DEFINITION OF THE SMART CITY

A smart city is one that uses technology and data to enhance its liveability, workability and sustainability. Or in short - tech and data for good.

However, before we jump to "smart" cities in this Info Card series, we should first deal with the word "city." Real world smart city examples are rarely a city in the strictest term. Many are more than a single city, such as a metropolitan region, a cluster of cities or a collection of nearby towns or a regional coalition.

Other examples are less than an entire municipality, such as districts, neighborhoods, townships, villages, campuses and even infrastructure projects. Indeed, many local Council's are taking a place-by-place approach to planning and development, and therefore smart cities implementation.

We believe smart cities must respond to all of these human ecosystems, regardless of scale. Therefore, smart cities is a 'scale-neutral' agenda, meaning there is no minimum or maximum size of place where technology and data cannot support enhanced outcomes.

And with size not being an issue, neither does smart cities discriminate against location. Whether a large mega-city, a small rural town, or remote village - smart cities works for all.

Regardless of size and location, smart cities takes a comprehensive, holistic view that includes the entirety of human activity in an area, including city governments, schools, hospitals, infrastructure, resources, businesses and people. Smart cities always has, and always will be a social, economic and environmental agenda.

So, don't be convinced otherwise - smart cities is about people! But it is fundamentally about technology and data helping people - enhancing quality of life, increasing wellbeing and creating better access to opportunity.

SOME OTHER IMPORTANT NOTES

- Smart cities embraces both technology, and data - not one or the other
- Smart cities has the potential to 'accelerate' - achieve outcomes quicker, cheaper and more efficiently
- Through its ability to connect and engage, smart cities can help build greater democracy
- Given smart cities value data as an asset, and the insights it provides, they can enhance transparency and therefore trust with their citizens.

STANDARDS

Smart cities standards are available all around the world, and are an important resource in your smart cities journey.

There are international standards, national standards as well as numerous voluntary frameworks and guidelines.

They cover a variety of topics - from strategy development, to security, interoperability and data management.

Standards can help:
- create a shared purpose
- build a common understanding
- accelerate innovation
- help build scale, and aggregate demand
- specify performance requirements
- reduce risk
- reduce costly and unnecessary rework.

The Smart Cities Readiness Guide was published by the Smart Cities Council in 2013, informing many of the world's smart cities standards that have since been created. It is one of the most comprehensive handbooks on smart cities ever published, with 200 case studies and multiple checklists. This is a free resource available at smartcitiescouncil.com

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THE CORE FUNCTION OF THE SMART CITY

A smart city is one that uses technology and data to enhance its liveability, workability and sustainability. And there are three parts to this process: collecting, communicating and crunching.

First, the city collects information about itself through sensors, other devices and existing systems. Next, it communicates that data using wired or wireless networks. Third, it "crunches" (analyses) that data to understand what's happening now, and whats likely to happen next.

This process provides a timely reminder that both technology and data are at the heart of the smart city. Outlined below is a little more on this process.

COLLECT

A smart city collects information on whats happening. Smart devices are logically located throughout the city to measure and monitor conditions.

For instance, smart meters can measure electricity, gas and water usage. Smart phones can measure movement and speed. Social media platforms present a wealth of information on what people value, and how they feel. What we can sense and collect is only restricted by our imagination.

COMMUNICATE

Once information is collected, the smart city communicates that information to other devices and servers where it can be safely stored before being analysed for its insights.

The information is typically communicated using a mix of wired and wireless communications pathways, from fiber-optic to cellular to cable. Wireless communications also include Wi-Fi and Low Power Wide-Area networks.

And in terms of storing that data, there are a variety of solutions such as cloud, edge, and hybrid models.

CRUNCH

After collecting, communicating and storing the data, you can analyse it for one of three key purposes:
1. Presenting - providing current situational awareness
2. Perfecting - providing system optimisation
3. Predicting - providing insights on 'whats next'

Importantly, analysing data turns information into intelligence that helps people and machines to act and make better decisions and achieve better outcomes.

Cities can derive benefit by collecting, communicating and analysing information from a single department. But the greatest benefits come when data is connected with multiple departments and third parties. And when opened up to the public, the value created from that data can be exponential. Open and shared data are addressed in other Info Cards in this series.

THE SMART CITIES FRAMEWORK

Fact Sheet 1 and 2 defined the smart city as one that uses technology and data to do good. The smart cities framework now captures the relationship between the city's responsibilities (what it needs to accomplish for its citizens and businesses) and the available smart cities enablers (the solutions that can make those tasks easier).

The framework has four compenents, as outlined below.

STEP 1
OUTCOMES

Cities have essential functions and services that must be available everyday to citizens and businesses.

These must be guided by clearly stated outcomes - goals and targets.

To help with this, use a recognised framework (eg. UN Sustainable Development Goals) which has been localised and informed by community engagement.

Here is some additional advice in articulating your outcomes to guide smart cities action:
- Be strategic - where can you do more whilst saving tax payers money?
- Be compassionate - how can you help the community's most vulnerable?
- Be climate focused - How can you reduce greenhouse gas emissions?

STEP 2
ENABLERS

Understand and apply technology and data solutions that can accelerate those outcomes, and help you achieve those outcomes more efficiently, using less tax payers money.

But deploy solutions that are meaningful, appropriate and that do no harm. Ensure they are interoperable, open source, secure and ethical.

And you have many transformative technology and data enablers to help achieve your outcomes. There are seven (7) core enablers, listed below but explained in more detail in other Info Cards:
- Instrumentation and controls
- Connectivity
- Interoperability
- Security and privacy
- Data management
- Computing resources
- Analytics

STEP 3
MONITOR

Now that you have taken action and made strategic investments to accelerate the achievement of your outcomes, its important to know if you achieve them.

Capture the data, convert it into insights, tell stories and engage your community.

STEP 4
REPEAT

As you learn to appreciate the value of insights, and engage with your community, you can set a path for greater outcomes.

Continually review your targets, find better ways to use technology and data to achieve your outcomes, and build transparency and trust with your community.

Here are some valuable resources for shaping your smart cities journey:
- Smart Cities Readiness Guide (Smart Cities Council)
- ISO 37106:2018 Sustainable cities and communities — Guidance on establishing smart city operating models for sustainable communities
- United Nations Sustainable Development Goals

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THE SMART CITIES ENABLERS

Smart cities can radically enhance city-wide outcomes through the power of technology and data. These enablers can make buildings more efficient, water and energy more affordable, transportation quicker and neighborhoods safer.

We refer to these transformative technologies and capabilities as enablers. They put the "smart" in smart cities. There are seven core technology and data enablers used in smart cities around the world. They are listed below.

1. Instrumentation and control

Instrumentation and control is how a smart city monitors and controls conditions. Instrumentation provides the eyes and ears of a smart city and control systems provide remote management capabilities.

2. Connectivity

Connectivity is how the smart city's devices communicate with each other, and ensures that data gets from where it is collected to where it is analysed and used.

3. Interoperability

Interoperability ensures that products and services from disparate providers can exchange information and work together seamlessly.

4. Security and privacy

Security and privacy are technologies, policies and practices that safeguard data, privacy and physical assets.

5. Data management

Data management is the process of storing, protecting and processing data while guaranteeing its accuracy, accessibility, reliability and timeliness.

6. Computing resources

Computing resources include three things - 1) the billions of computer "brains" of all sizes, from wrist watch components to server farms, 2) data, which has little value until it is communicated and analysed, and 3) a range of simple to very complex software that allows data to be accessed, analsed and made useful.

7. Analytics

Analytics create value from the data that instrumentation provides.

There are also a range of supporting 'general' enablers for smart cities which are discussed in other Info Cards.

THE OPEN DATA FUNDAMENTALS

Cities, other public entities and private sector companies, by their nature, collect all manner of information on just about anything and everything that happens within their purview – tax payments, bus ridership, crime reports, consumer spending transactions, ride sharing patterns and thousands of other data sets.

So all of that data routinely collected is like the Mother Lode just waiting to be mined. By unlocking these data sets and posting them online, they can be easily accessed, analysed, manipulated and shared.

This is essentially open data - the process of making data sets available to the public to use and reuse.

WHAT DOES 'OPEN' MEAN?

As you can see, open data represents a powerful opportunity for cities to connect with citizens and businesses in meaningful and life-impacting ways.

But what has to happen for data to be deemed open? The World Bank offers a straight forward definition. It considers data open if it satisfies these two conditions:

Technically open: It is available in a machine-readable standard format, which means it can be retrieved and meaningfully processed by a computer application.

Legally open: It is explicitly licensed in a way that permits commercial and non-commercial use and reuse without restrictions.

BIG DATA VS OPEN DATA

It's hard to escape the terms big data and open data these days. And athough they are certainly related, they are not the same.

While big data is defined by its size, open data is defined by its use.

Big data refers to the ongoing accumulation of massive, often complex and always-changing data sets – for instance, machine-generated data from sensors or mobile phone GPS signals. Or it may be data from social media platforms. Big data's value is that it can be analysed and manipulated to provide insights and promote better decision-making.

And while big data can become open data, it is not by definition available to the public. Open data, on the other hand, are data sets purposely made available to the public to use and reuse. Those sets may come from big data but they don't have to. Smaller amounts of data can be useful too.

PRESENTING OPEN DATA

The primary goal for opening data is to make it usable, used and reused. There are a range of platform options for doing that through various types of data portals. There are cloud-based open sourced portals, or cities can build their own.

Prioritising which data should be published can be based on availability, or inviting feedback on what the community would like to access.

The Smart Cities Open Data Guide was published by the Smart Cities Council in 2015, presenting advice, best practices and tools for creating a data-driven city. This is a free resource available at smartcitiescouncil.com

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