

Smart City 2.0

“City as a Platform” for Growth





We live in a fascinating world where plants send text messages when they need to be watered, houses tweet when there is a knock on the door, and cars are driven by algorithms. A decade back what seemed like a pipe dream or an exorbitantly expensive science project i.e. having the physical world reacting to one's unique needs and preferences to provide a contextual, relevant, and a very targeted experience has now started to become a tangible reality. All this is largely because, hardware has become a lot more affordable, wireless connectivity is ubiquitous, and technologies such as IoT, Big Data, and AI are mainstream.

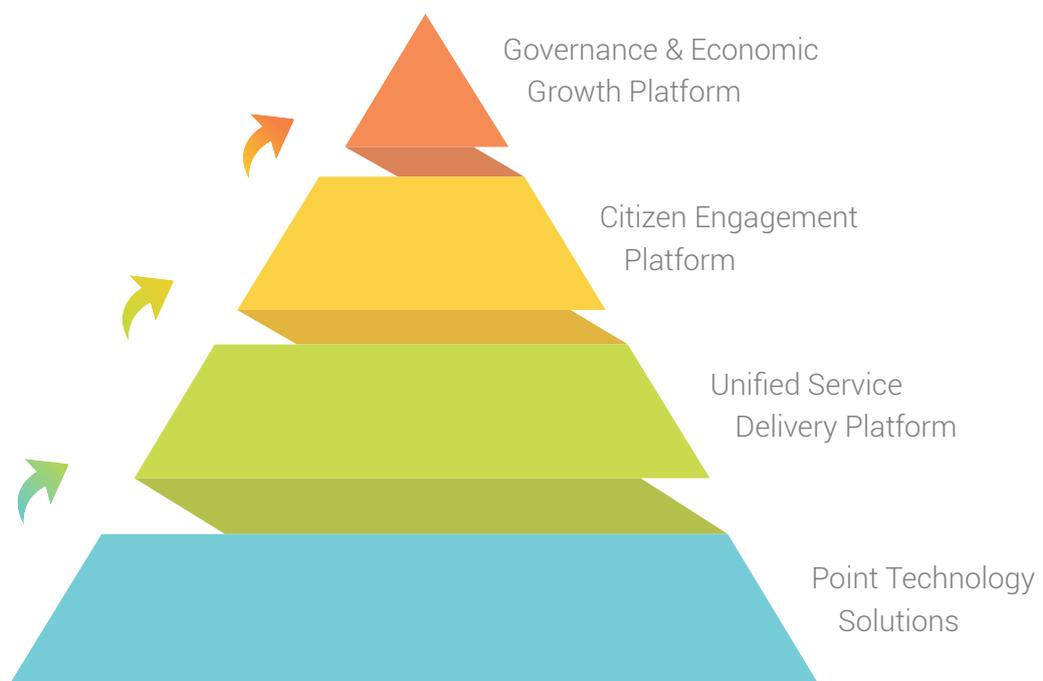
Not just corporates but municipalities, towns, and cities across the world are beginning to leverage these technologies to maximise benefit for their citizens.

People living in Singapore, Barcelona, London, Amsterdam, San Francisco have already begun to see some of these magical experiences come to life. From Power Grids to Transportation, Healthcare, Education, Infrastructure - they are all beginning to get connected as the 3rd wave of digital growth gets unleashed. An unprecedented amount of capital is being pumped in to maximise the benefit- India alone is planning to invest \$150+ BN over the next decade to help accelerate 100 cities in their journey to become smart or connected. We expect the total global investment into "Smart City" initiatives to be nearly 20-30x, during that time horizon. However, the roll out is not going to be an easy one and will need a lot of focus, discipline, and leadership to truly provide the citizens the promised value.

What is a Smart City? Why do we need to invest in them?

Nearly half of the world's population resides in cities today and we expect by 2050 that percentage to be anywhere between a staggering 70-90%.^[1] As towns and cities grapple with increasing population they would also be dealing with legacy issues of aging infrastructures and declining budgets. To manage this risk and accelerate urban development in an efficient manner "Smart City" projects were first started to primarily integrate ICT and IoT into city planning initiatives.

However, in recent times it has evolved to something much bigger - it's gone from Technology Point Solutions launches to being an Urban Service Delivery Platform to maximize Citizen Engagement. Moreover, now it is often seen as a Platform for "better governance and economic growth". With ever increasing mandate, the budgets have ballooned up too and leaders will have to take stalk of scope creep to ensure these projects get off the ground and are setup for success. Nevertheless, it's exciting times for citizens, governments, technologists, and city planners overall.



The Evolving Scope of Smart City Initiatives

Which are the most advanced Smart Cities today?

The flag bearers of "Smart City" initiatives confess that these projects were first rolled out to solve specific issues and as and when they were able to successfully demonstrate the use of technology to improve productivity, operational efficiency, and effectiveness, they were given harder nuts to crack. Which truly is the right paradigm to work with - manageable chunks of problems to begin with and rewards for performance and agility, as in most start-ups and corporates today. Let's look at what some of these cities have been able to unleash:



Barcelona, Spain

- ◆ Identified 12 areas for intervention, including transportation, water, energy, waste, and open government.
- ◆ Using remote sensors to monitor rain and humidity, smart irrigation optimizes flow of water to city parks and fountains, resulting in a 25% increase in water conservation. ^[2]
- ◆ Reduced energy consumption by 30%,^[2] once they started using smart technologies to enhance efficiency and utility of lamp posts.
- ◆ For drivers, Barcelona has implemented a sensor system that guides them to available parking spaces, dramatically reducing congestion and emissions. The application that drivers use to locate parking also allows them to pay for parking online.
- ◆ The city officials estimate that IoT systems have helped to save \$58 million on water, increased parking revenues by \$50 million per year, and generated 47,000 new jobs. Through smart lighting, the city reports saving an additional \$37 million annually. ^[2]



Singapore, Republic of Singapore

- ◆ Smart National program was launched in 2014.
- ◆ Deployed an undetermined number of sensors and cameras allowing authorities to monitor everything from the cleanliness, crowd densities, and movement of every locally registered vehicle.
- ◆ Data collated and fed into an online platform, called "Virtual Singapore" giving the countries' managers unprecedented access to real time information.
- ◆ Security, Healthcare, Citizen Engagement, and Traffic management- the most important reasons cited for the initiative.
- ◆ Goals for this Next-Generation Smart City:
 - ◇ Target to recycle 65% of waste by 2020. ^[3]
 - ◇ 70% of traffic to be utilised by public transport by 2020. ^[3]
 - ◇ 80% of all its buildings to meet minimum "Green Mark Certified" energy efficiency standards by 2030. ^[3]



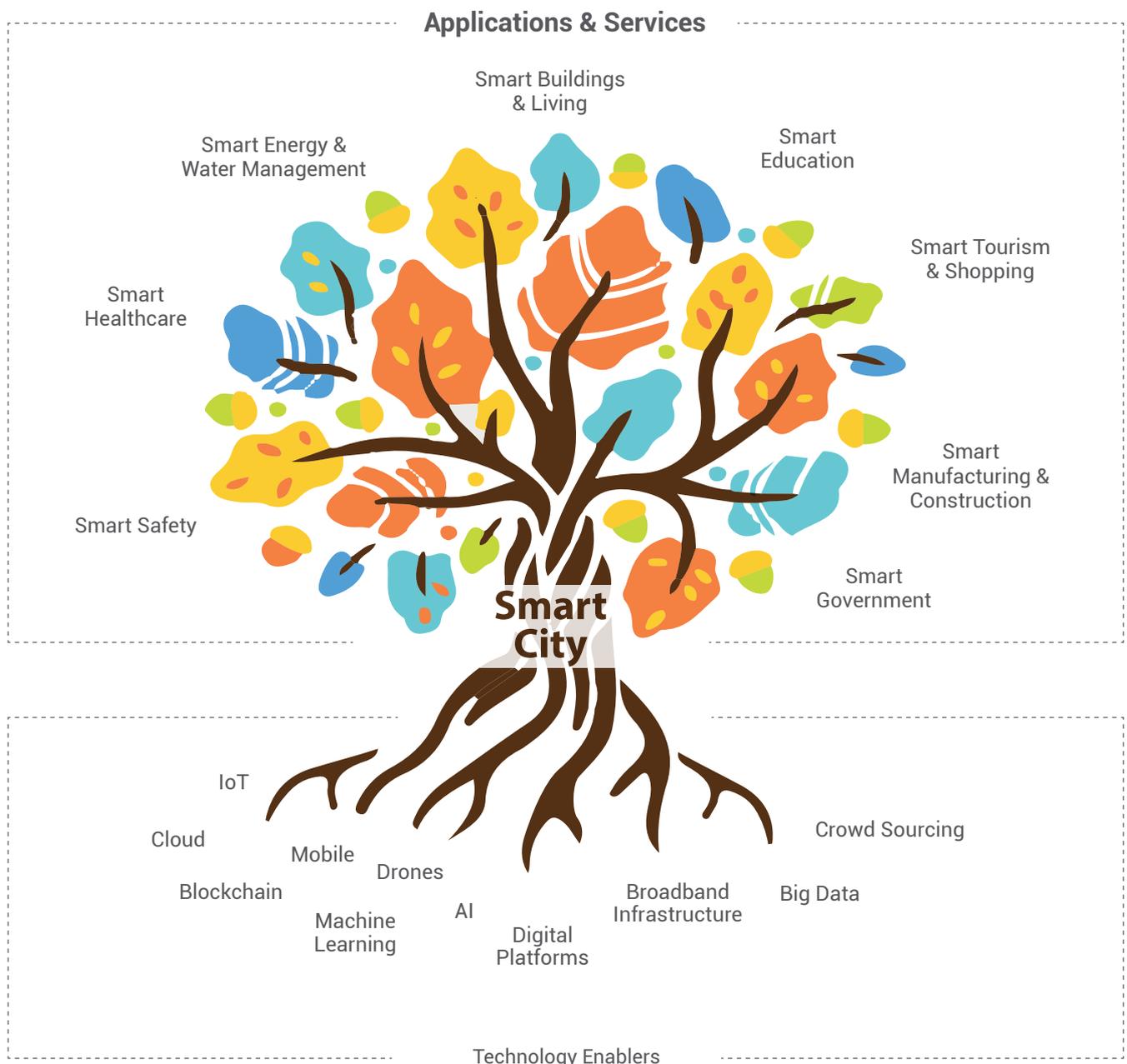
Amsterdam, Netherlands

- ◆ Supplying households with renewable energy, mostly through windmills.
- ◆ Crowdsourcing on the AmsterdamOpen.nl platform to learn how interaction with citizens can support local policies.
- ◆ Making available all its data on traffic and transportation to interested parties (i.e. parking availability, taxi stands, and cycle paths, as well as live traffic updates).
- ◆ Projects can be catalyzed, funded, and implemented on a 50:50 public-private model jointly funded by the EU, city government, and private participants.

What is the killer Smart Cities use case?

There is no one individual killer application of Smart Cities but rather a myriad of them, which help solve the cities issues. However, Smart LED Lighting is considered the gateway drug to smart city applications and services. This is primarily because the cost

of truck rolls for maintenance is prohibitive and operational savings associated with energy makes the ROI extremely attractive. Smart Parking is another one which has an immediate impact on the CO₂ emission and congestion in neighborhoods as witnessed with a 30% reduction in greenhouse gas and ~10% reduction in traffic on one smart parking pilot in SFO.^[4]



A few of the other use cases include:

Smart Traffic Control - Optimization of traffic flows by adjusting traffic lights and signals. The real-time information captured by sensors in infrastructure, vehicles, and mobile generated traffic is analysed and based on predictive algorithms; acted upon.

Smart Waste Management - Using intelligent sensors within garbage containers and routing trucks to garbage containers only when they are full and require emptying. A pilot project in Seattle realized a 57% diversion by volume of compostable material, and more than 70% total diversion.^[6]

Smart Fire Hydrant - Having the ability to proactively identify and resolve critical issues around operational efficiency and water conservation - before they affect services. A UK based water utility identified water leakage on one fire hydrant site amounting to an annual economic loss of ~ \$39,000 per year and collectively saving \$1.9M every year across the city.^[6]

Citizen Engagement Applications - Providing citizens with tools and mobile applications to have a two - way alerting and engagement mechanism. For instance, in the City of Portland, the citizens are connected directly to city services that repair streetlights, potholes, sewer catch basins, graffiti, and park equipment via a mobile application. It allows them to report issues, automatically detecting the GPS co-ordinates, with features

to augment more information through audio or video, and help in facilitating notification to the city planners of issues with the local infrastructure.

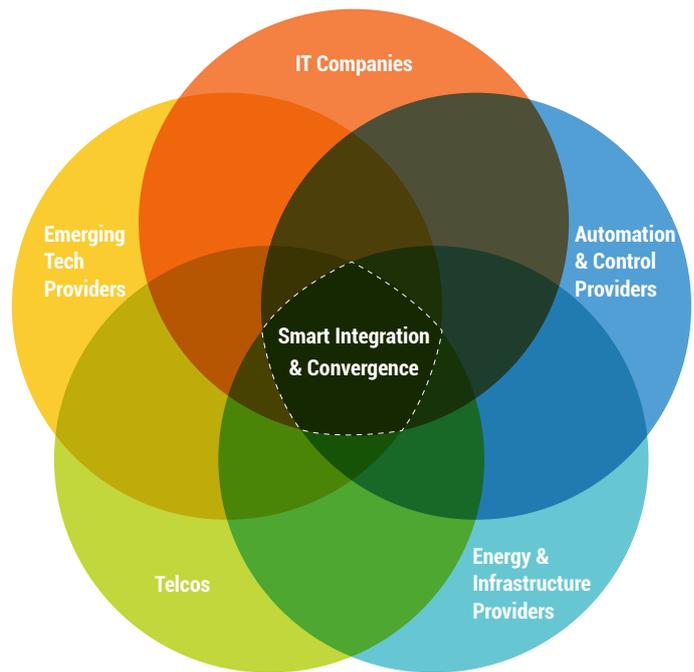
Smart Bus-Stops - provide passengers with real - time updates via touchscreen panels and a city-wide sensor network informs workers and residents about temperature, air quality, noise level, and pedestrian traffic. The City of Edmonton has gone one step further by integrating with Google Transit, providing real time location of each Smart Bus every 15 seconds on Google Maps. Not only do the locations show up, but riders can zoom - in a little and know what exact time their next bus will be at their stop.

Drones for Risk Assessment - Leveraging drones to assess risk to emergency response units, capture images of damage due to natural calamity or manmade disasters can materially help save lives and plan better. Case in point being State Farm Insurance exploring the use of drones to assess potential roof damage during the insurance claims process and to respond to natural disasters.

Smart Healthcare - Whether it is connecting fireman's suits with sensors and location trackers to ensure their physical safety and wellness, or having smart prescription medical bottles to help increase the efficacy of medication significantly and proportionately - the list of healthcare use cases which can be unlocked are endless.

Who are the key players in this Ecosystem?

The value chain of smart cities is complex and needs a plethora of players to work in tandem with each other. They typically include IT Companies, Energy and Infrastructure Participants, Telcos, Automation providers, and Emerging Tech Providers - but the make and break of the opportunity is really around the player(s) the city chooses to bring it all together i.e. "Smart Integrators". This is exactly where the likes of IBM, Accenture, mobileLIVE, and others can add value from their in - depth knowledge and past experience of bringing these use cases to life.



The work done by a few of the companies is path breaking:

IBM, Enterprise IT Software and System Integrator

IBM has always sold grand visions and then gone on to accomplish them by executing it. This time

around their focus is on Smarter Planet with Smart Cities being a means to the end. Using a plethora of platforms and solutions ranging from IBM Watson, Intelligent Operations Center, and Bluemix they are helping to solve issues and simplify the problem for world leaders. They have also set up its Smarter Cities Challenge, where cities could apply to

COMPANIES BUILDING SMARTER CITIES

<p>PARKING</p>	<p>ENVIRONMENTAL/LOCATION SENSORS</p>	<p>DISASTER MANAGEMENT</p>	<p>SMART TRANSPORT (SHUTTLE/BIKE)</p>
<p>DATA-DRIVEN URBAN PLANNING</p>	<p>WATER SOFTWARE & ANALYTICS</p>	<p>CONNECTIVITY</p>	<p>GRID/ENERGY</p>

CBINSIGHTS

Source: CBInsights

have an IBM engineer seconded to them to work on real - world issues. Some cities where they have helped solve problems include:

Venice: Using sensors to manage increased pollution and flow of 20M^[7] annual visitors.

Chicago: Improving emergency management by installing new cameras, linking existing cameras, and running predictive and prescriptive analytics on streams of video collated.^[8]

Rotterdam: Aim to use real - world, real - time information to manage the effects of climate change on the city's water infrastructure and operations.

Verizon, Telecom Operator

The largest telco in the US has made a big push into the Smart City space by acquiring two companies in the second half of 2016.

- ◆ Sensity Systems was brought in-house to help provide embedded network technology for LED streetlights. Their smart lighting solution for municipalities also enables other applications such as public safety, environmental and weather monitoring, parking management, and location analytics.
- ◆ Subsequently LQD Wifi was acquired which makes interactive kiosks - called Palo hubs - offering free Wi-Fi, news, community information, and emergency alerts.

To add to it, they are investing \$300M^[9] in their Boston Smart City Pilot to unleash the true value of its broadband, mobile communications, and network IT services infrastructure along with their ready to deploy Enterprise grade IoT applications.

CISCO, Infrastructure and IT Provider

CISCO has been consistently named as one of the leading providers of Smart City solutions and infrastructure every year. They have reorganized the entire company to be able to and really unlock the true value of IoE (Internet of Everything) for its customers. Their IoE vision brings together People, Processes, Data, and Things to make Network Connection more relevant and valuable. Some of their Smart City initiatives include:

Amsterdam: Connected Public Lighting Within Smart Cities.

Chicago: Developing Digital Planning and Neighbourhood Services.

New York: City24/7 Platform helps Informs, Protect, and Revitalize the city and its citizens.

Busan: Transforming Economic Sustainability by connecting citizens, educational institutions, government agencies, and industry through a public cloud network.

Nice: The IoE Smart City Pilot project which was introduced, includes four city services that can rapidly demonstrate the benefits and value of IoE for both residents and city leadership. These services include: 1) smart circulation, 2) smart lighting, 3) smart waste management, and 4) smart environment monitoring.^[10]

Some of the other contenders and challengers would include Huawei, Siemens, Microsoft, Hitachi, Schneider Electric, Itron, Panasonic, amongst others. Given the hype and level of investments a lot of VC's and start-ups have also started focussing on this space.

What kind of Technical Foundational Capabilities and Enablers are needed to build a Smart City?

The Smart City program is anchored on leveraging open non-proprietary platforms which talk to each other and build a scalable model allowing millions if not billions of simultaneous connections, built on years of learning and helping to provide the best user experience to the citizens. The various pieces of the technological puzzle, at a high level

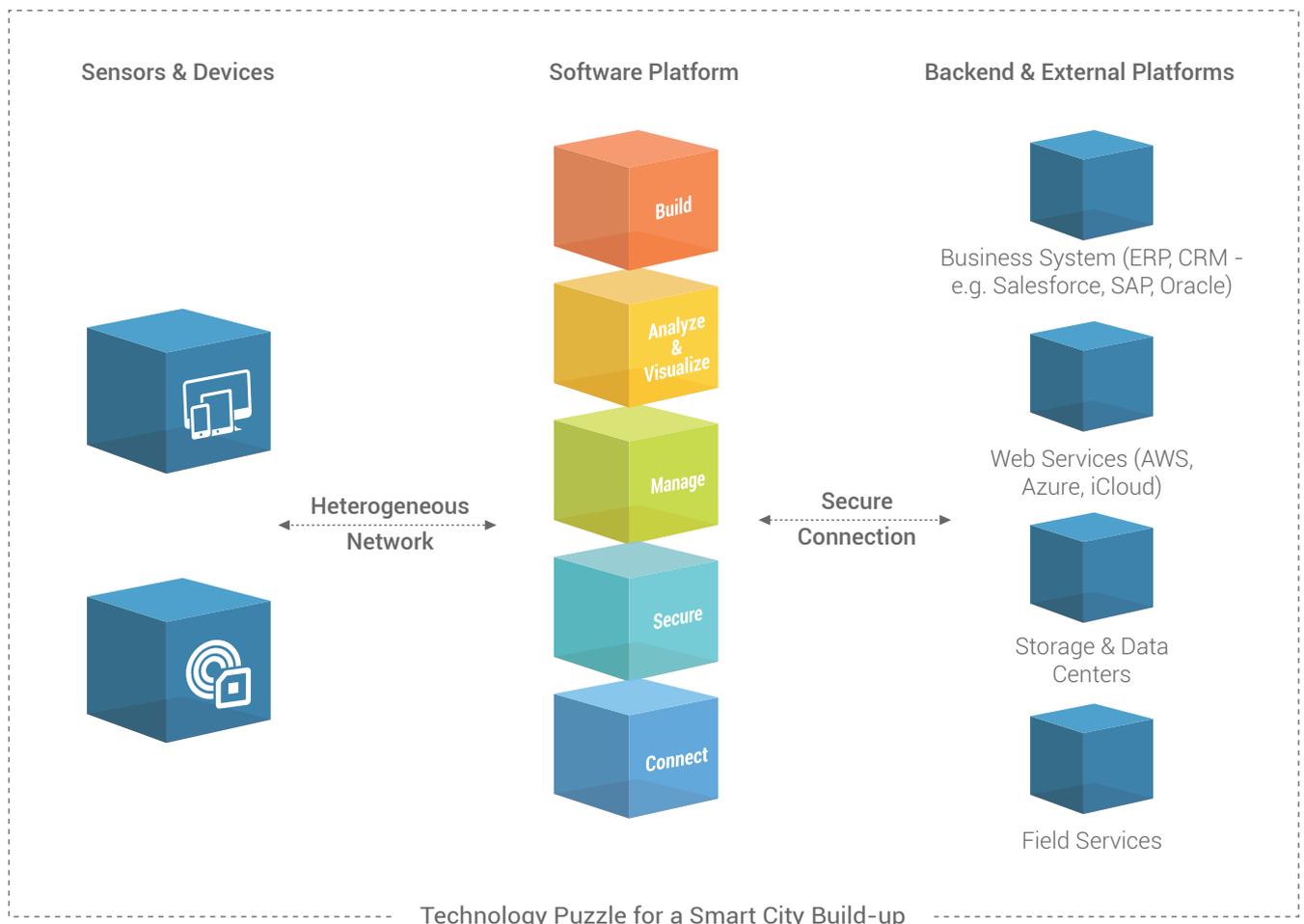
would include:

Heterogeneous Network Providers

Will need digital connectivity across the entire domain of Fixed and Mobile (Cellular, LPWA, Wifi, Bluetooth, Zigbee, Z-Wave etc).

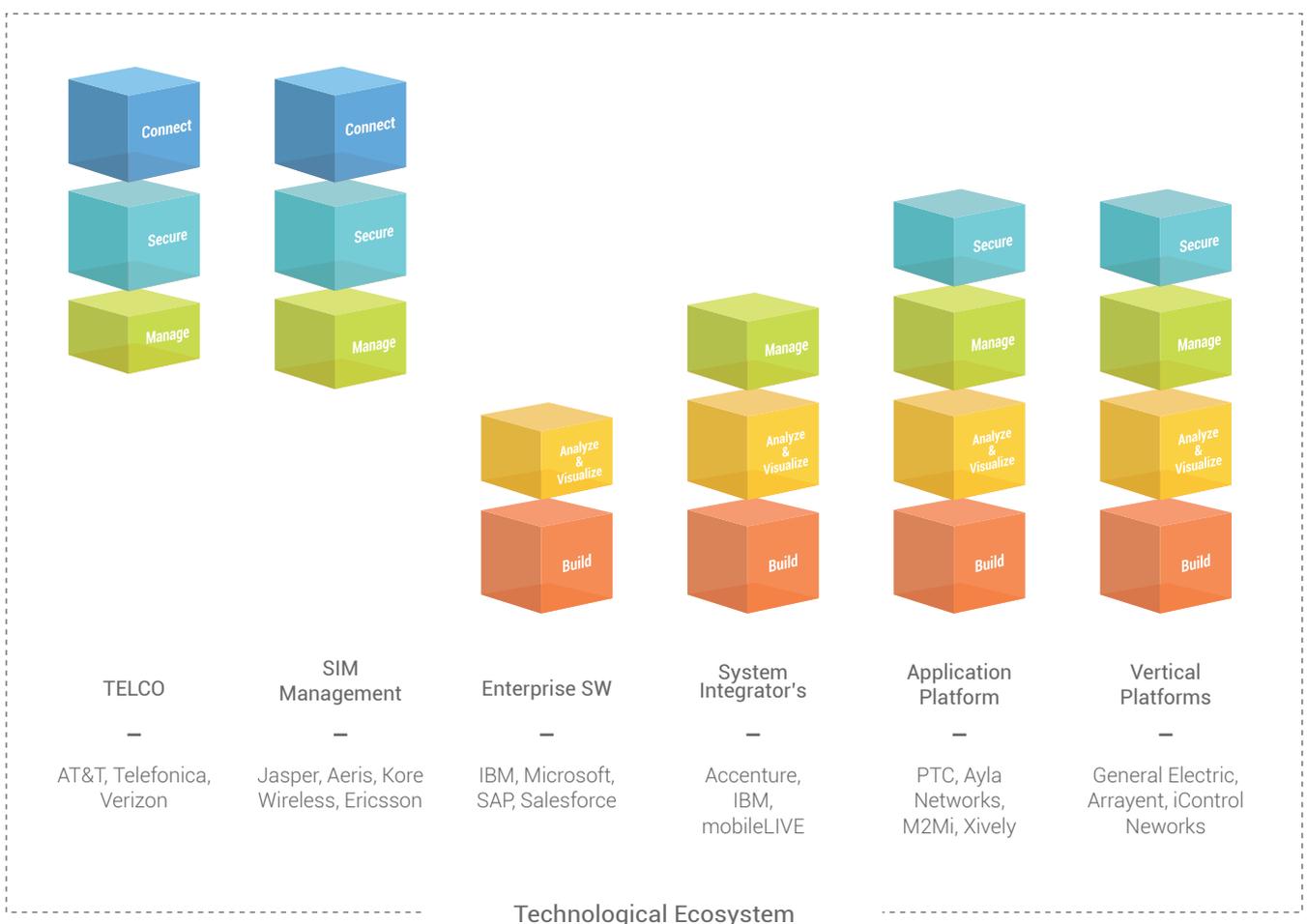
Infrastructure and Software Providers

Wide array of platforms needed to collate information, process, analyse, visualize, store, and act on it. Every vendor seems to have a platform to offer, however, it is important to ensure we have a clear understanding of competencies across the value chain.



From a city's perspective, the key principles for building a Smart City would include:

- ◆ Not own or build any of the platforms but have excellent partner management capabilities to assess the individual competencies and leverage them to build the best in class and a future friendly ecosystem.
- ◆ Architecting the solution in a modular fashion integrating through API's and
- ◆ hence fostering a model which is flexible, efficient, and allows for agile development.
- ◆ Set Up an innovation lab to drive collaborative innovation across a multitude of partners and technologies.
- ◆ Consider and invest in human/social behavior and interaction as much as in technology.



How do you ensure a successful Smart City rollout?

With such large scale initiatives, when the budget could be in billions of dollars and be ongoing for years, a lot of things have to be structured right to ensure its success. Some of the most salient features of a successful initiative includes:

Top Down Push

Smart Cities have to be pushed from the very top aggressively and the vision has to be sold to all the councillors. However, it has to be ensured that although the approach is collaborative only a few people should be driving the initiative and should have the power to implement quickly and efficiently, and also be held accountable for budget and timelines of delivery.

Focus on Agile Delivery and Quick Wins

Function like a start-up. Rather than boiling the ocean and swinging for the fences from the beginning it is important to generate constant evidence and business cases for success. On the back of the initial pilots and improved QoE and QoS should larger and costlier initiatives be implemented.

Start with Urban Challenges and NOT Technology

Often the industry gets so anchored on the technology solutions that the challenges being solved get put on the back burner. Case in point being showcasing a Smart City in a brand new city will create a lot of marketing

awareness but very limited benefit to citizens - since they aren't wrestling with legacy issues of 100 year old infrastructure, parking, or other problems. It is important to focus on cities which have issues and solve actual tangible problems and quantify the benefit constantly.

Active Citizen Engagement

Technology is providing tools to bridge the gap between planners and citizens, who have typically relied on statistical tools vis-a-vis through active engagement of the end-customer. Through crowdsourcing of ideas, issues, and data points the city planners are today in an enviable position to leverage the digital medium to create a customer first city planning initiative. Not only would it engage the citizens more, but also help solve issues which matter the most.

Share Information across other National and International Smart City Initiatives

Active sharing of information and best practices on a provincial, national, and global scale will help circumvent the long learning cycles and help leverage each other's platforms, partner management, and citizen engagement tactics to create the best in class "Smart City" initiative quickly and more effectively.

How Smart is your City?

Rather than hoping for overnight transformation it's important to realize that a Smart City program is a journey, which requires a profound shift in thinking and a break from the past. City Officials should measure and quantify their cities progress and development needs, from a holistic point of view. Identifying where they want to be and how they make that leap is equally important as the actual transformation itself. Starting from differentiating their strengths which will attract skills, knowledge, and creativity, a strategy should be created that centers around these strengths. During the assessment, quick wins should be identified

to enable a successful start to the journey. Every baby step taken towards becoming a smarter city creates operational efficiency and every bit of this efficiency reduces the burden on city budgets, freeing up resources to focus on driving economic growth and prosperity.

We would encourage you to reach out to mobileLIVE's team to help assess your cities goals, quantify where the city is, create a framework to evolve, grow, and strategize on how to bridge the gap. Having worked on Smart City initiatives to build applications and launch platforms we understand the digital transformation journey and what it takes to realise a vision of "People-centred" Smart Cities.



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