

Telstra Submission to the
House of Representatives Standing Committee on Agriculture and Industry
Inquiry into Agricultural Innovation
12 October 2015

Introduction / Executive Summary

Telstra welcomes the opportunity to make a submission to this inquiry and thanks the committee for the extension of time to submit.

Agriculture is one of Australia's most important industries and one that has, throughout our history, benefited from the ingenuity and innovation of our farmers and the businesses that work with them. We strongly support work by this committee to seek to understand and improve the efficiency of agricultural practices. We are strong supporters of the role that technology can play in boosting innovation and enhancing productivity. We work with our agriculturally focused customers – large and small – to assist them access and take advantage of the opportunities brought about by technology. The rollout of the National Broadband Network and expansion of the Telstra mobile network will provide greater connectivity to people in rural Australia, including farmers.

This submission provides detail about Telstra, our network and commitment to rural Australia. It provides detail on the importance of connection to agriculture and agricultural innovation and the challenges and opportunities of connection. There are some examples of what Telstra is doing to support both customers and researchers along with some broader trends in technology and their applicability to agriculture. Finally, this submission addresses some of the challenges and opportunities for the Committee to consider as it addresses how to both look to further improvements and recommend how to harness emerging opportunities for the agricultural sector.

About Telstra

Telstra is Australia's leading telecommunications and information services company, offering a full range of communications services and competing in all telecommunications markets. In Australia, as at 30 June 2015, we provided 16.7 million mobile services, 7.3 million fixed voice services and 3.1 million retail fixed broadband services. In addition to carriage services, Telstra provides a range of enhanced services including information technology, cloud and network applications and services. We work with our partners to create seamless services, often comprised from multiple partners and vendors, delivering our customers a consistent experience, point of contact and dedicated account management for larger business accounts. We believe the more connected people are, the more opportunities they will have, which is why we aspire to create a brilliant connected future for everyone, everyday.

Telstra's commitment to rural and regional Australia

Telstra has had an ongoing commitment to regional and rural Australia. Since June 2000, Telstra Country Wide has been improving telecommunications for households, businesses and local communities across Australia, with a focus on rural and regional Australians. We continue to have

local Area General Managers, and their staff, located across rural and regional Australia working to support our customers locally and engage with the community.

Telstra's network advantage

The breadth of our network allows many working in rural and regional Australia to access the benefits of connection. The Telstra Mobile Network is Australia's largest mobile network covering more than 2.4 million square kilometres and over 1 million square kilometres of out to sea coverage supported by more than 8,000 mobile coverage sites. Our 4G coverage is larger than any other carriers' 4G coverage, with over 3,800 4G sites in operation, extending our 4G well beyond the Metro areas to over 600 regional towns or communities.

Our optical fibre is the backbone of our networks holding our fixed and mobile networks together and covers a vast distance of over 229,000km – this is enough fibre to wrap around the entire planet nearly 6 times over; includes our recently commissioned world's longest low-latency 100Gbps fibre link spanning the continent from Perth to Sydney.

Telstra also offers satellite mobile and mobile broadband to our customers in areas beyond the scope of our fixed and mobile networks.

Regulatory policy is an important factor to consider in the investment decisions made by firms. Research undertaken for Telstra by Covec¹ indicates that Australia has enjoyed a relatively light handed approach to mobile regulation and this stance deserves some of the credit for the benefits Australians have enjoyed from the mobile sector. Further, it states that a major factor in the consumer benefits of mobiles is network investment and competition between networks. The state of competition is such that each network has both the ability and the incentive to upgrade their networks.

Case study of Telstra's mobile network:

Mark Barbetti, a dairy farmer from just outside Bunbury, Western Australia recently told Telstra about his experience using the mobile network.

Mark thinks the biggest influence technology has had on his business has been the role mobile phones have played in allowing him to run his farm regardless of where he is.

Mobile phones weren't a common thing when Mark did his apprenticeship. However, over the years they rose in prominence, and around the turn of the century they became a crucial part of running a farm – which would have been great for Barbetti farm, if it hadn't been in such a remote location for network access.

Mark says Telstra's investment in rolling out 3G across Australia back then was the turning point when coverage improved dramatically. As Telstra has continued investing in strengthening its networks with the roll out of 4G, and soon the super-fast 4GX, Mark has seen his farm evolve from being a cluster of paddocks and animals, to being one giant connected office.

"Before the arrival of 3G, as you made your way through the gullies between the hills, calls would drop out. Sometimes we'd spend half the day out of range, so any tasks that came up that involved

¹ The full report can be accessed via this link: <http://exchange.telstra.com.au/2014/02/28/building-mobile-networks-how-australia-is-a-global-success-story/>



accessing the internet, or making phones calls, would have to be done when you were back at the office.

"Now I do everything on the move with my iPhone. I order supplies, negotiate rates, sell stock, and communicate with delivery drivers. I don't have to go to town and ask questions with traders every time something comes up. We don't miss a beat anymore, which means we can do more each day and gives me more time to relax.

"I can have an apprentice in the opposite corner of the farm to me, but still keep in contact with them to ensure they're across the work I need them to pick up."

The importance of connectivity: the challenge to connect all Australians

Providing access to high speed broadband and mobile coverage is a challenge for those in parts of rural and remote Australia. We understand that the lack of universal access to technology and the internet has been a challenge in parts of rural Australia. Telstra is proud to have partnered with governments of all levels and over many years, to extend coverage in a number of ways.

The Australian government has taken major initiatives to redress the access issue in Rural Australia, most recently with programs like the Mobile Blackspot Programme of 2015. In June 2015, we were pleased to be successful in our tender for 429 sites in the first round of the programme plus 250 4G small cells (see below for some additional detail on this technology). A combined investment of \$340 million will be leveraged with Telstra contributing \$165 million in addition to the Commonwealth's contribution to us of \$94.8 million².

In Western Australia, the Rural Mobile Communications Project has, through a joint investment of funds from the Western Australian Government and Telstra, delivered terrestrial mobile voice and high speed data broadband to improve highway and town-to-town coverage in regional, rural and remote communities of the State. Telstra has deployed new mobile communications infrastructure at 113 sites across Western Australia, increasing mobile phone coverage by up to 31 percent from 430,000 square kilometres to around 567,000 square kilometres and boosting access to next generation broadband services. Overall, Western Australia highway coverage has also increased to 8,650 kilometres of near-continuous in-car kit coverage. The Western Australian Government have indicated that this project "will drive productivity, improve safety on Western Australian roads, enhance the delivery of emergency services in regional areas, and better connect our cities, regional, rural and remote communities."³ Telstra contributed \$106 million with the Government investing \$39.2 million.

As an additional component to Telstra's federal blackspot programme bid we committed to funding the establishment of 250 additional "small cells" to the 40 we have already rolled out, with a plan to reach 750 by the end of the 2017 financial year. Telstra had already developed this innovative capability designed to increase communication and connectivity in small towns or isolated communities where there is simply not the business case to establish mobile base stations. A small cell will provide outdoor hand held coverage in a radius of up to 200m from the site and is intended

² <http://exchange.telstra.com.au/2015/06/25/telstra-will-build-429-new-mobile-towers-in-regional-australia/>

³ <https://www.commerce.wa.gov.au/industry-and-innovation/regional-mobile-communications-project-overview>

to provide communications capabilities to towns of typically 100 to 200 people, where no mobile coverage currently exists.

These cells provide 4G coverage only and is intended to provide the ability to access data. As Telstra currently provides voice calls principally on the 3G initially voice calls have not been supported. This situation will change with the launch of VoLTE, (Voice over LTE, also known as 4G), which has begun to roll out across the nation. Customers will of course need a compatible handset to use VoLTE.

As part of our commitment to working with our customers in rural and remote Australia, Telstra has rolled out initiatives to support the education of students studying remotely. A recent example of this is the decision by Telstra to allow unmetered access to key education websites following a request from the Isolated Childrens Parents Association (ICPA)⁴.

The telecommunications sector in Australia has been successful in connecting the majority of the population to the internet. However, those that remain unconnected are at greater risk of being left behind and barriers to digital access be they physical, financial or literacy-based, are likely to reinforce disadvantage⁵.

Telstra considers that education, training and support are important in ensuring that all Australians have the ability to access the benefits of an increasingly digitally connected Australia. Digital connectivity is increasingly seen as an essential service, with access to the internet in many parts of the world now underpinning economic development, social connections, education, the arts, employment and social services.

Through Telstra's 'Everyone Connected' programs, we are working to bridge the digital divide in Australia. Last year we delivered \$185 million worth of benefits to our customers and communities through these programs, designed to foster digital access and inclusion for everyone, regardless of age, income, ability or location.

The National Broadband Network

Access to fast, reliable broadband is a key enabler, making accurate information more readily accessible and critical business decisions simpler and more objective. We are working to connect rural and regional Australians to the National Broadband Network (NBN) as it rolls out.

Telstra is a strong supporter of the NBN and the opportunity it offers to provide access to high speed broadband to all Australians. In terms of agriculture, the NBN aims to offer fast and reliable download speeds – helping provide local farmers with the opportunity to work more efficiently with suppliers and to build their business effectively without leaving home. It also allows them the opportunity to more easily access and share relevant farming information as well as industry specific tools such as farming apps and sensors. We understand that the NBN will help farmers realise the productivity and efficiency benefits that come from remote monitoring and management of farm operations, towards the “promised land” of precision agriculture.

We consider that the NBN's potential to deliver fast, reliable download speeds will enable local farmers to utilise digital technologies to revolutionise the farming industry.

⁴ <http://www.icpa.com.au/news/view/17/breaking-news-from-telstra-country-wide/federal-news>

⁵ <http://exchange.telstra.com.au/2015/03/30/addressing-the-digital-divide/>

Telstra's engagement in innovation

Telstra strives to build technology and content solutions that are simple and easy to use. We consider that, in the 21st century, opportunity belongs to connected businesses, governments, communities and individuals. Telstra is proud to be helping our customers improve the ways in which they live and work through connection.

Telstra has a commitment to innovation and support a strong innovation ecosystem. We see great opportunity for Australia's farmers and agricultural businesses to embrace technology and the ability it brings to innovate.

Telstra believes all levels of society have a role to play in supporting and promoting innovation. In particular, the government, those in education and the private sector play a particularly critical role in delivering an innovative country with a strong economy. Telstra recognises that collaboration is an important component of innovation. As a telecommunications and technology leader, Telstra believes that collaboration with our stakeholders including partners, customers and the community is critical.

Telstra has identified six priority action areas on which Australia should focus upon in order to design and deliver an improved innovation system. These are outlined in the submission we provided to the Economics Committee Inquiry into Australia's Innovation System in August 2014⁶. We believe Australia has opportunities to invest in smart jobs, foster talent and build a culture of creativity and innovation. In our submission we stated that "Traditional industries, including agriculture, mining and manufacturing will remain important to Australia and innovation in those industries and beyond will ensure Australia maintains its ability to effectively compete in an increasingly competitive world". We consider that it is a mistake to see innovation as only being relevant and necessary to new or purely digital industries – existing industries need also to innovate for Australia to grow and prosper.

Telstra's engagement in agriculture and our engagement with universities and researchers

Telstra supports Australian agriculture by providing connectivity to farmers, small and large, and to the range of associated businesses that support them. We work with universities and researchers to seek to advance the efficiency and effectiveness of Australia's rural industries.

Telstra has been involved in the sponsorship of research in the Agriculture industry through its partnerships with Australian universities since 2013. Recognising the importance of developing capabilities in both the technologies underpinning precision agriculture and the people involved in developing systems and methods for agriculture, Telstra works with universities on a formal and informal basis to fund students performing research and development and secondly work with universities and partner organisations to develop and commercialise research projects that will increase productivity and produce quality.

In our experience, one inhibitor to the development and adoption of technology in the agriculture industry is the lead times experienced between development of new products and technologies to

⁶ http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Innovation_System
(Telstra's Submission is number 171)

the deployment of commercial products. Having recognised this, Telstra is moving its agriculture based research and development capabilities towards a rapid deployment and commercialisation model – where products, capabilities and services can move from concept to commercial product in a period of weeks.

Some of the big trends in technology with implications for agriculture

One of the most significant new trends we are seeing is the 'Internet of Things' (IoT). Billions of connected devices are starting to be connected across all sorts of industries. In agriculture the possibilities of the IoT is endless and is already taking place. The use of sensors allows farmers to be more productive by reducing the time they need to spend on low value activities.

Farmers have been collecting information manually for generations by collating raw data and making observations over periods of time. Placing sensors at critical observation points can provide accurate information in real time. This real time view, coupled with historical data and analytics, can help develop powerful decision making capabilities that have not been possible before now.

A simple example is water – where farmers might jump in their trucks to manually inspect dams, water bores, tanks and troughs. This vital task, could take up to a couple of hours, a day, a week or even a month – and will need to be done on a regular basis. The IoT and sensor technologies coupled with management applications means that this task can be automated. Sensors on bores, tanks and troughs allow data to be sent to applications where you can see what is happening in real time and even set alerts to go to one's mobile phone. Farmers can then gain a couple of hours, a day, a week or even a month, as well as the saving on diesel and vehicle wear and tear.

Another example is fertilizer. Most farms apply fertilizer on a universal basis but this might not be required for an entire crop. Instead, soil sensors could be sending real time soil information that can be combined with weather data and genetic data to provide agronomists real time, granular details to more accurately make decisions on fertilizer requirements.

Telstra have supported a scholarship for a PhD student at CQU in the precision livestock management research group⁷. This group are looking at utilising emerging wireless sensor network technologies to gain information to use to better understand livestock production systems.

The trend of Big Data allows the analysis of vast amounts of data from different sources, detecting trends and providing insights, allowing for early intervention for adverse events and more precision based business decisions. We consider the real value is being able to synthesise these observations and data sets to consumable insights.

When applied to livestock, real time wellbeing information and location data means that farmers do not have to have eyes on their animals at all times. Infrared sensors can collect data and aggregate it, providing real time reporting and predicted trends such as weight information and pregnancy scanning.

While all of these things are interesting there is one key factor that will impact usefulness of all this data. That is, being able to consume it in a way that is simple to understand and track. We

⁷ <https://www.cqu.edu.au/cquninews/stories/research-category/2015/puberty-moos-and-phones-home-thanks-to-antennas-on-cattle-farms>

appreciate the need for intuitive applications and easy to use interfaces as key to ensuring these opportunities able to be utilised.

Case study: RAM Select

Telstra has developed an application for the Sheep Cooperative Research Centre to be used by Australian sheep farmers who are looking to buy rams at either auction or private treaty⁸. The application makes use of Sheep CRC developed Australian Sheep Breeding Values (ASBV's) to select rams that will support the development of a given flock of sheep in line with set objectives. ASBV's are scientific measures of certain physical and genetic traits that can be used to predict how a sheep's offspring will develop in certain areas such as wool, meat, fertility and health.

Telstra is hosting this application on our cloud platform and supporting it through our application of Big Data Practice for maintenance and enhancement.

Looking further into the future, Telstra is developing capabilities and products that will have the potential to have profound effects on the agricultural industry. Through our information technology capabilities, including the ability to bring together multiple IT and cloud sources, we can offer farmers and agricultural businesses the platform from which they can access the world of technological innovation. We consider the advances taking place in the ability to remote monitor equipment, crops or stock, mine data, automate processes and systems, all require a strong network foundation. Further, unmanned vehicles, both ground based and aerial, are being developed for agricultural uses and Telstra is currently awaiting a CASA commercial operators' certificate that will allow us to automate data collection in areas where previously manual labour was required.

Coupled with innovative network technologies currently being trialed, the next generation of on farm technology will see the growth of Precision Agriculture accessible to small enterprises. The use of remote sensor technology when integrated with data analytics opens the door to a new world of decision making capability based on real time data and Telstra is currently working with research organisations developing sensor based data gathering methodologies in the livestock and horticulture sectors. Collecting this real time data and then comparing it with empirical data before using analytics to detect patterns and deviations will deliver productivity gains previously unobtainable.

Conclusion, insights and recommendations:

Telstra believes achieving innovation in the agricultural industry will require the collaboration and expertise of all relevant stakeholders and access to telecommunications networks, including the NBN. IT literacy and education is important to leverage the benefits of connection afforded through telecommunications and farmers and those working in agricultural businesses will not be able to take advantage of the benefits of connection if they do not have access or the skills to access the connection they have. Telstra is committed to working with the Commonwealth in the rollout of the NBN and in working with the education sector and Governments on digital literacy initiatives.

We encourage the Committee to consider the role of research and development in both its pure and applied form. While we support the undertaking of pure research, our experience in the area of

⁸ <http://www.ramselect.com.au/>

agriculture and technology, is that we also see the need to apply the findings of such research into applications that are accessible and useful to farmers and agricultural businesses.

We encourage the Committee to consider the need to scale the research and development that is undertaken in agriculture so that smaller agricultural businesses are able to access it. As large farming companies and agricultural enterprises have economies of scale they have opportunities to take advantage of innovations and specialised applications. Yet we often find that smaller farming businesses who could gain great benefit are unable to afford the capital or initial costs. Associated with this is the disaggregation of industry that we believe is inhibiting broad access to technology innovation. We are open to working with Governments, researchers and the many farming communities to find ways to address these issues and especially to ensure that all farmers are able to access innovation.

Finally, Telstra considers one of the most important raw ingredients required to take advantage of the digital age is data. There are vast amounts of data held by government and representative bodies that we believe farmers should have greater access to. With the ability to access different data sources and analyse and interrogate it (including adding it into the data they derive from their operations) farmers will be able to gain insights that they can use to drive greater efficiency or even create new products and services.