SCCEI REGIONAL SNAPSHOT

Wellington, New Zealand

December 2018

SmartCitiesCouncil®
emerging innovators

Executive Summary

Wellington is a leader in New Zealand's smart city sector.

It is a supportive environment for smart city start-ups to be developed and tested as it possesses an established network of technology and data experienced professionals and business incubators, a supportive local government with a clear vision for the sector, and well developed associated technology and creative industries.

Wellington is currently experiencing the challenge of transitioning this primarily start-up driven sector into an established market. This requires the city to identify and implement commercially viable business models and successfully communicate to investors and customers the value that smart initiatives can offer the city, all while balancing the privacy concerns its citizens.

If Wellington's smart city sector can successfully become established, it will secure the city's future as a significant regional hub for smart innovation.

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Introduction

The SCCEI Regional Snapshot is a guide to a region's smart city sector. It provides the reader an understanding of a region's initiatives, challenges and possible future within the sector.

This document has been prepared by the Smart Cities Council Emerging Innovators (SCCEI). SCCEI is the emerging professionals network for Smart Cities Council Australia New Zealand. SCCEI's vision is:

To connect and empower emerging innovators to deliver world class leadership for smart cities.

SCCEI has members across all major Australian and New Zealand cities from a range of professional backgrounds. Its purpose is to create a platform for emerging innovators in smart cities to meet, share, learn and promote how technology can be used to make the environment more liveable.

The information within this document has been gathered through interviews with industry experts and research by SCCEI members. We would like to thank the industry experts who were involved with our interviews for Wellington's snapshot. They are:

- Sean Audian, City Innovation Lead, Wellington City Council
- Kriv Naicker, Executive Director, New Zealand IoT Alliance
- Drew Broadley, Executive Director, Data Ventures

For more information on Smart Cities Emerging Innovators, please visit www.emerginginnovators.com or email sccei@anz.smartcitiescouncil.com.

We would also like to thank the guidance of the Smart Cities Council Australia New Zealand (SCCANZ). SCCANZ is part of the Smart Cities Council, the world's largest network of smart cities companies, practitioners and policy makers, embracing technology, data and intelligent design to accelerate liveability, workability and sustainability in our cities and towns.

Further information about the Smart Cities Council can be found at www.smartcitiescouncil.com.

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Wellington as a Smart City

Wellington City is New Zealand's capital and second largest city with a population of approximately 200,000 people. It is the main social and economic centre for the wider Wellington region as the city draws over half of the region's workforce from the surrounding districts; Porirua, Upper Hutt, Lower Hutt and Kapiti Coast; and holds many of the nation's cultural and art institutions.

Globally, it has substantive political standing through its central and local government relationships with other countries and cities, as well as high acclaim for its creative and digital industries and high standard of living.

Wellington is a leader in New Zealand's smart city sector. It has benefited from the early adoption of initiatives and policies by local and central government that has enabled experimentation in the sector. For example, the vision document *Wellington Towards 2040: Smart Capital*, developed in 2011 by Wellington City Council, positioned 'virtual connectedness' as a strategic goal for the city to increase its resilience to global trends such as competitive markets and disruptive technology.

In 2014, Wellington City Council signed a memorandum of understanding with Japanese technology firm NEC to trial new sensing technology in the city with the aim of exporting the technology to oversea markets. This culminated in the *Safe City Living Lab* programme that used sensing technology to improve the city's understanding of social harm and disorder, and improve the delivery of social services.

Between 2015 and 2016, Wellington City Council also worked with Land Information New Zealand, the central government's land and property information service, on its *Smart Cities Programme* that explored collaborative approaches between the public and private sectors to test the use of real-time monitoring and sensing technologies to improve civic management.

For Wellington, the smart city sector offers the tools to deliver greater outcomes for its citizens and businesses. This snapshot provides an insight into the city's current initiatives, challenges, and possible future in the smart city sector.

Wellington's Smart City Initiatives

The below initiatives from Wellington City Council, New Zealand IoT Alliance, and Data Ventures provide a snapshot of Wellington's smart city sector.

Wellington City Council

Wellington City Council is the local authority for the city. Driving its smart city initiatives is its Customer and Innovation Team who is tasked with achieving the city's strategic goals aided by the use of smart city technology. The team works collaboratively with external public and private sector organisations, as well as leading internal innovation across departments within the council.

Wellington City Council's initiatives are:

Virtual Wellington is a virtual reality simulation of the city that enables users to experience the effects of new city planning regulations, spatially see information from the city's sensor network and understand the impacts of sea level rise. It is currently being used by council officers to draft the next district plan through simulating development scenarios, and engage communities in the discussion about the city's future.

Evolving out of the city's former partnership with NEC, Virtual Wellington is earmarked to be integrated into the next generation of democratic, community and planning services.
It is anticipated that the city's decision making will become more informed by data and visual or immersive experiences conveyed by virtual, augmented and mixed realities. It is envisioned that this will result in a more accessible understanding of the issues and outcomes.

Screenshot from Virtual Wellington

The **Data Engagement Project** is a tool hosted on ArcGIS that enables the council to share data internally across their teams and with regional health and emergency services to better understand the life journey of patterns and needs in the city. By spatially showing information captured by various teams, it can identify patterns of harm or distress that were previously hidden by geographic distance, delays in reporting or organisational silos.

"If we can have a smart city that is particularly adept at helping us understand our natural hazards, adapt to them and recover from them, then I think that is where we want be"
– Sean Audian, City Innovation Lead, Wellington City Council

The tool is currently being used in the city's review of their liquor ban bylaw to establish a baseline understanding for alcohol harm and alcohol related issues. It will also be adopted by the city's alcohol management strategy, the policy that controls the sale and availability of alcohol, as a monitoring tool to track the wider causes and effects of adverse alcohol related events in partnership with emergency and social welfare services.

Wellington City Council's **Seismic Sensing** project uses earthquake-measuring accelerometers in 400 buildings across the city to better target evacuation and repair efforts post-event. The accelerometers are IoT devices that allows the council to quickly understand the potential structural health of buildings in the city.

Working with QuakeCoRE, a research partnership between various New Zealand universities that focuses on earthquake resilience, the devices measure how each individual building moves during the day and during earthquakes. The initiative is considered important to the natural hazard challenges facing the city as it is positioned on a major faultline.


Mt Victoria from the Waterfront. WREDA.

New Zealand IoT Alliance

New Zealand IoT Alliance is a membership based organisation who advocate for the IoT (Internet of Things) sector in New Zealand. Their members include corporations, government agencies, small businesses and tertiary institutes. Their key aim is to accelerate IoT innovation by promoting collaboration across industry and government.

New Zealand IoT Alliance's initiatives are:

Seven working groups have been established to develop key areas of the sector. These working groups focus on device certification, ecosystem mapping, radio spectrum management, pilot opportunities, cyber security and data and privacy.

For example, the IoT Ecosystem Map Working Group identifies the supply and value chain from manufacturer to customer and the form of relationships between the stakeholders. By identifying each stakeholder and how they fit into the ecosystem it will create a supply chain that is resilient and with a clear identity in the market to spur growth and investment.

The working group has supported **Callaghan Innovation's Scale Up** programme that provides start-up IoT initiatives with a mapped network of businesses, funders, and mentors in New Zealand and overseas that they can tap into for support. Scale Up is set to launch in early 2019. Businesses and organisations can register to be involved at www.callaghaninnovation.govt.nz.

In 2017, the organisation published an **IoT Sector Report** titled *Accelerating a Connected New Zealand*. The report provides an overview of the current state of the IoT sector including the comparisons with overseas countries and the challenges facing the sector's growth. The report states that:

"the key barrier to the uptake of IoT is a lack of knowledge of how it can improve business… there is little understanding from Line-of-Business of the role real time data can play and the value of that data, which means there is currently little demand for it"
- Accelerating a Connected New Zealand, page 29

70% of organisations that have, or are planning to implement IoT, believe that IoT will be transformational or strategic to their business. This suggest that once organisations understand what IoT can do for them, it becomes increasingly important."
- Accelerating a Connected New Zealand, page 14

New Zealand IoT Alliance

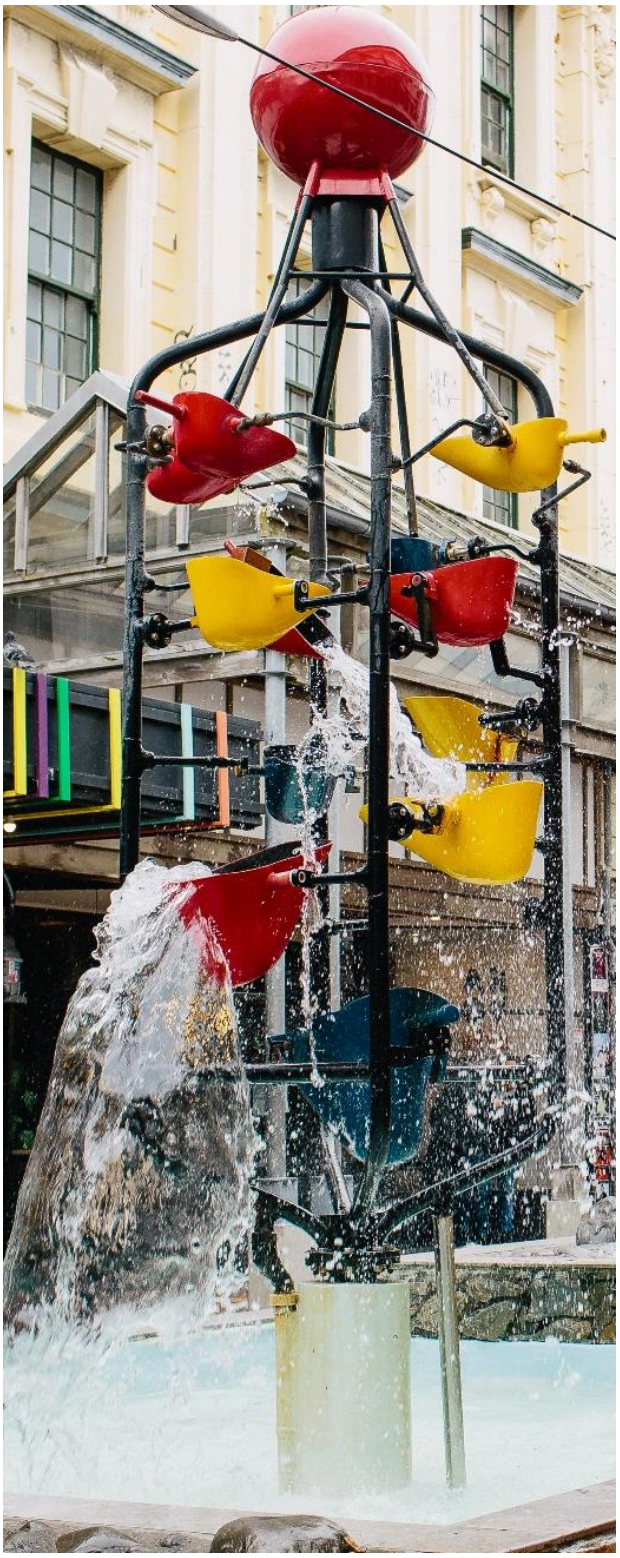
The report also finds that the sector's successful vendors are the ones who clearly articulate the value proposition of their solution and builds a strong narrative around how the technology can improve business and bring discernable financial reward. It also identifies that high setup costs for devices should be avoided or, at least scaled to the value that the technology is bringing to the customer.

The report highlights opportunities for IoT devices to improve New Zealand's agriculture, utilities, asset management and civic industries. Examples of the opportunities are:

- Farm animal IoT tagging to monitor individual weights, detect movement, know location and track production of each animal. This enables farmers to get a more detailed insight into the animal's health and economic value that can otherwise be easily lost in herds and large processes.

- Smart Water meters enable customers to monitor their water usage at a greater frequency rather than being integrated into annual property rates. This can empower customers to better control their usage and water bills. It can also improve the city's ability to monitor usage during periods of drought.

- Smart street lights that adjust their brightness depending on whether users are on the street, monitor environmental measures like air quality and identify maintenance needs. This can greatly reduce a city's electricity consumption, the city's data and improve the effectiveness of repair efforts.



Bucket fountain. WREDA.

Data Ventures

Data Ventures is a business unit of Stats NZ. A self-described data ‘experiment’, they have a mandate to test and explore uses for publicly available data that is captured in the census but that is not often optimised.

Since their inception in 2017 they have been trialing business models, product offerings and finding their position in the market. They have the target to become commercially self-sustainable by March 2019.

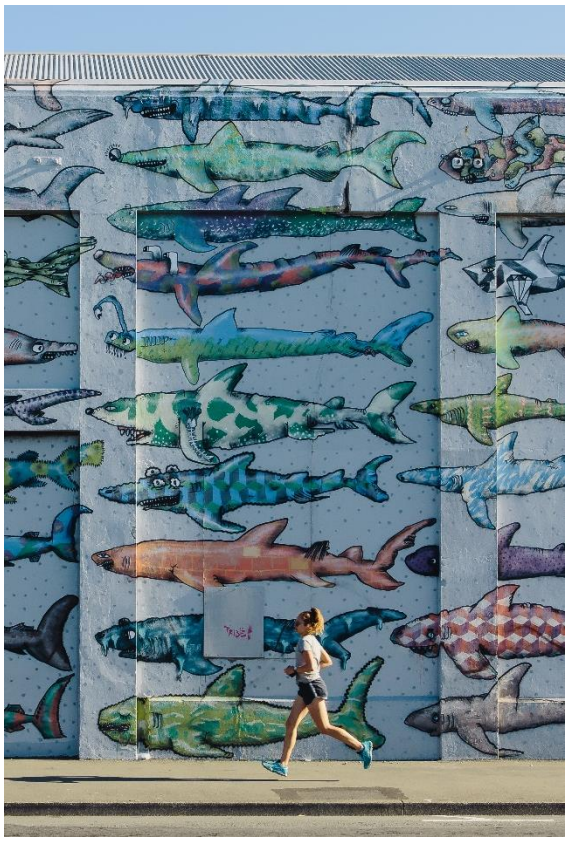
Their customers are central and local government, government owned agencies and iwi. They do not sell Stats NZ or private data to customers.

Their aim is to improve their customer’s decision making by providing up to date and fit-for-purpose data-sets that are understandable and useful. Data Venture’s initiatives are:

Population Density is a data offering that provides a snapshot into the population density within an area unit (areas that are in between meshblocks and territorial authorities and similar to suburbs in size) at any given time. It uses data from telecommunication companies to identify the number of people in a location through active mobile connections, aggregates the data to remove the ability to identify people and demographics, then provides the filtered information to their customers.

The outputted data is anonymized and simply shows the numerical figure of people in an area and the relative proportion compared with previous times and the rest of the city. While there are many uses for the information, it is currently being used to support emergency and event management to ensure that there are sufficient staff and resources available in densely populated areas where the need may be the greatest.

Travel Patterns will provide data on how populations move within and between area units. It is earmarked to be used during large events at the city’s main stadium, Westpac Stadium, where 45,000 people can attend an event resulting in large fluctuating demands on public transport and civic services as the crowd moves through the city to and from the stadium.



Shark wall street art. WREDA.

Data Brokerage is an offering to work between data providers and private consumers to mitigate privacy, ethical and expectation issues that can arise when data is traded.

Data Ventures uses its impartiality and experience as part of Stats NZ to ensure the data provider removes confidential and personal information and guide the parties through the trading process. Data Ventures then packages and delivers the data-set to the customer in a format that is useful for their intended purpose.

It is understood that once the data is delivered to the customer that they may then engage the private sector to help interpret and apply the data in decision-making.

Anticipating this, Data Ventures seeks to educate its customers by asking them to undertake an assessment addressing the privacy, cultural and ethical risks of acquiring and using the data, including the risks associated with contracting private sector services to interpret the information and implement data-based decisions on behalf of the customer. The aim of this assessment is to make all parties aware of their responsibilities as stewards of the information and reduce the likelihood of harm caused by unintentional misuse or management.

More information about Data Ventures can be found at www.dataventures.nz.

"We believe that you can get enough information from area unit data without having to know personal information...we want to get more granular in terms of frequency, not more in terms of resolution"
- Drew Broadley, Executive Director, Data Ventures

"Data Ventures can bring the datasets, confidentially, privacy, integrity and impartialness to the market but that is where we hand the information to the private sector who can provide the insights"
- Drew Broadley, Executive Director, Data Ventures

Cafe. WREDA.

Challenges Facing the City

Wellington's smart city sector is transitioning from the start-up stage to an established market sector. To achieve this, the city is facing the following challenges:

- Balancing the public's concerns about the collection and use of information sourced from individuals and the public realm with data-driven innovation;
- Establishing market-wide ethics and practices around data sharing and trading;
- Creating commercially viable business models to sustain the smart city ecosystem; and
- Integrating the smart city sector into the public and commercial discourse.

Wellington's drive to use publically available data to inform civic decisions is experiencing the challenge of assuring its citizens that their privacy and personal information is not being misused or is at risk of being misused. Like Toronto's data-informed suburb of Quayside, mistrust alone can risk stalling an initiative's progress and damaging the perception of smart technology. From the interviews it is evident that protecting the public's privacy is central to all initiatives in the city. However, with the development of more detailed monitoring technology and changing public opinions on data sharing, the sector will require continual updating on how it balances the demands of privacy, data collection and innovation.

Data Ventures and Wellington City Council are currently mitigating these concerns by avoiding capturing personal data and images at street level.

The constant evolution of Wellington's sector means that there are few entrenched ethics or practices that inform how the market should conduct data sharing and trading. This can result in varying degrees of expectations among industry players on which processes to adopt and discourage those without privacy or data management backgrounds from entering the sector as they may be unsure about the privacy, legal and market expectations.

This is not helped by current privacy legalisation that is not clear on the amount of anonymization is required when collecting or trading data, especially when the triangularisation of data-sets can undo some anonymization attempts.

"The one area that is still missing is moving from the pilot phase into a commercially environment that is in line with the larger infrastructure and operational projects in a city"
- Kriv Naicker, Executive Director, New Zealand IoT Alliance

Wellington's smart city sector needs to identify commercially viable business models at the multiple stages in its supply chain to sustain an established sector. These business models need to provide for data collection, processing, filtering, brokerage, verification, marketing and packaging of services and products in the ecosystem, as well support services such as administration, employment and hardware. They need to be replicable and be understood by the market to attract new investors and businesses to the sector.

Progress on some of these models are more advanced than others, such as Data Ventures' filtering and brokerage services. However, it is vital that the marketing and packaging of smart services and products is progressed to better communicate their value to the wider market so they can be seen as a commercial option for customers. It is likely that the private sector will be required to develop these and similar commercially focused stages in the supply chain as the public sector may be politically restricted regarding commercial investment and initiatives.

"The challenge with smart cities is that the business models to support the initiatives don't really exist and so they are constantly having to be developed"
– Sean Audian, City Innovation Lead, Wellington City Council

"There has been so much focus on collecting street-level data but there is still some work that needs to be done to address the perception of the information (that is being gathered)"
- Drew Broadley, Executive Director, Data Ventures

To transition from the start-up stage to an established sector, its knowledge, aims and principles will need to be introduced and integrated into the existing wider market. Sector leaders will take a pivotal role to build the required relationships across the city's various professions and industries who will likely have varying degrees of interest in and understanding of the sector.

If successful, smart city initiatives will be positioned as a tool that other sectors can use to achieve their aims. This will have the benefit of growing the demand for smart solutions but most importantly to increase the influx of new ideas into the sector that can drive future innovation. By achieving integration into the wider market the long-term viability of the sector will be assured.


New Zealand Festival. WREDA.

The Future of Wellington's Smart City Sector

The interviews identified the following aims for Wellington's smart city sector:

- Achieving the horizontal integration of smart city tools and initiatives with other established sectors;
- Increasing the use of smart technology in local government to enhance decision-making abilities;
- Implementing smart technology to grow market efficiencies and innovation across the Wellington region; and
- Making data and information more available to the public and businesses.

Achieving horizontal integration with other sectors will enable the city's smart city sector to find new markets and expand its service offerings. It is important that the sector designs open and flexible tools that can plug into Wellington's large transport, local and central government lines of business to help the sector transition into the mainstream market and become a integral contributor of value to the city. Integration may come in the form of accessible and easily customisable IoT operation systems, and data management and trading platforms.

"We will end up with a modulated and sustainable smart city as opposed to a collection of prototypes which is often the biggest problem in the sector"
– Sean Audian, City Innovation Lead, Wellington City Council

Wellington City Council aims to increase the use of data and smart technology to inform their decision-making and to better communicate with their communities. With increasing demands on public infrastructure and the varied interests and needs of the public, their role of serving, administering and enabling the city's future is becoming more complex and nuanced. Smart technology has been identified as a cost effective and agile way to understand these demands and implement solutions.

"People and councils will be at the point where they can make decisions quickly – not wait every five years"
- Drew Broadley, Executive Director, Data Ventures

Mount Victoria View. WREDA.

Implementing smart technology in the private and public sectors will grow the city's capacity to support additional business activity, efficiencies in current processes and increase its influence in the region as a hub of innovation. This will likely create financial and cultural dividends within the local market as the city will attract new talent and be considered an easy place to conduct business.

Currently, Wellington Regional Economic Development Agency is supporting the use of the technology as a market stimulant through accelerators, incubators and events such as GovHack, Creative HQ and TechWeek. These initiatives support start-ups, established companies and government services to understand and adopt new technologies and systems that can help them achieve their aims. As the smart technology in these initiatives find success, it is anticipated that this will introduce new ideas and capabilities to the wider market which will improve the city's overall willingness to apply smart technology across sectors.

All interviews identified an aim to make data and civic information more understandable and applicable to the public and businesses in an effort to improve the sector's transparency and encourage new data-based innovation. Currently, plenty of publicly available data is accessible via Wellington City Council's Open Data Portal and Data.govt.nz, however, improvements are required to make it more welcoming for the general public and non-technology focused sectors. To improve this, future initiatives are anticipated to focus on transforming datasets into user friendly experiences and promoting the concept of individual and business empowerment through the use of public information.

"Vendors should seek to turn discussions from technology led to business led. Buyers need to better understand that data is the value of IoT, not the technology itself. Data should be considered a strategic asset."

- Accelerating a Connected New Zealand, page 16

In conclusion, Wellington is a leader in New Zealand's smart city sector. Its experience with various small scale initiatives has provided insights into governance models, privacy management, and understanding the supply chain. The next step is to identify commercial business models that are replicable and supportive of the market's existing operational goals to attract large scale investment and application.

Thank you to the representatives from Wellington City Council, New Zealand IoT Alliance and Data Ventures for participating in this research.

Student with VR. WREDA.

We thrive on feedback, and would welcome your comments to help make this work as impactful as possible. Please contact us at anytime.

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