A GUIDE TO CREATING A SMART COMMUNITY IN AUSTRALIA

2017

AUSTRALIAN
smart communities
association

LEAD PARTNERS

Continuing to support the development of smart communities is a natural extension and progression for the Acaché management consulting team. Throughout our history we have been involved in designing, developing and delivering major projects and transformations for public and private sector client organisations. Applying our problem-solving and stakeholder engagement skills to complex community challenges and opportunities ensures decision-makers, partners and community members have opportunity to increase their own happiness and wellbeing in concert together.

www.acache.com

Smarter Technology Solutions is a technology consultancy service provider, systems integrator and managed services provider, specialising in improving business process and operational effectiveness.

At STS, we live and breathe innovation, digital disruption and emerging technology trends and use these technologies to collect, analyse and apply data from previously unconnected systems. We do this by leveraging smart/IoT based technologies to detect and measure metrics and leverage data analytics capabilities to determine trends, identify weaknesses and measure success.

www.smartertechnologysolutions.com.au

[ui!] the urban institute is a multinational organisation with a strong foundation in IT research, product development and commercialisation, software engineering and IT project management. [ui!] provides smart city software and consulting services to governments and industry in Europe, Australia, Singapore, North America and New Zealand. Its keystone product, UrbanPulse, is an open Internet of Things (IoT) analytics and smart services platform with an open interface architecture, which connects various data streams, eg traffic, lighting, energy, water and parking data, in real time.

www.ui.city/en

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WELCOME

Welcome to the second edition of the guide which showcases some of the best examples of smart solutions being deployed in Australia and New Zealand.

Building on our first *Concepts and considerations for the future of smart communities* launched in 2016 (in partnership with Acache), this year's guide has expanded to include a broader range of smart city themes and case studies featuring best practice initiatives and deployments from large cities to regional areas.

We are excited to share the successes of our members and partners as they solve challenges with smarter approaches, innovative solutions and smart technologies, ranging from smart parking to smart signage, lighting and poles, to sensors, apps, management platforms and open data programs.

We thank our project partners Acache, Smarter Technology Solutions and the Urban Institute for their valuable contributions to this year's *Guide to creating a smart community in Australia.*

This guide will continuously change along with the ideas and solutions. Updates highlighting case studies will be available on the ASCA website: http://australiansmartcommunities.org.au/asca-guide

Michael Whereat
President, Australian Smart Communities Association

AUSTRALIAN SMART COMMUNITIES ASSOCIATION

The Australian Smart Communities Association (ASCA) facilitates, promotes and advises on how communities can build liveable, sustainable, workable smart cities. We put our citizens, local businesses and stakeholders at the core of our activities.

Our members are made up of local governments, Regional Development Australia committees, Regional Organisations of Councils, industry, businesses and individuals who **collectively represent 1 in 2 Australians**.

In 2016 we restructured the association to create a strong membership and partnership system to support our next phase of growth. We have since welcomed R&D innovation partners, Federal, State and Territory partners, as well as national and international partners.

Through this new model ASCA will become the primary integrated organisation for smart cities in Australia for supply and demand sides.

australiansmartcommunities.org.au

1 What is a smart community?

Autonomous on-demand vehicles, high-speed public Wi-Fi, smart street lighting and augmented reality: no matter the technology, innovation or advancement, what we aim to do under the smart communities banner must be linked to and address community needs. A smart community should be working towards improving people's lives – their happiness and their health. The efficiency of critical infrastructure or data-driven decision-making are just part of the journey.

The improvement of many key societal outcomes since the inception of the first Industrial Revolution (late 18th century) changed human experiences and have gradually made urban life healthier and happier.

The Fourth Industrial Revolution: if we believe the hype, the global community is on the cusp of a monumental transformation in the way that we interact, work and experience the world we live in. Waves of innovation and disruption have already started breaking all around us. It's an exciting time – whether we consider ourselves a participant or an observer.

So how do know if we are on the path to achieving smarter communities or just an age of incredible technological advancements?

THE FOUR INDUSTRIAL REVOLUTIONS

Mid-late 1700s to early-mid 1800s
Water and steam power to mechanise production

Late 1800s to early 1900s
Electric power to create mass production

Mid-late 1900s
Electronics and ICT to automate production

Now
Explosion of technological advancements across physical, digital and biological eg IoT, AI, robotics, quantum computing

Source: World Economic Forum www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/

...how do we know if we are on the path to achieving smarter communities

In this Australian smart communities guide, we will not describe what is 'smart' in overly prescriptive terms, as each community is unique (and dynamic) in its history, composition, needs and aspirations. Thoughtless and impatient "keeping up with the Joneses" in the smart community sense is a recipe for high risks and ultimately disappointment.

Instead we have identified the following elements as key principles for smart community success[1]:

- We are making **better decisions** – across government, business and the general population – based on the timely availability of integrated and relevant data. More data, better data, insights and decisions should be our growth path in a smart community
- **Improved asset use and performance.** We are doing more with what we have, what we build and how we use it. There is less waste across our infrastructure and services because the infrastructure and asset configuration is better aligned with community needs
- **Increased opportunity for more of us** – to create, build and grow. Smart communities empower and improve the experience of the masses, rather than just furthering the interests of a privileged few
- Community members are brought along and, as much as is practical, shape the smart development journey. **Citizens are meaningfully involved** in determining needs, making decisions and assessing the benefits of smart projects. Effective and balanced cooperation between the three core stakeholder groups – community, government and private sector – is needed to be smarter, in process and outcome
- Smart technology is smart because of the way it **interfaces and is used by people,** not simply the way it connects with other technologies. At some point – and hopefully, at many points – people need to be involved for ideas to be truly impactful.

Anything less than the pursuit and achievement of those smart principles may leave community members with something akin to *digital buyer's remorse.* Quicker, shinier, newer, but not smarter or better. So how are local communities effectively identifying and harnessing the opportunities of smart communities?

[1] These may be used as benefit management themes within local government programs to deliver smart community outcomes.

CASE STUDY

The City of Newcastle

Who was involved?

Newcastle City Council

What was the challenge or opportunity?

Transforming the region into an internationally recognised centre for technology innovation.

How was *smart community* demonstrated?

Council's ambitious Smart City Initiative is influencing a city-wide revitalisation and regional transformation aimed at establishing Newcastle and the Hunter Region as an internationally recognised centre for technology innovation.

This initiative maximises opportunities in sectors including technology, advanced manufacturing, the digital economy and creative industries. It leverages the smart city movement to improve the city's liveability, sustainability and economic diversity, develop local innovation, build international profile and attract talent and inward investment.

The Newcastle Smart City Strategy is fundamental to the Initiative and outlines its long-term objectives around six smart city themes: Smart governance, smart economy, smart people, smart environment, smart living and smart mobility.

Council's partnership with University of Newcastle, Newcastle NOW and Hunter DiGiT secured $9.8 million funding from the State Government's Hunter Infrastructure Investment Fund for the Hunter Innovation Project. With Council and the University contributing $8 million, this $17.8 million collaboration is providing services and infrastructure instrumental to a smart community:

- **Sector leading smart city infrastructure** - Digital connectivity through Wi-Fi and LPWAN (low power wide area networks) will link sensors and integrated technology to provide detailed real time city data, facilitating an open-ended range of services and applications to improve the ease of access, efficiency and liveability of the city.
- **Globally connected, regionally focused innovation hub** - a dedicated facility that will bring together researchers, students, developers, entrepreneurs, investors, technical specialists and business advisors to facilitate the launch of spinoffs, startups and mature companies; attract investment and businesses to the Hunter Region; encourage innovation and commercialisation; and produce the next generation of entrepreneurs, business leaders and inventors.
- **A revolutionary designated digital precinct** - with high speed fibre broadband (fttp). This concentrated capability will give the Hunter Region a key competitive advantage in attracting and retaining high-tech, digital and creative industries to stay or locate in the region.

Continually harnessing community and business feedback has enabled Council to substantiate that a smart community is not only about local craft, community and locally-sourced food. It's about transitioning the way we interact and do business, how we attract investment and bring about urban and environmental efficiencies through applications such as smart parking and intelligent lighting and waste management, about strong collaboration and partnerships, and about embracing cutting-edge innovation and technologies.

Newcastle Smart City Initiative: www.newcastle.nsw.gov.au/Business/Smart-City

Hunter Innovation Project: www.hunterinnovationproject.com.au

2 Harnessing disruptive technologies

In the way that Uber has transformed the taxi business, and Airbnb the hotel business, disruptive technologies are also changing the landscape of our cities and communities.

By using sensor networks, automated systems and insights from data collected they will help improve liveability, sustainability and support local economies as well as provide more proactive services to citizens. Councils are also able to improve operational efficiency and provide cost saving initiatives through automation, greater business intelligence and facts to support trends and pattern recognition.

While the Internet of Things is recognised as one of the key elements in a smart city or community there are various other components and challenges which much must be addressed to successfully execute a smart city strategy. It should be noted that smart cities aren't just about technology; in addition to disruptive technologies, disruptive thinking, innovation and business process optimisation enables councils and other organisations to create new opportunities that have been simply overlooked or didn't exist due to constraints or obstructive barriers in the past.

In addition, smart communities focus on the community outcomes in terms of jobs, growth, environment and liveability, attracting new people to the local area and retaining those who call it home.

What is a smart city and how does technology fit into the equation?

Different entities define smart cities differently; however, it is commonly understood that smart cities are about liveability, economic development, sustainability and quality of the local culture and community. Disruptive technologies relevant to smart cities include:

- Autonomous vehicles
- Artificial intelligence
- Machine learning
- Internet of Things (IoT)
- Renewable energy
- Robotics and automation
- Data analytics and business intelligence tools.

These, and others, have promised to provide greater disruption in the next 20 years which will likely rival the previous 100. A key impact of this upcoming transformation is the nature of work, the impact it is likely to have on social and economic ecosystems, service provision and in the longer-term overhaul and transform the education system to prepare the next generations for the highly automated, intelligent systems workforce they will contribute to.

87% of companies feel that digital transformation is a competitive opportunity

Source: Capgemini Consulting Digital Talent Gap Report

CASE STUDY

Who was involved?

CSIRO Data 61

What was the challenge or opportunity?

Supporting livability and sustainability using data.

How was harnessing disruptive technologies demonstrated?

MyClimate is an urban sustainability related project that aims to use image processing and data analytics algorithms to calculate a "sustainability/liveability measure" for a dwelling.

It also evaluates urban heat island and winter heat loss effects for the neighbourhood to ensure communities are able to deal with sustainability/liveability issues using evidence based data.

As an example, the sustainability measure could be an indication of how conducive the dwelling is for installation of solar PV and/or rainwater tanks. Similarly, the liveability measure could be an indication of whether the community requires specific tree plantations. The key datasets required for the analysis include airborne high resolution imagery and thermal maps.

The capability was developed as a prototype for the City of Port Phillip in Victoria (in partnership with council) and won the State iAwards in the sustainability category in 2015. The tool and data is open access and available to use for free by anyone.

Currently Data61 is in the process of extending the applicability of the tool to other parts of Australia. In doing this we are evaluating the use of high resolution satellite data sources rather than LiDAR (Light Detection and Ranging) and airborne data which can be expensive to capture especially if the data requires frequent updating.

www.enviroehub.com.au/articles/try-our-award-winning-my-climate-tool

Who was involved?

Xandra Labs

What was the challenge or opportunity?

Digital technologies creating new and innovative services to engage residents.

How was harnessing disruptive technologies demonstrated?

SunCentral, the organisation designing and delivering Australia's only greenfield smart city CBD, has partnered with Xandra to develop a chatbot for the new Maroochydore City Center in Queensland.

The Bright City Guide provides information to residents, businesses and visitors about the project's vision, the technologies behind the Smart City Framework, the timeline of development and how the new city will fit within the broader region.

Messenger was chosen as the ideal channel to engage digital natives and early technology adopters who are comfortable with messaging interfaces and are more likely to trial the solution and provide meaningful feedback. Maroochydore was the first city in the world to embrace this new platform for public engagement.

The initial deployment, launched in late 2016, is in live testing mode to collect data on user behaviour and expectations. Content in the first version was limited to what was initially provided by SunCentral. Version two will add natural language processing, machine learning, and additional content to make the experience more "chat-like"- emulating the experience of asking questions of a human tour guide.

Subsequent releases will incorporate information from open data feeds provided by local government and industry.

In addition to dialog, the team created a full persona that informs the bot's tone, level of humor and place within the community. This persona will evolve as the city emerges to increase its sophistication and usefulness.

www.facebook.com/chatbotagency

CASE STUDY

Who was involved?

Trendwise

What was the challenge or opportunity?

Visitor analytics to understand and monitor social behaviour and identify hot spots and travel paths.

How was harnessing disruptive technologies demonstrated?

The City of Mandurah is one of Australia's fastest growing cities covering an area of 173.5km. It is home to more than 82,000 people with more than 4000 local businesses.

The city approached Trendwise because it needed to:

1. Better understand how visitors interact with their precinct on a day-to-day basis.
2. Identify the impact that particular campaigns have on increasing pedestrian traffic, and subsequently the economic impact of those campaigns.

Since 2014 Trendwise has deployed 14 proprietary IoT sensors and partnered with Cisco Meraki to integrate 46 access points to send data to the online analytics platform. The collected data allows the city to monitor day-to-day visitor and resident behaviours, identify hot spots and paths within and between precincts and understand year-on-year event data.

Furthermore, this data-driven information provides the tools to plan accordingly when developing new pedestrian paths, activating public spaces and requesting new infrastructure.

The longevity of this deployment supports the city in effectively evaluating and measuring the ROI on their largest event, The Crab Fest. The real world data is used to compare event attendance, see who returned between days and year to year, as well as access the economic impact the event brings to the precinct.

The value of the data and analytics to the City of Mandurah is evidenced by the evolution of the relationship and expansion of data capture zones throughout the city since 2014.

www.trendwise.co

CASE STUDY

Who is involved?

Community Care Smart Assistive Technology Collaborative

What is the challenge or opportunity?

To provide an online community of practice to facilitating collaborative developments and consumer engagement.

How was harnessing disruptive technologies demonstrated?

The Community Care Smart Assistive Technology Collaborative (CCSATC) provides a space to collaborate, learn and access resources and expertise on Smart Assistive Technology.

The focus on local, national and international community care practices and experiences with incorporating Smart Assistive Technology in service provision will ensure participants are able to access leading edge and contemporary information.

Since its deployment, the CCSATC has gained over 1000 registered users, including consumers and families, technology developers, researchers and academics, and community care providers.

Open access, open source and providing good user experiences are coordinated in the CCSATC collaboration framework. These principles are adhered to through partnerships within the collaboration by providing an online community of practice, facilitating collaborative developments, and consumer engagement through co-design and co-creating portal.

Learnings from this project:

- A collaborative effort is required to increase the impact of the agenda of Smart Assistive Technology in communities
- Consumers are central to discussion regarding co-design and co-creation of new technologies
- Joining the dots between researchers, technology developers, consumers and service providers, as well as the wider community is essential.

The CCSATC has partnered with a number of partners to deliver Smart Assistive Technology solutions to the community care sector. These include over 1020 collaborators, the Queensland Government, leading technology developers including CSIRO/Data61, Apple, Microsoft and Uber, service providers throughout Australia, consumers and their families and international collaborators.

www.satcommunity.com.au

Who was involved?

City of Whittlesea

What was the challenge or opportunity?

Socially assistive robot enabled context based services for sustainability of long term emotional wellbeing of people with dementia.

How was harnessing disruptive technologies demonstrated?

For the past four years the Research Centre for Communications, Computers and Social Innovation (RECCSI) based at LaTrobe University conducted research and field trials of socially assistive robots with people with dementia and their caregivers in home based and residential care. The trials included preventative and proactive care services for people with dementia and their caregivers.

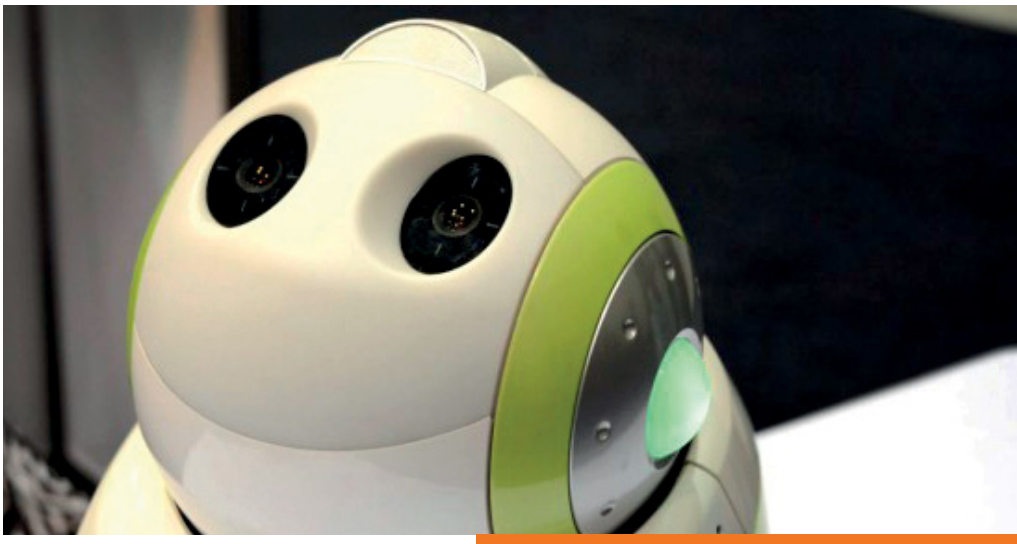
The social robots have the ability to collect context and location based data: verbal (eg speech), non-verbal (eg facial expressions, emotional responses, gestures), multimedia (eg video streaming) and sensory based (eg blood pressure, heart rate).

The pilot trials involved six robots placed in the homes of nine couples for 1-6 months. The robots helped to:

- Break down technology barriers
- Establish the potential for improving the emotional wellbeing of people with dementia
- Provide respite to partners.

The socially assistive robots delivered personalised and interactive services to each participant. For example, singing and dancing to songs, reminders, phone calls, video streaming, quizzes, reading the news and storytelling.The robot's personalised services offered the following benefits to the user:

- Sensory enrichment (singing, dancing)



- Resilience and coping (reminders)
- Social connectedness (phone calls, video streaming)
- Utility (quizzes)
- Comfort (news, storytelling)
- Memory retention (reminders, quizzes).

The robot / services helped to:

- Improve the quality of engagement between caregivers and residents in nursing homes
- Build capacity of nursing homes staff by providing additional services
- Support remote data collection
- Monitor and manage people with dementia
- Reduce the stress level of caregivers in nursing homes.

The robots provided diversion therapy services to people with dementia in group and one-to-one sessions, using multiple communication methods: voice, touch panel, facial expressions and gestures. As the relationship between the social robot, person with dementia and their caregivers evolved, the context and location based services were adapted.

Council supports using complementary technology to support the most vulnerable members of its community and enable them to maximise their quality of life.

Council is keen to use this technology in its aged services and sourced the families for the research study to be conducted. Council aims to make this technology available to families on a lease basis after the success of the research.

CASE STUDY

City of Whittlesea

www.latrobe.edu.au/reccsi/research/health-and-aged-care-research/robot-enabled-services-for-people-with-dementia

3 Structure, strategy and policy

In order to achieve smarter communities, the mechanisms and approaches – structures, strategies and policies – of the past may not be adequate. The foundations for a smarter future are laid in the way governments and communities encourage, attract, facilitate and incentivise smart programs and projects.

"If you build it, they will come" is one of the most iconic, though misquoted, lines in cinema history. The message could also be interpreted as the tagline for many of the world's most significant sporting events; how governments and big business salivate at the opportunity to be 'watched by the world'.

Although building a modern sports stadium, attracting the world's greatest athletes and filling it a few times may feel euphoric in the moment, the financial aftertaste can be bitter for taxpayers. The last Olympic Games that was able to generate a direct profit was the 1984 Los Angeles Games[2]. The centrepiece of the Beijing Olympics, the 91,000-seat Bird's Nest stadium, cost US$480m to build and has annual maintenance costs of US$11m. It has, however, no regular tenant and has since relied on a $20 fee to circle the running track on a Segway as its primary revenue stream[3]. Governments of all types have realised that the price of prestige is a cost to bear[4]. "One piece of good sense would be more memorable than a monument as high as the moon."[5]

While a typical local government cannot host an Olympic Games, it could study examples of strategy and policy that fail to deliver sustainable community value, even if an event delivers a short-term impact.

In the midst of the excitement and emotion of the smart community market opportunity, how do we ensure that pragmatic strategies and policies influence and govern decisions and priorities? And how do we balance the aspiration to innovate and dream big with the need to be fiscally responsible and economically sustainable?

Local councils can start by focusing on their reason for existence. The primary purposes of a local government (council) are to:

- Provide services and amenities to local communities
- Regulate and provide services for local land and property
- Ensure the general health and well-being of the local community
- Provide community services and recreational facilities
- Encourage tourism and foster local commercial benefits or community pride
- Be a catalyst for building local identity and social cohesion
- Ensure that local communities function effectively every day and are provided with the basic services and facilities that Australian communities expect.[6]

Smart city strategies and policies for local councils and governments should link back to achieving these basic purposes. The technology and its applications may be changing but the motivation should not. Strategies and policies should focus less on specific technology performance criteria and more on people's experiences and meaningful social outcomes. In a dynamic, modern context this may look like some, or all of the following:

- Smart community developments and enhancements focus on improving whole-of-community access to services and information.
- Smart community projects and programs fit within a portfolio approach that includes a clear, aligned business case and an understanding of (for example) how a single emerging technology creates community benefit beyond the technology implementation itself.
- Local businesses and other institutions (eg schools and universities) are given opportunity to shape smart city projects, in both development and delivery.
- Smart city projects have independent financial and economic modelling to quantify the anticipated opportunity and to balance it against the opportunity costs. Taxpayers / ratepayers should be confident that there is robust data to support decisions and developments.
- Smart community strategies and policies are integrated within the broader strategy and policy framework, rather than being viewed as a standalone, siloed, technology-driven effort.
- Policies and strategies consider the current state, and historical factors, in their design and execution.

The fruits of effective public policy and strategy in regards to smart communities may not be evident in the short-term, so there is also need for courageous community leadership. So how are local communities effectively designing and implementing *smart policies and strategies?*

[2] New York Times (10 August 2014) *Does hosting the Olympics actually pay off?*
[3] NPR (10 July 2012) *China's post-Olympic woe: How to fill an empty nest*
[4] News.com.au (20 February 2017) *Fewer cities are bidding to host the Olympic Games*
[5] Thoreau, Walden (1854)
[6] Parliament of Australia (2011) *Local government and the Commonwealth: an evolving relationship*

CASE STUDY

Who is involved?

Sunshine Coast Council

What is the challenge or opportunity?

Providing the policy, strategy and implementation to create a smart city

How are *smart strategies and policies* being demonstrated?

In late 2014, Sunshine Coast Council partnered with Telstra and Cisco to develop a Smart City Framework for the Maroochydore City Centre Priority Development Area and wider Sunshine Coast region.

Seen as a keen competitive advantage for the region, the framework was designed to balance improvements to quality of life, economic growth and environmental sustainability through the implementation of key technologies associated with the development and attraction of businesses, the management and monitoring of pollution as well as key improvements to the transport, health and education sectors.

Officially launched in September 2015, the Smart City Framework identifies the elements necessary to achieve a successful and integrated Smart City.

The initial framework identified 15 action areas ranging from smart Wi-Fi to smart parking and health and five themes under which the Smart City Solution Systems are grouped:

- foundation systems
- transport
- energy, water and waste
- built and natural environment
- smart citizens and living.

The Foundation Systems form the backbone of the smart city and include Council's duct and pit network, free public Wi-Fi access points, Council-owned and managed fibre optic cable, multi-function poles and a Smart Centre and Living Lab where visitors can interact with the smart city technologies being trialled.

Council adopted the Smart City Implementation Plan (SCIP) in December 2016; a three-year transition program that lays out a structure, program of works and deliverables for the implementation of the Smart City Framework into Council projects, systems and processes.

By incorporating the delivery of the smart city solution systems within existing capital works programs and organisation-wide operations, smart outcomes can be delivered sooner and with higher value results.

Through the Smart City Implementation Program, Sunshine Coast Council is actively seeking to harness the benefits of the digital revolution to increase the region's sustainability and drive new investment through its international profile as a leading smart region.

www.sunshinecoast.qld.gov.au/smartcities

4 Innovation culture and organisational transformation

Smart should mean more than solutions and outcomes; we should be smarter in the way we understand our circumstances, diagnose problems and consider options. Fostering, encouraging and enabling a culture of innovation – and the necessary transformation for organisations – should be a focus for all involved in building smart communities.

Like the 'smart' descriptor, it is understandable to be cynical about 'innovation'. Many make the claim, but how many deliver on the promise of innovation? Moving beyond an overused buzzword, understanding what innovation means and how to be innovative is worth investigating. How do we ensure that innovation is given every chance to inform our ideas and solutions?

At its core, innovation is no single technological advancement but reflects a broader culture that encourages and enables divergent thinking, research and development, and a willingness and capacity to make decisions in the face of risk and uncertainty. This culture is further strengthened through more practical mechanisms that include financial investment, incentivisation for improvement, and abilities to measure and communicate progress.

Innovation may be viewed as the enemy of a number of key safety features of large organisations, public and private. These are a few ideas for large (or small) organisations to preserve bureaucratic integrity, and also promote a culture of innovation and transformation.

INNOVATION IN ACTION: LOCKHEED MARTIN AND SKUNK WORKS

Defense and aerospace company Lockheed Martin's abaility to deliver innovative solutions through its Skunk Works business area is a clear example of how large organisations can strike the right balance between

- strong corporate governance
- innovative people, processes and solutions

Skunk Works project teams had the capability, guidance, freedom and responsibility to develop some of the most significant, cutting-edge aircraft systems in history including the U-2, SR-71 Blackbird and F-117 Nighthawk.

The iconic SR-71, operational between 1964 and 1998, still holds the recordfor the fastest air-breathing manned aircraft (over Mach 3). This record has stood for more than four decades.

Feature of large organisation	Angle for innovation
Slow, complex decision-making structure	Empower small, high-performing teams outside of the normal organisational decision-making framework.
Resistance to transformation	Incentivise development of new/different approaches that solve existing problems or enable new opportunities.
Status quo comfort	Increase collaboration and interaction with market-leading, innovative companies to be aware of the potential value of alternatives.
Fear of failure	Focus on communicating successes that arise beyond the normal way of business. More critical discussion about the opportunity cost of inaction and a trajectory of caution.

Fostering a culture of innovation and enabling organisational transformation implies risk – for individuals, groups, organisations and communities. Decisions will need to be made with incomplete information and in the face of uncertainty. How are organisations you work with choosing settings that either promote or inhibit innovation to the degree they want?

CASE STUDY

Who was involved?

Rockhampton Regional Council

What was the challenge or opportunity?

The Rockhampton region's digital strategy is predicated on the use of technology and real-time data created by sensors and smart devices to help improve public services, grow employment, get the most out of our resources and provide a city where residents want to work, live and play. The concept also focuses on the next generation of technology and steering towards the new technology based jobs.

How was a *culture of innovation and organisational transformation* demonstrated?

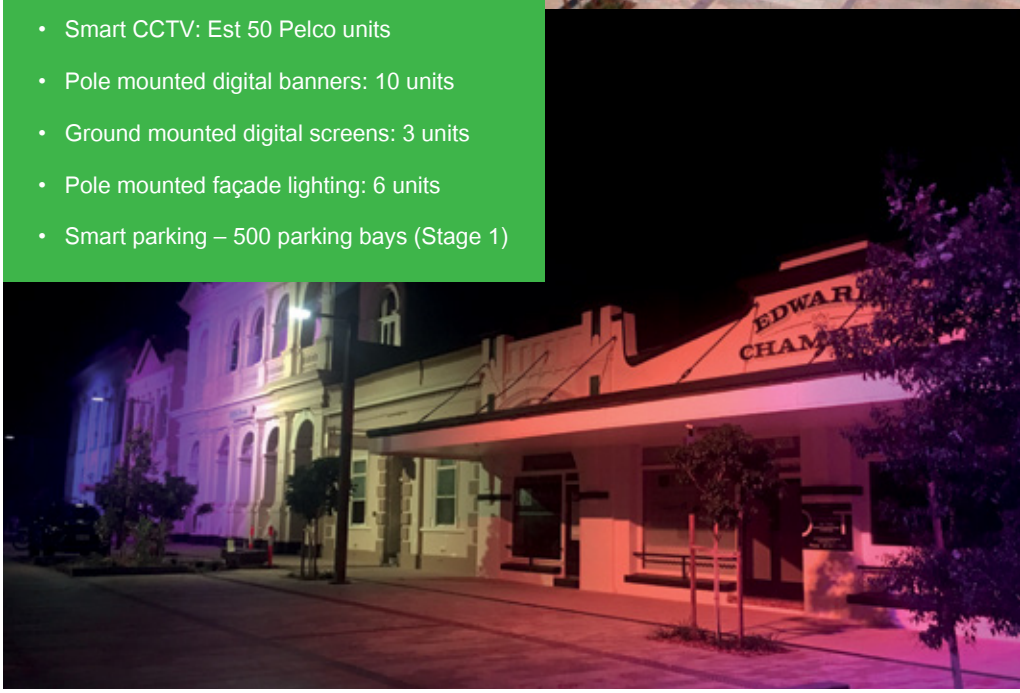
Rockhampton's CBD Smart Technology and Hub project, an initiative under the Smart Way Forward Strategy, won the Economic Development Australia 2016 Award for Excellence in the Digital Entrepreneurs Category.

Our award winning project includes the establishment of a Smart Working Hub and the installation of smart poles and LED lighting, free public Wi-Fi and connectivity to the university EduRoam network, smart CCTV, digital signage, and smart parking solution.

The Smart Hub on the riverfront on Quay Street is central to the project connected by our investment in Australian-first state-of-the-art smart technologies.

RIVERFRONT AND CBD SMART TECHNOLOGY

- Starts: November 2017
- Completion: March 2018
- Free Public WiFi: Est 50 Cisco Meraki Access Points
- Smart poles and LED Luminaires: Est 238 units
- Laneway smart lighting: Est 22 units
- Smart CCTV: Est 50 Pelco units
- Pole mounted digital banners: 10 units
- Ground mounted digital screens: 3 units
- Pole mounted façade lighting: 6 units
- Smart parking – 500 parking bays (Stage 1)



This digital infrastructure and Smart Hub form the core our $4.54 million Rockhampton CBD Smart Technologies and Working Hub project (co-funded under the Queensland Government Building Our Regions program).

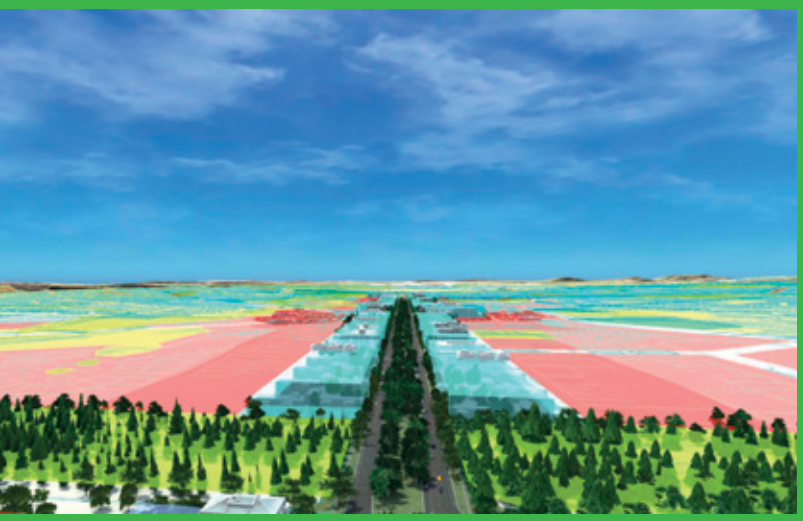
The Smart Hub launched on 19 May 2016, with two startup businesses moving into the space on opening. There are now eight, and a number of the startups have increased staff.

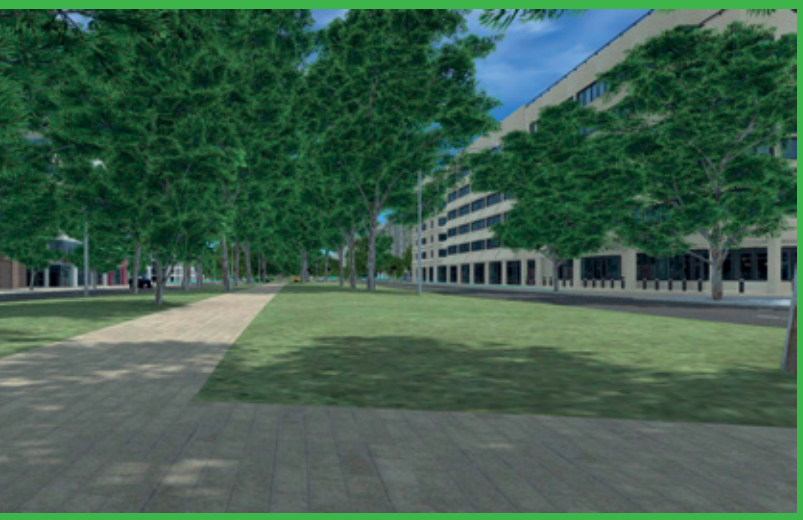
It has morphed into a thriving little ecosystem with some of the businesses collaborating or seeking advice on their tech ideas.

In an Australian first, Rockhampton has partnered with an American company, Illuminating Concepts, to install its Intellistreets smart pole post top modules throughout the Rockhampton CBD to light the way with new LED smart poles.

www.smart.rockhamptonregion.qld.gov.au/smart-way-forward

CASE STUDY





Who was involved?

Urban Circus

What was the challenge or opportunity?

Transforming interdepartmental culture

How was a *culture of innovation and organisational transformation* demonstrated?

ACT Government has a bold smart city agenda, and is setting new benchmarks in digital transformation. From Australia's largest free Wi-Fi network, international smart city partnerships, and nation-leading intelligent street lighting upgrades, Canberra is realising the great promise of the smart city movement.

The Canberra 3D model (CBR 3D), developed by Urban Circus, is playing a critical role in achieving this vision.

CBR 3D is streamlining and enhancing planning and development outcomes – providing advice for the assessment of development applications, particularly in relation to urban design, shadow and height analysis. The ACT Government used the 3D model to present proposals to key stakeholders and interested parties to provide immediate clarity and understanding in real-time.

The model is openly available to proponents, consultancies and the community to access, reflecting the ACT Government's commitment to put people at the centre of its smart city program. CBR 3D allows decision makers to see plans from a human perspective, and is modernising the community engagement process, by bringing development proposals to life and allowing broader, more active citizen consultation.

The issues of trust, engagement and disenfranchisement between government, industry and community are more real than ever. CBR 3D is not just a tool to drive open and intelligent conversation, it's creating shared understanding and building a culture of trust.

For ACT Government, the ultimate objective of being a smart city is to empower its citizens to build a more creative, innovative, productive, liveable, and resilient city.

CBR 3D, developed by Urban Circus in partnership with ACT Government, is central to Canberra's smart city journey. ACT Government is taking an innovative, sophisticated platform and normalising it as smart standard practice.

www.urbancircus.com.au

CASE STUDY

Who was involved?

City of Ipswich

What is the challenge or opportunity?

City of Ipswich is leading an economic and social transformation agenda that will educate citizens, foster innovation and enable new ways of working and living. The goal is to make Ipswich Australia's most liveable and prosperous smart city, which sets new standards in liveability and opportunity – enabled by a Council actively investing in new industry skilling, infrastructure and technology.

How is a *culture of innovation and organisational transformation* being demonstrated?

The Transformation Agenda provides a framework for developing innovation capability within government, business and public sector organisations, and is an essential tool for ensuring that the advancement in opportunities and livability within Ipswich is not outpaced by its rapid population growth. Initiatives include:

Open data: Enable and encourage public access and reuse of city datasets.

Smart parks and sports facilities: Council will implement energy efficient LED lighting, remote control monitoring, Wi-Fi, video surveillance, maintenance analytics, emergency response, atmospheric sensors, usage metrics, sports and fitness analytics, solar power and battery banks, water management technology and sensored waste management.

Energy village: Actively support major greenfield residential developments in trial and full commercial application of new technologies and capabilities that support communities to use energy efficiently while fully leveraging the collective power of the community in sharing energy across residents.

Application Studio: Front-end developers, back-end programmers, user interface and user experience designers working in agile collaboration on Council challenges to create citizen-centric solutions.

Drones program: Revolutionise efficiency, accuracy and timeliness of large scale nature reserve monitoring. Adaptable data collection and analysis leading to ongoing innovation solutions.

Intelligent transport ecosystem: Council's iGo City Transport Plan has been developed to build and promote sustainable modes of transport. The Intelligent Transport Ecosystem Project aims to create a smart transportation system focusing on connected electric vehicles and autonomous transport. The project establishes Ipswich as preferred testbed for intelligent transportation innovation relating to different modes of transport and traffic management and enabling various partners to research and develop better informed, safer, more coordinated and smarter transport technologies.

www.ipswich.qld.gov.au

5 Risk and reward

The road to smarter communities includes risk and uncertainty. How do we ensure that risk is appropriately considered and factored into decision-making as we seek smarter community rewards?

It's estimated that there will be $1 trillion of smart community projects in the coming years.[7] This burden of responsibility is shared across communities, councils and governments, workers, inventors, consultants and corporations. Where there are large investments, mature risk and opportunity management practices should also be found.

Unfortunately, project underperformance is a common story involving many infrastructure and other capital-intensive projects. This failure occurs across the public and private sectors. Simple failures relate to taking too long (schedule), costing too much or not delivering what is asked for (scope).[8] More complex failures can relate to doing the wrong project in the first place. Inadequate risk management (including timely decision-making) in support of project development and delivery is a contributing reason for the high rate of failure for infrastructure projects.[9]

Risk should not be feared, nor does it necessarily need to be avoided. Risk and uncertainty need to be identified, understood (as best as possible) and appropriately managed. Efforts need to be made to factor the appreciation of risk and uncertainty within smart community decision-making.

Smart community stakeholders have several avenues to improve the effectiveness of risk management activities:

- Although smart community projects (and programs) may be different and 'new' in the technology content or application of a process, they are still projects. Good project **governance** will ensure all tiers of the project organisation to discuss and manage risk and uncertainty, and provide visibility to decision-makers, other senior stakeholders and perhaps even the community itself
- One of the key features of smart communities is the improved gathering, organising, integration and use of **data**. Timely, accurate and relevant data improves the likelihood of success, especially when managing risk. As much as possible, smart community project decisions – across the lifecycle – should be made based on data-rich evidence. Moreover, when decisions are made based on evidentiary data, there should be less reason to want to hide that critical information. Transparency of data and decisions allows stakeholders to be more involved in the smart community development journey.
- A deliberate approach to understanding the **(unintended)** negative **consequences** of smart community ideas and projects allows more informed decision-making. Communities are a system and introducing change – a new product, service, process or similar – will have impacts, and not all will be virtuous. Forecasting, planning for and managing societal change – including responding to unintended negative consequences – will assist communities to realise smart benefits.
- **Programmatic** approaches to smart community projects provides greater opportunity and incentivises vendors to partner closer with councils and government agencies. This can result in improved continuity in development and delivery, more intimate understanding of community needs, and can lead to overall cost reductions that strengthen the viability of ideas.

It's estimated that there will be $1 trillion of smart community projects in the coming years.

[7] www.slideshare.net/FrostandSullivan/global-smart-city-market-a-15-trillion-market-opportunity-by-2020

[8] The (Under) performance of mega-projects: A meta-organizational perspective, Lundrigan, Gil & Puranam, INSEAD, 2015

[9] Why do projects 'fail' and more to the point what can we do about it? The case for disciplined, 'fast and frugal' decision-making, Jenner, PM World Journal Vol IV Issue III, 2015. Why do large infrastructure projects often fail? Lando, Copenhagen Business School, 2011


SMS

CASE STUDY

thinxtra
Empowering Internet of Things

sigfox operator

Who is involved?

Thinxtra

What is the challenge or opportunity?

Providing automated school signs to keep children safe

How was *balancing risk and reward* being demonstrated?

New Zealand and Australian school signs are generally standalone devices with little or no communication or monitoring capabilities, relying on manual switching on/off by the school receptionist. This presents a risk since they provide a critical safety function for children on their way to school, however the technology used to turn them on/off is outdated and prone to human error.

Auckland Transport has no visibility on the status of the signs and relies on the public to report malfunctions. There is a high risk for accidents occurring due to human error or unreported malfunctions.

Thinxtra is rolling out a nationwide Sigfox LPWAN network dedicated to connecting things to the internet, covering over 71 percent of Australia (88 percent of New Zealand). The network is available for everyone and everything to connect; the data collected is available and open to data owners and whoever they want to share that information with.

Thinxtra, with its New Zealand partners, has developed a robust innovative IoT solution that allows for the switching on/off process to be scheduled and automated via the Sigfox wireless network to help keep kids safe. The solution is cost effective and does not impose significant load on the school's power consumption.

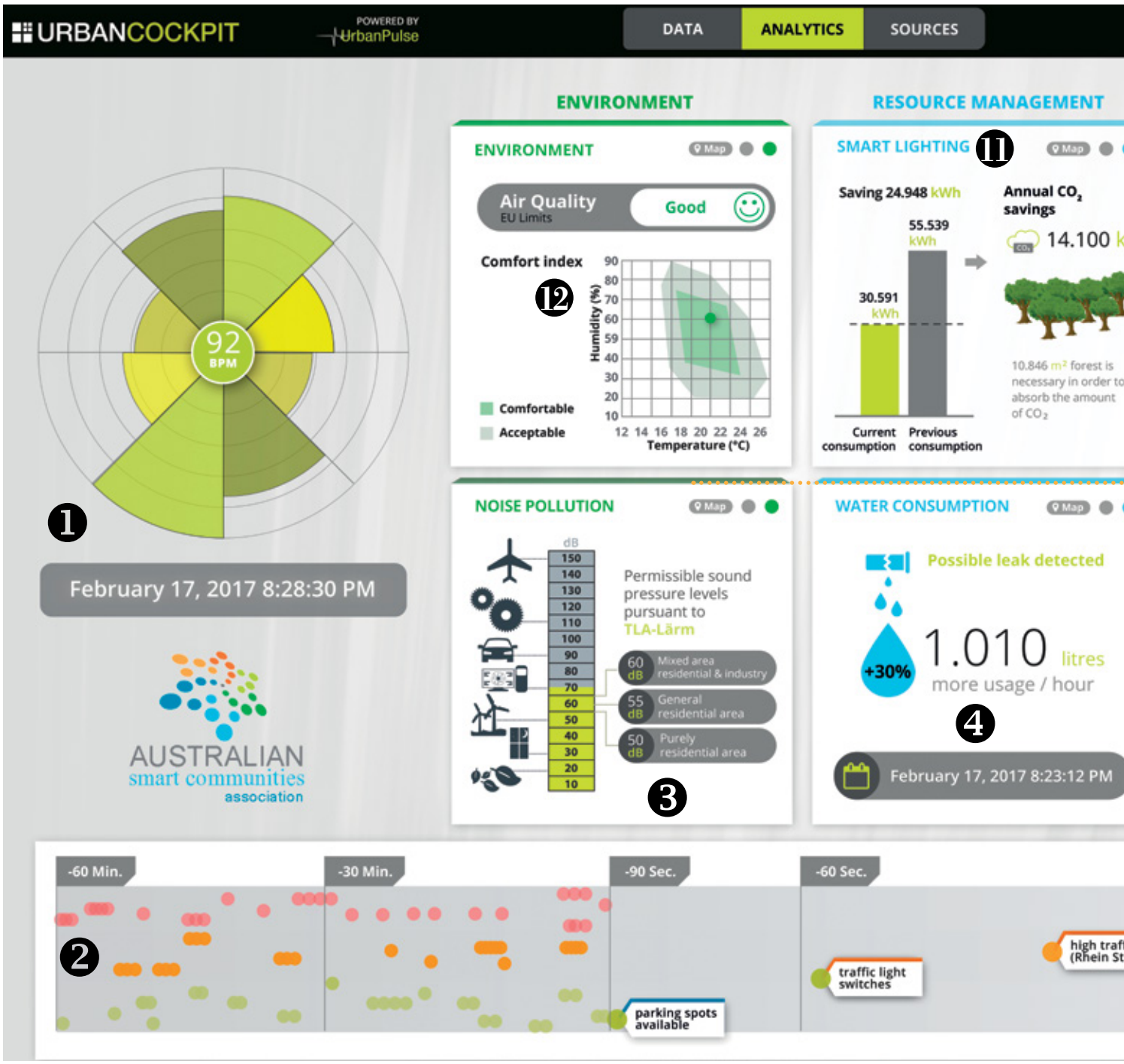
During the three-month test phase, the three schools in the pilot scheme refused to return to the old manual operation system. As a result of the project's reliability and effectiveness, This solution has been achieved through partnership between Massey University and Auckland-based industrial design company motiv.io and uses a new best fit for purpose technology other than the conventional 3G/4G technologies available.

Massey University is also the first university to locate a Sigfox base station at all its campuses across New Zealand, allowing students and researchers to release the potential of IoT and create innovative solutions. Thinxtra has supplied free connectivity, developer kits and modules to the university.

www.thinxtra.com

Auckland Transport and Auckland Council have agreed to roll out the solution across every school in Auckland.

[ui] UrbanPulse platform



1 **The Pulse:** Radar-style overview of events

2 **Historical timeline shows event flow for each tile, including 'future' events from predictive analytics**

3 **Environmental sensors embedded in smart poles** Track environmental factors, anomaly alerts (eg noise). *Data from City of Bad Hersfeld and WaveScape Technologies GmbH*

4 **Smart water metering.** Track water usage, identify problems and alert. *Data from Sunshine Coast Council*

The [ui] UrbanPulse platform allows cities, large infrastructure providers and others to implement new, data-driven smart services that provide the foundation for increased revenues, reduced costs, improved compliance and more satisfied citizens. The UrbanPulse is the reference implementation for DIN SPEC 91357, the EU standard for Open Urban Platforms.

Under the hood
UrbanPulse receives event streams through connectors for each IoT sensor it monitors, applies analytics and delivers smart services.

12 **Air Quality:**
Data from weather stations, environmental sensors, Bureau of Meteorology. Analytics to derive air quality metrics. *Data from ENBW*

11 **Smart Lighting**
Dynamic lighting control tracks energy savings.
Data from Schreder

The [ui!] Cockpit
Multiple views into data streams, through cockpit tiles.This cockpit shows eight tiles with insights into a variety of smart services.

10 **Smart bin sensors**
Track bin levels and schedule bin pickups based on fill levels.
Data from Sunshine Coast Council

9 **Smart traffic**
Data from traffic loops and cameras, predict future stoplight behavious & optimise traffic flows. *Data from city of Darmstadt*

5 **Wi-Fi.** Track Wi-Fi usage, people hotspots, identify areas where more capacity needed.
Data from Sunshine Coast Council

6 **Smart Bike Sharing**
Track & predict bike availabiliity. *Data from KVB and City of Köln*

7 **Smart Parking**
Track and predict parking bay availability.
Data from City of Köln and CleverCiti

8 **Electric vehicle fleet management**
Fleet optimisation and scheduling to reduce fleet ownership costs.
Data from [ui!] the urban institute

6 Management platforms

One of the key challenges of smart cities is the ability to centrally manage, control, visualise and collate city information in a single toolset or application. There are many approaches that can be taken when choosing a smart city or Internet of Things (IoT) management platform. These range from off the shelf to fully customised toolsets and applications that can be customised to ingest various data sets, provide visualisation, detailed analytics and integrate various systems.

When choosing management platforms there are a few key considerations that should be made to ensure decisions are made conscious to short, medium and long-term goals, technologies and initiatives:

- Security
- Flexibility
- Openness/interoperability
- Manageability (simple, intuitive and potentially modular)
- Scalability
- Emerging and likely future technology trends.

A common concern raised by many councils and organisations is being locked into a single vendor ecosystem and not being able to integrate the future tools required. The main concern comes from interoperability with other systems, integrating technologies and avoiding a collection of disparate tools and systems.

It should be noted that many of the management platforms provide an array of services and functional technologies in a range of several integrated components which can be used to construct a more holistic and tailored approach

This is like a series of interconnected building blocks to provide modular, semi-customisable management platforms, with interoperability and APIs (Application Programming Interfaces and connectivity) to other systems. There are various software systems/solutions designed to manage individual areas/issues such as parking, waste, Wi-Fi; but the most powerful platforms are those which unify and provide interoperability between the disparate solutions, unifying datasets and providing a greater and more in-depth picture of the community than the sum of its parts.

In addition to data and technology, an often-forgotten element of smart city management is workflow planning and how the systems will fit with business processes, existing task management and enterprise resource planning (ERP) tools, how functional staff will interact with these systems, billing platforms and other systems that will need to integrate with the smart city management platform. Best practice engages people in the workflows to provide guidance in the existing workflows, the effectiveness and problem areas of existing solutions and how these tools can improve them.

The key requirement for a successful smart community management platforms is to get the right information to the right person at the right time, and provide an aggregated view of the city, its services and citizens.

In addition to data and technology, an often-forgotten element of smart city management is workflow planning

CASE STUDY

[ui!]
the urban institute®

Who was involved?

[ui] the urban institute

What was the challenge or opportunity?

Integrating a range of smart city technologies to gain an overall picture of smart city activities.

How was *smart management platforms* demonstrated?

Bad Hersfeld is a regional hub in Germany, similar to Toowoomba (QLD) or Ballarat (VIC). The city has taken a pragmatic, bottom-up approach to experimenting with smart city technologies. Its ambition is to have workable and affordable solutions which have immediate positive impact on citizens and local businesses.

- **Noise management.** Bad Hersfeld is a major logistics hub with Amazon and DHL distribution centers in the area. While they create jobs, the traffic causes major noise issues. As a result, the city supported the development of a noise app which allows identification, resolution and monitoring of noise trouble spots.
- **Smart parking.** Using Cleverciti sensors, the city monitors the central parking lot of about 500 bays. Increased information has enabled improved revenue from around 15 percent to almost 80 percent. Real-time information about parking availability has significantly decreased traffic hunting for parking bays (studies show that parking-related traffic contributes up to 30 percent of traffic in a city).

Bad Hersfeld has implemented [ui!]'s UrbanPulse for its smart city platform to integrate its multiple smart city technologies and provide a coherent smart city picture, such as the relationship between parking, traffic and autonomous public transport.

UrbanPulse integrates data from the noise tracking apps, smart parking and energy use with data which tracks the effectiveness of a city cycling campaign, to create an overall picture of the smart city activities. Traffic and public transport data will be integrated in coming months.

In its next phase, Bad Hersfeld and [ui!] will explore the business value of the city's urban data by offering it to service providers, businesses, and global enterprises for a wide variety of smart services ranging from sustainable urban mobility to efficient district energy management including smart traffic flow, smart parking, smart lighting, environmental sensing, and electrifying local vehicle fleets.

www.ui.city/en

7 Standards and technical specifications

At each level of a smart city - from the devices in the field to the analytics and processing in the backend - there are various standards and specifications emerging or have emerged in the past few years.

Just as Wi-Fi has become a common standard in the technology ecosystem, IoT and smart cities are not as well-rounded yet. However, there are a several standards and technical specifications to be aware of:

Smart city standards

The first smart city standard: ISO 37120 Sustainable development of communities – indicators for city services and quality of life. ISO37120 contains the following themes:

1. Economy
2. Education
3. Energy
4. Environment
5. Finance
6. Fire and emergency response
7. Governance
8. Health
9. Recreation
10. Safety
11. Shelter
12. Solid Waste
13. Telecommunications and Innovation
14. Transportation
15. Urban Planning
16. Wastewater
17. Water and Sanitation

These 17 themes include 46 core and 54 supporting indicators that cities and communities shall (core) or should (supporting) assess and report. In addition, the standard provides profile indicators for population to GDP to ensure they are applying the most relevant comparisons for their size and environment.

Technology standards

Within Australia, the Internet of Things Alliance (IoTAA) consists of six IoT workstreams involving 400 industry and government volunteers who participate within these workstreams:

- Collaborative Australian IoT industry
- Smart cities and industries
- Data use, access and privacy
- Spectrum availability and licensing
- Cyber security and network resilience
- IoT startup innovation

This body represents both technical and practical challenges that have been created within the IoT and smart city movement. www.iot.org.au

Devices and device communication

As with all emerging and growing technology areas, a lack of interoperability between emerging devices and technology standards is a commonly experienced problem.

The main two areas of current frustration in building smart communities are device to device communication and the networks that these devices connect to.

- Satellite communication
- Cellular – 3/4G (emerging Long-Term Evolution (LTE) and 5G)
- Low Power Wide Area Networks (LPWAN) – such as LoRA and Sigfox
- Wi-Fi networks
- Mesh and short range networking – Bluetooth, ZigBee, RFID, NFC, Z-wave, ANT, 6LoWPAN.

This is discussed in further detail in the next chapter, Connectivity - wired and wireless.

Integration

A common challenge is the integration and inter-connectivity between various solution systems. Typical APIs should at a minimum support REST APIs however emerging standards such as Hypercat (launched in Australia September 2016) are providing deeper guidance on system and data interoperability. The case study to the right provides some insight into the challenges and method behind the standard to tackle this opportunity.

CASE STUDY

Who was involved?

Hypercat

What was the challenge or opportunity?

Standards play a critical role supporting the safety and security of our communities and the way we design and plan cities.

How was *standards and specifications* demonstrated?

As we enter the age of the smart city, standards will play an even more critical role.

If city leaders responsible for integrating technology into a city don't plan ahead and end up allowing the wrong standards to be introduced, they risk unintended consequences such as stifling innovation, limiting value creation and vendor lock in.

The value of standards depends on how they have been developed. Independent standard development organisations (SDO) are standard facilitators. They convene experts to describe what 'good looks like' and manage the discipline and governance around this. A standard developed this way should support open innovation.

A standard developed as the result of a dominant company specifying an approach results in a closed ecosystem dependant on that vendor.

Hypercat (BSI PAS212:2016) was facilitated by the international SDO BSI to address the thorny challenge of getting 'things' to talk to each other, or interoperability. It was launched in Australia in 2016 by the Assistant Minister for Cities and Digital Transformation, Angus Taylor, supported by Chief Digital Officer, City of Melbourne, Michelle Fitzgerald, KPMG and the Internet of Things Alliance Australia. It aligns with other standards to add context to a smart city. It creates a fertile and evolving environment for creativity, allowing new innovation by combining different systems in new ways. It insures against the failure of any system to provide greater levels of resilience. Hypercat is mandated by the UK government in smart city projects including Manchester City Verve.

www.hypercat.io

The Hypercat Standard enables easier communication between any connected Internet of Things (IoT) sensor or device used to monitor an environment, such as air quality and energy use to traffic flows and asset use.

8 Connectivity – wired and wireless

There are many network and connectivity options - short, medium and long range; wired and wireless - and can be confusing without the right guidance. So how do you know which one to choose?

Much of the time it comes down to factors which limit the number of available conductivity types and solutions for your use case. The most critical factors are:

- Battery life and power requirements
- Available devices
- Existing technologies or networks
- Availability and accessibility of network options
- Scale of the deployment, ie the number of devices
- Cost
- Frequency of device check-in
- Type, volume and size of data transmitted
- Location that the device will be deployed.

In many cases, once these items have been discussed only a few viable network options are usually available.

It is best to assume that whatever the decision is for networking conductivity now, it may not always be the best and most suitable. For this reason, we recommend that you build smart city and smart community solutions for flexibility in a technical sense.

CASE STUDY

Who is involved?

Ipswich City Council

What is the challenge or opportunity?

Ipswich City Council has been working proactively with NBN Co since 2009 to improve planning and implementation processes to ensure the seamless rollout of fibre optic and other infrastructure in existing and new property developments.

How was *connectivity* demonstrated?

Council has worked to raise awareness and drive uptake of the National Broadband Network (NBN) within the community, through citizen communication initiatives such as:

- Community education sessions on the NBN rollout.
- Presentations to city stakeholder groups regarding the benefits of the NBN, in partnership with various Chambers of Commerce.
- Integrating communication of NBN construction impacts and rollout timings with Council e-newsletters, social media posts and media advertisements.
- Expediting the NBN construction rollout through streamlined and coordinated assistance by Council, which has been verified by representatives of NBN Co.

Ipswich was one of the first cities in Australia to ensure installation of fibre-ready telecommunications pit and pipe in all new property developments.

NBN Co has been progressively rolling out FttP network infrastructure in the Ipswich City Council area since October 2012. By December 2016, approximately 32,000 premises can now connect to the NBN fixed line high speed broadband network, and approximately 23,760 premises are in build-commencement for FttN, HFC and fixed wireless connections.

Ipswich is home to the greatest amount of continuing build activity in a single council area within Queensland. The projected whole-of-city completion date is 2019. In greenfield areas, as of December 2016, Ipswich now has 144 development stages with activated NBN FttP covering approximately 3694 new premises. Another 125 new development stages covering 4450 premises will have FttP available over the next 12-24 months.

NBN Co's infrastructure investment in Ipswich City Council is estimated to be approx $300 million.

www.ipswich.qld.gov.au

CASE STUDY

Who was involved?

City of Prospect

What was the challenge or opportunity?

Wireless connectivity in smart cities.

How was *connectivity* demonstrated?

City of Prospect launched its Free Wi-Fi network in the Prospect Road Village Heart area in January 2017 as part of Council's Digital Economy Strategy to boost local business.

This initiative builds upon City of Prospect's unique advantage of having nbn™ fibre to every premise in the city.

It seeks to encourage more people to spend their time in Prospect Road's Village Heart to experience the shopping, food, wine and coffee options from local businesses that have become great places to both relax and do business.

- Prospect Superfast Wi-Fi is in the test phase and provides operating speeds between 30-50Mbps download. A proposed upgrade to the network will seek to develop a system which provides 80-100Mbps download.
- User/visitor rates are tracked via Fortinet, which provides data about how many people login and at what times of the day/night.
  In the two-month test period, there were more than 3,000 views.
- The Broadband Cafés project was launched to market free Wi-Fi offered by eight local cafes to mobile business professionals and home based businesses. The promotional Broadband Café videos attracted over 123,400 views in February 2016 and March 2017 via the Network Prospect facebook page.

The project has been brought to life by City of Prospect's Network Prospect team which is encouraging users to also visit the Network Prospect website, a directory of over 200 local businesses and professionals. Users can elect to receive updates of popular events in the City of Prospect, along with the business-focused Network Prospect news, tap into support organisations and be promoted through a variety of social media platforms.

Prospect Super Fast Wi-Fi is a partnership between City of Prospect, local businesses, property owners and Vintek, who supplied and installed the Wi-Fi infrastructure.

www.networkprospect.com.au

CASE STUDY

Who was involved?

ACT Government

What was the challenge or opportunity?

Parking innovation to reduce traffic and travel times

How was *connectivity* demonstrated?

ParkCBR is making a major impact in Australia's capital, with 40 percent of ParkCBR app users reporting that smart parking has reduced their travel times in a city that leads the nation in terms of per capita car vehicle kilometres and car ownership (Bureau of Infrastructure and Transport Economics 2015).

Deployed as part of the ACT Government's 12-month Smart Parking Trial, the ParkCBR app uses real time data from infrared sensors in 460 on-street and off-street parking bays in Manuka and helps guide drivers to available car parking bays. These include paid-for, free, off-street and on-street bays, electric vehicle and disability parking spots.

Five new LED street signs also direct drivers to available off-street parking bays, with 53 percent of drivers reporting them helpful in finding available parking and getting cars off the street.

ACT Government is a key promoter of innovation and publishes real time sensor bay data feeds for innovators, including sponsoring the GovHack ACT 2016, with the open APIs real time feeds available from https://api.smartparking.com/Help.

To better influence parking behaviour, especially during peak times and in hot spots, the ACT Government is developing a new ACT Parking Model for dynamic pricing, in addition to real time information for improving trip planning and travel times, better targeting enforcement and providing a pay by mobile and Tap n Go channels for Manuka.

HOW DOES IT WORK?

Using a simple red, amber and green system, the ParkCBR app provides real time information (updated every minute) on where drivers are more likely to find an available car parking space. It can even interact with most satellite-navigation apps, directing motorists to their chosen parking location. Users can tap a map marker on the screen to view information such as number of available spaces, hours of operation, hourly tariffs and if a space is designated for disabled drivers.

www.act.gov.au/smartparking

9 Choosing priority areas

The smart community opportunity would be less challenging to navigate if there was no need to prioritise, make trade-offs and forego certain opportunities and ideas. Infinite wants and finite resources: how do communities determine which paths to take and which projects to develop in their smart journey?

The path to greatness – or smartness – may not be the same in every community. What works and is smart in one community may not be the optimal blend for another community. Imitation and replication might be the path of least resistance, but there is risk in allowing others to think for us.

A community is a system that includes people, natural resources, groups, organisations, technologies and information. Smart solutions are opportunities to build on that system in a meaningful and coherent way. Before smart solutions are developed and delivered we should ask ourselves: What problem(s) are we solving? or, what opportunities are we creating?

Local government needs to have a deep understanding of what makes the community 'tick'. Likes, dislikes, interests, pain points, trends, concerns, fears, hopes and questions. Social media is just one avenue for organisations and people to communicate with communities, supplementing more traditional community engagement mechanisms. As all organisations and people continue to gather information about their local community, a sense of priorities will emerge. Key factors determining priorities for smart communities include:

- Demographics
- Institutions (community, educational etc)
- Education and skills
- Natural resources
- Climate
- Infrastructure and technology (existing)
- Business environment
- Political system
- Social norms and structures
- Culture and cultural narratives
- Legal and regulatory environments
- Strategies and policies
- Bureaucratic capacity
- Transport and logistics networks
- Crime and law enforcement

Beyond these, other elements that should inform the selection and prioritisation of smart community ideas and projects include:

- **Complimentary** attributes. This is more likely to be achieved when councils take a programmatic approach to decision-making, development and delivery. Projects may be complimentary based on:
  - Outcomes and benefits
  - Inputs and/or outputs
  - Skills
  - Technology
  - Data
- **Likelihood of successful implementation.** This may be based on the maturity of the technology, vendor strengths or subject matter expertise involved in the project.
- The **practicality** of an idea or project (ie how tangible the outputs are). Not every smart community priority will have a tangible output but councils should avoid the trap of focusing on iterating strategies, blueprints and plans – without delivering more practical outcomes

The first steps for a smart community effort can be the most daunting, difficult and stressful. However, once those steps are taken, progress can be evaluated and adjustments made. Evidence-based, transparent decision-making will ensure that priorities are appropriate. How are communities effectively selecting *priorities* and progressing down the development and delivery path?

how do communities determine which paths to take and which projects to develop in their smart journey?

CASE STUDY

Who is involved?

Telstra

What is the challenge or opportunity?

Explore digital ways of engaging with residents, businesses and visitors.

How is *choosing priority* areas being demonstrated?

Telstra is working with Cairns Regional Council to explore digital ways of engaging with residents, businesses and visitors to meet the expectations of these community stakeholders, while also empowering Council with intelligence about the way people use spaces and places within the community.

Telstra began discussions with the Cairns Regional Council executive team in 2015 in relation to its Smarter Communities program. Council's immediate interest was in how it could use digital technology to better engage with its community, as well as how they could introduce more evidence-based decision making.

Cairns Regional Council identified Wi-Fi and related analytics as its first step into a digital future, and key to its ability to engage with residents, visitors and tourists, understand the ways that these community groups utilise the spaces and places within Cairns, and also provide input into its planning on its broader smart city aspirations.

Telstra developed a list of objectives for the project in collaboration with Cairns Regional Council that includes:

- Delivering a seamless user experience across the community.
- Providing fully managed service to minimise costs and resources required from Cairns Regional Council in managing and maintaining the systems.
- Enabling detailed future analytics capability to provide insights on usage including demographics associated with social media login facility.
- Ability to use the Wi-Fi for Council's own use for field crew operations as well as IoT applications in future if required.

The solution involved the implementation of Telstra Air for Enterprise, using Cisco's Meraki Wi-Fi architecture to ensure optimised performance in the hot and humid conditions in the Cairns region. The solution is a fully managed, and essentially co-funded approach, to the provision of seamless community-wide Wi-Fi and an extensive range of future analytics. 129 Wi-Fi access points were installed at various community locations selected by Cairns Regional Council.

www.telstra.com

10 Selecting solution systems

A methodical approach to the selection of solution components is required to prioritise and produce smart cities.

This normally comprises the following key steps in a well rounded methodology:

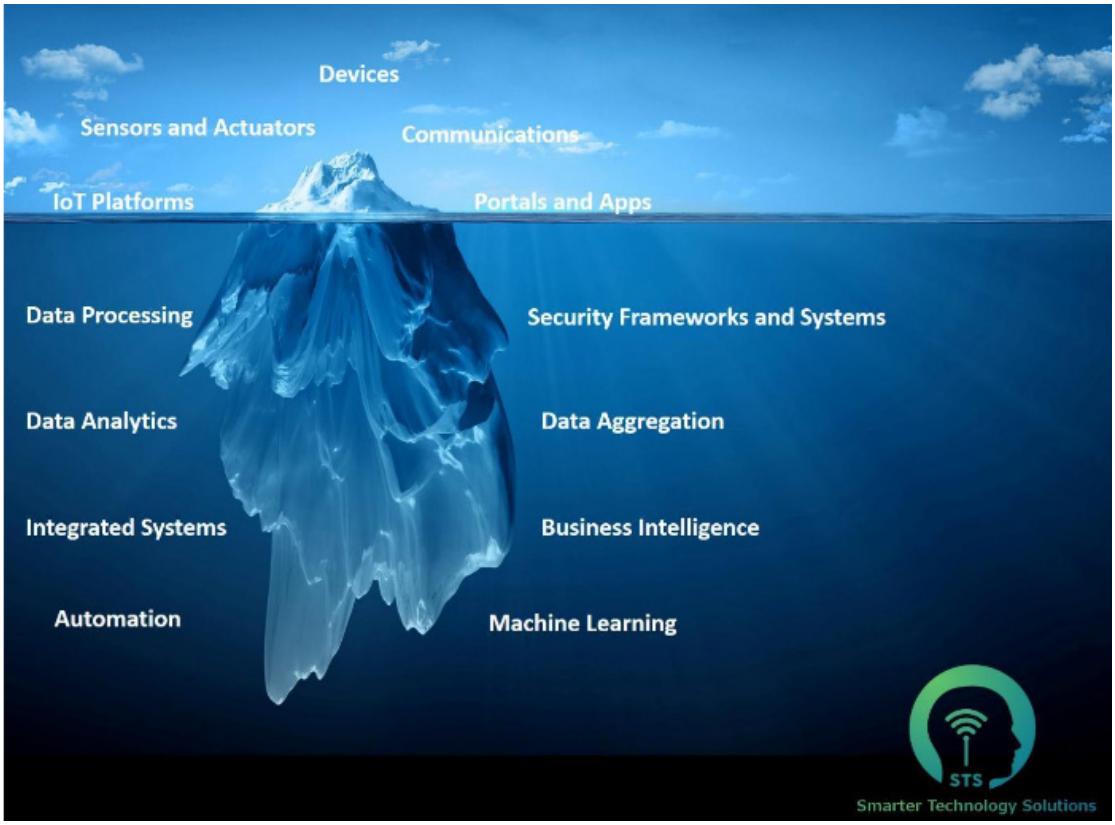
- Define the problem or area being addressed
- Define why this action is being taken (why now?)
- What other opportunities interlock with the solution being designed?
- Consult all relevant stakeholders and seek input from the community and council as appropriate
- Understand the people and workflows involved
- Understand the data and technology requirements
- Build a business case and understand the return on investment
- State what success looks like
- Ensure measures are in place to test the effectiveness of solutions
- Evaluate, review and assess the trial/proof of concept before conducting a full rollout.

Ideally the focus should be on experience and solutions, preferring digital services (and thinking mobile first) as well as considering the seamless interconnectivity and integration between smart city components.

A phased approach is recommended with clear deliverables, outcomes and objectives.

In relation to the services, it is important to consider not only the 'surface viewable' elements and to think much broader around how systems will integrate with other solutions and infrastructure.

It is also important to note technology and economic trends regarding the costs of solutions as the cost of collecting, analysing and storing data is becoming more cost effective. This is somewhat of a relief as the amount of data stored is currently doubling every 18 months (IDC, Aberdeen). This is also true for the cost of devices for smart city initiatives.



CASE STUDY

Who was involved?

Sunshine Coast Council

What was the challenge or opportunity?

Creating Australia's first Smart Street.

How is *selecting solution systems* being demonstrated?

In 2017, Bulcock Street Caloundra will be Australia's first smart city urban streetscape demonstration and testing facility. A range of technologies will be installed on Bulcock Street including:

- Dedicated Smart City communications conduits:
  - Council owned and controlled active optic fibre network
  - Council protected through a Telecommunications Carrier Licence
- Dedicated smart city electrical network to support LED lighting using smart controls and other systems:
  - Smart poles designed to house the smart city communications and electrical requirements
  - Multi-function poles allowing rapid change of components
- Smart waste sensors
  - Bin sensors to measure waste levels and provide data to council for more cost effective waste management services
- Smart parking sensors
  - Deliver real time parking availability through Council's SCCApp
  - Monitor dwell time and vehicle turn over rates to maximise outcomes for local businesses
- An integrated testing and demonstration space combining the Smart Centre and Living Lab with the smart street features
- Automatic bollards enable the street to be closed safely for market day and special events
- Sensors turn off the irrigation system if they detect rain
- Ability to control various components remotely via smart phone or tablet
- Smart Wi-Fi
  - Data collected from free public Wi-Fi access points allows Council to understand how public spaces are used to inform future design and planning.

The integration of these technologies with the Smart Region Management Platform delivers an integrated secure and rules based system. Named an International Smart 21 City for 2017 by the worldwide Intelligent Community Forum, for the Sunshine Coast, Smart City technologies build a stronger economy, a safer community and improve service delivery to residents, businesses and visitors.

www.sunshinecoast.qld.gov.au/smartcities

CASE STUDY

Who is involved?

Duncan Solutions

What is the challenge or opportunity?

Providing smart integrated parking meters.

How was selecting solution systems demonstrated?

Duncan Solutions worked collaboratively with Macau's parking operations authority for two years to provide smart integrated parking meters to the region, which still used traditional coin-operated meters until recently.

Following an initial installation of 200 VX meters, an additional 500 were delivered in February 2017.

Duncan Solutions used its certified payments capability developed in-house in Australia, which accepts payment from the Macau Pass card solution, allowing citizens to use the card as a form of electronic payment for transportation much like a debit card.

When paired with Parking Enterprise Management System (PEMS), the collection, auditing and financial reporting of coins and electronic payments is streamlined, maintenance can be alerted to faulty meters and operational data can be relayed to management in real-time.

www.duncansolutions.com.au

CASE STUDY

taggle

Who was involved?

Taggle Systems

What was the challenge or opportunity?

Collecting detailed information about water use patterns and water losses.

How was selecting solution systems demonstrated?

In 2011, challenged by a rapidly growing population putting increasing pressure on available water infrastructure, Mackay Regional Council (MRC) faced the prospect of reaching capacity in its main water treatment plant. While one option was to build a new water treatment plant (with a $100M price tag), the non-capital solution identified was to reduce per capita consumption.

Initial calculations indicated a 10 percent reduction in per capita consumption could likely delay the new plant by 4-5 years. A key prerequisite for a demand management program was detailed information around usage patterns and water losses, of which MRC had little or no information.

Taggle Systems, at the time a small start-up, demonstrated that it could collect hourly water meter readings at a low enough cost using its new Low Power Wide Area Network technology, to establish a viable business case. After a few trials, MRC committed to using Taggle's network to automatically read its 40,000+ water meters and started on a journey which would transform its water business.

Increasing from 80,000 to around 300 million meter reads per year, highlighted many aspects of consumption which were previously unknown. Identifying customers' water leaks quickly, along with an active customer notification program, resulted in a reduction of average leak duration from 150 days to less than 60 days.

Observing that outdoor water use was a major contributor to the peak demand for water in the critical dry season periods, MRC also ran a social marketing campaign on water conservation focused on watering lawns using water-wise plants.

The detailed data generated has also helped MRC to significantly improve its level of consumer engagement. A dedicated customer portal now enables MRC's water consumers to view their daily consumption, understand how they compare to their peers, and set up customised alerts to help manage consumption.

MRC's demand management activities, informed by Automatic Meter Reading (AMR) data, have resulted in a 12% reduction in per capita consumption. The $100M water treatment plant, planned for 2022, has been pushed back to 2032. Capital deferment and cost efficiencies, resulting from the AMR and other initiatives, have enabled MRC to freeze prices for water and sewerage for two years.

MRC's outstanding work was recognised in 2016, winning both national and international awards for transforming its water business.

www.taggle.com.au

11 Financing options

How do organisations appraise the various approaches and models to sustainably fund smart community research and development, ideas, projects and other activities?

Financing smart projects can be a weakness for councils, particularly in regional locations where total revenues may be lower, there are smaller populations, fewer businesses, and external investors may see better returns elsewhere. The initial unconstrained smart community conversation and innovative new idea becomes practical once cost and financing becomes the topic of consideration.

As with any government-led service, project, decision or initiative, community members expect value for money, a reasonable return on investment, purposeful use of public funds and logical decision-making (10). A sustainable and viable solution is much smarter than the alternative. Smart communities need to be viable to truly be smart.

Traditional funding models for government projects tend to be: public funds paying private-sector companies to do work to deliver or contribute to a service. However, this model may not always be the most appropriate and, in some cases, may be inadequate to service the immediate need, manage the risk, or permit the necessary development. It is possible that inexperience at alternative funding models and feelings of comfort in well-known traditional funding models may harm potential project viability and may translate into fewer services delivered.

Although not new, public private partnerships are a non-traditional funding model to:

- Attract investors
- Raise necessary capital
- Identify development and delivery partners
- Maintain government involvement in community projects while harnessing the effectiveness and expertise of private companies
- Ensure the community maintains some ownership and control over ideas and solutions
- Manage the ultimate financial risk.

The progression of smart community ideas from concept through to effective implementation may require close cooperation between governments, the private sector and community organisations. How are communities demonstrating smart approaches to funding smart projects?

[10] for instance, based on a genuine business case.

CASE STUDY

Who was involved?

Telstra

What was the challenge or opportunity?

Deploying smart technologies to enhance community engagement and improve operational efficiencies.

How was *smart financing options* demonstrated?

Tamworth Regional Council engaged Telstra to make its investment in a regional playground smarter concurrent with Telstra's work to deliver a smart city framework for the region.

Council's objective was to enhance community engagement and improve operational efficiency through free public Wi-Fi and analytics, smart parking sensors, signage and enforcement apps, smart lighting and CCTV as well as smart waste sensors on litter bins.

Telstra began discussions with Council in late May 2014, about Council's adoption of a smart community program, as well as the challenges and opportunities presented by relevant smart technologies. These discussions led Council to nominate the Tamworth Regional Playground as an ideal site for deployment of relevant smart technology.

Telstra conducted multiple visits to the area to develop a conceptual design incorporating relevant technologies that would achieve the agreed objectives for embedding smart technology into the asset.

The objectives shared by Council and Telstra included:

- Enhance the user experience for residents and visitors to the playground
- Enable operational efficiencies for Council to manage the facility
- Ensure public safety and asset protection
- Generate valuable intelligence about asset use
- Allow Council to understand the implications of smart technologies
- Provide the ability for Council to promote its smart community program.

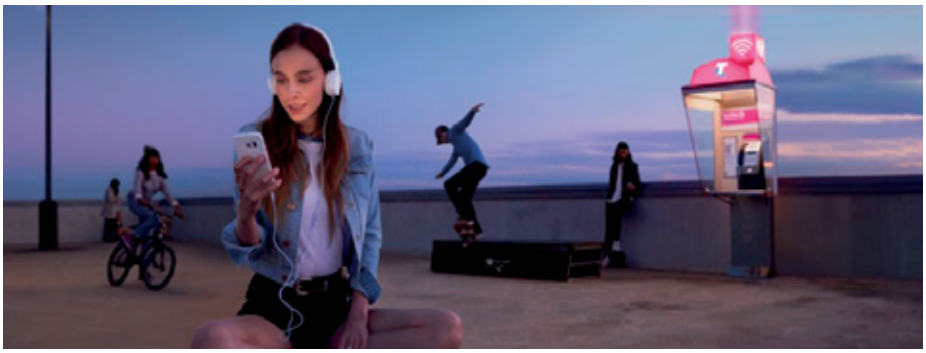
Scope

The site is located on a section of land adjacent to Bicentennial Park which was previously unused. The scope incorporates:

- Smart lighting
- Smart parking
- Smart waste

This scope compliments other elements provided by Council and its local contractors including Wi-Fi and CCTV.

The Tamworth Regional Playground has been built using grant funds, developer contributions, income from the sale of a Council site and substantial contributions from businesses donating their expertise, services, products and equipment. It was funded by a $1.1 million NSW Government Clubs Grant along with the same amount from Council. Council has committed $340,000 in Section 94 funds to the project ($200,000 for the playground and $140,000 for the Family Social Function Area) plus $910,000 from the sale of Prince Of Wales Park.



www.telstra.com

12 Creating APIs and open data

Data democratisation is a key component of the smart city movement. Providing information and data sets to the public increases citizen engagement and allows data to be used in new ways by the public, businesses and council. The key concerns with open data are security, privacy and, in some cases, a desire to monetise data which can incentivise or restrict the amount of data a council would want to share.

The open data movement provides benefits such as:

- Increased transparency, information sharing and accountability.
- Support for evidence based research and policy.
- New opportunities for government, businesses and individuals to innovate.

Summarised from www.data.nsw.gov.au.

As has been demonstrated in many Govhack events, open data can provide creative and interesting ways to use this information to create new services, provide new value and present new opportunities. This also contributes to the local innovation initiatives and engages the population.

Data standards

When sharing datasets, a common problem is translating and understanding them. Metadata standards exist for this reason, and allow a common format to share information so it can be consumed effectively.

These standards also exist to de-identify data and provide privacy (removal of personal information), manage risk (by conducting risk assessments on the proposed datasets), categorise data, and improve use through the standard metadata tagging.

Sample data categories include:

- Arts and culture
- Business and economic
- Communities
- Construction and housing
- Education
- Events
- Facilities and structures
- Finances
- Geography
- Government
- Health
- Historical
- Indigenous
- Information and communication technology
- Library
- Maps and geospatial
- Media
- Mining
- Organisations
- Parks and recreation
- Property
- Public safety
- Public service
- Sciences
- Social services
- Training and employment
- Transportation
- Women

(QGovOnline, 2017)

Open data

Open data is commonly defined as *freely available data that is available publicly in a reusable form.*

Typical characteristics of open data include:

- Minimally restrictive licencing
- Well described, reusable information
- Shared in modifiable, open formats.

Open data provides an opportunity to provide:

- Transparency for local governments to share data with their community
- Innovation and commercialisation for local people and businesses
- Improved data quality
- New types of research and support for existing research
- Automated knowledge discovery using online tools
- Verification based on previous results
- Wider data than any research team/person could collect
- Exploration of topics not envisioned by the initial investigators
- Possibility to create new data sets, information and knowledge when data from multiple sources are combined
- The transfer of factual information to promote development and capacity building in developing countries
- Interdisciplinary, inter-sectoral, inter-institutional and international research.

(Australian National Data Service 2017)

There are three broad data types found in government agencies:

- Raw data generated out of business as usual activities – such as spatial data from a program, energy ratings,

crime statistics, administration etc. Often this data is stored in databases and used in business applications.

- Processed data – new data generated from tables used in annual reports, FOI logs, other data generated for organisational functions. This could also be an aggregate view of a raw data set, fit for public access.
- System data – automatically generated from other processes such as web analytics, project management, access logs and other systems.

Identifying different data across an organisation involves looking beyond traditional data teams and leveraging other existing datasets to improve services, policies and efficiencies.

How to prioritise data

Popular or easily opened data sets are identified by:

- Analysing FOI, parliamentary and external helpdesk requests for common requests. This could help to reduce time and resources spent on providing the same data to individual requests, as well as identifying popular data sets for publication.
- Looking at information an organisation already publishes, either in data form or PDF, for quick results. Publishing the data on data.gov.au will improve accessibility, reuse, discoverability and the ability for an organisation to reuse the data. For example, tables from an annual report, budget, grants, administrative data or mandatory reporting are all useful.
- Assessing what data sets exist across your organisation and identifying a top 10 that would provide greater economic, transparency or policy benefits if made publicly available.
- Identify where you need data to deliver a new service or application and consider making the data feed publicly available to cut costs in your service delivery and enable external services based on your data.
- In all new systems consider the data that is created and how you can best reuse and appropriate expose the data from the start.
- Your organisation's priorities for opening data should be identified as part of a broader open data strategy.

Source: Getting on with Government 2.0 www.finance.gov.au/sites/default/files/Government20TaskforceReport.pdf?v=1

CASE STUDY

Who was involved?

Lake Macquarie City Council

What was the challenge or opportunity?

Giving developers access to real-world city data through the Lake Mac Open Data program.

How was *creating APIs and open data* demonstrated?

Lake Mac Open Data is an initiative of the Lake Mac Smart City, Smart Council Digital Economy Strategy and aims to empower the community and staff with improved access to city data to improve transparency and provide a resource to catalyse local innovation and app development.

While developing the strategy, Council asked the community how it could use technology to make the city a better place to live and work, and make Council more transparent and efficient. In response, Council was told to provide open data.

To help understand what an open data initiative could look like, Council collaborated with Idea Bombing Newcastle to host Hackivate the City as part of the Hunter Innovation Festival. The event gave the community the opportunity share ideas on what datasets they would like to see open and why. It also allowed Council to learn more about open data and how other agencies, businesses and startups use this information to produce innovative products.

Council now has 40 datasets on the Federal Government's open data portal, data.gov.au, including data on water quality and ecosystem health. These datasets are already published to various locations on Council's website. Publishing them on data.gov.au provides a one-stop shop for developers and researchers and encourages Council to think about how it generates, stores and uses information internally and how it can streamline these processes to improve automation.

www.lakemac.com.au

13 Creating a local innovation system

Innovation isn't about coming up with good ideas, it's about action.

Local innovation systems are driven by ideas, pushing boundaries, collaboration and accomplishment. Whether it's online spaces, physical buildings, accelerators or incubators, Australian communities appear to be more focused than ever on fostering a sense of community and supporting innovation.

Citizen engagement, startup hubs, blue sky thinking and radical ideas are pushing Australia's innovation boom in many communities. Most successful local innovation systems start with challenges, questions and harness local engagement to provide new approaches to timeless challenges.

From hackathons and startup incubators, public forums, makerspaces, innovation challenges and public collaboration spaces provide limitless opportunities to engage local and international parties in the interests of innovation. With today's tools and technologies, ideation and collaboration tools, online meeting spaces, public challenge platforms and a range of other digital tools are quick, easy and inclusive ways of engaging the public, businesses and other councils.

It seems that organisations want to draw some benefits that startups demonstrate; collaborative, agile, iterative and creative attributes appeal to everyone from the Fortune 500 to local cities and councils. There has never been a more collaborative way to design services, post questions and iterate services as there is today.

The CohnReznick Innovation Framework provides the following approach to innovation:

- **Ideate:**
  - Discover opportunities
  - Explore customer experiences and interaction
  - Business case
- **Design:**
  - Define
  - Explore
  - Validate the design
- **Build:**
  - Develop
  - Pilot
  - Test solutions

•**Deploy:**
  - Launch
  - Learn and refine
  - Transfer skills and review.

This approach is about strategy and governance, collaborative experience, agility and speed as well as creative learning.

Collaborative and co-innovation systems offer a simplified and agile way to harness the ideas and insights of your employees, partners, customers or anyone whose experience can help your organisation do things better.

Collaborative innovation systems deliver three key outcomes:

- Cultivation of innovation and insight
- A channel for community engagement
- Enablement of co-creation/collaboration.

CASE STUDY

Who was involved?

CSIRO Data61

What was the challenge or opportunity?

Providing an online marketplace which matches businesses with potential purchasers or recyclers of waste by-products.

How was *local innovation system* demonstrated?

ASPIRE supports manufacturing companies concerned about waste disposal costs and broader environmental issues by providing an online platform and offline program to engage existing business networks facilitated by local government economic development or sustainability officers.

The online matchmaking tool captures data around waste created by manufacturers or of interest to local recyclers, by providing tailored information on partnerships for potential waste exchanges. Pooling information across the business networks enables more and better matches, and the data required to identify opportunities for business to innovate in industrial ecology.

Operating as a proof of concept since 2015, CSIRO partnered with Cities of Kingston, Knox, Dandenong and Hume Councils in Victoria. Now in a one year pilot, ASPIRE is adding other interested councils, and the Barwon South West Waste and Resource Recovery Group, to understand how the program can operate successfully in rural and regional areas.

More than 100 businesses have registered with the program, with 12 waste exchanges saving $200,000 for business and diverting over 1000 tonnes of waste from landfill. Case studies from exchanges are made publically available, to enable other businesses to learn from participants' experience.

Key learnings from the program include the need to consider the attention of business operators as the limiting resource, requiring careful targeting both in useability of the online tool, and ensuring that it is embedded in an off-line support network. Personal relationships, between businesses and with local government facilitators, are critical to the establishment of a successful innovation network.

www.aspire.csiro.au

CASE STUDY

Who is involved?

Ipswich City Council

What is the challenge or opportunity?

Raising the profile of entrepreneurship and innovation to develop a knowledge-based workforce, create jobs, and foster economic diversification.

How is *local innovation system* being demonstrated?

Fire Station 101, which began in March 2016, provides education, mentoring and access to sources of potential funding.

Fire Station 101 leverages the diversity of its members while focusing on themes emerging in the community. Local members and founders also share roles as mentors to other mentors, including areas of legal, video production, business management, entrepreneurial leadership development, game development, software application development, and 3D printing.

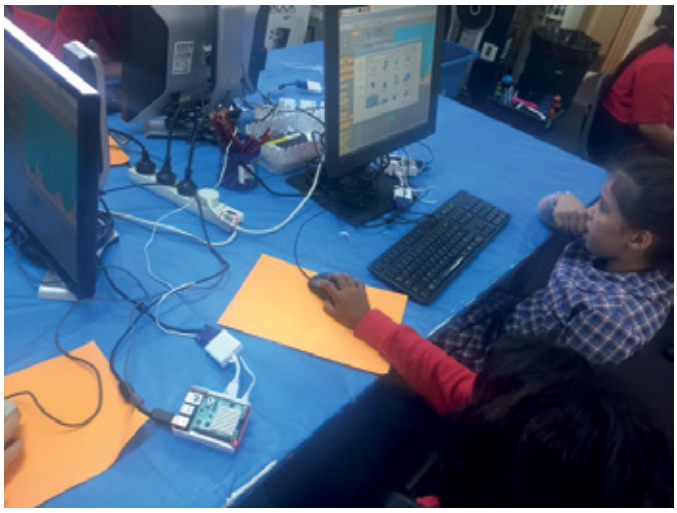
This collaboration is focused on the main themes of virtual reality, smart city (IoT, open data, big data analytics), and social enterprise (addressing community challenges through scalable and sustainable solutions).

Since March 2016, Fire Station 101 has demonstrated its capabilities to generate local digitally-focused jobs through new company formation. After just nine months of operation, 64 startups had become members, with an acquisition rate of 1-2 members per week. These members are all startup entrepreneurs at various stages, from pre-revenue to securing capital for global scale-up.

They are working across technologies such as virtual reality / augmented reality, smart city / internet of things and social entrepreneurship and other related areas.

www.firestation101.com.au

CASE STUDY



Who was involved?

City of Whittlesea

What was the challenge or opportunity?

Teaching computer coding using low cost Raspberry Pi computers and electronic waste.

How was *local innovation system* demonstrated?

Council's Intelligent Community Strategy identifies the importance of facilitating its community to take advantage of the significant open access broadband network available.

To support the delivery of its STEM program, Council worked with Thomastown West Primary School to assist the teaching of computer coding to students using Raspberry Pi computers.

Council sourced electronic waste (monitors, keyboards, mouse, etc) and recycled them to provide computing facilities for the students to learn coding. Each week, more than 30 Grade 3 and 4 students across five schools assemble the small computers using old monitors, keyboards and mice donated by La Trobe University.

Building a computer from scratch has helped the children understand how computers work and what hardware components are needed to build them. This understanding complements the computer coding classes, making coding lessons more real for the children. The students always comment, "I can't believe it's so small" or "Can we keep it at the end of term?"

The Raspberry Pi computer operates using free and open source software for the operating system and individual software packages. The package was designed to give students a deeper understanding of computers to help strengthen their education and employment prospects in the future.

Computers are expensive, whereas a Raspberry Pi computer can be assembled for less than $100. A whole classroom of computers with 11 workstations costs less than $1500. Other schools are already interested in this coding platform and the intention is to gradually expand this program to other nearby schools.

Teaching STEM subjects to children will help build the smart communities of tomorrow. Small and low cost Raspberry Pi computers are proving to be an efficient way of delivering this to communities.

The school work has been complemented with a computer and robotics club established at the local library on a Monday night. The work in schools is fostering the students' interest in technology and preparing them for the emerging jobs in robotics and artificial intelligence.

www.whittlesea.vic.gov.au

CASE STUDY

CITY *of* PERTH

Who was involved?

City of Perth

What was the challenge or opportunity?

Future proofing local areas to find diverse development and economic opportunities. Creating a local innovation ecosystem, unifying startups, business, investors and government to foster new relationships and opportunities.

How was *local innovation system* demonstrated?

The City of Perth's smart city journey began as one of 16 global cities nominated as an IBM Smarter Cities Challenge recipient in 2014. Five senior IBM executives worked with the city to deliver recommendations aimed to future proof Perth for development and economic outcomes.

A key recommendation was to engage the city's thought leaders. In response, the city has actively supported the local innovation and startup technology sector to drive the ongoing development and engagement of Perth's Smart City platform.

The city is using smart technology to capitalise on the economic opportunities the sector can offer and, as noted by the Startup WA ecosystem report, technology startups have increased 235 percent in two years, with one third of all Western Australian startups located within the city.

Perth has developed the full spectrum of the local innovation ecosystem including sponsoring events such as the WWW Conference, West Tech Fest and OzApp awards. Accelerators supported include Unearthed and Founder Institute as well as coworking environments such as StudioStartUp and Spacecubed. The investment side of the ecosystem has also been supported by sponsoring the Perth Angels Investment Masterclasses.

As the city expands its smart city platform, currently comprising of an extensive fibre and CCTV network, free public Wi-Fi, live parking availability applications, cyclist counters, 3D City modelling and data / business information projects, it is engaging with new partners including the Curtin University CISCO Internet of Everything Innovation Centre to progress exciting initiatives such as a machine learning applications to the urban environment.

www.perth.wa.gov.au

Jeremy Outschoorn with the new bicycle counter on Barrack Street. Picture: Michael Wilson

DIGITAL CYCLE COUNTER

The Eco Counter captures daily cyclists in the cycle lane travelling in both directions, and provides cumulative year-to-date bike counts, which are displayed on the live screens.

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Events app: my.yapp.us/ASCA

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