

# Smart cities

In partnership with Australian Computer Society (ACS)

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## Population growth the challenge

**Strategy** Pressure on infrastructure a key issue going forward.

Ian Grayson

As public debate grows over what a future “big Australia” might look like, attention is focusing on the implications continuing population growth has for the nation’s cities.

Buoyed by the combination of natural births, migration and longer life expectancies, Australia’s urban centres are expected to experience significant changes during the coming decades.

To cope with these population gains, experts believe urban infrastructures will have to become more integrated and efficient. The concept of a “smart city” will need to evolve from a planning concept into reality.

At a recent roundtable event conducted by *The Australian Financial Review* in partnership with the Australian Computer Society (ACS), participants agreed strategies and action are needed to guide the nation toward a smart cities future.

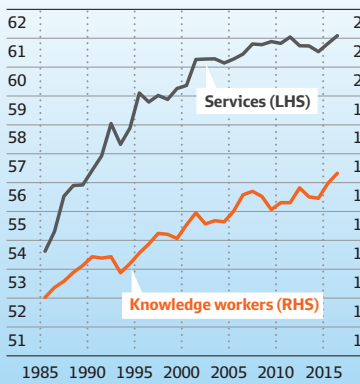
Michael Blumenstein, Associate Dean (Research Strategy and Management) at UTS, says the push needs to come from both the public and private sectors. “I would suggest it probably needs to be a partnership,” he says. “The federal government has a big role to play [as well as] other institutions. Everyone’s got a part to play.”

However, Blumenstein cautions that the term “smart cities” is often used as a tag line rather than referring to initiatives that are actually being put in place. Australia needs to ensure it moves from talking about the concept to taking practical actions.

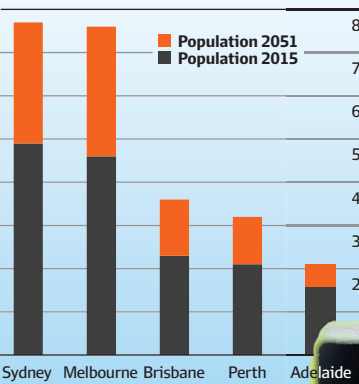
“For smart cities to become a reality, particularly in Australia, there needs to be some things happening on the ground that actually exhibit the smart city notion. There are pockets of activity occurring, but the problem is I don’t believe that it’s organised in a way that’s really moving towards a defined goal.”

### Planning for the future

Services share of GDP and knowledge workers’ share of total employed (%)



Projected city population growth to 2051 (million)



About three quarters of Australians live in the larger cities

SOURCE: DEPT OF PRIME MINISTER AND CABINET

**If the country had a bit more of a vision towards making cities ... more effective, then we would be able to show GDP growth.**

Geof Heydon, digital economy and smart cities consultant

Digital economy and smart cities consultant Geof Heydon says the term smart cities has become something of a rallying point in Australia, but more practical steps are required to bring the concept to life.

“If the country had a bit more of a vision towards making cities ... more effective, then we would be able to show GDP growth and we’d be able to show



Dr Fang Chen, says the key element underpinning any smart city strategy must be data. PHOTO: DEAN SEWELL/OCULI

that the country is massively benefiting,” he says. “I think the government – the federal government as well as states – needs to see that as a critical objective.”

Kylee Anastasi, infrastructure and urban renewal partner at PwC Australia, agrees saying Australia has some way to go if smart cities infrastructure is to become reality.

“One of the things that I’ve noticed

coming back into Australia is this lack of objective or vision,” she says. “We have different drivers and reasons for why we want to get there, but the government [has to] really try to set that vision and that objective. The private sector can [then] come and say ‘yes, we align with your objective’.”

Anastasi says the overriding

**Continued next page**

## New culture of sharing the way to go

### Partnerships

Mark Eggleton

The market for smart city technologies could be worth more than \$2.5 trillion by 2025 according to Frost and Sullivan, but Australia has work to do when it comes to riding the smart city wave.

It would seem Australian planners might still be smarting from the Hawke government’s plans to build a Multi-Function Polis (MFP) or future city in South Australia back in the late 1980s. The MFP plan was eventually snuffed out by the Howard government in the late 1990s after years of criticism.

Elsewhere in the world, it would seem there’s a real impetus to develop smart city solutions for the 21st century. Moreover, there are already plans afoot to develop an open innovation platform on a global scale which will see countries share their research and data on everything from developing smarter systems for energy and traffic to water and waste management.

Speaking at the recent Smart Cities roundtable co-hosted by *The Australian Financial Review* and the Australian Computer Society (ACS), University of Technology Sydney Associate Dean (Research Strategy and Management) Professor Michael Blumenstein spoke about some of the leading international players on the international stage and why Australia has slipped behind.

He suggested Australia does not have the right culture to build better partnerships between industry, government, research and the tertiary sector and to grow “the smart underpinnings of a smart city, you do need those partnerships”.

Internationally, Singapore has a strong digital roadmap and integrated plan between all sectors of the economy, as does Israel.

Even further afield, Finland’s six-city strategy covers 30 per cent of the Finnish population and whole urban communities participate in developing and testing innovative concepts on an

**Continued next page**

## Data Sharing Frameworks Technical White Paper

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# Hubs can spur the digital economy

## Urbanisation Growth will drive need for sustainable solutions.

Mark Eggleton

By 2050, two-thirds of the world's population will be living in cities. Urban centres from Mexico City to Tokyo to New York will need to accommodate more people than ever while managing finite natural resources. The population of many Australian cities is rising quickly. The Department of Prime Minister and Cabinet has formulated a national Smart Cities Plan designed to ensure Australia's urban hubs thrive in the digital economy.

While this enormous growth presents a challenge, it is their scale which makes our cities incubators for smart, sustainable solutions. More pertinently, technology is already providing solutions as we build smarter buildings and building management systems through the power of data and the Internet of Things.

In fact, while much of business has focused on the cloud, big data and the Internet of Things, the development of Smart Cities combines them all.

The cloud has meant the development of huge data centres to crunch the data and the Internet of Things now encompasses everything from our smartphones to traffic lights, industrial machinery and home appliances. In the smart city of the future, technology can improve it all.

At a recent Smart Cities roundtable co-hosted by *The Australian Financial Review* and the Australian Computer Society, participants included Michael Blumenstein, Director, Technical Advisory Board, ACS and Associate Dean, UTS (Research Strategy and Management), Head of School, Software, Engineering and IT as well as Dr Fang Chen, Research Group Leader and Senior Principal Researcher

## Smart Cities combine the cloud, big data and the Internet of Things.

Data61; Paul Edwards, Group General Manager – Workplace Experiences, Mirvac; Kylee Anastasi, Partner – Infrastructure and Urban Renewal, PwC Australia; Jack Archer, CEO Regional Australia Institute, and Geof Heydon, smart cities expert and founder of IoTAA and Creator Tech.

An excerpt features below:

*On the data story:*

**Dr Fang Chen:** The story of getting data right, it's always the starting point of everything ... and one of the big challenges now is that we have a lot of data in the silos. We need a coherent and synchronised system to look at data in a way that is beneficial for industry, cities and society.

*On creating smart cities:*

**Geof Heydon:** You can't say that there is



Geof Heydon: "We need to accept that learning by doing is the journey we're on." PHOTO: DEAN SEWELL/OCULI

a blueprint anywhere in the world we can copy. That is not a practical thing to do. We need to accept that learning by doing is the journey we're on and we've got plenty of examples in Australia now where learning is happening because doing is happening.

*On community involvement:*

**Kylee Anastasi:** This is less about tech-

nology and more about policy and the citizens and how we as a community really want to utilise technology going forward. If we put the community at the centre of some of this [smart city] decision-making with support from entities such as government and also from the private sector then I think that will really help to get things moving.

**Paul Edwards:** I think to move us

from just being a buzzword around smart cities we have to collaborate across different sectors both private and public. Across different levels of government and the community as a whole, and [hopefully] this will allow us to feel safe in sharing our data which will activate opportunities for new businesses and for new ways of working.

## From previous page New culture of sharing the way to go

open shared platform. Companies across the six cities can freely experiment with their innovative smart city solutions and all the data and end-user experiences are shared between stakeholders. The aim is to ensure whole communities will flourish as will industry and the local start-up community.

Blumenstein says if we look to those countries you can see those partnerships are recurring, and "they are fruitful, and they are generating new businesses, new technologies and new products".

And if we can get the mix right, Australia can become a leader in the space and not just be the slavish followers of other nations' initiatives but before we see that happen, "we need to get the basic infrastructure right".

Fellow roundtable participant Paul Edwards agreed Australia does not have the right infrastructure in place to create smart cities. He says we need to create more smart precincts that promote collaboration and innovation.

Edwards, who is the group general manager – workplace experiences for Mirvac, also cites Singapore as a nation that is investing in education and the start-up community as well as smart hubs or precincts.

He says smart cities need smart precincts where innovation can flourish and he does not believe we have any of those precincts in Australia yet.

Mirvac is working towards one at Sydney's Australian Technology Park (ATP) where it hopes to create an environment that enables organisations to work together to create smart city solutions.

One idea Mirvac has is the concept of providing shared testbeds, which is in its nascent stages.

"At the ATP, you provide a testbed,



Michael Blumenstein says partnerships generate new businesses, new technologies and new products. PHOTO: DEAN SEWELL/OCULI

which might include lots of sensors which then provides data, and then you provide a governance layer so that people can access that data and use that data to create new businesses.

"For example, we're going to have one of the first urban farms on the rooftop of one of our buildings down there. We can put sensors in the soil, we can do food testing and we're talking to Data61, who are based there, about how we create lots of data which we can gift to the citizens who actually can then drive new businesses out of it."

Smart cities consultant as well as founder of Creator Tech and Internet of Things Alliance Australia, Geof Heydon, also agrees sharing data across open platforms is integral to creating the smarter urban areas of the future but unfortunately, "our culture is not so great at sharing".

Referring to the start-up ecosystem, Heydon suggested Australia does have

a great incubating environment but when you look at the ecosystem in other countries, "people with intellectual property as a start-up find ways of sharing it with others to create bigger and better intellectual property".

"Unfortunately, we have an opposite tendency here in Australia. If you have a great idea, you want to sit on it and not let anybody steal it."

Heydon believes part of the problem is the start-up funding model here in Australia sees plenty of investment in first-round funding but when start-ups move to the next stage of their development and are looking for second-round funding, the investors are staying away.

The upshot is start-ups are sitting on their ideas and looking internationally for the next round of funding and we lose them overseas.

"We have a lot of incubators getting that first step but the real challenge is the next step in their development."

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objective of a smart cities initiative needs to be less about the technologies and products that need to be put in place and more about targets such as reducing the impact of climate change, lowering traffic congestion and boosting a city's overall productivity and the quality of life of its citizens.

"Those [are the] sorts of things that the community can sign up to and endorse," she says. "Then it's over to the private sector to come up with the innovations that help drive that to become a reality."

Dr Fang Chen, research group leader at Data61, says while smart cities is something of a buzz phrase at the moment, progress is already being made in a range of areas. She says the key element underpinning any smart city strategy must be data. It's only through the collection, analysis and use of data that effective strategies can be evolved from theories into practical projects.

"My daily job is working on data, and what we can do with the data," she says. "From that perspective, I actually think Australia is not in a bad place."

Chen points to the example of a traffic control system developed in Australia that has been exported to cities around the world. She says maintaining a focus on data and how it can be used will lead to the development of other smart city components in the future.

She says while the process of creating a smart city needs to begin with a solid base of data, this must be linked with an overall vision and used to aid the creation of a standard platform to support targeted initiatives.

While attention around smart cities tends, naturally, to focus on our largest urban centres, the roundtable discussed the potential for the strategies to

also add significant value in regional centres.

Jack Archer, chief executive of the Regional Australia Institute, says many people do not realise that 50 per cent of regional Australians live in cities of more than 50,000 people.

He says these small cities are great testbeds for smart city initiatives as they do not become bogged down by having to deal with multiple local councils and other authorities to become established.

"There are [already] some great initiatives in Newcastle and some good things with environmental sensing in Cairns," he says. "There's [already] a lot of innovation going on in these places."

During the roundtable discussion, Heydon cautioned that a sustainable Australian smart city strategy would

## There are [already] some great initiatives in Newcastle and some good things with environmental sensing in Cairns.

Jack Archer, chief executive of the Regional Australia Institute

need to be more than simply a series of one-off projects. He says some centres call themselves a smart city when all that has been done is the implementation of smart street lighting.

"It's very difficult for one business or one product, or even several products, to change something," he says. "It has to be done in partnership. For cities to really change, it does need a strong government with vision and strong action."

The roundtable participants concluded that, while there is significant scope for Australia to glean advantages from smart city projects, thorough planning and co-ordination will be needed to ensure their success.



# Huge potential of IoT but also some concerns

**Security** No room for complacency when it comes to breaches.

Mark Eggleton

When World Bank Group president Jim Yong Kim stood up in front of the Mobile World Congress earlier this year in Barcelona, he spoke of the power of the Internet of Things and how big data could be used for the greater social good.

While he was emphasising the potential of increased connectivity to alleviate poverty, Kim was also drawing attention to 5G technology being the engine that will drive the fourth industrial revolution.

Speaking with Fairfax Media in March, the global head of Samsung's mobile business, DJ Koh, also spoke about the potential of 5G and how it will deliver unimagined experiences. He likened 4G to a bicycle and 5G to a motorbike, giving us extraordinary connectivity.

Frost and Sullivan also spoke of the benefits of 5G and how it will drive the Internet of Things technology in "smart cities, smart infrastructure and enhanced connected living concepts".

Yet Frost and Sullivan also warn that as more devices become networked, the potential for security breaches expands exponentially.

Cyber security attacks cannot only cause operational disruptions; breached or malfunctioning devices can also be commandeered to launch cyber security attacks on other devices and systems, posing significant risks to consumers, businesses and societies.

As Koh says, "data security is No.1" and it was discussed extensively at the recent Smart Cities roundtable co-hosted by *The Australian Financial Review* and Australian Computer Society.

Speaking at the roundtable, smart cities consultant and founder of Creator Tech Geof Heydon said if we are complacent about security, "we could have a potential disaster".

"Everything we aspire to from the technology side of things when it comes to enabling citizens, could actually fall down at the blink of an eye if we're not prepared," Heydon says.

We are already seeing the potential pitfalls of massive security breaches and blatant misuse of data. A recent study by the University of Surrey in Britain titled *Into the Web of Profit* (Understanding the Growth of the Cybercrime Economy) suggests cybercrime is worth over \$1.5 trillion a year – making it equivalent to the world's 13th-largest economy.

And it is not just individuals' data at risk. According to the report, last year 12 Saudi government agencies were discovered to have been victims of espionage-directed spear-phishing cyber attacks. The attacks aimed to place malware on computers to mine or steal data from them.

In the last few years, Saudi businesses, especially in the energy sector, have also been victims of spying attacks from malicious actors such as the Greenbug cyber espionage group or the Shamoon hacking group, who were able to disrupt over 35,000 computers at the Saudi Aramco oil company in 2012.

It is also happening closer to home, where recent reports have outlined massive health data breaches.

All these reports are worrying, especially when we realise the smart cities of the future will rely heavily on the use of data and the sharing of data to make our cities run more efficiently.

Participants at the roundtable suggested while a degree of paranoia is warranted around security, sometimes it is inappropriate.

The general consensus was governments have to educate people about data usage and obviously establish a



Kylee Anastasi says data can assist in making a city smarter. PHOTO: DEAN SEWELL/OCULI

strong degree of governance around its usage. University of Technology Sydney associate dean (research strategy and management), Michael Blumenstein says data is the key to harnessing the power of the collective intelligence.

Blumenstein, who is also the director of the ACS Technical Advisory Board, says while privacy is vitally important, it's the use of data which will engage

## People want to see data used in a real-life context.

Dr Fang Chen, Data61

citizens to help create smarter cities. The challenge is how do you get that engagement with a lot of privacy?

He says once people give up their data, they want to get some assurance that it will be used appropriately.

Research group leader and senior principal researcher at Data61 Dr Fang Chen suggests it is more of an education process. She says people want to see data used in a real-life context such as public transport and on-demand transport services.

"If you live on an island by yourself and you aren't willing to give any information about yourself and your movements, there is no way of estimat-

ing the demand and time you might need to leave and ensure a service like an Uber is nearby.

"Now if there is 10, 20 or 100 people, we can give you a profile of the community. It's about sacrificing a little bit of privacy so you can have a better service."

PwC Australia's infrastructure and urban renewal partner Kylee Anastasi agrees people would be more than happy to give up their transport data through their mobile device if they knew their transport would be there when they needed. It's the ideal example of how data assists in making a city smarter.

"You're giving that information up because you're receiving – you're seeing a very tangible link between what you're giving and what you're receiving as the citizen," Anastasi says.

"If you can understand the trade-offs, you'll make your own decision."

While people might happily give their data to a transport provider, the deeper privacy issue is with whom the transport provider then shares your data with. Roundtable participants agreed efficient smart city infrastructure would need data to be shared widely.

Chen said if it is used wisely it can then be used to inform traffic movements, consumer behavioural changes and more. She says technology will improve the interpretation of data and

once that happens it will give people more confidence to share data.

"We need to craft a policy on how we share the information and then that information can be used in whole city planning," she says.

The key is winning people's trust even when it comes to them anonymously sharing their data.

For example, Mirvac's group general manager of workplace experiences Paul Edwards says people basically give their data away to Facebook or Apple "when they say yes to the terms and conditions".

"Yet when we actually ask someone for data for a specific purpose such as tracking someone around one of our buildings to work out space utilisation and space optimisation, most people will say no.

"I've been at conferences and asked whether people would sign up to being anonymously tracked. I tell them we don't know who you are, we don't know anything about what you're doing, other than where you are moving around the building, but when I ask that question to a room full of people, only 10 per cent would volunteer."

For Edwards, people do not understand the value proposition. They will give everything up to some things, but are more worried about having their boss maybe knowing where they are – even though it is anonymous.

# Key to innovation for regions is playing to their strengths

Lifestyle

James Sherbon

Australia's regional cities should play to their strengths when it comes to being innovative in the digital economy, suggested a number of participants at the recent Smart Cities roundtable co-hosted by *The Australian Financial Review* and the Australian Computer Society.

Chief executive of the Regional Australia Institute, Jack Archer, says playing to their strengths just makes common sense rather than trying to achieve the scale of change talked about in the larger cities.

"Australia has 31 small cities from Cairns through to Hobart where 4.5 million Australians live. These small cities are great test beds for innovation because you're dealing with one local government," Archer says.

"Cities like Newcastle, Rockhampton and Cairns are starting to lead in the smart cities movement and they're playing to their strengths."



Jack Archer: "Small cities are great test beds." PHOTO: DEAN SEWELL/OCULI

According to Archer, one of those strengths is the lifestyle advantages of each of these cities. For example, they are all popular with retirees and Archer believes there is real potential for them to become powerhouses in aged care and create smart aged-care communit-

ies. Moreover, it is an area with enormous export potential as many of the region's populations are ageing.

"We're having a big discussion about smart homes for old people, but what about smart communities in places like Port Macquarie or on the Sunshine

## We can be global leaders and take technologies all around the world.

Jack Archer, CEO, Regional Australia Institute

Coast, the Gold Coast or the Fraser Coast? These places are magnets for people retiring and downsizing out of the city.

"There is a great opportunity for these to become smart cities where people can access a whole lot of services and have a city that really works for them. We can be global leaders and if some of our smaller cities can help develop the technologies, we can take those technologies all around the world."

Smart cities expert and founder of advisory firm Creator Tech, Geof Heydon, agreed every city needs to work out what makes it unique so people are made aware of why they would want to

work and live in a particular city.

"There's this really big problem that there is almost a generic smart-city statement for every council or every city across Australia," Heydon says.

In many ways, it's a little like the Pixar film *The Incredibles* when the villain Syndrome suggests that "when everyone's a super[hero], no one will be". There is a lack of differentiation, so what Heydon does when cities want to talk smart is to ask "what are your unique assets that you're going to make more attractive to society".

"You can go to many councils around the country and they haven't got a clue what is unique about them, or when they do tell you what is unique it's that gold mine, or it's something that isn't actually that helpful.

"Every place has something great to start from and when a person doesn't want to live in a congested city, they're choosing from other characteristics.

"I really don't think anybody is really putting enough thought into what are their assets which form the base to build smart from."



# Singapore, Bristol show what's possible

**Inspiration** 'Problem-solving' cities are leading the way.

Ian Grayson

While the creation of a truly smart city in Australia may appear to be a complex and long-range task, proponents are finding inspiration in successful projects established in other parts of the world.

Participants in a recent round table hosted by *The Australian Financial Review* and the Australian Computer Society on the topic pointed to initiatives underway everywhere from Britain to Singapore as evidence that progress was not only possible but led to demonstrable benefits for the urban centres involved.

General manager workplace experiences at Mirvac, Paul Edwards, says a good example of what is possible can be seen in the British city of Bristol.

There, the council is undertaking a multi-phase smart city project designed to improve everything from traffic flows and rubbish collection to air quality and health services.

"They've branded themselves the 'problem-solving city' and they've done that through setting up all the network underneath that allows [data] to be gathered in a consistent way," he says.

"But, far more importantly, they've got the platform that goes across all of that, so they can look at the data from anywhere."

Edwards says Bristol City Council has successfully built a model where industry, local government and the university work hand-in-hand with the start-up community. If a project requires research then the university leads, and if it's an industrial project then industry leads.

"I like that model because they've recognised that ... it's a long journey, and you've got to [work together] to solve problems," he says.

Smart city projects are also rapidly gaining steam in the Asia-Pacific region. Associate Dean (Research, Strategy and Management) at UTS, Michael Blumenstein, says Singapore is a solid example of what can be achieved with thorough planning.

"What's interesting there is they are going for the big problems and looking at things like transport," he says. "They are designing smart, autonomous electric trams that will be running around the city in the form of platoons."

The trams will connect and disconnect on the basis of changes in passenger demand across the city.

However, Blumenstein says a truly smart city requires not just selected high-tech projects but an overall vision for what it wants to become.

"I suspect that there are lots of cities



Detailed planning has helped Singapore in its goal to become a smart city.

trying to use showpieces like that to articulate their maturity in the smart city space, but none – to my knowledge – has all the pieces together," he says.

Edwards says cities with a strategy of becoming "smart" are taking a phased approach to implementations. In this way the success of early activities can add value to other initiatives that follow.

"The first phase is doing the really simple things like putting sensors on bins to make rubbish collection more efficient," he says. "That's easy and lots of councils are doing it all over the world. It's not that smart, but it's an important first step."

Edwards says a second step is often looking at the lighting in public spaces and adding sensors and controllers to

make its operation more efficient. This, in turn, leads to the deployment of a range of other sensors that can monitor everything from traffic flows to air quality and the movement of crowds.

With multiple sensor networks in place, the next phase is looking at how the different data streams being collected can be combined and add value in

**It's a long journey, and you've got to [work together] to solve problems.**

Paul Edwards, Mirvac

more complex ways. This could involve, for example, traffic management systems that alter traffic flows in times of poor air quality.

"One of the good measures of maturity [in smart cities] is data sharing and the policies wrapped around that," says Jack Archer, chief executive of the Regional Australia Institute. "A lot of people say that the oil of the digital economy is data [so] you have to have policy wrapped around that."

"You can't just say we're collecting data from all these sensors and we'll make it available willy-nilly."

"You have to know when it's too risky to share some data, when it's too personal [or] when it's inappropriate for national security."



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