



#WETHECITY3

TOWARDS A DATA-DRIVEN AND RESPONSIVE SYDNEY

The Committee for
Sydney



CONTENTS

1.	INTRODUCTION	3
2.	THE #WETHECITY JOURNEY	10
2.1.	TECHNOLOGY AS AN ENABLER	13
2.2.	EFFICIENCY AND VALUE CREATION	13
3.	WHAT IS HOLDING US BACK?	15
3.1.	CITY GOVERNANCE	15
3.2.	A LACK OF STRATEGY	16
3.3.	THE ROLE OF LOCAL GOVERNMENT – INTEGRATED PLANNING AND REPORTING FRAMEWORK	17
4.	WHAT IS TO BE GAINED BY CHANGING OUR THINKING?	18
4.1.	IMPROVED PROJECT JUSTIFICATION	18
4.2.	IMPROVED PROJECT OWNERSHIP AND PARTNERSHIP	20
4.3.	EFFICIENCY	22
4.4.	VALUE CREATION	23
5.	TOWARDS A SMART SYDNEY STRATEGY	23
5.1.	A SMART SYDNEY STRATEGY	24
5.2.	ROLE OF REGULATION	27
5.3.	ACCIDENTAL SETTINGS – SUBSIDIES, INCENTIVES AND PENALTIES	27
5.4.	BUSINESS CASE DEVELOPMENT	28
5.5.	BUDGETING	29
5.6.	MARKET-MAKING	29
6.	A FRAMEWORK FOR THE SMART SYDNEY STRATEGY	31
6.1.	CROSS-GOVERNMENT STRUCTURE	31
6.2.	CUSTOMER-LED METHOD	32
6.3.	PEOPLE-CENTRIC INSTITUTIONAL CULTURE	34
6.4.	PUBLIC AND PRIVATE CAPABILITY	35
6.5.	INNOVATION IN FUNDING	37
7.	RECOMMENDATIONS	38

1. INTRODUCTION

This report comes at a time when smart cities are fast becoming a serious policy focus for Australia's city leaders. It's clear we now have a significant upswing of interest in how best to leverage data-driven services to meet the challenges our cities face today.

This is welcome, because in the Committee for Sydney's view, Australian cities have been slow to invest –significantly and strategically– in smart city infrastructures and planning. At the core of this problem has been siloed state government and a fractured local government system, which has impacted on the design and implementation of digital platforms and tools and impaired the collection of data at a metropolitan level. Without smart governance, there cannot be a smart city – and only modest progress towards a data-driven and responsive city at a metropolitan scale.



Image credit: UNSW Built Environment

METRO-SCALE GOVERNANCE AND CROSS-GOVERNMENT COLLABORATION MAKES SMARTER CITIES

It is noticeable that cities leading the pack in scaling up, managing and transforming their city have governance at either metro-scale or a single authority covering a significant part of their metro area. They also tend to have more powers and resources at their disposal. For example, Chicago's city government includes almost 3 million people while Boston city government covers 650,000 of the 2.5 million residents. This is compared with the City of Sydney having 230,000 residents within a city of almost 5 million. Both Boston and Chicago also have oversight over a larger range of essential services along with a range of tax-raising and bond-financing powers.

Beyond their formal powers, 'Big City Mayors' take it for granted, not least because they tend to be directly elected, that they have a 'convening' role – of seeking to align in a single city strategy, the various government, private sector enterprises and not for profit bodies operating in their city. With more of the city's services under the council umbrella or in alignment with the Mayor's aspirations, the kind of cross-sector, cross-government integration that helps the scaling up and dissemination of smart city initiatives becomes more feasible. With this hard and soft power comes the capacity to be an influential advocate around such initiatives within and without the city council – particularly important in promoting digital inclusion and awareness across the community.

In this context, given the importance of smart city technologies and approaches to the economy, public services, and the ability of communities to shape their city, the Committee believes it is vital for Sydney that there is progress on several fronts. One is to continue the journey to greater metropolitan governance and collaboration as we have seen in the advent of the Greater Sydney Commission.

Another front on which there has been less progress is local government amalgamations, although there are now some large councils in Sydney, particularly in its West, which are assuming a leadership role at the metro level. These should be developed as test-beds for smart city initiatives and urban innovation and have more powers devolved to them given their potential importance in planning and shaping a great future for Sydney.

But there are other steps we must take. Particularly important is the sharing of best practice and urban innovation from across the world. We showcase some of that innovation in this report, including both international and home-grown initiatives. Because the fractured and siloed governance of our city has led to a kind of 'market-failure' in Sydney around information-sharing, sharing exemplars is crucial.

There are spatial opportunities to help us achieve a step-change in the design and implementation of smart city infrastructure and initiatives, such as the emerging cluster of 'innovation districts' and 'health precincts' in Sydney. Emerging at Parramatta, Ultimo, Camperdown, Westmead, Liverpool, Penrith, Macquarie Park and many other locations, these districts have certain core features which make them work well as places of economic agglomeration in the knowledge economy, including a strong role for universities or research establishments and well-connected and vibrant mixed-use environments. These precincts are well described by Julie Wagner and Bruce Katz as

"the ultimate mash-up of entrepreneurs and educational institutions, start ups and schools, mixed-use development and medical innovations, bike-sharing and bankable investments, all connected by transit, powered by clean energy, wired for digital technology and fueled by caffeine."

In building a new Sydney we can make it a smarter Sydney.

1 Katz, B & Wagner, J 2014, The Rise of Innovation Districts: A New Geography of Innovation in America, Brookings Institution, <https://www.brookings.edu/essay/rise-of-innovation-districts/>

KEY DYNAMICS DRIVING SMART CITIES

In this report we focus on some fundamental ingredients we need to champion if we are to make the most of emerging smart technology for Sydney. This is not an exhaustive review but we do draw attention to some key dynamics.

One of those dynamics is that for cities to be ‘smart’ they need to invest in programs and initiatives that enhance the quality of the **data infrastructure** that supports them. Though cities are now vast data factories, exuding massive volumes of data exhaust daily, much of the data generated is not very usable or accessible to decision-makers. Creating environments in which urban data is more usable and accessible to decision-makers, innovators and citizens is fundamental to the success of any smart city strategy.

For governments, this in part means promoting data accessibility by publishing data in open formats, harvesting new sources of data through Internet of Things (IoT) sensors, or fostering collaborative data partnerships across public and private agencies. This work could be geared towards addressing our biggest challenges, like congestion and affordability.

But as we know, **data is not the same as knowledge**. Today’s leading smart city platforms are collaborative ventures between government, the private sector, researchers and citizens. These smart city platforms connect data with decision-makers, catalyse ecosystems of innovators, align challenges with data-driven innovations, and help good ideas to scale.

As data-driven services proliferate – whether in the fields of transportation, banking, cyber security, or strategic planning – cities that are leading the way in their smart city investments recognise that **success depends as much on the cultures of experimentation, collaboration and risk-taking** they foster in areas of governance and decision-making as on they do on technology platforms.

When we consider the activity currently underway in Australia, it becomes clear that while we have a number of welcome technology investments and trials, we lack the strategic frameworks and collaborations that can catalyse transformative innovation across our cities.

There is an urgent need to scale up levels of investment in data-driven infrastructure, but we also need to become much better at using data-driven capabilities and standards to drive real change to our governance and decision-making frameworks: to how we plan, manage and monitor our cities.

FROM SMART CITIES TO SMART GOVERNANCE

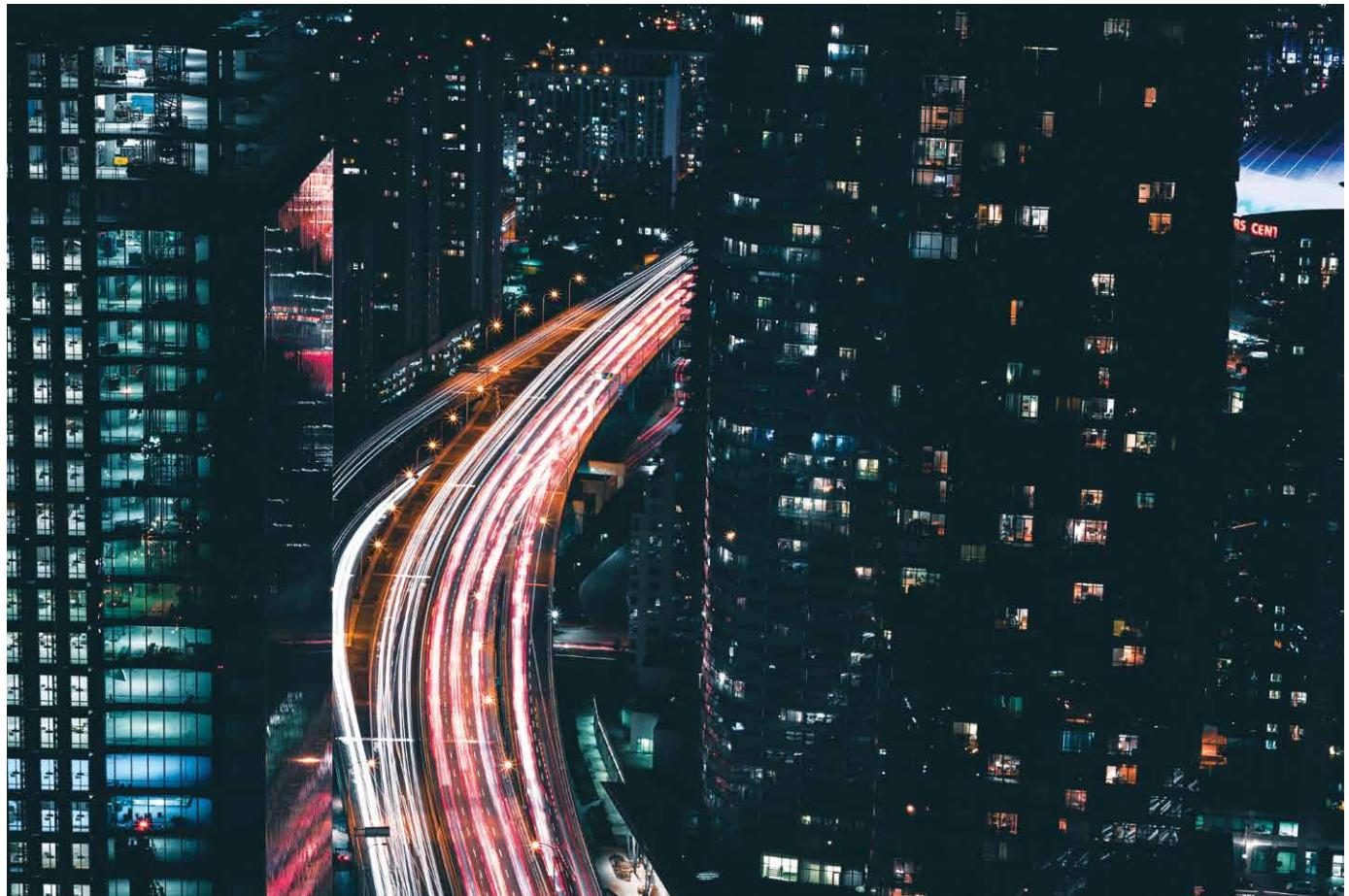
A common theme of the #wethecity series is that technology advances and digital disruption *without* institutional innovation can only ever make a very limited contribution to our cities.

We have continued to champion the fundamental importance of ‘smart governance’ as the criteria of success for any smart city program. In other words, smart cities depend on smart governance. In the first #wethecity, we said:

Smart cities need smart governance. We also mean governance, not just as leadership or management of a council but also how the structures, platforms and ways of working enable people who live and work in the city – and governments’ own staff – participate in designing and delivering services and outcomes for their communities.

In this Report we put the spotlight on some of the data-driven challenges that must be tackled as part of a commitment to smart governance. To make data work for cities we must build a collaborative and sustained effort to connect bottom-up innovations with top-down leadership and vision.

We see this as Sydney’s ‘missing middle’. We must connect data-driven innovations with city-wide strategic imperatives to address issues like housing affordability, social inclusion, smart transport and mobility, and intelligent, responsive ecosystems that support sustained renewal of jobs and innovation. We must utilise data-driven expertise to better monitor the impacts and effectiveness of investments and infrastructure. We must connect data-driven innovation with policy reforms and thinking at the city scale.



IT IS EVEN MORE IMPORTANT TO BE A SMART CITY WITH AUTONOMOUS VEHICLES COMING

This is even more important as we enter an era in which the coming together of ‘digital innovation’ and urban planning can either happen ‘to us’ as a city or ‘with us’. Autonomous vehicles are coming faster than our capacity as a city to think about or plan for them. They can improve or worsen urban outcomes such as congestion and sprawl - which effect they have will depend on how strong our city’s urban vision and governance are. Sydney’s current fractured governance and lack of integration of smart city thinking with urban policy does not give confidence.

The need for that coordinated city planning approach to ‘smart cities’ is reinforced when it is understood that AVs require the cities in which they operate to have significant broadband capacity as they will have massive data needs to run successfully. Such cities will need the kind of fibre network download/upload speeds that Sydney simply doesn’t have even with the current version of the NBN. Sydney’s globally uncompetitive broadband capacity and speeds struggle to meet current demand let alone an IoT and Autonomous Vehicles future. We must ensure we avoid having ‘driverless cars in rudderless cities’.

A NEW ERA OF DATA-DRIVEN RESPONSIVE GOVERNANCE

As Stephen Goldsmith and Susan Crawford have written in their book *The Responsive City*, our ability to collect, analyse and share information today enables governments and its constituents to focus on results, not only compliance.² Today’s data analytics can allow governments to move from what they call a “compliance model” to a problem solving one – “one that truly values the intelligence and dedication of its employees and the imagination and spirit of its citizens”. This can ignite a great renewal in governance.

But the potentials of responsive government will not be realised simply through advances in data-analytics and standards. Collaborations across public, private and community sectors are vital here, addressing data gaps, building data partnerships and solutions, rather than replicating existing siloed agency structures. ‘Data Collaboratives’³ are new vehicles designed to bring a range of stakeholders and data custodians together to support more responsive services.

2 Goldsmith, S. and Crawford, S. 2014. *The Responsive City: Engaging Communities through data-smart governance*. Wiley, San Francisco.

3 See <http://thegovlab.org/datacollaboratives/> for more information on Data Collaboratives.



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SYDNEY AS A SMART CITY CAPITAL

Many curious-minded innovators, dedicated urbanists and passionate technologists are proud to call Sydney home. We should be capitalising on this energy to establish Sydney as a leading exemplar of the data-driven, responsive city.

Sydney has the opportunity to be a world leader in building the data-smarts to support our next wave of urban innovation to build a world-leading data ecosystem that leverages data for decision-making, and builds platforms for open collaboration and innovation.

Here's why:

The city's role as a key financial hub for the Asia Pacific, home to Australia's highest concentration of technology start-ups and digital industries, means that Sydney more than any other Australian city has access to the skills, creativity and talent needed to grow a healthy ecosystem for data-driven services.

In recent years this city has become a leading fintech capital in the Asia Pacific region, supported by incubators like Stone & Chalk that nurture start-ups by working collaboratively and pooling the support of entrepreneurs, VCs, corporates and government. The success of fintech in Sydney shows how important collaborative spaces are for start-ups and for ideas to accelerate and build scale.

The NSW State infrastructure program is accelerating its investment in productivity-enhancing assets, undertaking \$72 billion in investment over the next 4 years. There is an opportunity here to grow a world-leading smart infrastructure program, and leverage this investment through integration of IoT technology and by promoting innovation in data-driven service delivery.

The Greater Sydney Commission has the potential to deliver a more integrated, cross-agency approach to addressing Sydney's needs as a growing, polycentric city.

We want to build on these vital ingredients to establish Sydney as a smart city capital. This means we must focus on major areas of energy & investment.

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LET'S LEARN BY DOING

In the following chapters we examine in more detail these building blocks of the data-driven, responsive city. We review what we can learn from others, supported by applied research and insights. However, we reiterate: smart city strategies are not just about technology. They represent very important urban development policies that include large investments and long-lasting physical infrastructures. They yield serious consequences in the delivery of services and the relationship among the public sector, citizens and businesses, shaping the future of society and governance in the years to come. It is essential for Sydney that we study them methodically and strategically.

While the defining characteristic of a smart city strategy is the promotion of technological infrastructure development, technology is not an end in itself. Technology would be useless if it didn't promote the development of human and social capital and the performance of the city which is seeking to be 'smart'. To be truly smart we need an integration of the digital with physical and institutional dimensions of the smart city. Physical planning and social policy must underpin the digital dimension of the city and promote its integration upon them. That requires coordinated city management and governance - deeply based on a renewed engagement with communities - hand in hand with the design and implementation of technological infrastructure: it is the Internet of People as well as the Internet of Things that truly makes the Smart City.

2. THE #WETHECITY JOURNEY

Four years ago, the Committee released #wethecity. In that Paper, we called for the creation of a Sydney Policy Unit and the digitisation of key government planning processes. We called for more and better open data, we called for new models for engagement with stakeholders, and a digital inclusion campaign.

But the most important thing we called for was the establishment of a single voice for "We the City". A single body to coordinate government, and its many levels and agencies and to champion Sydney as a smart city. A single body to provide the necessary policy framework to drive and coordinate the disparate digital efforts of private, public and community based organisations. The creation of the Greater Sydney Commission (GSC) has now provided us with this platform. A vehicle to implement city wide planning and policy development on behalf of the people of Sydney.

Understandably, the GSC has several pressing priorities to deliver in its first phase of operation, not least delivering new district plans and a new metropolitan strategy for Sydney. However, the Committee recommends the NSW

Government and the GSC to pursue a digital strategy for Sydney in its second horizon. As we suggested in #wethecity 1 the strategy should;

- i. Develop Sydney wide platforms for engagement and decision making.
- ii. Appoint a digital champion for Sydney - a digital commissioner of the GSC.
- iii. Develop a multi-faceted digital inclusion campaign targeting those without the means of taking advantage of these reforms.
- iv. Support the roll out of digital technology across the city.

This iteration of #wethecity seeks to take these points further. The opportunity that exists with the GSC should not be underestimated. The Commission offers a place based governance model for Sydney. For the first time, we have a single organisation whose job is to break down the sector based silos of public administration that have plagued Sydney's development. The opportunity to plan and deliver civic improvements that are citizen centric must be pursued, and done so using innovation in technology.





Image credit: UNSW Built Environment

We now have a governance configuration that can be used to deliver success.

In #wethecity 2 we spoke about the data-driven city. The world is rapidly moving to a paradigm where almost all city activity can be measured, stored and analysed. We argued that the data-driven city needs to have sound foundations on which to build a smart Sydney on. Put simply, promoting open data, effective data governance and uniform standards to promote interoperability and value creation. These are the building blocks of a smart city.

The opportunity now exists to better use the data that we already have and to deploy devices using the Internet of Things to capture additional data sets to inform the planning and management of our city. The NSW government now has an ambitious program of publishing its data. Credit should be given to the efforts of freeing up data sets particularly by Transport for NSW and the Department of Planning and Environment. On open data policies, the NSW Government has made real progress. The value of making these data sets publicly available is limitless, offering the research and development community the information they need to pursue opportunities to unlock value across the city.

The creation of the NSW Government's Data Analytics Centre is another step forward. It offers an opportunity to develop and access innovative analytical techniques to address high impact opportunities and challenges such as tackling domestic violence and improving infrastructure utilisation. While welcome, the Committee believes more effort needs to go into sharing the data available to the Data Analytics Centre (DAC) with industry, academia and the broader community. To make the data available to non-government analysts, maximising the talent available to create city improving products. We need more eyes on the data and more brains thinking about how to use it. More work is needed in facilitating a deep procurement market, providing resources for innovators to draw upon and, in turn enable the growth of a global centre of excellence or skills cluster.

As Sydney gains access to more and more information, we are improving our understanding of the activities and behaviours of our citizens. This self-awareness is often a prerequisite of pursuing change.

We also advocated for a greater role from the Commonwealth in supporting smart city thinking and funding. In this iteration, we are very pleased to see the Commonwealth has answered the call with two significant initiatives. The Smart Cities and Suburbs Program and City Deals.



Image credit: Marco Verch, Augmented-Reality-Tour-on-observatory-of-World-Trade-Center, Licensed under Creative Commons. Downloaded from <https://www.flickr.com/photos/30478819@N08/26672943732> on 1st November 2010

City Deals

On 21 October 2016, the NSW Government signed a memorandum of understanding with the Commonwealth to develop the state's first City Deal. The City Deal will bring together all three levels of government in a collaborative partnership to realise the potential of Sydney's outer west.

The City Deal will focus on the local government areas of Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith, the Blue Mountains and Wollondilly. The population of Western Sydney is set to grow by more than 1 million people over the next 20 years, including almost 500,000 in these Councils

The City Deal will capitalise on the opportunities presented by this significant economic and population growth - supporting a region that is more liveable and more productive and a region that is skilled, innovative and embracing its digital opportunities.

The City Deal presents an opportunity to reform the way government operates to deliberately enable smart city innovation to blossom. There is an opportunity to establish a Western Sydney Office of City Management that manages and monitors the performance of the region.

In the first two iterations of #wethecity, we tried to raise awareness within Government and the wider community on what a data-driven, smart Sydney might look like. In #wethecity3 we examine how to move from awareness to management. How to create markets and other mechanisms for public, private and blended value to be created to make the city more productive, liveable and sustainable.

Like many commentators in this area we have identified two broad opportunities:

- **Smart cities** – harnessing technology to improve the performance of the city.
- **Intelligent communities** – using technology to empower citizens and offer greater choice in the millions of decisions that cause the interactions that drive our cities on a daily basis.

Smart Cities and Suburbs Program

The \$50 million Smart Cities and Suburbs program supports local governments, private companies, research organisations and not-for-profit bodies to work collaboratively to deliver innovative smart city projects. Indeed, collaboration is a key assessment criterion for receiving a grant. The goal is to improve the liveability, productivity and sustainability of cities and towns across Australia.

Importantly the program will offer a snapshot of Sydney's smart city readiness. We'll be able to see which local councils are motivated, resourced and prepared to take advantage of the dollar for dollar funding offer contained in this initiative. We'll see which councils are prepared to take the lead. This will be important because initial feedback from industry and local NGO's points to systemic issues in the way councils in Sydney approach the subject of smart cities. These barriers will be discussed later in this paper and must be addressed as a matter of urgency.

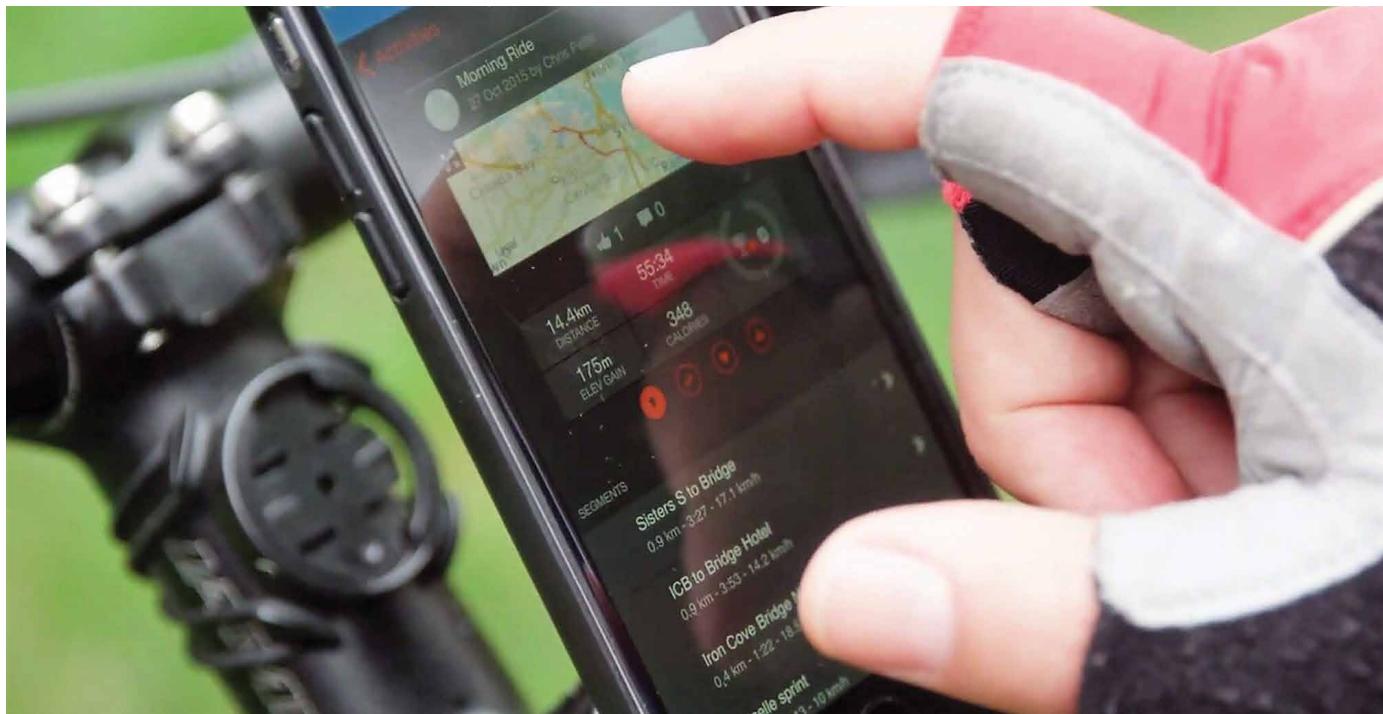


Image credit: UNSW Built Environment

2.1 TECHNOLOGY AS AN ENABLER

Technology can change the way we interact with both our landscape and with each other. This is not disputed. We now have countless examples from across the world where technology is changing the way our Cities work. Be it artificial intelligence, data mapping tools, the deployment of sensors or the development of decision support tools, the opportunities are endless.

The existence of endless opportunities is prompting a dizzying amount of activity and deep competitive marketplaces, full of talent and ideas. Yet, outside of the Fintech sector the reality is that Sydney hasn't made the most of these opportunities that other cities have. The reality is that we have some structural barriers that need to be overcome before the benefits of this technological revolution flow to the citizens of our city. An example of a significant barrier to our success is fragmented governance, which is described in more detail later in this document. This paper assumes the continuation of the rapid development of software and hardware to meet the challenges of global cities. What can't be assumed is that his technological development will flow through to improvements in our citizens lives. We have more work to do.

2.2 EFFICIENCY AND VALUE CREATION

Broadly there are two categories smart city initiatives fall into. The first category are those that reduce resource use, costs or improve utilisation for a largely unchanged service outcome. That is, they help us do what we are currently doing, only cheaper or easier. These initiatives work well where there is a market that prices existing products or services and where a digital transformation reduces costs. Examples include:

- Smart sensors for water usage - reducing wastage for the irrigation of playing fields by detecting ground moisture.
- Automated closing of restroom facilities, removing the need for the deployment of rangers to complete this task.

The second category relate to those that add context and a user experience that is of more value than its previous offering. That is, they help us do something new, or better.

An example here could be the routing of a pedestrian journey for a person with mobility issues. It may not be the shortest journey, but if it could incorporate routing preferences like shade, minimal slope inclines and accessibility offerings such as the location of elevators to avoid stairs, it could be a better journey.

The two categories are not mutually exclusive and some of the most compelling offerings achieve both outcomes, most notably Uber, Airbnb and GoGet.

GoGet

GoGet is a car share platform that allows members to access and use cars parked in many locations across the community using a tap on, tap off card system. The fleet allows for short term usage of a range of vehicles including cars, vans, SUVs and utes, allowing members to use the fleet for a variety of different uses.

The product has led to behavioural change and the ability to collect and analyse data to offer policy makers insights into road usage. GoGet facilitates sharing of assets and provides benefits to users who can own fewer cars, or no car at all, especially in transport-rich areas like Glebe. It benefits communities and businesses, through congestion management and environmental benefits. And these behavioural changes have the potential to shape the city – by freeing up parking and kerbside space and allowing for more efficient use of land.

Sydney is emerging as a leader in carsharing in Australia and indeed internationally, spurred in particular by the innovative collaboration between the City of Sydney and GoGet. In a report in 2016, the Committee for Sydney noted that in the City of Sydney where there is a network of nearly 1,000 cars and where 15% of residents (20,000 people) are car share users, carsharing has taken around 10,000 vehicles off congested roads and overloaded kerbside space. Carshare users drive much less than typical residents of the City of Sydney: around 1,500km per year compared with 3,525km per year.

In ‘smart city’ terms, Sydney is smart indeed in its pioneering approach to carsharing. The success of GoGet and the City of Sydney demonstrates effective collaboration between government and the private sector and provides a local success story of the innovation economy.



GoGet

3. WHAT IS HOLDING US BACK?

3.1 CITY GOVERNANCE

Before technology can solve our problems, we need to start with a clear understanding of the problem to be solved or the opportunity to be harnessed. The nature of defining a problem varies significantly depending on your role in the delivery or consumption of products and services. Almost always the consumer is best placed to identify the problem. The individual understands their own preferences and needs better than the supplier. The rise of the customer or citizen centric approaches is a much-needed voice in the pursuit of enabling technology to enhance our cities. Sadly, Sydney rarely takes a citizen centric approach, but why?

The answer lies in the way we've chosen to govern our City. Prior to the GSC, Sydney's governance was splintered across a myriad of government agencies and dozens of local councils. Each agency is responsible for one particular "thing"; a road network, a hospital system, a park, etc. Each Council is only responsible for their 'patch'. No one has responsibility for the city as whole. No one speaks for 'We the City'. This fragmented accountability limits the definition of a problem to the agency or Council who are only motivated to define problems using the elements of the city services that they oversee.

Consider the working parent dropping their child off to school.

We know that the Premier has a priority of tackling childhood obesity. Walking to and from school every day would increase a child's level of physical activity and likely improve their well-being. Yet, despite being seen as a priority by the Premier, fewer and fewer of kids are walking to School. Why? The options available to working parents and the choices they make based on these options almost guarantee it.

Consider a single mum of a seven-year-old and a two-year-old, who works in the Sydney CBD. She must take into account:

- School opening hours.
- Before school care.
- Public transport routing and timetabling – often express busses cease operation before a parent can complete a school drop off.
- Work commencement times.
- The quality of the journey, including the crossing of roads, shade, shelter and footpaths.
- Long day care options nearby for children under school age.
- Perceptions of safety.
- Knowing your neighbours and community so you can share the load of leading many children on a walk to school.
- Accessibility of schools and the size of school catchments.

This means that having the following stakeholders could be influential in providing a solution to her problem:

- a local council.
- a school.
- a before school care service provider.
- a bus operator.
- an employer.
- parents and friend's association.
- child care providers.
- police.

However, if any one of these agencies were to propose a solution on their own it's unlikely to address all the various challenges and considerations facing the mum. Whose job is it to map out the problem - her journey, her preferences, options and choices?

Whose job is it to map out the problem - her journey, her preferences, options and choices? If any one of these agencies were to propose a solution on their own it's unlikely that it would address all the various challenges and considerations facing the mother.

Who would pay for the development of an initiative that sought to address this problem? The State Government argues that tackling childhood obesity offers benefits to the individual and the broader community and would likely make a financial contribution towards the development of a solution, but the benefits (and thus onus to fund) sits across a number of departments. Helpfully, this issue has been made a Premier's Priority and the delivery of Premier's priorities is the responsibility of the Department of Premier and Cabinet and the Premiers Delivery Unit.

We need a similar unit to focus on the performance of our city working across government to deliver citizen focused outcomes. Smart cities have a 'joined up' governance. The Greater Sydney Commission is a start but we need more.

You might be reading this and thinking what does walking to school have to do with a smart city - consider the following improvements to the journey:

- The school could have a temperature and moisture sensor to inform students on what to wear on the way to school.
- The transport authority may be able to offer additional express services if parents state their desire to travel later due to school drop offs.
- An app could be developed to optimise the route of a 'walking bus' that picks up 6-8 children offering police checks and parent to parent communication to improve perceptions of safety.
- The same app could measure the distance covered and incentivise additional activity for at risk children.
- Analytics from the use of the App could be used to improve the journey to school, offering citizen led insights on improvements to footpaths, storm water management, where to plant shade trees and the need for traffic calming devices.

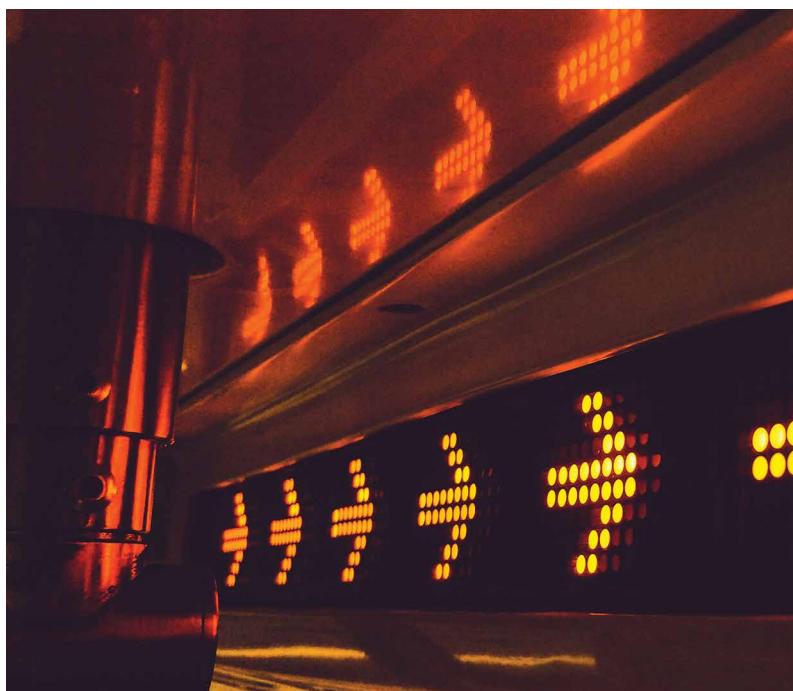
Small problems can be solved with smart kit. That's what smart cities do.

3.2 A LACK OF STRATEGY

The example above illustrated the complexity of looking at a problem through the eyes of service providers as opposed to the consumer. It shows the need to co-ordinate entities across government, levels of government and between the government, non-for-profit sector and private sector.

Where the exercise involves public money, there needs to be an expression of public priority made to argue that addressing this problem is of strategic importance to the community. In the example above, the definition of tackling childhood obesity is a priority of the highest order - being a Premier's priority that must be included by every agency in the development of their strategies.

- What is the problem, how do we expect it to change over time?
- What is the outcome we want?
- How do we prioritise and fund the development of solutions to these problems?
- When do we want it and how aggressively will we pursue it as a priority?
- Who pays for it?
- Are we willing to experiment to deliver outcomes?
- What are the service delivery methods, procurement and what role for the private sector?

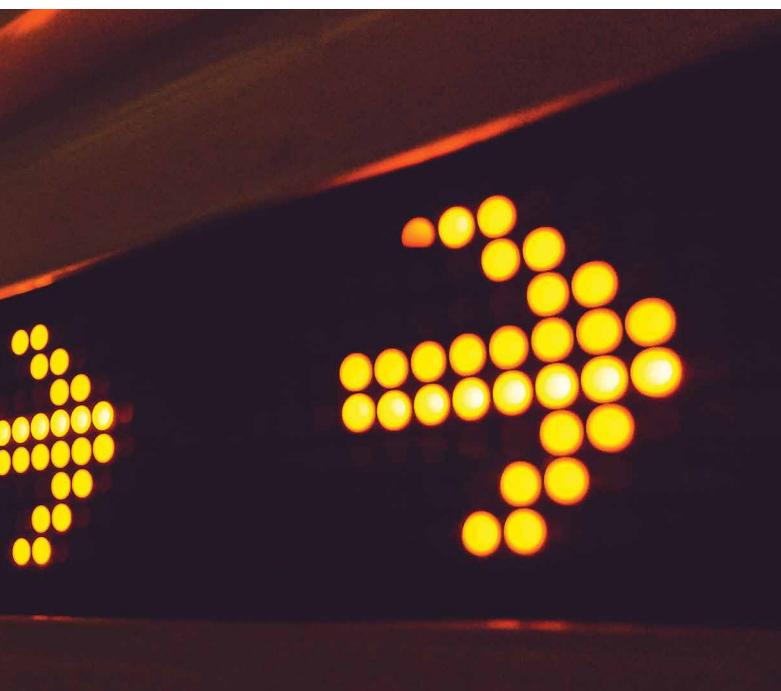


3.3 THE ROLE OF LOCAL GOVERNMENT – INTEGRATED PLANNING AND REPORTING FRAMEWORK

Local Government is heavily regulated; bound to plan for and deliver strategic plans for their communities. This corporate planning leads to budgeting and implementation plans that allocate public funds to deliver community priorities. Local government can play a more significant role in understanding citizen needs across service providers. Larger councils, with greater responsibility and accountability can address previous fragmented civic accountabilities to better align service providers and place managers to deliver smart city solutions.

Similarly, smaller councils with relatively small spheres of responsibility are unlikely to be able to respond to city performance challenges compared to larger ones. The work that is taking place in the Greater Sydney Commission to plan for land use and infrastructure changes across the city should be extended to look at how technology can deliver a smarter city. It is understandable that the Greater Sydney Commission has prioritised land use planning and the integration of infrastructure and land use planning but its next operating horizon must include citizen or firm led problem identification and the use of technology to develop solutions.

More work is needed to increase the use of a collaborative approach to problem solving. No one entity has all the answers to addressing the challenges of the city. We need a governance and capability model that supports the rapid definition of problems and solutions for deployment.



City Collider

As an example of Smart Governance being crucial to the realisation of Smart Cities, a cohort of significant US cities including San Francisco and Miami-Dade County has come together with Siemens as an industry partner to pilot a unique approach to Autonomous Vehicle services.

They are doing so not because they want to be seen as pioneers in technology but because they have identified a core urban challenge for which a strategy on Autonomous Vehicles is the best answer: the need to meet the rising demand for mobility services at a time of constrained public resources.

To this end they are ‘creating the playbook’⁴ on how to capitalise on the opportunity to introduce services for connected and autonomous vehicles and communication between vehicles and city services while addressing data security and privacy.

Believing that the biggest potential lies not in autonomous vehicles for personal use but as a part of city mobility services and that a mix of public and private operators is most appropriate in the current era to deliver this outcome, each of the cities is piloting key projects or ‘colliders’ which will inform the overall ‘playbook’.

The playbook is aimed at building capacity in city governments prior to implementation and to identifying the key problems to be resolved and the policy levers and technology roadmaps that can assist in solutions. How do we link existing mass transit operations with the new AV offering? What policy decisions are required? How can we mesh public and private operations in a seamless experience for passengers? These are the kinds of questions this important initiative in joint civic and technological innovation is seeking to answer.

⁴ City Innovate 2017, Connected cities collider, <http://cityinnovate.org/home/programs/test-learn-collider-urban-sensors/>

4. WHAT IS TO BE GAINED BY CHANGING OUR THINKING?



4.1 IMPROVED PROJECT JUSTIFICATION

When it comes to reviewing infrastructure projects we have some of the world's best processes and technicians. For example - Infrastructure NSW and their investor assurance framework takes what was once largely a project led process, to one that focusses on the role of government as an investor. The new process adds the perspective of the taxpayer as an investor. The assurance audience is now representatives of the taxpayer, not as it was before, just those accountable for project delivery.

It is a very short bridge to cross to adopt a citizen centric approach - government on behalf of the citizen for smart city infrastructure, but we rarely do it in Sydney. Projects are still generally developed by one agency and costs, benefits and assumptions still focus heavily on the proposal that

can be delivered by that agency alone. If you only have a hammer, every problem tends to look like a nail.

This tends to favour traditional built form solutions, responding to projected increases in demand and projected behaviours, rather than understanding citizen journeys, preferences, options and choices. The Department of Education, the Police and Transport agencies rarely ask the parent how they'd like to get their kids to school. They focus on what they've traditionally done, whether this is what's needed and they rarely coordinate their activities to meet the actual need. But smart cities provide a simple platform for the parent to tell them what they want.

We need to develop a method of project justification that goes beyond what one agency is responsible for – incorporating the rest of government, not for profit sector and the private sector. This definition of the problem will not only encourage the use of technology but create a burning platform for investment.

We need to develop a method of project justification that goes beyond what one agency is responsible for - incorporating the rest of government, not for profit sector and the private sector.

Melrose Park: Smart Suburb

PAYCE is developing a Smart Suburb in its \$6 billion-dollar renewal of Melrose Park. The project is being planned as a data-driven mixed use development, offering technology enabled infrastructure and tailored software solutions to enhance the experience of the resident, visitor and worker. The project is exploring the development and handover of digital tools to Council in the same way that developers have created and maintained landscaping of public spaces.

The smart city initiatives to be rolled out across the development, will be co-designed with Council and will be focused with input from the community. The scope of the program includes smart energy, water and waste management. The deployment of sensors, open access to data, the development of dashboards and the engagement of the market to develop solutions for improved mobility and other priorities of Council.

The concept includes a “smart street” in stage one of the development where vendors can deploy and test new technologies with a view to rolling them out across the suburb and potentially the local government area.

The proposal involves Council, universities, the not-for profit sector, State Government and the private sector

to deliver for solutions for the community. It is the first time a Council and Capital Developer have aligned their digital objectives to deliver a program of smart suburb initiatives. The work will build capacity in Council and will be an example of market making offering technology companies an opportunity to respond to specific and funded urban development and smart city problems and opportunities.

The aspiration is that the smart suburb offering be extended beyond local government to include State Government services such as guidance on education, public transport, active transport (walking and cycling), car sharing and ridesharing and car parking.

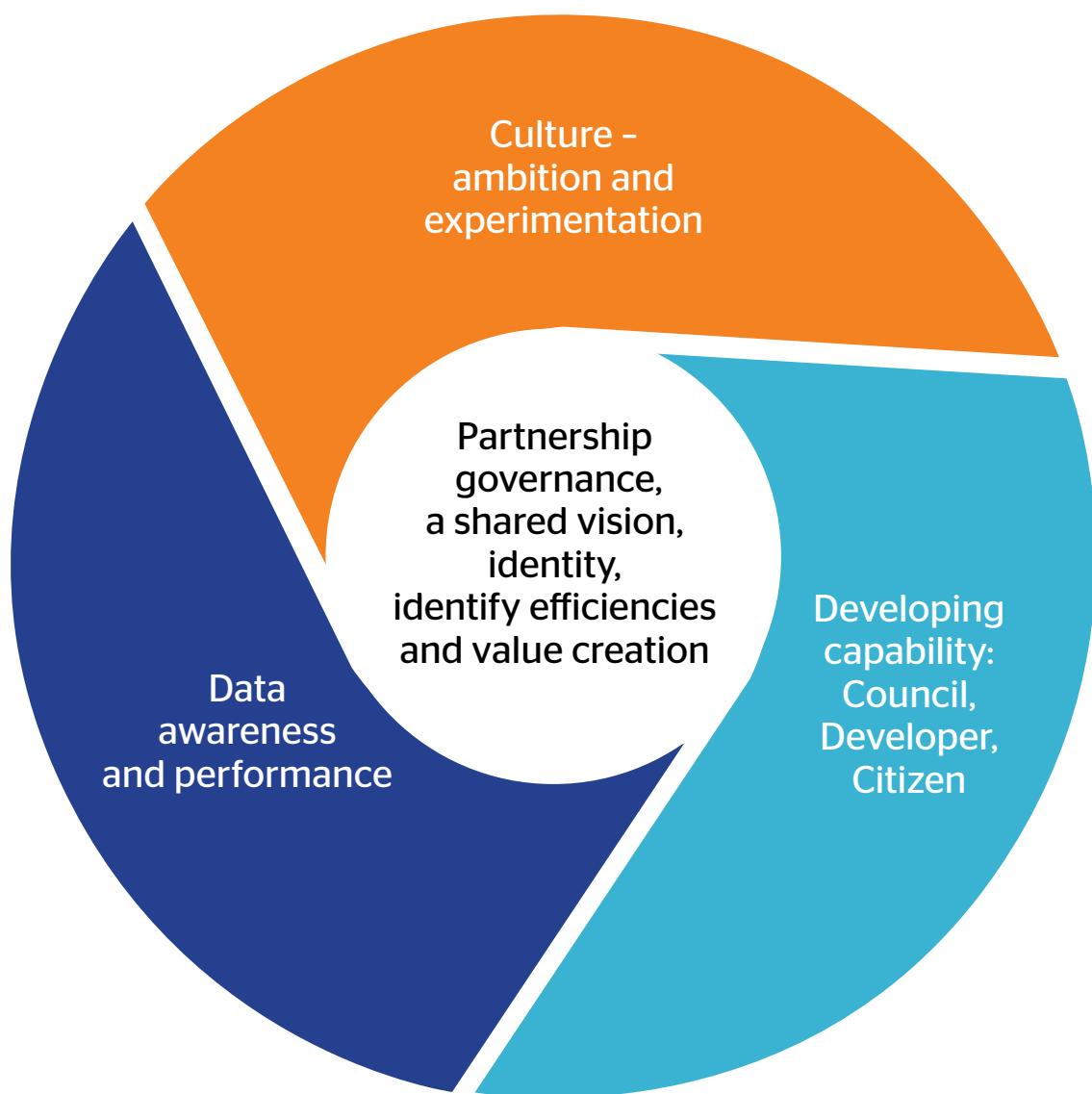
Clarity on governance and funding is essential in delivering a program of work with more than one stakeholder accountable. Importantly the relationship between Council and PAYCE regarding smart city initiatives has been well defined and documented and the two parties joined together to apply for a grant from the Commonwealth Government’s Smart Cities and Suburbs grant program.

The project offers an opportunity to develop a proof of concept and minimum viable product for several initiatives that, if worthwhile, can be scaled across the suburb, the local government area and Greater Sydney.

4.2 IMPROVED PROJECT OWNERSHIP AND PARTNERSHIP

The Melrose Park case study offers an example where two entities that are accountable for the development and management of a suburb are working together to deliver an outcome. Why does this work?

Smart city initiatives that unlock efficiencies in resource use or labour costs are generally the easy pickings, but this can be complicated by fragmented governance and unclear project ownership.



Reducing Precinct and City Emissions - Follow The Data

The City of Sydney has ambitious sustainability targets for the LGA including 50 per cent renewable energy by 2030 and net-zero emissions by 2050. Critical to this journey is the need to manage big data associated with the city's performance.

In 2016 the City commissioned Kinesis to develop CCAP City, a unique world-first data platform that integrates LGA environmental performance data such as energy and water utility consumption with community metrics such as data from the City's Floorspace and Employment Survey, ABS data and real time performance data provided from the City's programs and urban service providers.

CCAP City enables cities to break down silos of information and follow the data to develop a pathway for emission reductions. Particular strengths of CCAP City include:

- Open and transparent methodology - this is critical to build trust with stakeholders.
- Normalises frequent and infrequent data into fine grain sector specific analysis that is useful for program design and tracking.
- Real time performance data provided by City program participants can be compared to estimated sector data to determine the effectiveness of programs and track the progress of particular sectors over time.

For the City of Sydney, this has led to focusing on the commercial sector, driving emission reductions with major building owners through the Better Building Partnership. This program has achieved a 50% reduction in emission intensity, compared to a 30% reduction in general emission reductions across the CBD.

CCAP City is an innovative response to the challenge of navigating the multitude of issues that influence the environmental performance of the LGA and ultimately determine the success of the City achieving its targets. It allows for a variety of measurements, including:

- **Tracking city-wide greenhouse gas emissions:** The City of Sydney can track community wide emissions from utility and transport datasets against 2030 and 2050 targets.
- **Enabling commercial building to track their performance:** Commercial buildings contribute to 45% of the City of Sydney's communitywide greenhouse gas emissions. To measure this, the City of Sydney has established the Better Building Partnership to drive emissions reductions with major commercial building owners.
- **Commercial Building Program Dashboard:** The City of Sydney tracks the performance of their commercial building program through a customised dashboard, identifying and reporting trends and performance outcomes.

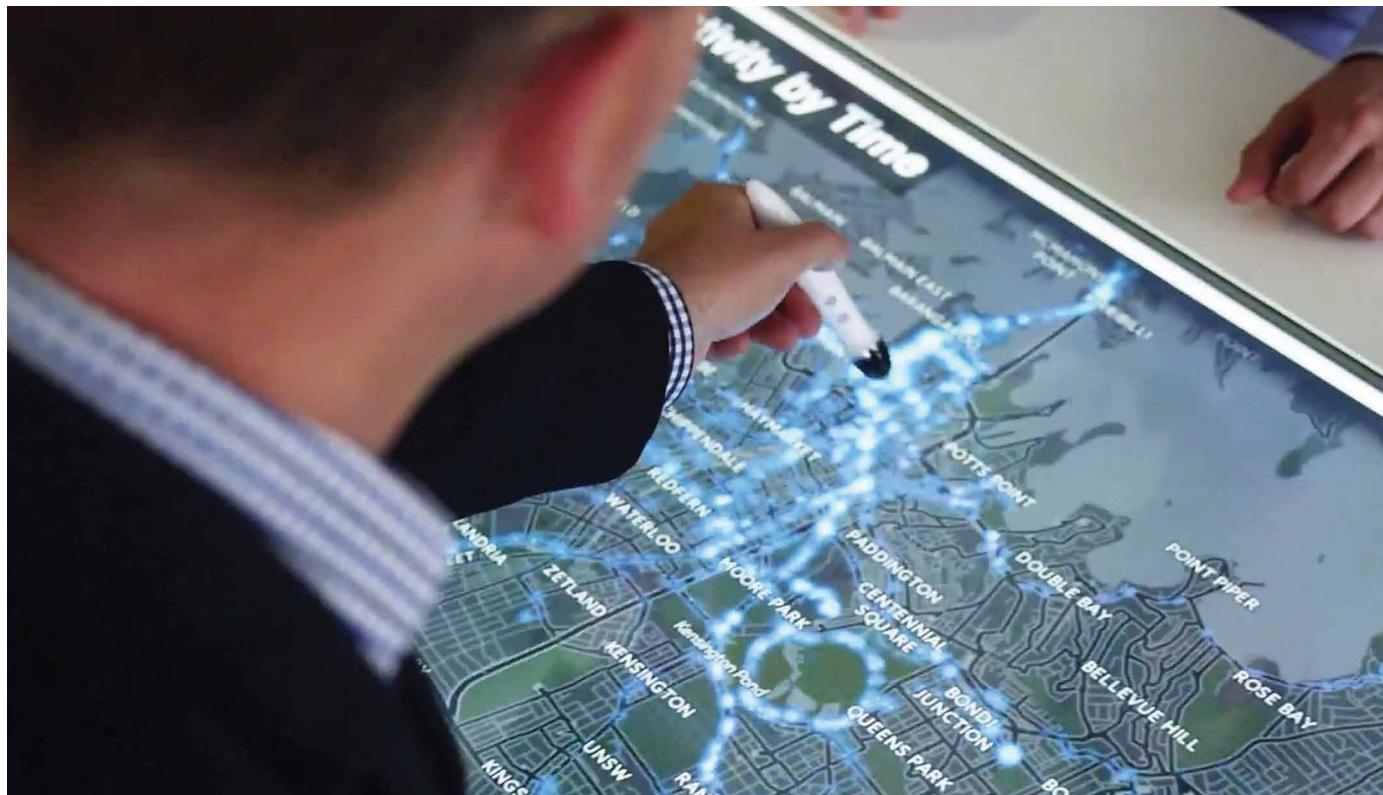


Image credit: UNSW Built Environment

4.3 EFFICIENCY

The digital transformation of systems, processes and interactions in our cities offer an opportunity to drive down costs through better using resources. These smart city initiatives are generally the easiest to conceptualise, fund and finance as the activity is already taking place and the introduction of technology saves money that can be reallocated to deliver additional outcomes to the firm or government.

Examples of these initiatives include a reduction in input costs such as energy and water usage, labour costs, or a better utilisation of assets. There are two unsaid and important attributes of these initiatives:

- i. Money is already being spent to deliver these products and services. The case to invest in using technology for these initiatives does not need to justify the need for these products or services – it's already there, an accepted priority of government or the business.
- ii. The benefits are relatively easy to articulate because the cost savings can be quantified using existing pricing and mature markets. For example, after making assumptions on resource efficiency electricity, water and labour savings can be easily calculated, informed by current operating costs.

CityData

CityData is an online platform developed by the UNSW City Futures Research centre for storing, discovering and sharing data for city analytics and decision-making. CityData increases the ability to upload and store spatial data as well as non-spatial data and documents, allowing data creators to describe their data with metadata to aid discovery and use. Once a spatial layer is uploaded others may use it to create and share online maps. Each layer is automatically served online as map and feature services accessible from desktop GIS or web applications.

CityData makes it simple to find and identify the right version of spatial data and understand its licence conditions without needing to contact the data custodian. It complements published papers and supports smart cities data infrastructure for sharing locational intelligence about cities.

CityData was launched in August 2017 and includes high value research datasets on cycling trips for transport and recreation for the capital cities of Australia. This provides a valuable open data resource to support city shapers and decision-makers in planning for a more vibrant active transport future for Sydney. In the coming months, additional datasets will be added including housing affordability and health city indicators.

4.4 VALUE CREATION

A more complex and in most cases a more rewarding pursuit, is value creation. This can often add to costs, but still be a compelling proposition because of the benefit unlocked for our city. Unlike efficiency related initiatives that can reduce the costs of existing activities, value creation will likely lead to new products and services. Products and services that cross between the public and private sector, levels of government and government itself.

The value created through these initiatives focuses on the experiences of people regardless of how they use space. In a smart city context, we are creating value for people in places across the different types and uses of places across the metropolis.

The value creation characteristics of smart city initiatives offer the opportunity to redesign how we use the city, how data can drive decision making and how technology can be interoperable to provide a superior user experience. The challenge with these opportunities is to clearly define what it is to be solved and prioritising these initiatives based on impact.

Value creation initiatives contextualise the experiences of the city to the individual. It could be based on their physical, cultural or behavioural needs because we all use the same city in a different way.

Sydney's challenge is to create an innovation and investment environment that can spawn these value creating Smart products and services. These initiatives will most likely be new, city experiments. Some will work, some will fail, some will be localised and targeted to a small cohort or a particular geography, others will be globally scalable.

Mobility With a Pram

Getting around Sydney on a rainy day using public transport can be a difficult experience, made more complex by the addition of a pram – not every experience is about the shortest route between two places. Consider how a parent would plan a route that:

- Had access to safe crossings and footpaths that support using a pram.
- A tree canopy or awnings that can provide shelter.
- Access to lifts or other ways to avoid stairs.
- A list of “friendly” venues with restrooms.
- Bus services and train stations that offer pram accessibility.

If you swap a person with a pram for person who uses a mobility device like a wheelchair or scooter you might have a similar need but a very different context.

The data requirements for these two use cases would be very similar. The information would need to be provided by the local council, bus operator, rail operator and local businesses. No one entity is responsible for maintaining a data catalogue containing this information. This fragmentation of responsibility and accountability is a very large barrier to the development of smart city initiatives. The number of government entities that have an interest in our city requires a strong governance framework that challenges the existing ways of providing goods and services. It should be remembered that smart city initiatives can have both efficiency and value creation characteristics. The best ones always do.



Image credit: ADSHEL

5. TOWARDS A SMART SYDNEY STRATEGY

Pursuing the digital transformation of how we live in our cities is not dissimilar to a digital transformation exercise in a company. The process is much the same. It requires a clear strategy, a deliberate effort to remove the barriers and an exercise in acquiring the skills, tools and systems to deliver your outcomes.

Our smart city agenda must challenge the settings that have supported our cities in the past. What worked in that past must not limit our options for the future.

5.1 A SMART SYDNEY STRATEGY

Smart city initiatives are mushrooming across the city, driven by entrepreneurs, government and the community. The types of strategies that underpin these initiatives are largely the same as they were five years ago when #wethecity1 was published. The Metropolitan Plan for Sydney, Future Transport Plan and State Infrastructure Strategy all have references to how we can better use technology for land use planning, mobility and infrastructure investment and operation. To this historic suite of documents, we can now add the new Innovation Strategy from the Department of Finance and Services and the District Plans. However we still do not have an integrated Smart City Strategy for Sydney that incorporates connectivity, skills, workforce participation and digital inclusion.

Without a Smart City Strategy for Sydney, government, industry and the community are left with no choice but to second guess what is needed, its priority and who will pay for its development.

The NSW Government's record infrastructure investment program provides an unprecedented opportunity to deploy sensors to accelerate the transformation of Sydney into a data enabled and responsive city. Metro transit, motorways, schools and hospitals can all have Internet of Things (IoT) technologies embedded in their procurement requirements. By deploying this technology, we can better understand important project attributes that impact service provision such as maintenance requirements, usage patterns and the impact of weather and major events on the systems that run our cities. IoT deployment guidance should be included in this Smart City Strategy, ensuring that individual Councils and Projects do not fragment an emerging digital governance framework. Issues relating to standards, security and privacy should all be anticipated in the strategy.

There are examples of buildings, precincts and infrastructure projects that have embraced IoT in Sydney.

Without a Smart City Strategy for Sydney, government, industry and the community are left with no choice but to second guess what is needed, its priority and who will pay for its development.

Sydney Science Park

The Sydney Science Park is an innovation precinct being developed by Celestino on 250 hectares of land between Penrith and the future Western Sydney Airport. The future mixed-use precinct will capitalise on its location close to the new airport to bring smart industry jobs to Western Sydney and create a new epicentre for scientific research and technological development. The Sydney Science Park will eventually host 12,000 jobs based in the knowledge industries, along with thousands of homes and Australia's first Science, Technology, Engineering and Mathematics (STEM) based school. In addition, the precinct will also feature significant public and green spaces, facilities for research companies (including laboratories) and space for technology start-ups.

The Science Park will be constructed as a smart precinct featuring the latest innovations aimed at making the urban realm more liveable, including energy efficient lighting and construction methods, waste water minimisation, a green landscape to foster greater community wellbeing and an 'active' street grid designed to encourage walking and cycling. Celestino has also partnered with CSIRO to launch a research hub that will study methods designed to make the urban environment more sustainable. The Urban Living Lab will act as a national centre of research with the goal of designing and testing innovative urban planning concepts within the setting of the wider mixed-use precinct.



With relatively little effort, Sydney can collaborate with entities such as the Internet of Things Alliance Australia to be the dominant smart city in the country.

The dividends of smart city success are not limited to the people of Sydney. We have a tremendous opportunity to export our solutions to the rest of the world. The Sydney based Global Infrastructure Hub offers a platform to introduce proven technologies to similar infrastructure projects throughout the countries of the G20. The connection between real-time data collection, the management of risk and its relevance to fintech can be leveraged to access new markets quickly.

Some of the best examples of cities with smart city capabilities worldwide have a clear city-wide strategy. Consider Amsterdam, Barcelona, London and Stockholm.

Amsterdam's smart city is being realised through a partnership between the city government, businesses, other public agencies and research institutions. It has a main focus on reducing emissions and has seven areas of interest: Smart Mobility, Smart Living, Smart Society, Smart Areas, Smart Economy, Big & Open Data and Infrastructure.

The City of Barcelona is one of the earliest adopters of smart city technologies; it has been using information and communications technologies to improve urban functions for more than a decade now and has had an Internet of Things strategy since 2013. Within the structure of the municipal government is the Urban Habitat Department, which coordinates services previously provisioned by individual City Departments regarding infrastructure, urban services, urban planning, environment, housing, architecture, energy and water. Under this new organisational scheme, previously isolated government departments are called to coordinate their strategies in order to achieve common goals. The number of local projects run by the Urban habitat Department is over 100 – some examples include the energy efficiency in buildings, smart lighting, and optimised waste collection.

London's smart city plan is organised around seven key themes: placing Londoners at the core of innovation, providing access to open data, leveraging London's research technology and creative talent, facilitating networking among and with other smart city stakeholders, enabling smarter infrastructure development and management, providing more effective and integrated City Hall services, and offering a smarter London experience for all. Importantly, London's strategy also targets education and training in multiple levels, including physical and digital educational infrastructure, institutions and targeted programs. Educational institutions have an active role within the smart city ecosystem, as they are expected to become hubs of innovation in education, collaborative research in edge sectors, and multifaceted social interaction.

Stockholm's smart city strategy focuses heavily on innovation through testing and experimentation of environmental and information technologies. These technologies are tested and used extensively throughout the city's infrastructure, with the purpose of creating a flourishing ecosystem that involves the city's own high-tech sector to foster a stronger local economy. The strategy is also citizen-centric, focusing on providing enhanced e-government services to citizens. Data for mobility and services are collected via sensors, giving residents real-time information about traffic flow, journey times, and best travel options. Stockholm uses large-scale pilot projects to test solutions in real locations, called 'demonstrators'. One of those demonstrators, is Kista Science City, Sweden's world-class ICT cluster, where Research and Development and technology transfer take place between businesses and academia, demonstrating an exemplary concentration of expertise, innovation and business opportunities in the ICT field.

Technology is becoming a core component of city strategies in all four of these cities. They are investing predominantly in broadband networking (mostly wireless and optical fibre) and on a second level on sensor networking. Wireless broadband networking is obviously a more convenient option for cities with complex physical structures already in place. However, Stockholm's case of 100% optical fibre coverage is an exemplar that is the result of proactive policy making and continuous efforts by the City.

In terms of digital services and applications, the main focus across these cities is in city infrastructure and utilities, namely energy, transport and waste management. Government services play an important role too, encompassing city hall services and means for engaging citizens in the policy making process. They foresee the collaboration among the cities inhabitants, businesses and public sector as a source of new and effective knowledge production and as a precursor for the development of open knowledge and innovation ecosystems.



5.2 ROLE OF REGULATION

Government regulation serves many purposes in our cities and have mostly been designed to improve the economic, social and environmental components of our wellbeing. These rules were developed at a particular point in time, reflecting the values and aspirations of the then community and the operating environments of the regulator and those being regulated.

Over time regulation must be reviewed to ensure the outcomes of the governing body are being efficiently and effectively delivered. Typically, this review happens every five years and is informed by government strategy. A Smart Sydney strategy would, among other things, drive digital enabling regulatory reform.

5.3 ACCIDENTAL SETTINGS – SUBSIDIES, INCENTIVES AND PENALTIES

Each of our city supporting infrastructure systems have many regulatory settings, that when well designed delivered a public purpose such as reductions to our costs of living or improvements to safety and reliability. Often these systems started off as publicly owned monopolies and have been restructured over time to improve efficiency and performance through contestability. These contestability frameworks should accommodate innovation and the introduction of smart city initiatives but can be limited by the prevalence of subsidies that reduce the pricing of services that cannot be accessed by the private sector.

Perversely the lack of competitive access to these subsidies that currently reduce the cost to consumers could be limiting innovation that could further reduce the cost of providing a service.

The same can be said for other financial instruments such as penalties and incentives. The finance and infrastructure sectors in Sydney are across these issues which are quite common in the negotiation of long term outcomes based performance contracts with government. These skills can be better used to restructure the city's regulatory frameworks to encourage the development of smart city initiatives.

Localised Energy Generation

It is widely accepted in Australia, by industry and the Australian Energy Market Operator (AEMO), that local generation has the potential to reduce peak demand across the energy distribution network. Advances in technology now allow small-scale electricity networks to operate independently of the grid, being tailored to optimise cost, reliability and sustainability. Emergent business models suggest there is ample scope for customisation to respond to particular urban development contexts, energy user type, and specific energy services. As Sydney grows, there are two dominant development scenarios that will influence smart city energy supply responses:

- high density urban infill which involve multi-dwelling and mixed use - commercial and retail.
- land and housing developments which entail low rise single dwelling housing and less concentrated mixed use.

These urban forms will have different scope for battery storage, local renewable energy generation, electric vehicles and local grid management. To embrace this technology the regulatory environment needs to better accommodate non-network options for the supply of energy in Sydney. Pursuing regulatory reforms to support microgrids should improve energy resilience, increase competition and place downward pressure on prices.

5.4 BUSINESS CASE DEVELOPMENT

Much work has been done to strengthen project assurance capabilities within the NSW Government. Infrastructure NSW now has a world class investor assurance process ensuring government money is spent well in the delivery of infrastructure projects.

The process relies on inputs and these inputs require some development to best support a smart city agenda and clearly articulate the costs and benefits of investments. Importantly, any project needs to commence its assurance journey by responding to a challenge or opportunity outlined in a government strategy or plan. The lack of a smart city strategy for Sydney immediately weakens the likelihood of funding support for smart city initiatives.

The appraisal of social, economic and environmental costs and benefits need to comply with guidelines from the NSW Treasury. As you would expect, these guidelines rely on global best practice in determining qualitative and quantitative costs and benefits. It stands to reason that in some of our initiatives we will develop new products that produce new benefits that haven't been described before. Work will need to be done to explain these benefits to those involved in investments and unpack how they can contribute to a robust appraisal. The same can be said for looking at place based business cases that include a program of investment across a number of jurisdictions and delivery areas. These new blended business cases are innovative themselves and are yet to have their stated benefits tested to give decision makers comfort in their methodology.

5.5 BUDGETING

5.5.1 Capex and opex

Once we get over the business case hurdle and agree that benefits outweigh costs and that the project is worthy of investment, the question becomes “who benefits from the project?” Who should pay for the benefit and how much?

Depending on how you obtain the solution you could be buying hardware, building software or buying access to software or services.

Arguably most of our smart city solutions will involve software as a service, paying for access and use rather than owning and maintaining systems. Accounting standards treat government expenditure differently with operating expenses affecting the budget result. The Smart City Strategy should offer guidance on procurement and the appropriate use of capex and opex to deliver initiatives.

For example, government may choose to design and build a whole of government data warehouse and visualisation product or procure it from the market. The accounting treatments of these two options vary based on the interpretation of an investment in capital to develop of an asset compared to the operating costs of licensing another entity's solution.

5.6 MARKET-MAKING

Smart city initiatives that have been deployed in other cities find it difficult to engage with local and state governments in Sydney unless a market for that good or service already exists. In those situations where a local market does not exist, a vendor with a solution that delivers an outcome relevant to London, New York and Tokyo has identified a similar need in Sydney.

But it's the government that needs to identify this need, not the vendor. They must also be up-front to ensure that vendors understand clearly what is possible, and what problem a city is trying to solve.

The government needs to define it, prioritise it and in most cases, fund it. A procurement model needs to be determined and a process used to ensure sufficient competitive pressure is applied to deliver value for money to taxpayers.

Demonstration projects are needed to de-risk the deployment of initiatives proven overseas, into a local context. These issues are significant and require immediate attention to ensure Sydney is not bypassed in the deployment of globally proven initiatives.

Similarly, this operating environment stifles local smart city initiative development discouraging local investment, retention of talent and job creation.

Boston and the Office of New Urban Mechanics

The City of Boston is one of the leading smart city pioneers internationally. It established an Office of Urban Mechanics, a unique vehicle for engaging not just Council departments but also the community and businesses of Boston in a shared civic problem solving and innovation effort. The office has developed a ‘Smart Cities Playbook⁵ that guides the private sector and researchers in engaging with the government. The playbook states that better decision making requires making sure that smart city solutions for ‘real problems for real people’ and that understanding the city’s needs - and its ‘bigger unanswered questions’ - comes first and technology solutions second. A similar model may be appropriate in Sydney – if, and only if, it’s tied to genuine engagement from government.

Boston’s mayor has stated his ambition for Boston to be the “first true 21st-century American city”. To this end the

council has created a tool called City Score that tracks key city outcomes, for example how quickly graffiti is removed following reports by the community, on a daily basis. This publicly accessible data store details user experiences and satisfaction but also response times in dealing with problems or threats of major public interest. It is designed to inform the Mayor, city managers and the public about the overall health of the City at a moment’s notice by aggregating key performance metrics into one number. It has already led to service improvement in a key area of public service: ambulance response times, with data feeding back into service resourcing and change management.

In addition, all City departments take part in the Boston About Results initiative. The citywide application tracks how well the City is performing at delivering key City services. Again, this information or scorecard is used internally to drive performance and shared externally so the public can see progress.

⁵ Office of New Urban Mechanics 2017. Boston Smart City Playbook, <https://monum.github.io/playbook/#play1>

SYDNEY SMART CITY AWARDS 2017

To promote and recognise these demonstration projects, the Committee for Sydney has launched the Sydney Smart City Awards with our founding partner, PAYCE Consolidated. The awards include categories that recognise the various stakeholders and civic problems that can be solved using Smart City initiatives. The winners were announced at our AGM on 19th October 2017:

- **Best Industry-led Partnership:** An initiative where partners came together to tackle a problem unable to be solved by one entity alone.

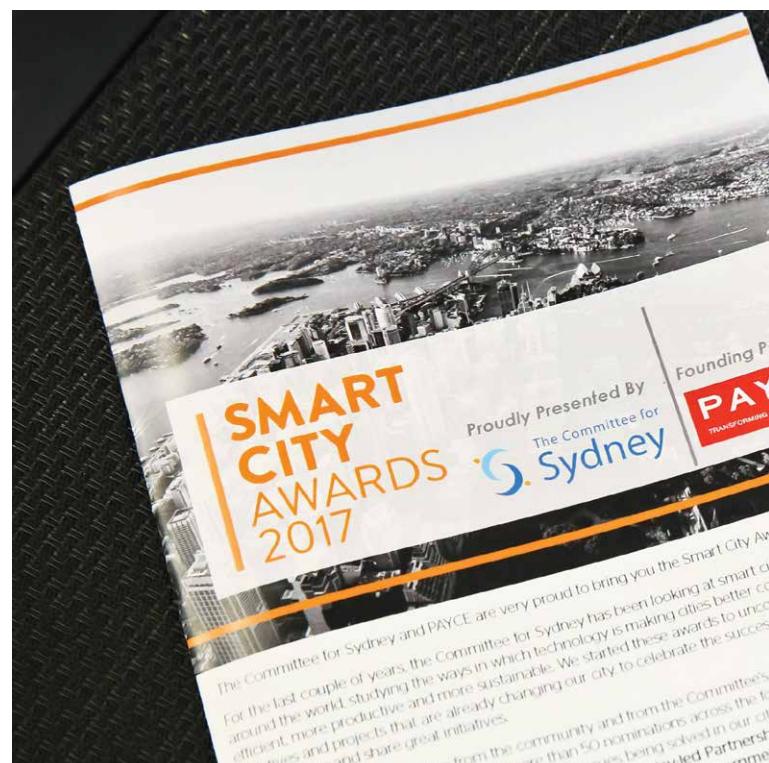
Winner: UNSW – RAISE

Rapid Analytics Interactive Scenario Explorer (RAISE) is a city analytics tool that enables users to rapidly estimate and visualise property values against spatial data like land zoning, proximity to services and transport. The tool rapidly calculates the uplift effect of new infrastructure on property prices at land parcel level and will help Government agencies to realise better infrastructure outcomes for Sydney's citizens.

- **Best Local Government Initiative:** An initiative that delivers a better experience for Council stakeholders including visitors, ratepayers and residents. Candidate projects will deliver operational benefits to Council and/or community benefits. Highly regarded projects align to Council strategic plans and have the potential to be reproduced across Metropolitan Sydney.

Winner: Liverpool City Council – Automated s.149 Certificates

Liverpool City Council issues more than 6,000 s.149 Planning Certificates necessary when selling, purchasing or developing properties. In the past, this process required council staff to issue and manually review the certificate. By repurposing GIS and secondary data sources, Liverpool has fully automated this process, reducing the turnaround time from 5 days to 5 minutes.



- **Best Community Initiative:** A community driven project guided by community defined use cases and driven by community benefits. Non-proprietary, low cost solutions that can be easily accessed by new and existing communities were highly regarded.

Winner: Infoxchange - AskIzzy

Ask Izzy is a free, location-based mobile website that helps homeless Australians each night to find food, shelter and other support services. Almost 80% of people who are homeless own a smartphone and now they can search more than 350,000 services across Australia to find help nearby. It has had over 500,000 searches in the first 18 months, and helps feed information back into the system to understand service demand and uncover service gaps.

- **Best NSW Government Initiative:** An initiative that uses technology to deliver better services for the people of NSW. Some initiatives related to reducing the costs of services or enhancing the customer experience. Initiatives that deliver outcomes for the environment, people or firms across multiple government portfolios were highly regarded.

Winner: Transport for NSW - PTIPS

For Sydneysiders it is now standard and expected that we have real-time information about public transport services – but this is a relatively new innovation and is by no means standard around the world. The Public Transport Information and Priority System (PTIPS) provides real time data for locations for Sydney Trains, NSW Trains, Light Rail, Ferries and Buses that provide the data for all the transport real time apps. TfNSW was the first and currently only agency globally to provide real-time passenger numbers for the public travelling on buses, including how many people are on board and when it is predicted to arrive. Now, 1.8 million people use real-time information per day.

This project was also the Overall Best Smart City Project for 2017.



6. A FRAMEWORK FOR THE SMART SYDNEY STRATEGY

Fragmented governance and historic ways of dealing with issues are two of the largest barriers that Sydney needs to overcome to be a smart city. The advent of the Greater Sydney Commission offers a vehicle to overcome these issues – the ability to make decisions that affect people in places. The Commission itself will need to have its focus, resourcing and mandate broaden over time to continue to deliver improvements in city performance in the medium to long term.

A perspective that seeks to deliver improvements to city experiences for people in places offers both a citizen centric and geographically targeted focus that can overcome silos across and between governments.

Pursuing this agenda requires a review of five focus areas:

- 1. Cross-Government Structure.**
- 2. Customer-Led Method.**
- 3. People-centric institutional Culture.**
- 4. Public and Private Capability, and.**
- 5. Innovation in Funding.**



Image credit: 'Parramatta skyline from the west August 2012',
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“Commuter expectations are set not by their last transport experience, but their last digital experience. As a key part of commuters’ daily life, Transport for NSW needs to be up there with the best digital experiences that are provided to customers across all platforms.”

Tony Braxton-Smith, Deputy Secretary Customer Services,
Transport for NSW.

6.1 CROSS-GOVERNMENT STRUCTURE

This refers to the institutions and other structures that have resources to make and implement decisions that support our activities in the city. These structures have their own policies, cultures, finances, accountabilities and responsibilities, shaped over many years in response to politics, technology and public opinion.

6.1.1 Crossing sectors within government

Over the last five years the NSW government has reorganised agencies and introduced new capabilities to make the public service more contemporary. Infrastructure NSW, the Greater Sydney Commission and the Data Analytics Centre all offer whole of government services that consider people in places. The next wave of reform should consider the financial benefits that one agency can accrue to another. It should consider how we fund initiatives where there is a strong benefit across more than one agency.

If transport planners are concerned about moving people from point A to point B, health planners about regular exercise, the environment sector about reducing emissions there are potentially three sectors that will benefit if a person chooses to walk, run or ride to work rather than driving. This person may not find the option attractive today because of a lack of access to a quality experience, this could be based on several factors including a need for better infrastructure or improvements to end of trip facilities.

Can we see the health and environment budgets supporting an improvement in active transport infrastructure? Should it be additional investment or should the money be taken from existing agency budgets to pay for it, if so what services do we stop providing to pay for it? How do we pose this challenge to the city’s companies to fix? Who funds the solution? A smart city initiative could relate to utilisation and access (bike sharing, access to showers and change rooms)

6.1.2 Crossing different levels of government

The aforementioned example had three agencies that could design, fund and execute a strategy to support an increase in use of active transport. The task becomes more complicated if we add the local council in as a potential provider of infrastructure and end of trip facilities. Similarly, we could add the planning and development consent authorities to the roster of agencies with an interest in or the ability to influence the outcome.

Historically there has been a reluctance to look at these issues through the eyes of the citizen because it adds complexity to the way government delivers services. The complexity exists because of how government is organised which is fit for purpose for the majority of its activities, but rarely to the needs of the individual. The question then becomes how do we tweak the current structures to invite the public and private sectors to deliver services to allow these cross-government initiatives to flourish?

The Premier has a number of priorities that are case managed by the Premier’s Delivery Unit. This approach has been used in the UK and should be expanded with a City focus in Sydney. If done well, an Office of City Performance could nominate those areas that would benefit from a whole of government approach to defining a problem. It could craft the brief and seek investment from relevant agencies to fund initiatives, procuring the private sector to offer goods and services to solve problems on behalf of the government. It could also identify where important data sets exist but are not available and work with data owners to link them with people solving these problems.

As well as responding to requests from agencies, the Office of City Performance would be able to monitor key indicators and create its own challenges to be solved. This initiative is the logical extension of the Greater Sydney Commission’s dashboard, moving from the position of being made aware of issues through data collection and visualisation to doing something about it.



6.2 CUSTOMER-LED METHOD

Over the last five years the NSW Government has sent very clear messages to the public on its intention to make customer service a high priority. The government created the role of the Customer Service Commissioner – a role that been common place in the C-Suite of major private sector companies. Sydney Trains has transformed in its engagement with the public. Similarly, Sydney Water has a customer charter that should be rolled out across other sectors and service providers.

A sectoral approach to customers offers an opportunity to consider how the systems that support this city are used and can be improved. Systems thinking offers an opportunity to drive efficiencies, increasing utilisation and better managing resources. Smart city initiatives are well suited to solving system problems when they are well defined and system information is readily available.

The unfortunate risk of considering the city as a system of systems is that it is easy to forget the people that use these systems – indeed they use more than one system and have a need for these systems to interact. Blending design thinking in with systems thinking offers the best way to address this issue.

Customer-Centric Experience at Transport for NSW

Transport for NSW is committed to building the most innovative, customer-centric transport network that Australia has seen. In order to achieve this, they recognised that innovation comes from all stakeholders, not just from within. Using Wave Analytics, Transport for NSW can view customer insights in real time from its Feedback2go app, allowing their contact centre to receive feedback from commuters and respond instantly.

Transport for NSW's ongoing commitment to use customer insights to drive innovation through online and digital apps has allowed the department to get real-time feedback on any changes being made across the network – and use these insights to change their practice to improve the customer experience.



6.2.1 The data-driven and responsive city

Both system thinking and design thinking rely on understanding the current situation. Access to data is critical in developing smart city capabilities both for problem definition and solution formulation. Much has been said in previous Committee reports regarding the need for open data and the opportunities that flow from having access to public and private sector data sets.

Much more work is needed on the collection, storage and visualisation of data that can inform citizens about their city. The information may influence the millions of decisions that take place in the city each day or may be used by governments to identify areas of underperformance that require an intervention. The issue is not unique to Sydney and a national framework on data standards would benefit Sydney. Common definitions for places and common ways to describe the data that is collected would save time and the resources used by data analysts.

Geospatial data provides an opportunity to communicate data in the context of a place. The ability of app developers to consume and visualise layers of information to smart phones offers millions of people the opportunity to have data drive their own decisions.

Government can also benefit from using more data to make its decisions. There is an opportunity to better use public resources by using big data and artificial intelligence to complement existing infrastructure and service planning techniques. Using more data that is collected and accessed more frequently can reduce the prevalence of assumptions that can overly influence forecasts for the demand of services. The use of data in project assurance should be expanded, ensuring the best information is available to support decision making. Sydney is building infrastructure that will have a life cycle that will traverse the introduction of many technologies and changes in customer behavior. Our assets will need to be adaptable, ensuring their utility

over a project's life cycle. The key to adaptability is the active monitoring of use and rapid and frequent experimentation with usage patterns and customer preferences. Data can enable our infrastructure to evolve with our preferences.

The adaptability of our systems and pursuit of demand management initiatives remain critical factors in the successful management of Sydney's systems. The recent, record capital investment program has been catalyzed by asset recycling. Future infrastructure investment programs are not guaranteed to benefit from the favorable balance sheet conditions generated by asset divestments.

As the city becomes more dynamic and change happens quicker due to development, demographics and behaviours changing resource use, having the ability to readily access data allows decision makers to know when there is a large difference between what they assumed and what is happening. Data allows for an early intervention to reconsider what was a reasonable assumption when it was made but is clearly not accurate enough for today's infrastructure and service planning.

The assumptions and decision support tools used by government will be improved by accessing additional and more current data sets, but also by making models available to the public. Open models can allow smart city developers to test existing frameworks and offer solution improvements. By having access to models, developers can identify what elements of a system impact other elements and importantly the experience of the user.

A well-developed data warehouse for Sydney will support the development of initiatives that make Sydney both a data-driven and a responsive city. Artificial intelligence can be used to predict responses to patterns observed in the usage of our systems. Examples of initiatives that promote Sydney as a responsive city include traffic management and our preparedness and response to natural disasters,

6.3 PEOPLE-CENTRIC INSTITUTIONAL CULTURE

People should be at the heart of service provision if we are to capture the opportunities that smart city initiatives can bring. The culture of our institutions and the individuals within them must adapt. Cultures of our institutions need to exhibit behaviours that:

- i) promote collaboration and co-design.
- ii) promote experimentation.
- iii) celebrate success and define failure as a learning experience.
- iv) improve things incrementally, quickly.
- v) promote the broadening of perspectives - innovation will be supported by those who can appreciate other people's views and skill sets.
- vi) a strong sense of empathy and a desire to hear from those who will be affected to improve the design of the initiative - engagement not just as a compliance exercise.

Digital Democracy

In its recent paper – Digital Democracy, the tools transforming political engagement, the National Endowment for Science, Technology and the Arts UK (NESTA) observed the following insights about digital democracy initiatives:

Think twice: don't engage for engagement's sake.

Offering tangible outcomes (such as with participatory budgeting) and binding votes can make engagement more meaningful, but equally important is demonstrating to citizens how their contributions have been considered, even if the outcome is not what the individual sought.

Be honest: what's involved and what are you going to do with the input?

This is important for all stakeholders. Before starting any digital democracy initiative, it is essential to consider who needs to be engaged (for example, is the objective broad, mass participation, or to tap into more niche, distributed expertise?) and how that community can best be reached. Furthermore, clarity of what the process will entail helps manage expectations and create a more effective exercise for everyone involved.

Digital isn't the only answer: traditional outreach and engagement still matter.

Carefully targeted PR, advertising and outreach underpin almost every successful digital citizen engagement initiative. Many, particularly those which enable citizens to make decisions or play a very active role in the development or scrutiny of proposals, also blend offline and online activity.

Don't waste time: get buy-in from decision-makers before you invest too much.

Buy-in, ideally broad and cross-party, is important.

Don't cut corners: digital democracy is not a quick or cheap fix.

There is often a hope that 'digital' will mean a more efficient and cheaper way of doing something. In none of the examples we have looked at is this the case. To do digital democracy well often requires extensive traditional outreach alongside the use of new communications technology. Digital democracy initiatives require teams to deliver and support them, investment in IT and software, and investment in staff and/or volunteers to ensure they have the necessary skills. In some instances it is important to have capacity to evaluate a large volume of contributions, with a digital back-end that supports analysis and processing of the data obtained.

It's not about you: choose tools designed for the users you want, and try to design out destructive participation.

The tool used must not only lower the barriers to participation by making it easy to contribute, but it should be actively designed to improve the quality of the discussion, debate and output. The best platforms make it easy for participants to see the contributions of others, with some visualising the content to aid understanding.

The transition of our institutions to being more client focused, not being bound by precedent and with a willingness to dissolve structural barriers requires change management. This should be supported with investments in enhancements in staff capability and organisational support systems.



6.4 PUBLIC AND PRIVATE CAPABILITY

In the Committee's recent report - *Joining the Top Table - Benchmarking Sydney's Performance*, it was revealed that Sydney has much work to do in improving its innovation ecosystem. There is a strong relationship between the development and retention of talent and depth of the market in which they can supply products and services.

Issues such as liveability and access to housing also contribute to tensions around talent attraction and retention however the relationship between the opportunity to develop skills and experiences through an active smart city marketplace should not be underestimated. These initiatives can start small and be scaled across the city and indeed across cities around the world.

6.5 INNOVATION IN FUNDING

Social impact bonds have been applauded for their design. A financial instrument that incentivises industry to invest in measures that offer economic and at times financial returns to the community. These products all have one thing in common, they are human centred, dealing with issues that cover more than one agency in government.

The concept could easily be applied to the smart city industry using government funding and private sector finance to develop a new product - a smart city impact bond. The product could be commissioned by the Office for City delivering millions in economic, social and environmental benefit to residents of the city.

There are two ways smart city impact bonds may work. It may be that the impact bond seeks to solve a problem directly, say through the better provision of data to citizens. For example, improving public health by informing people of active transport options for commuting or reducing congestion through real-time alerts to encourage commuters to re-time their trip to work. It could also support other, non-digital programs that deliver social good but require improved data collection tools in order to measure success. For example, providing social housing tenants with live information on how energy saving reduces their power bill or technology that helps older people age in place.

i-Teams

Direct investment in fostering greater innovation should be pursued. The development of a Smart City Innovation Team should support both public and private sectors dissolve the barriers that have been identified in this paper. With a moniker coined by the National Endowment for Science, Technology and the Arts (NESTA), i-Teams bring small teams from the public and private sector together to work intensely on city problems - they are the city's in-house problem solvers.

In its 2014 report, NESTA in conjunction with Bloomberg Philanthropies conducted research into examples of innovation teams around the world. Their report *i-Teams - The teams and funds making innovation happen in governments around the world*⁶ concluded these teams were largely tackling one or more of the following civic challenges:

- **Creating solutions to solve specific challenges.** These i-Teams focus on solving high priority problems and developing usable and scalable solutions, often in collaboration with colleagues in government agencies. These i-Teams are developers and creators of innovations.
- **Engaging citizens, non-profits and businesses to find new ideas.** These i-Teams focus on opening up government to voices and ideas from outside the system, often adapting the open innovation and challenge-led approaches more commonly seen in the private sector and making use of strong communications and engagement strategies. These i-Teams are enablers, creating the conditions for innovations from outside government to thrive.

- **Transforming the processes, skills and culture of government.** These i-Teams focus on transforming the way that government approaches innovation, often through consultancy services and training, as well as through secondments and placements, to develop the skills and mind-sets of mainstream government departments. These i-Teams are educators, providing the insights and knowledge needed to empower others inside government to innovate.

- **Achieving wider policy and systems change.**

These i-Teams focus on bringing about transformation, looking beyond specific interventions to the wider policy context and complex systems that need to change, for example in healthcare, energy or education. These i-Teams are architects, creating the designs and blueprints that others can follow.

The acceleration of innovation led by our city will support jobs growth and an innovation ecosystem that can flow on to other sectors in the economy. The Sydney i-Team would have a blended governance model with representatives of the private and public sector, including federal, state and local governments.

The Committee for Sydney will work with government, universities and industry to develop this initiative, potentially hosted by a University and promoted to encourage data scientists, students, hackers and the broader community to tackle our cities problems. The i-Team will promote innovation and a healthy contest of ideas.

⁶ NESTA 2014, iTeams: The teams and funds making innovation happen in governments around the world, <http://www.nesta.org.uk/publications/i-Teams-teams-and-funds-making-innovation-happen-governments-around-world>

7. RECOMMENDATIONS

1. Strategy: A Smart Sydney Strategy

To be released by June 2018

The NSW government should produce a Smart Sydney Strategy to complement the suite of strategic documents that plans and delivers infrastructure and services in the city. The document should be co-designed by the Greater Sydney Commission and the Department of Finance Services and Innovation and include the top five challenges for Sydney to be offered to the innovation community for resolution.

2. Structure, Method and Culture: A Smart City Commissioner

To be appointed by December 2017

A new position of the Smart City Commissioner should be created and be the representative of the Department of Finance and Services on the Greater Sydney Commission. The Commissioner should work with the GSC to identify and prioritise challenges suited to smart city style solutions and broker funding agreements across government. The position holder should work closely with the Customer Service Commissioner and the Privacy Commissioner to ensure they create a customer-centric method of working, and a people-centric institutional culture.

3. Capability: An Office of City Performance

To be created by June 2018

A new Office of City Performance should be created to monitor and manage improvements in key city metrics. The office should support the Smart City Commissioner and be tasked with driving innovation, improving efficiency and increasing value for the millions of people who interact in our cities every day.

4. Capability: A Government backed Smart City i-Team

To be created by December 2018

The Smart City Commissioner together with private sector, community sector and government stakeholders, should operate a Smart City i-Team that dissolves the barriers to innovation across all three sectors to improve Sydney's capability to understand their problems, and how they can be solved.

5. Investment: Smart City Impact Bonds

To be created by December 2018

The Office of City Performance in conjunction with NSW Treasury should pilot Smart City Impact Bonds, a financial instrument that offers commercial returns for economic or financial dividends that can't currently be monetised by the market.



The Committee for
Sydney

“I commend the
Committee on the
role they are playing
in intellectual thought
leadership for Sydney.”

THE HON. GLADYS BEREJIKLIAN MP
PREMIER OF NSW

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