



Azcende

Smart Cities White Paper
Habitats for Humans

“We will neglect our cities to our peril,
for in neglecting them we neglect the
nation.”

- John F. Kennedy

“The axis of the earth sticks out visibly
through the centre of each and every
town or city.”

- Oliver Wendell Holmes

“Every city is a living body.”

- Saint Augustine of Hippo, City of God

“Cities have always been the fireplaces of
civilization, whence light and heat
radiated out into the dark.”

- Theodore Parker

Foreword

Humanity is committed to being urbanised.

By 2050, 66 per cent of the world's population of 11 billion people will live in urban environments. We are heading to larger cities.

Meanwhile, the World Economic Forum recently issued a report¹ that indicated that in 2014 there was a US\$1 trillion shortfall in infrastructure spending. That could be closer to US\$1.5 trillion dollars today that we are not spending on the infrastructure we need to live our lives in urban environments.

If we are not investing enough in urban infrastructure then we need to change the way we use what we already have. This is a critical, and overlooked, aspect of smart cities – using existing data and infrastructure in a way that improves the lives of people while addressing the challenge of ensuring they are economically sustainable.

This will ensure we can build cities where we can actually live, where people can be prosperous, and where people can advance.

So what does advancement look like? We believe very strongly in the notion that advancing humanity is about moving up Abraham Maslow's Hierarchy of Needs², from a safety and security base through to the desire for self-actualisation.

The challenge of safety and security is relatively consistent around the world. It's being able to walk down the streets at 3am without the fear of harm or threat. It's being able to have vibrant conversations with each other whenever you feel like it, knowing that we will be all treated equally and equitably.

The goal is for each of us to achieve self-actualisation and to realise the potential we each have. We need to ask how we can better organise our cities so each of us can become everything we are capable of. This is the type of question we should be asking instead of, "do we have enough money to build the roads we need or the railways we need?"

- Alok Patel, CEO Azcende

In this paper we present current thinking on smart cities in the Australian context which we hope will help policymakers and the private sector make informed decisions on how to best manage change. It has been developed based on two roundtables held in Sydney and Melbourne in May 2017.

The roundtables were hosted by venture capital firm Azcende. Participants were leaders in business, construction, infrastructure, financial services, start-ups, government, logistics, communications, education as well as smart city specialists.

We would like to extend Azcende's thanks to all those who participated and in particular to Telstra, which kindly hosted them.

¹ <http://reports.weforum.org/strategic-infrastructure-2014/executive-summary/>

² <https://docs.google.com/file/d/0B-5-JeCa2Z7hNjZINDNhOTEtMWNkYi00YmFhLWI3YjUzMDEyMDJkZDEwNWRm/>

Executive Summary

Cities are our most human invention. They are the apotheosis of function begetting form and they are 5,000 years old – at least – and almost certainly a good many millennia more ancient.

Johann Wolfgang von Goethe described architecture as “frozen music”. If architecture can be described as music frozen in time, then a smart city is surely technology breathing it to life.

We hold that as we use the millennia of human technical achievements and our nation’s treasure to breathe life into our cities, the guiding vision must be to improve the lives of the citizens of our future metropolises.

Government and the private sector must identify the projects which will have greatest impact on our lives and apply private sector expertise to implement them – at the same time, placing the risk associated with these undertakings on business.

And government must play a crucial role in setting a vision that guides and supports the private sector to deliver cities that improve the wellbeing of the people who live in them.

Smart cities are and should be magnets for talent. Despite technology enabling many people to do their jobs remotely, people engaged in collaborative enterprise still flock to cities, the creative hothouses of nations.

Australia must create urban environments that support this desire for the human contact and connection that fosters creative energy or lose our best and brightest to other nations.

Smart cities are about the most efficient use of talent, space, infrastructure and time – in short, the vast majority of things that make up the economic life and wealth of the nation.

Despite plans and good intentions, governments are often puzzled as to how to describe and execute a grand smart city vision. We argue that instead of thinking big, the opportunity is in thinking small: favouring iterative, proof-of-concept strategies that solve problems in markets where there is high demand.

Once the nascent stage has been bootstrapped into profitability, it can then be scaled up – either with government help or seed funding from the private sector.

There are many heartening portents for smart cities in Australia.

In the data space, a nationwide Internet of Things has been announced, along with the revelation that our telco giant is already reaping \$150 million annually in IoT revenue.

In addition to the government’s smart cities plan, a \$60 billion wish list from Infrastructure Australia and the formation of PPPs across the smart city space gives us hope for the future of our cities.

Other positive signs include governments and business recognising the potential of value capture and venture capital to fund new projects, the use of partnerships with other institutions including universities and hospitals, employing existing infrastructure more efficiently and other innovative funding models, including co-ops, community ownership and tolls as well as other user-pay models.

To ensure optimal outcomes we will need to develop the conditions listed above – including a co-operative approach by government and business, with private enterprise taking the lead on risk and a scalable proof-of-concept approach to innovation.

The sum of all these will deliver our goal – an improved urban space where people can be their best as they live, work, trade and play in comfort and safety.

Part 1

Defining smart cities in the Australian context

We define a smart city as a vision of an urban space that incorporates a mix of information and communication technology (ICT) solutions, transport and infrastructure technology while maximally safeguarding privacy to improve the lives of its citizens and helping them achieve happiness and self-actualisation. In simple terms, a smart city is one in which things work better than they have before, for shared benefit.

Big data, the Internet of Things, and a new purpose-driven approach to urban planning are coming together to achieve this vision and make urban centres which embrace them into “smart” cities.

The degree to which we embrace these developments in ICT, transport and infrastructure will directly impact Australia’s international competitiveness and our ability to attract the best talent to our cities.

But they are not inevitable.

Australia’s private sector has the capacity to provide both leadership and funding for creation of smart cities, and it can be argued industry works best when governments get out of the way.

While government is not engineered to be highly adaptive or agile like industry, it is still electorally responsible for delivering services to the community, which makes it impossible for it to remove itself entirely.

Still, we believe that the best result for Australia would be created by the government harnessing the power of the private sector to do what it does best in discovering the wants and needs of citizens, and using this information to imagine, design and build smart cities.

The private sector can invest in risk, reducing the share of risk borne by the government and the taxpayer. Together government and the private sector can identify the projects which will have greatest impact and apply private sector expertise in implementation.

In doing so, it is important to consider which level of government is best placed to lead and partner on the many micro-initiatives which make a city smart. There is high demand.

“The narrative has to be pitched at the three levels, but we should concentrate most effort on local government. Local government has far more influence on the daily lives of the community and the community can be mobilised far more quickly than through the federal government to facilitate change.”

- Mick Slater, Linfox’s President for Government and Defence

Part 2

Building Australia's talent advantage

Successful cities can easily become victims of their own success. As they attract more people, infrastructure must keep pace with the growing population. The cities have to become better faster, just to stay in the same place.

Australia has the third highest population growth of any country in the OECD – after Luxembourg and Israel³ – and keeping up with high population growth will remain a challenge for smart city builders.

Getting cities right is crucial to the nation's competitive advantage. Smart cities are and should be a magnet for talented people. A recent report by Ernst & Young said that cities have to compete for talent.

"This is not just about GDP. GDP might be the result, but it's generated by efficient cities where people want to live and make their careers," said Ernst & Young's Oceania Government and Public Sector Transactions Leader, Darrin Grimsey⁴.

Making cities as attractive as possible to talented people is crucial to the growth and wealth and prosperity of nations around the world.

To this end, the Smart Cities Council lists three key criteria that define smart cities:

- **Liveability**

Cities that provide clean, healthy living conditions without pollution and congestion. With a digital infrastructure that makes city services instantly and conveniently available anytime, anywhere.

- **Workability**

Cities that provide the enabling infrastructure — energy, connectivity, computing, essential services — to compete globally for high-quality jobs.

- **Sustainability**

Cities that provide services without stealing from future generations.

"We are looking for solutions that help improve the way we live, work, move, play and trade. It is everything. It's kind of scary. But that is what our life in the city is."

- Johanna Pitman, head of CityConnect at start-up incubator BlueChilli

A recent article by PwC⁵ said tomorrow's top talent will consider mobility, flexibility, and connectivity to be essential components of their work environment and their personal life.

"These concerns are already top of mind for millennials and we should expect future generations of workers to continue to push these priorities."

PwC's recent report on Talent Mobility⁶ found international assignee levels are up 25 per cent over the past decade, and predicted 50 per cent more growth in mobile employees by 2020. According to the report, cities that facilitate and catalyse those priorities will stand out as talent magnets. Efficient traffic patterns, widely available broadband, ample housing near mass transit, and complete neighbourhoods that minimise travel time will help bring the best and the brightest people to urban centres.

Meanwhile, urbanisation is creating big gains: the top 600 urban centres generate 60 per cent of global GDP, and that number will only grow as more people move to cities.

While new technology makes working remotely feasible for most "smart" jobs, a high-functioning city must facilitate both virtual and physical collaboration.

³ http://www.keepeek.com/Digital-Asset-Management/oced/economics/oced-factbook-2015-2016/population-growth-rates_factbook-2015-graph2-en

⁴ EY's Oceania Government and Public Sector Transactions Leader, 2016 report

⁵ <https://medium.com/pwc/smart-cities-need-smart-people-c1f3d5a475cc>

⁶ <http://www.pwc.com/gx/en/managing-tomorrows-people/future-of-work/pdf/pwc-talent-mobility-2020.pdf>

Part 3

Local innovation for global impact

As the level of government closest to the everyday needs of the constituency, local government is uniquely positioned to improve people's lives in a way that will have an immediate impact.

However roundtable participants cautioned that local council hierarchy and procurement processes can slow or even stymie progress. As one participant expressed it, the current council structure is "one CEO, five departments and 2000 staff ... using procurement processes that go back 40 to 50 years".

"You have all this investment from the private sector in speculative technology - billions and billions being spent in the blind hope that we can deliver it through a [bureaucratic] straw."

- Adam Carey, CEO of Citelum

Procurement and financing models must change to support innovation.

Current procurement processes favour project delivery by big corporates (purely due to their financial ability to weather the cost of onerous government compliance and processes), typically resulting in a less innovative approach. Start-ups may not even reach tender stage after being dissuaded by the compliance burden.

In addition to this bottleneck, innovative technology is not being deployed because there is still a central planning mentality rather than an iterative start-up mentality that could more effectively deliver solutions.

One way government could move more quickly would be to embrace the iterative approach discussed above, where technology is proven on a small scale, then picked up in other areas. This type of approach in turn lends itself to creative financing options; investments are no longer so massive that only large corporations can propose a solution.

Instead smaller players can bid for projects using models that break investments into funding parcels over a 12 to 24-month period, with returns coming within five years.

Part 4

Harnessing start-up methodology

Start-up methodology and financing models can help overcome funding gaps, as well as acting as a way of reducing the investment risk governments take with taxpayer money.

Take for instance Wi-Fi, initially invented by an Australian radio astronomer to search for miniature black holes is now ubiquitous. Australia's failure to commercialise this invention to its full potential is just one of many instances in which Australia has allowed global leadership opportunities to slip through its fingers for lack of a vision or commercial backer.

By way of contrast, tiny Finland dominated the mobile phone market for years thanks to a clever management of the Nokia innovation and brand, but it was the Finnish government that was forced to take the risk in a colossal gamble by the state on a new untried technology.

The private sector has had more success on this front. Uber is a great example of the small-scale iterative approach that could well serve the development of smart cities. The \$69 billion behemoth started with a mere \$200,000.

Part 4 (continued)

AirBnB meanwhile began with \$30,000 in start-up cash and, like Uber, simply went about solving a problem – in this case demand for accommodation in a bursting-at-the-seams San Francisco – using existing infrastructure and linking it to new technology.

“We should look at what the outcome should be and reverse engineer (the solution).”

- Bruce Riddle, Advisian social infrastructure specialist

It's worth noting that Uber and AirBnB are both examples of capacity utilisation or using excess capacity from existing infrastructure.

This is now happening even with new 'smart' infrastructure, with people building on excess capacity.

In the short time that people have been installing solar power units on their homes and batteries to store energy, innovation is already happening – with the creation of smart virtual power grids, where energy suppliers can reach into household batteries and tap the storage of electric cars to meet demand at peak times.

“What will the city of the future be? Will it be a CBD with suburbs hanging off it, or a virtual environment where much wider set of environments, virtual or real, interact?”

- Robbie Singh, Managing Director of EAC Partners

In March 2017, AGL went live⁷ with a virtual power grid, which utilises the storage batteries of 1000 Adelaide homes to draw up to 5mW of power during peak energy use periods – the equivalent of a small power station, without having to build a physical plant.

While 5mW is not a huge amount of power – the biggest coal-fired plant in New South Wales produces 200 times as much energy – it could point the way forward and can be described as a proof of concept.

Participants noted that “successful innovation focuses on experience and addresses real pain points in our everyday lives”. Opening up to different types of tenders and building relationships with a new breed of innovative venture capitalists will enable governments to find better solutions from a different approach to commercialising innovations.

“Think about Uber, they didn't start by addressing infrastructure change, they looked at how booking and paying for a taxi could be as simple as possible in every location. By doing so they revolutionised how many of us travel in cities and essentially made ride sharing frictionless and personalised.”

- Doug Howe, MasterCard's Vice-President Transit Development and Innovation for Asia Pacific

⁷ <https://www.agl.com.au/about/agl/media/centre/article/list/2016/august/agl-launches-world-largest-solar-virtual-power-plant>

Part 5

Using data properly

A recent report by Deloitte⁸ described data as the “lifeblood” of smart cities.

Governments collect colossal amounts of data from both traditional and non-traditional sources, including data they do not even know they have. The potential of this data to make our lives better can only be imagined.

Smart city advocates from the public and private sectors have begun to work together to find ways in which the data can be made available to entrepreneurs without compromising privacy.

Reformed data laws will be critical to ushering in smart cities. But participants noted that the process has to be bi-directional. “Most people are not going to be able to provide insights beyond what makes them immediately unhappy,” one participant noted.

Data will be key to revealing insights into citizens’ future needs. Correlations that we are currently unaware of will release the next wave of value to society.

“We need to have a national data exchange platform to leverage the mountain of information that’s already out there.”

- Merrick Spain, Telstra’s
Emerging Technologies Lead

Part 6

The internet of things

Despite the hurdles outlined, the private sector, with help from peak bodies and the federal government, is already developing the solutions and technologies that will underpin the cities of the future.

For example, the Internet of Things continues to grow apace.

A new report by the International Data Corporation⁹ forecasts worldwide spending on the IoT to grow by nearly 17 per cent in 2017, reaching just over \$800 billion.

By 2021, global IoT spending is expected to total nearly \$1.4 trillion as organisations continue to invest in the hardware, software, services, and connectivity that enable the IoT.

A recent report by Deloitte Access Economics¹⁰ found that the contribution of digital technologies to the Australian economy is forecast to be \$139 billion by 2020, when it will equate to 7 per cent of Australia’s GDP.

The nation’s growing digital economy illustrates the significant role technologies such as cloud platforms, data analytics, AI and IoT will play in driving economic growth in Australia.

This is illustrated by Telstra’s announcement at the Mobile World Congress in Barcelona in February 2017 that it was partnering with Ericsson to create an Australia-wide Internet of Things.

Telstra CEO Andrew Penn also revealed that the organisation was already reaping \$150 million a year in revenue from its IoT arm.

Combined with Telstra’s existing coverage, customers can use a range of near-real-time IoT applications in areas that include logistics, utilities, medicine, transport, mining, agriculture, manufacturing and many more.

At around the same time, Infrastructure Australia laid out its \$60 billion wish list. And the Turnbull Government’s Smart Cities plan – released last April – is a laudable government framework in which to discuss future urban spaces.

With the private sector, peak bodies and government all on board – and with PPPs in use across the smart city space, Australia is well placed to capitalise on technology advances as they appear – and to make its own contribution.

⁸ <https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/publicsector/deloitte-nl'ps-smart-cities-report.pdf>

⁹ <https://iotbusinessnews.com/cdn-ampproject.org/c/s/iotbusinessnews.com/2017/06/14/20811-worldwide-spending-internet-things-forecast-reach-nearly-1-4-trillion-2021>

¹⁰ <https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-australias-digital-pulse-2017-010617.pdf>

Part 7

Technology as a tool

Few Australian readers will be aware of the innovation districts in Sydney, Melbourne and Brisbane.

Fewer people would be aware of self-contained precincts already being built in New York City, The Hudson Yards, and Yeerongpilly Green in Brisbane and on a smaller scale, the green space of the Finery in Waterloo, Sydney.

All are built on top of or near railway stations - the new Waterloo Metro station for Sydney's Finery and an extension to the 7 line train in Manhattan for the Yards.

Australian Unity will create a global benchmark for health precincts in Brisbane after the Queensland Government confirmed it as the preferred tenderer for the \$1.1 billion Herston Quarter.

These are just some examples of how the private sector is teaming up with government to create a smart precinct - or in the case of The Yards, a city within a city with its own microgrid - with green spaces, pools or water features and high levels of walkability.

While the private sector is tacitly acknowledging these facts, it is up to government to come to the fore with a "big picture" commitment to ensuring quality of life and happiness of its citizens.

Smart city technologies should not be just assembled data-based gimmickry, but must be designed to make cities more liveable, prosperous and inclusive.

Roundtable participants were excited also by the opportunity for smart cities to go beyond social cohesion and improve citizens' connectedness to the government.

This call for a vision for the smart city and a commitment to the happiness of the people is a crucial element to come from our roundtables.

Conclusion

The smart cities space in Australia does not lack for talent, drive, enthusiasm, willingness to invest and even sacrifice, if the attitude of the Azcende roundtable participants is any guide.

This discussion, and many more like it, are currently contributing to a better shared understanding of how government and the private sector can come together to create smart cities which are geographically Australian and technologically global.

But the guiding vision underpinning these developments must be the improvement of the general human condition.

We see smart cities as an opportunity to move humanity towards self-actualisation where every person can live a life where they are safe and secure, and be their best.

This is achievable now. While we should not be daunted by undertaking tasks that will take years to complete, what matters is wellbeing now.

With the technology we have available, Australia has the ability and the opportunity to build smart cities and improve people's lives today.

“We are the mechanism that disrupts our old ways of thinking and we can use that as a way to lead government down the path it should be going. Disruption is personal – if we don't do it to ourselves on an individual level, as industry and as a nation we'll never get to where we need to go.”

- Merrick Spain, Telstra's
Emerging Technologies Lead

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