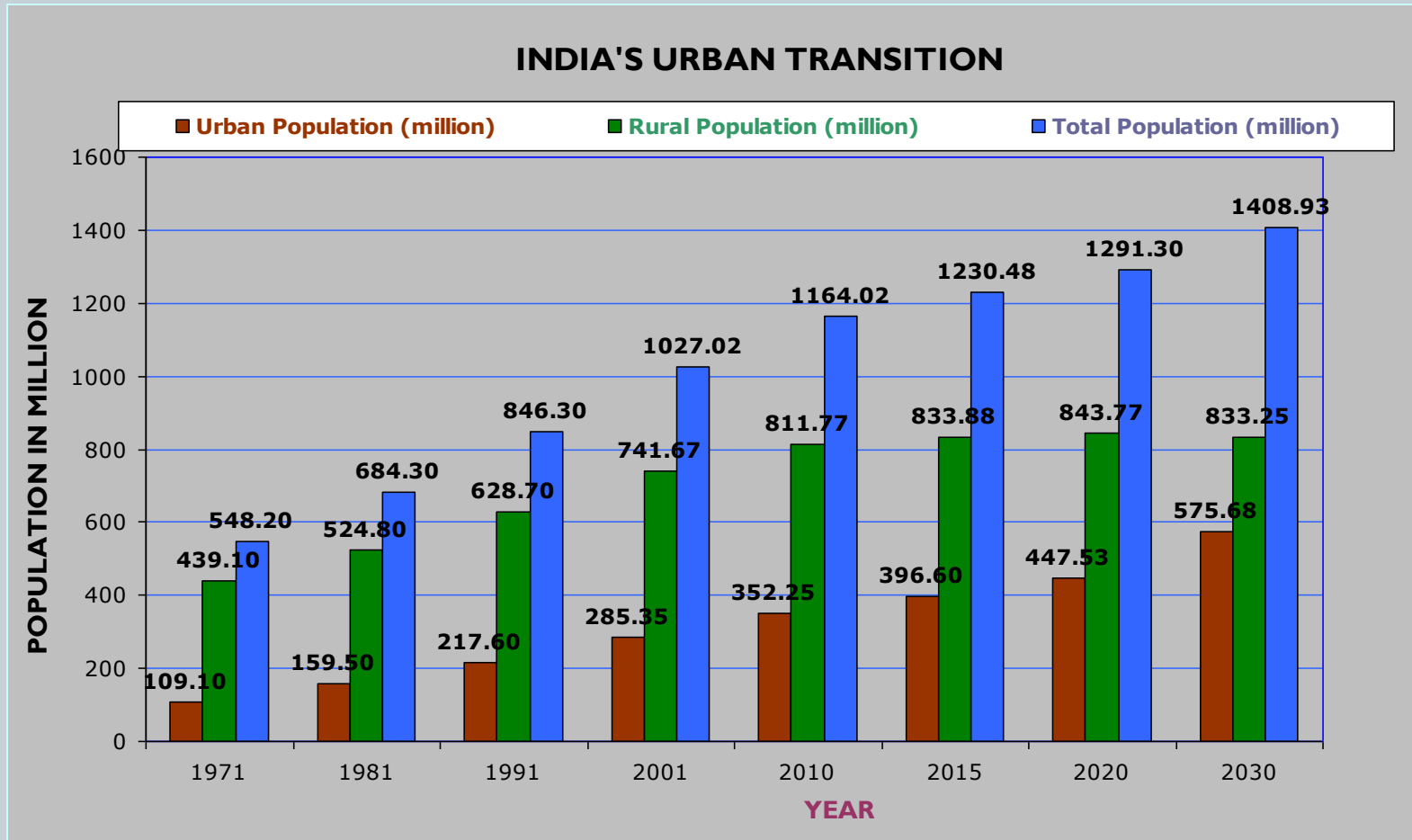# THE ROLE OF IT IN EFFECTIVE AND EFFICIENT PARKING SOLUTIONS- TOWARDS SMART PARKING OPTIONS IN INDIAN CITIES

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CEPT University, Ahmedabad, India

11 November, 2016

Urbanizing India

INDIA'S URBAN TRANSITION

Chart showing India's urban transition with Urban Population (million), Rural Population (million), and Total Population (million) across years 1971, 1981, 1991, 2001, 2010, 2015, 2020, 2030.

Year	Urban Population (million)	Rural Population (million)	Total Population (million)
1971	109.10	439.10	548.20
1981	159.50	524.80	684.30
1991	217.60	628.70	846.30
2001	285.35	741.67	1027.02
2010	352.25	811.77	1164.02
2015	396.60	833.88	1230.48
2020	447.53	843.77	1291.30
2030	575.68	833.25	1408.93

POPULATION IN MILLION

YEAR

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Growth of Registered Vehicles in India

Figure 1: Growth of registered vehicles in India in Millions[2]

Source : IIHS RF Paper on Transport

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Growth of Registered Vehicles in India

Table 2: Total number of registered motor vehicles in selected metropolitan cities in India: 1999-2009 (year as on 31st March and no. of vehicles in thousands)

Metropolitan cities	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR (%) 1999-2009
Ahmedabad	739	799	846	899	978	1075	1632	1780	1451	1586	1691	8.6
Bengaluru	1332	1550	1593	1680	1771	1891	2232	2617	2179	2640	3016	8.5
Chennai	1056	1150	1257	1356	1895	2015	2167	2338	2518	2701	2919	10.7
Delhi	3277	3423	3635	36S99	3971	4237	4186	4487	5492	5899	6302	6.8
Hyderabad	951	N.A.	N.A.	1241	1319	1356	1433	1522	2181	2444	2682	10.9
Jaipur	542	598	644	693	753	824	923	1051	1177	1289	1387	9.9
Kolkata	N.A.	N.A.	N.A.	801	842	875	911	948	987	573	581	9.5
Lucknow	N.A.	N.A.	465	556	615	N.A.	N.A.	N.A.	801	962	1025	9.0
Mumbai	911	970	1030	1069	1124	1199	1295	1394	1503	1605	1674	6.3
Nagpur	298	331	416	459	503	543	770	824	884	946	1009	13.0
Pune	568	593	620	658	697	755	827	874	930	1141	1153	7.3

Source: Transport Research Wing, Ministry of Road Transport & Highways, Government of India, New Delhi. Various Issues. *Motor Transport Statistics of India* and *Road Transport Year Book*.
Note: (1) N.A. indicates unavailability of data. (2) CAGR indicates compound annual growth rate. (3) From 2007 to 2008, there is a sudden drop in no. of vehicles registered in Kolkata because the Calcutta High Court in July 2008 ordered a ban on commercial vehicles registered before January 1, 1993 from Kolkata and its outskirts.

Source : Singh, SK, IIM_L, 2012

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Growth of Private Vehicles

Table 3A: Private transport vehicles in selected metropolitan cities in India (as on 31st March 2000 and 2009)

Metropolitan cities	Two-wheelers (2000)	Two-wheelers (2009)	Two-wheelers CAGR (%)	Cars (2000)	Cars (2009)	Cars CAGR (%)
Ahmedabad	616738	1312601	8.75	104179	233320	9.37
Bengaluru	1164204	1946767	5.88	238374	586639	10.52
Chennai	848118	2017816	10.11	207860	511457	10.52
Delhi	2184581	3846721	6.49	869820	1881135	8.95
Hyderabad	757684	1836549	10.34	99314	426733	17.58
Jaipur	444889	1035999	9.85	76133	204871	11.63
Kolkata	298959	173891	-5.84	238560	313900	3.10
Lucknow	344268	825088	10.20	53069	142861	11.63
Mumbai	407306	909993	9.34	325473	509246	5.10
Nagpur	272734	850276	13.47	27573	94823	14.71
Pune	443266	831029	7.23	62885	147108	9.90

Source: Transport Research Wing, Ministry of Road Transport & Highways, Government of India, New Delhi. Various Issues. *Motor Transport Statistics of India* and *Road Transport Year Book*.
Note: (1) CAGR indicates compound annual growth rate. (2) Cars include jeeps.

Source : Singh, SK, IIM_L, 2012

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Growth in Public Transport

Table 3B: Public transport vehicles in selected metropolitan cities in India (as on 31st March 2000 and 2009)

Metropolitan cities	Taxis (2000)	Taxis (2009)	Taxis CAGR (%) (2000-2009)	Buses (2000)	Buses (2009)	Buses CAGR (%) (2000-2009)
Ahmedabad	43865	94264	8.87	14993	17407	1.67
Bengaluru	77375	235525	13.17	6380	18176	12.34
Chennai	45016	136635	13.13	4409	34491	25.68
Delhi	104747	229991	9.13	37733	41142	0.97
Hyderabad	48898	110772	9.51	2539	22725	27.57
Jaipur	12513	33344	11.51	14362	18873	3.08
Kolkata	41946	49571	1.87	8586	6938	-2.34
Lucknow	15454	16010	0.39	2816	2794	-0.09
Mumbai	156261	161674	0.38	15414	13061	-1.82
Nagpur	10666	17436	5.61	2788	4160	4.55
Pune	44590	17533	-9.85	7827	12800	5.62

Source: Transport Research Wing, Ministry of Road Transport & Highways, Government of India, New Delhi. Various Issues. *Motor Transport Statistics of India* and *Road Transport Year Book*.
Note: (1) CAGR indicates compound annual growth rate. (2) Taxis include auto-rickshaws.

Source : Singh, SK, IIM_L, 2012
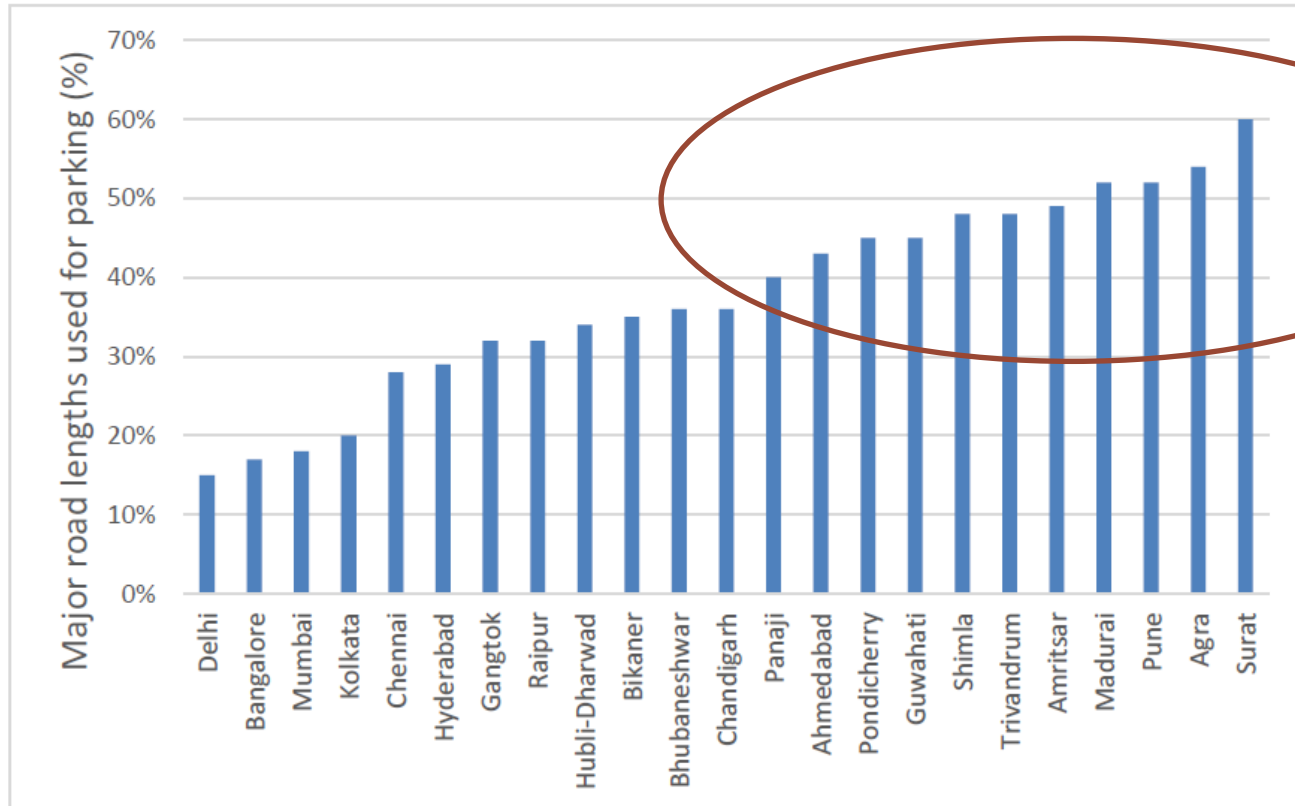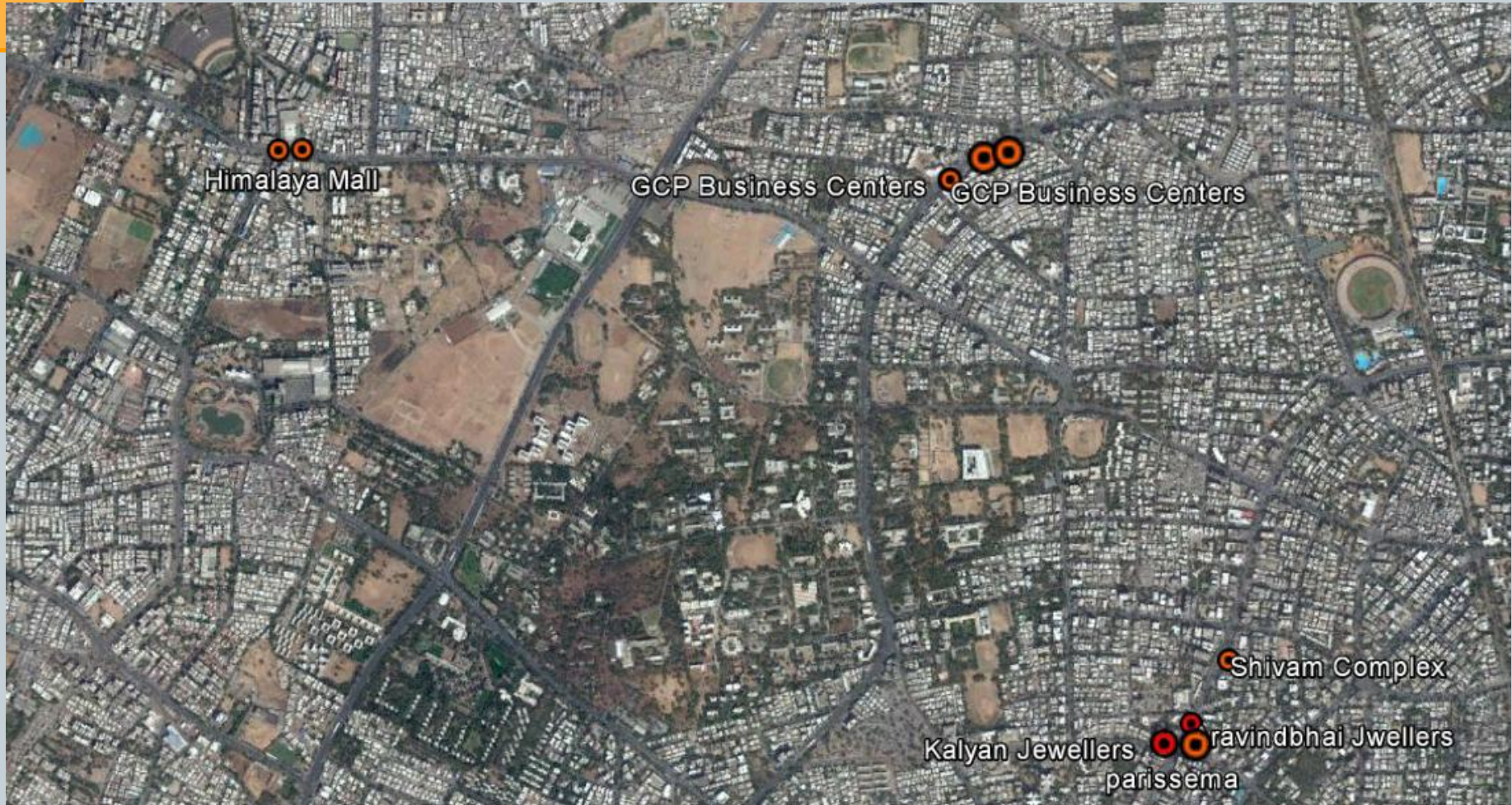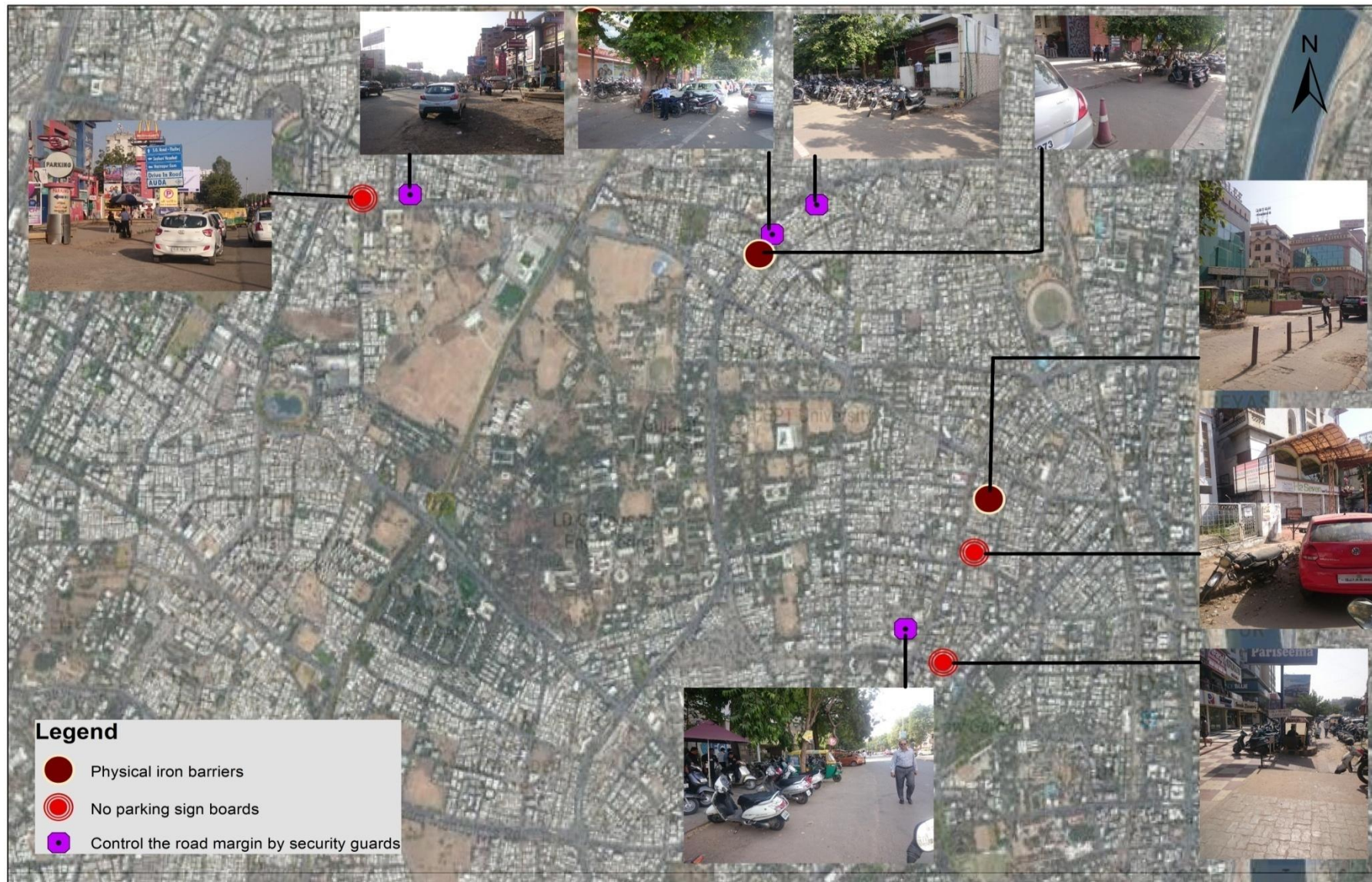
Parking on Roads

Figure 4: Share of road length used for on-street parking in key Indian cities (Singh et al., 2008)

Source : IIHS RF Paper on Transport

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Ahmedabad Parking Infrastructure Study, CEPT University IP, 2016

Legend

- ● Physical iron barriers
- ◉ No parking sign boards
- ■ Control the road margin by security guards

Emerging Challenges of On Street Parking

Politics of "No Parking" in Ahmedabad

Kalyan Jewellers

Aravindbhai Jwellers

Latitude=23.029933
Longitude=72.558832
Elevation=-15 m

Directions: To here - From here

Image © 2016 DigitalGlobe

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Politics of "No Parking" in Ahmedabad

Politics of "No Parking" in Ahmedabad

Quality and Accessibility of Off Site Parking

City Parking Challenges

- Shrinking of Usable Road Spaces due to on street parking

- No Listing/ mapping of city road wise Parking priorities

- Lack of Wider Parking Guidance Networks or Systems

- Limited Technological /ICT Applications/ Automation

- Absence of City wide parking demand assessments)

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Parking Proposal of Smart Cities(60)

HIGHLIKGHTS
• 20 LIGHT HOUSE CITIES
• 23 FAST TRACK CITIES
• 17 ROUND 2 CITIES

Analysis of 60 Smart Cities Proposal

| Sr	Details	No Of Project	Amount(Cr)	%
1	**Total Project Proposals under the Smart Cities (> 100 Cr)**	323	73429.38	100
2	**Total Projects in Transport /Mobility Sector**	80	16469.07	22.42
3	**Total Projects for Smart Parking , Multi level Car Parking**	21	5436.77	7.40

■ Total Project Proposals under the Smart Cities (> 100 Cr)

■ Total Projects in Transport /Mobility Sector

■ Total Projects for Smart Parking , Multi level Car Parking
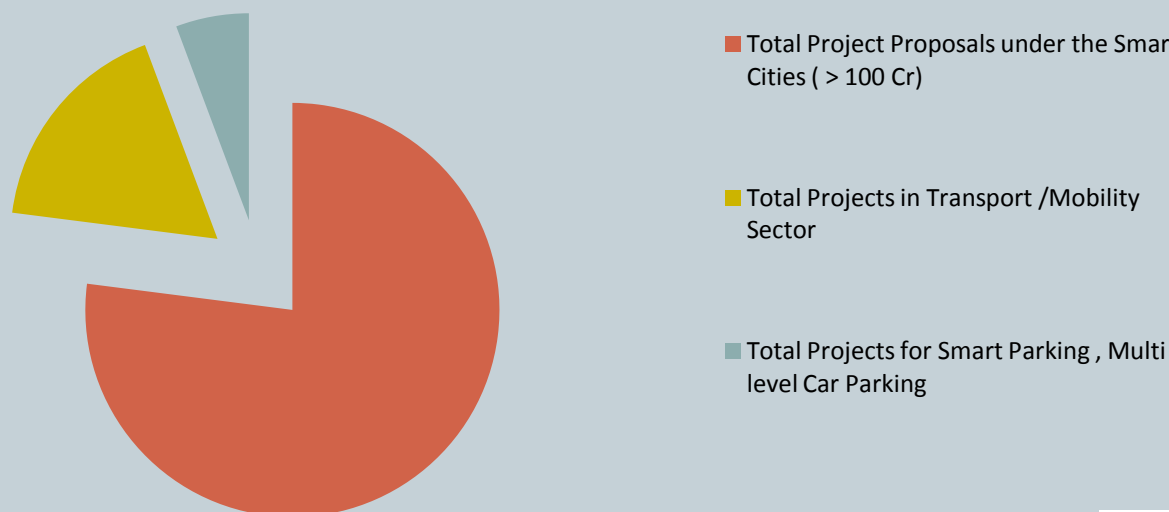
Total Projects in Transport /Mobility Sector
Total Number of Project - 80
Total Amount - 16469.07 Cr

City Wise Budget Distribution Graph for Project of Transport and Mobility Sector

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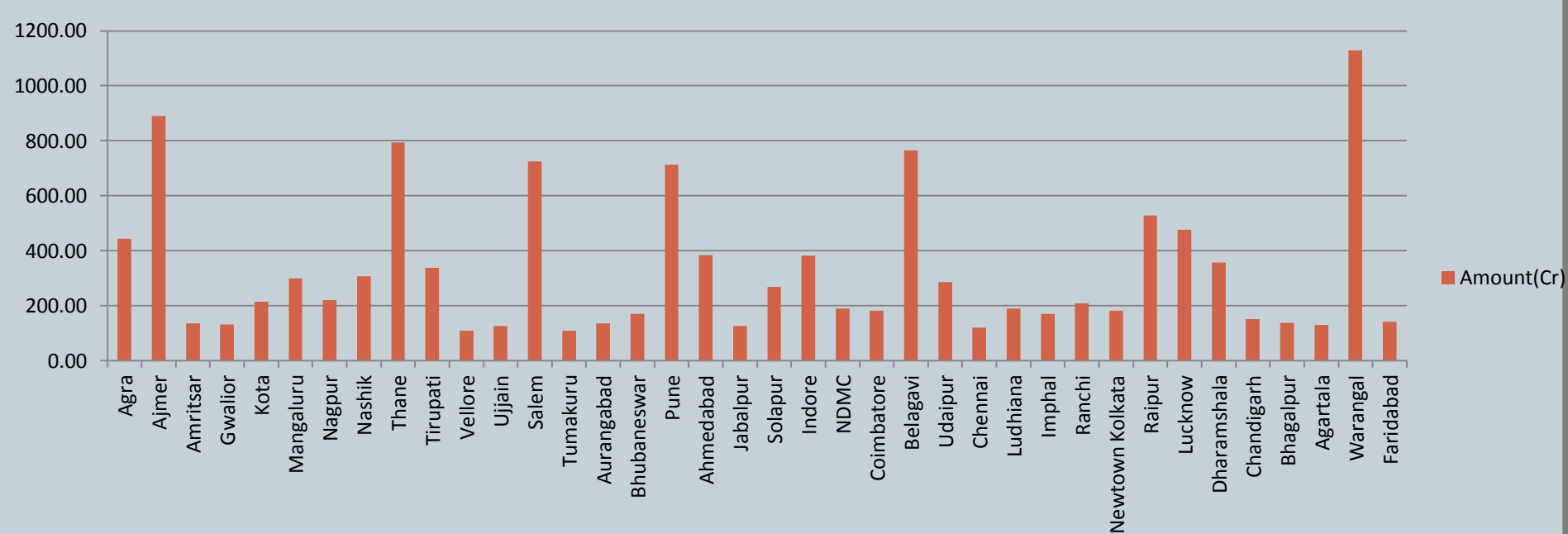
Total Projects for Smart Parking , Multi level Car Parking
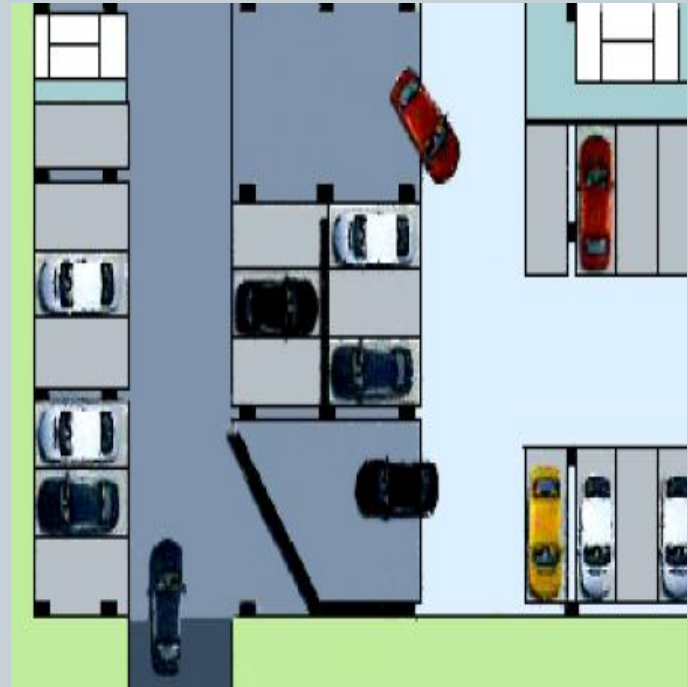## Total Number of Project - 21
Total Amount - 5436.77 Cr

City Wise Budget Distribution Graph for Project of Smart Parking ,
Multi level Car Parking
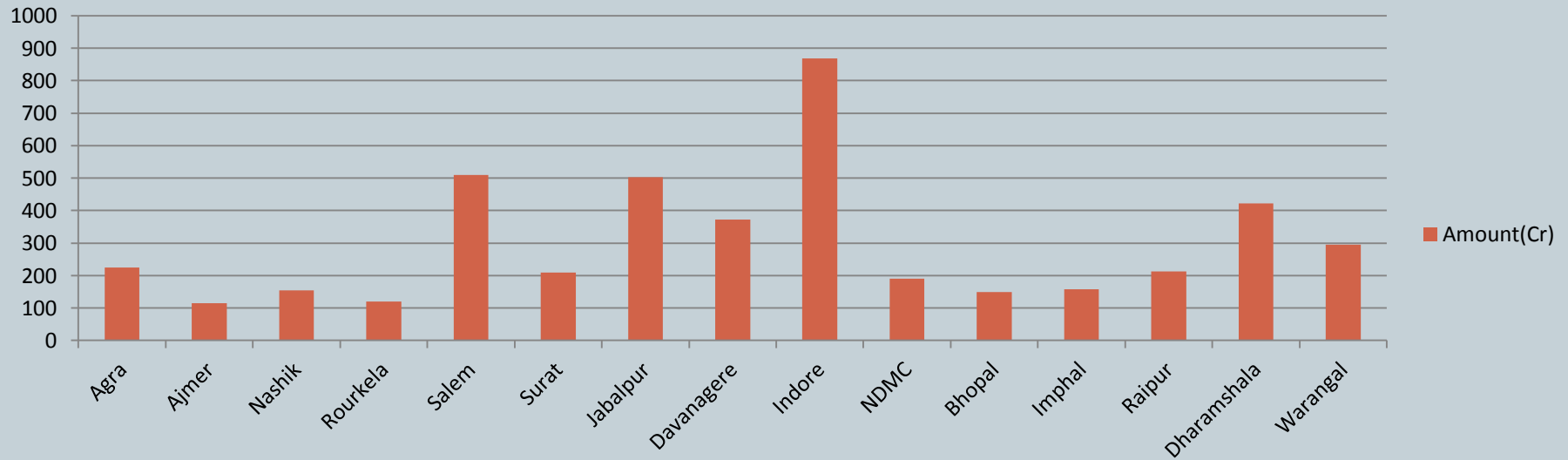
Technological Options

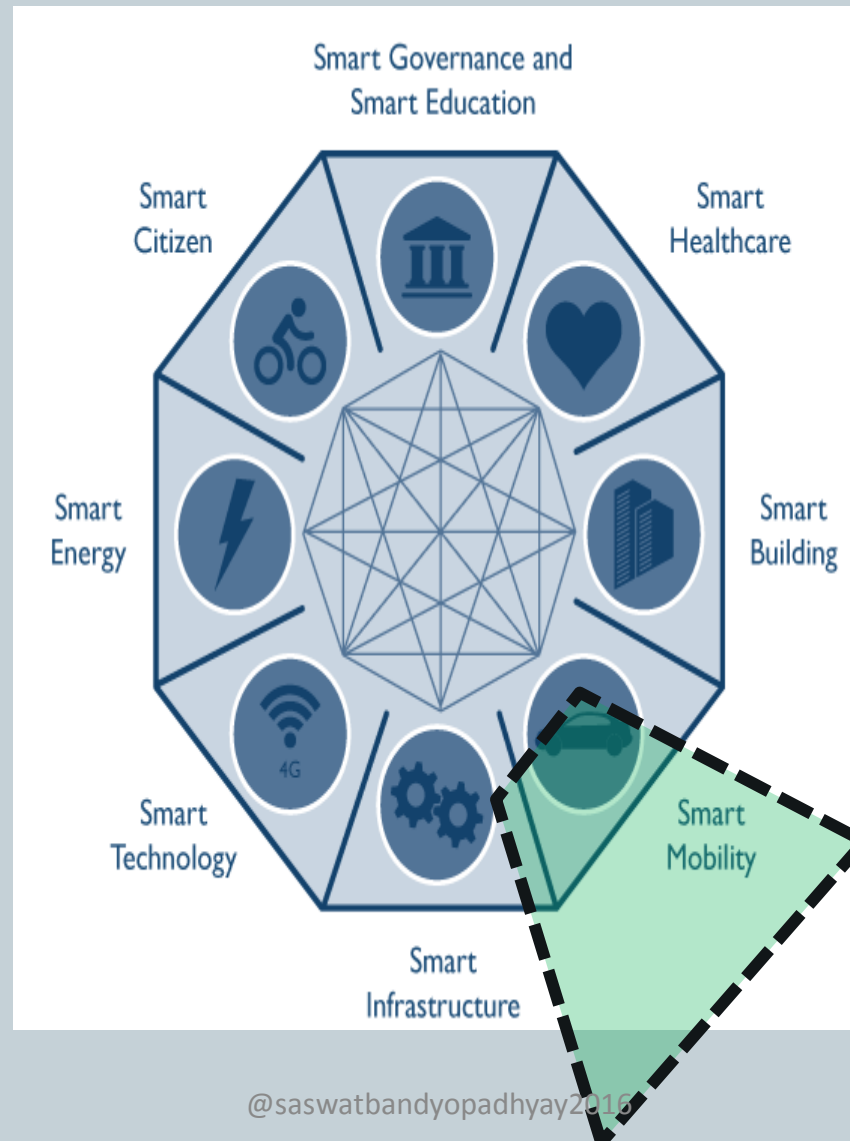- **<u>Multi-Level Car Parking (MLCP)/ICPS</u>**

Summary of Smart SCPs

- Over INR 5000 Cr. of parking proposals under SCM alone

- Most proposals are for isolated MLCP and IPS types

- Limited proposals for IT enabled parking applications or Automated Parking solutions

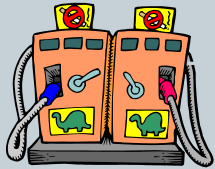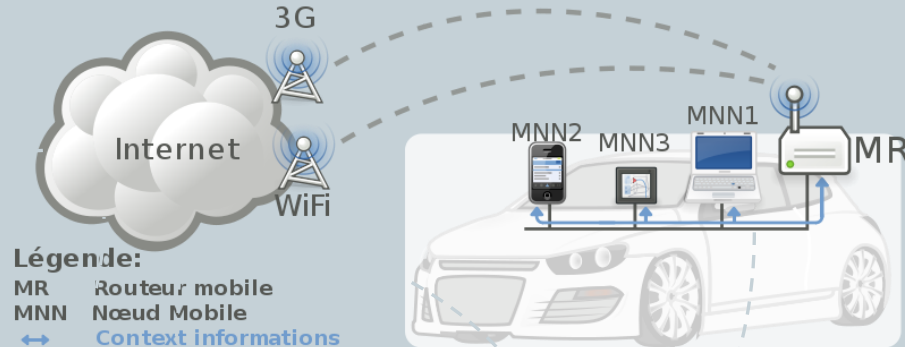- Almost No Proposals of City/Area based Wide Parking Networks and Management

The Role of IT in Effective and Efficient Parking Solutions- Towards SMART PARKING OPTIONS FOR INDIAN CITIES

Smart City Diamond

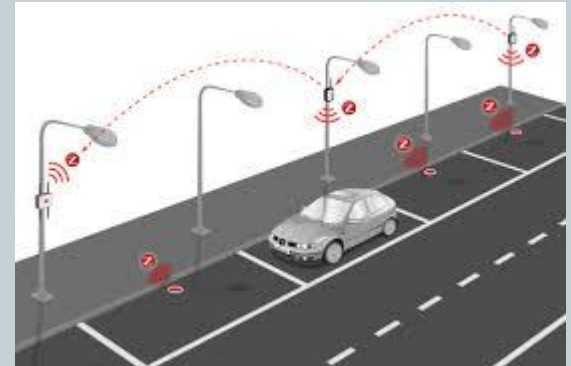9th Urban Mobility India Conference & Expo 2016
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Things Connecting to Things

Légende:
MR — Routeur mobile
MNN — Nœud Mobile
↔ — Context informations

- Complex and heterogeneous resources and networks

SMART **INFRASTRUCTURE**

Converges with the Connected Car

Smart energy meters

Vehicle to infrastructure communication

Smart traffic lights

Smart parking meters and garages

Road sensors

Wireless Vehicle Charging

3G/4G cellular

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Smart Parking Cloud

Smart Parking Advantages

On-street

- Traffic congestion decreases.
- Pollution is reduced.
- Local businesses get improved footfall as parking capacity is maximised.
- Streets are safer – drivers not distracted by hunting for spaces.
- Drivers less stressed and have more time to do things other than parking.
- Best possible use of available space.

Off-street

- Less time spent parking means more time to use your services.
- Traffic flow improves, saving time and increasing safety.
- Integrates with Smart parking APP for pay-by-phone, compliance and information to attendants.
- Space available gets maximum use.

P PARKING

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Pilot Smart Park in West Minister City Council

Westminster City Council has gone live with Smart Parking's real-time bay sensor parking solution that helps drivers find a space quickly and conveniently.

The go-live of 3,000 sensors installed at all paid-for and disabled parking bays across the West End in the heart of London represents the world's largest deployment of this kind of real-time parking technology to date.

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Rotterdam S-Park System

•Or the driver can adopt a full telematics services box that offers him S-Park and a lot of other servies.

•Mobile services router links tags with internet and back end server

•Or the driver has a very cheap tag for the basic S-Park services

•Tags will guide the car entering the street to the right spot (Indoor and outdoor)

•Tags know if a car has parked

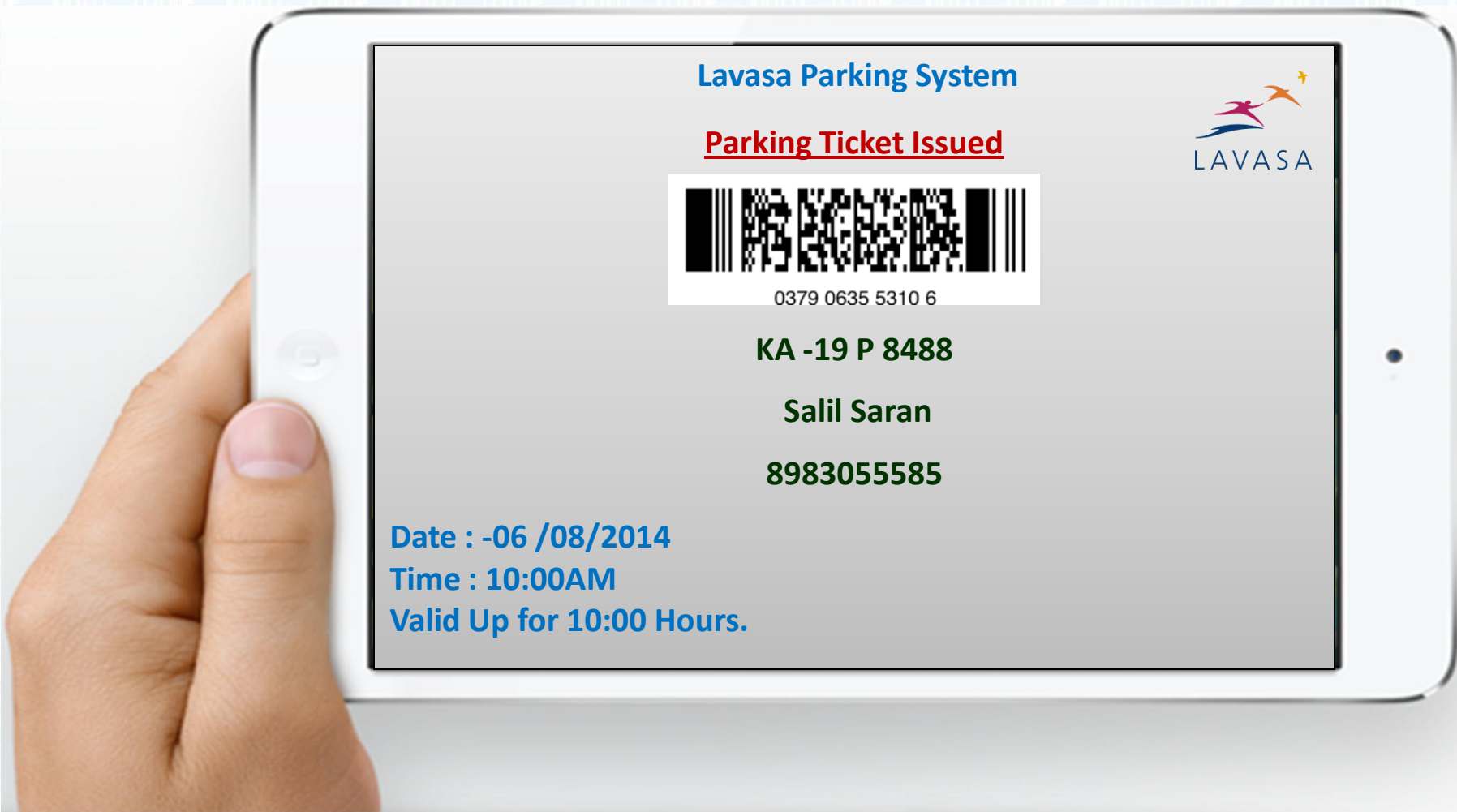•Tags have a 5 year life time and can be sticked to the pavement or in an in door parking spot

•Tags have no defined function and can execute other services.

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Smart Parking- Lavasa

Lavasa Parking System

<u>Parking Ticket Issued</u>

0379 0635 5310 6

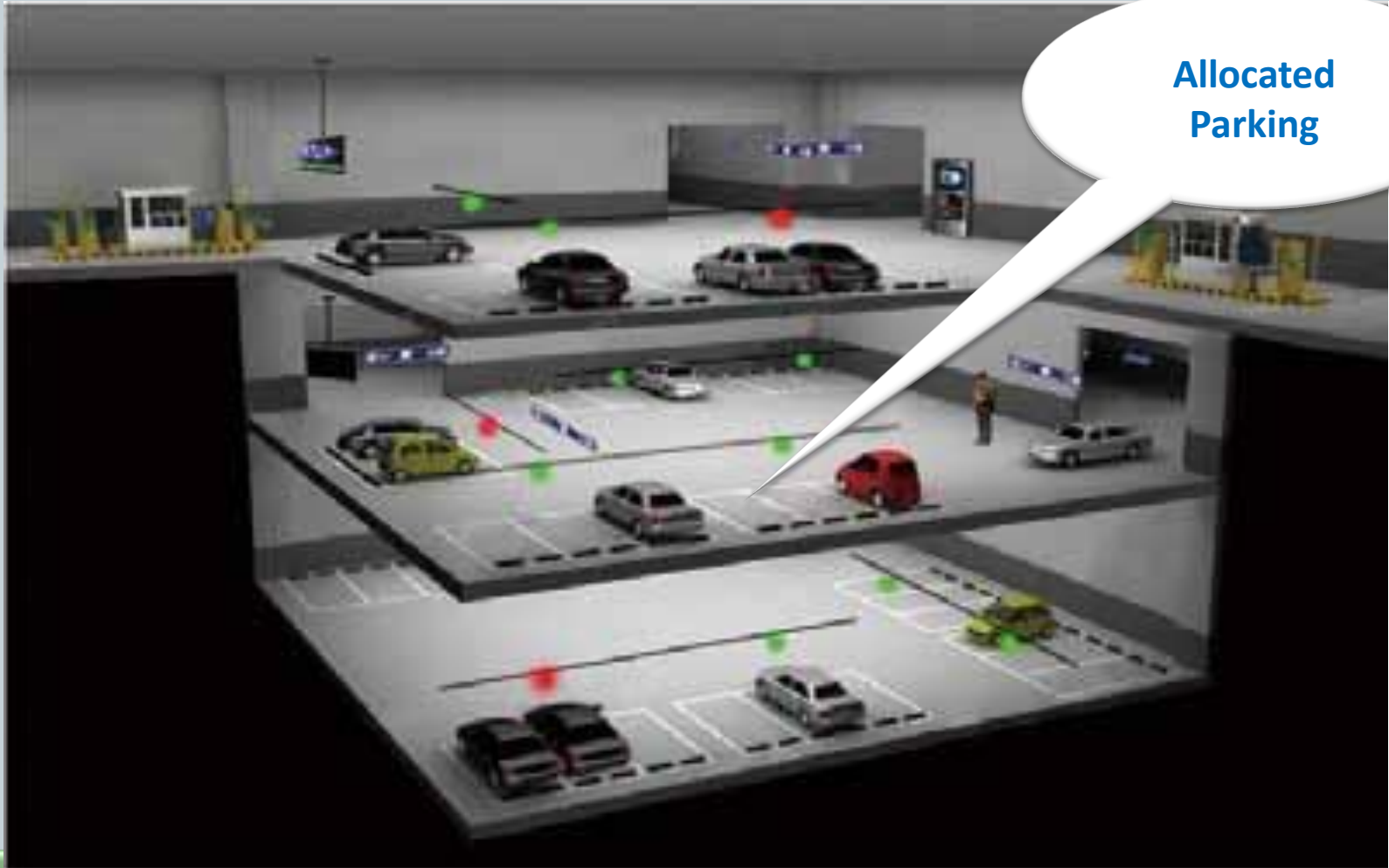**KA -19 P 8488**

Salil Saran

8983055585

Date : -06 /08/2014
Time : 10:00AM
Valid Up for 10:00 Hours.

Smart Parking Proposal Lavasha

Concluding Remarks

- **Paradigm shift required in our attitude and approach towards Urban Parking Management**

- **Based on the city specific demands, local "parking micro-zonations" (Eg. Auckland Smart-Rep)**

- **Integrated City Parking Networking rather than isolated, local MLCPs**

- **Adaptation of Smart Parking Technology Clouds**

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Thank you for your kind attention !

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