OPTUS

Submission in response to Department of Industry, Innovation and Science Discussion Paper

The Digital Economy: Opening up the conversation

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INTRODUCTION

1. Optus is a key infrastructure partner in the Australian digital ecosystem and currently employs around 8,500 people in Australia directly, and thousands more through our network of local partners. Optus provides key communications infrastructure which promotes many aspects of the digital economy, including;

   (a) mobile connectivity to 98.5% of the population;

   (b) world leading 4G and beyond technology;

   (c) advanced cyber security services;

   (d) big data analytics; and

   (e) safe and smart cities.

2. Optus is committed to helping Australia realise greater benefits from the digital economy through unlocking the potential of digital technology and what it means for businesses, academia, scale-ups and individuals.

3. We play a key role in bringing digital innovation to the market through targeted investments in start-ups, encouraging skills and knowledge exchange between Australia and partner innovation hubs globally – with particular focus on the Asian region. Optus also plays a critical role as a major supplier of technology to Australian governments, institutions and companies. Optus' advanced technology products and services are helping large and small entities to digitise, innovate and grow.

4. Optus offers a range of solutions that cater to the varied needs of individuals through to very large corporations, federal /state and local governments, as well as medium and small enterprises. Whilst best known for our mobile network, through organic growth and selected acquisitions, Optus' Business Division now offers solutions in security, identity management and biometric authentication, software-defined data networking, automation and robotic process automation.

INNOVATION IS KEY TO THE DIGITAL ECONOMY

5. Innovation is the key to survive and thrive during the disruption caused by the digitalisation of the economy. Optus has been a significant innovator in the broadcast and communications industry. As a wholly-owned subsidiary of one of the largest global communications groups, Singapore Telecommunications Limited (Singtel), Optus is targeting significant investment for innovation to benefit our customers.

6. More broadly, innovation is at the heart of Optus' corporate strategy. Through our global reach and connectivity, Optus brings learnings to the Australian economy and showcases Australian innovation to the rest of the world. Innovation is core to our business. We are investing billions of dollars in our networks to give our customers an even better service experience; transforming the traditional telecommunications provider landscape through innovative content, sponsorship and entertainment partnership; and revolutionising our operating systems and digital experience for our customers.

7. We also have several internal innovation programs to identify, develop and implement innovative solutions into our business;

(a) Our in-house start up team, the *Yes Lab*, applies lean methodologies to partner, build, measure, learn and launch new products or solutions for customers and communities in which they live. The *Yes Lab* is working on a number of exciting projects, aiming to solve some of Australia's most pressing social and geographic challenges.

(b) Optus Innov8 is the Australia division of Singtel's $250 million venture capital fund. Optus Innov8 has been established to invest and support start-ups in taking their business to the next level, and to provide a platform for potential expansion into Asia. Optus Innov8 supports start-ups with innovative or disruptive solutions, from early to advanced development stage, the areas of mobility, cyber security, IoT, digital home, convergence, health, education, and media industry verticals. Importantly, Optus Innov8 has broader scope than traditional venture capital funds, providing mentoring and networking support for start-ups as well as funding or partnership options with the Singtel group network to enable their business growth.

Using technology to innovate and disrupt

8. Advances in technology have had a profound impact on firms, institutions, industries and entire economies. Mass-connectivity has made it easier than ever before for buyers to connect with sellers, and for citizens to connect with information. This has created significant opportunities for new market entrants with radical business models. Examples of such extreme disruption are too numerous to mention, though the crowd sourced transport service Uber shows that even the most heavily regulated industries are not immune.

9. Technology is either driving – or accelerating – major economic, social and demographic change. It is contributing to:

(a) Transformation of economies: Technology is a major catalyst for, and enabler of, innovation. Technology has accelerated the renewal – and demise – of entire industry sectors, but it has also spawned new sources of economic value and employment. These industry transformations are fundamentally changing workforce composition and creating demand for new skills and capabilities.

(b) Globalisation and global mobility: Technology is reducing barriers to entry for market entrants across a range of industries. This is creating opportunities, on one hand, as well as obvious threats.

(c) Rapid urbanisation: While technology is not responsible for urbanisation, it has acted as an accelerant. The top 600 cities in the world are forecast to contain 25% of the global population and generate 60% of GDP by 2025.[1] The scale of this population movement has created significant imposts on infrastructure, and fuelled interest in the need for cities to be 'smarter' in the way they manage natural resources, congestion and infrastructure. This has created additional pressure on economies to innovate and solve community problems.

(d) High expectations among the 'millennial' cohort: This cohort is characterised by early adoption of technology and consequently have high expectations that the institutions they interact with will harness the potential of technology to personalise and enrich services provided to them.

[1] McKinsey Global Institute, *Urban World; Cities and the rise of the consuming class*, June 2012.

Areas where technology will change the economy

10. Optus sees that the technology disruption listed above is bringing five broad areas of change to the economy:

    (a) Mass connectivity and consumerisation of IT: According to the GSMA Mobile Economy by the end of 2016 there were 4.8 billion unique mobile subscribers and 7.9 billion SIM connections worldwide. More than half of connections (55 per cent) were running on mobile broadband (3G/4G) networks, which are forecast to account for almost three-quarters of connections by 2020. The number of individuals accessing the internet over mobile devices has doubled over the past five years to 3.6 billion, and will rise to 4.7 billion, equivalent to 60 per cent of the global population, by 2020. This level of global connectivity has never been seen before in human history; and gives rise to a variety of opportunities and risks to the Australian economy.

    (b) Internet of Things: The Internet of Things (IoT) captures the mass connectivity of objects to the internet. IoT is about connecting people to machines and machines to machines. It is estimated that only 2 per cent of all machines or objects that will be connected to the internet are currently connected. Connected objects will be as diverse as vehicles, streetlights, irrigation sensors and wearable technology detecting a variety of health data and alerts. The potential value and impact of IoT is immense:

        (i) IoT product and service suppliers will generate incremental revenue exceeding $300 billion by 2020.[2] IDC forecasts that the worldwide market for IoT solutions will grow to $7.1 trillion in 2020.[3]

        (ii) Consumer 'machine to machine' connections will top 7 billion in 2023, generating $700 billion in annual revenue;[4]

        (iii) The number of cars connected to the internet worldwide will grow 600% to 152 million in 2020 from 23 million in 2013.[5]

    (c) Big data, analytics and visualisation: It is no longer possible to consider IoT, much less the internet of everything, without contemplating big data and visualisation. The sheer volume of data that will be predicted in an IoT world, estimated by Gartner to include 26 billion units by 2020, is immense. Instead of capturing real time information, big data allows the capture of information that is predictive of the future. More sophisticated data analytics can allow a range of institutions (e.g. government or education) to observe patterns and predict a range of behaviours. This could have significant implications for the efficiency of service delivery.

    (d) Cloud: Often dismissed as a technology disrupter because it forms part of the 'plumbing' of connectivity, the impact of cloud on businesses and operating models, and associated cost structures, is starting to be felt across the economy. Cloud-based solutions initially came to attention for its potential to reduce costs, but institutions are increasingly attracted to the flexibility and agility that it provides and the capacity to take complexity out of ICT environments.

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[2] Gartner, *Gartner says the internet of things will transform the data centre (2014)*, www.gartner.com/newsroom/id/2684616

[3] IDC, *Market in a minute: Internet of things (2014)*

[4] Machina research estimate

[5] Naughton K, *The race to the connected car*

(e) Cyber Security: Given the increasing connectivity of businesses, organisations must now be capable of operating in a digital world where security if a constant threat.

11. Optus and Singtel offer an extensive array of services that assist firms in the above changes. It is vital that firms and other institutions utilise the available expertise in the ICT sector to address the changes that are occurring now, and are about to occur, in order to harness the benefits, and protects against the costs, associated with these changes.

12. Optus has a long history of delivering organisational automation solutions in customer service, citizen service, document management, identity management, remote biometric authentication, analytics, bots and natural language understanding. As these capabilities have evolved, Optus is adding machine learning, artificial intelligence and robotic process automation to its internal capabilities. Once sufficiently proven in our internal operations, we are making these solutions available to our enterprise and government customers, as well as to the consumer subscribers to our mobile network.

PARTNERING ACROSS THE ECONOMY

13. The discussion paper correctly highlights that the current wave of digital disruption (the 'fourth industrial revolution') differs from those faced in the past. It is impossible to predict the future with certainty. It is the *pace* of change in addition to the *magnitude* of the change that makes digital disruption different to previous industrial revolutions.

14. Optus believes that it is vital that key players in the digital economy collaborate efficiently to ensure that best practice learnings can be shared and the many innovative ideas coming from start-ups and universities can be brought to market at the pace expected of a modern digital economy.

Collaboration fosters high-growth firms

15. Optus has spent significant effort to understand how clusters of innovation activity can help Optus improve its own performance and that of high-growth firms. This is of particular interest given the convergence of related interests and entities, collaborating for a common purpose, will arguably ensure greater individual and collective competition and success.

16. As a foundation partner of the Macquarie Park Innovation District, Optus recently co-authored a report with Business Models Inc titled "Innovation Districts: a model for a thriving Australian Economy" (Optus Innovation Districts Report)[6]. The paper outlines in detail the role that innovation districts and clusters can play and specifically notes that:

(a) local Innovation District coalitions should articulate their vision and local strengths to begin forming local district governance groups and regional innovation hubs;

(b) land owned by governments or privately held by organisations or institutions with vested interests may also choose to provide land for the use of district development at favourable or no cost to encourage growth – particularly in regional areas.

17. Another related question is: what needs to be in place to ensure that these clusters deliver maximum value? The Optus Innovation Districts Report notes the importance of physical space and the proximity of innovative activity to infrastructure like mass transit

[6] http://go2.optus.com.au/E0m0G00cPc00200V3r00A08 . Refer to Annexure 1 for full the report.

hubs. It references the Brookings Institute's seminal framework for successful innovation districts which identifies core ingredients:

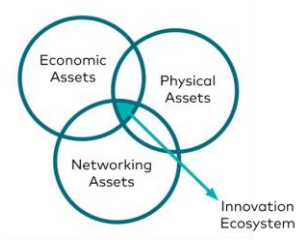

Diagram 2: Brookings Institute Innovation Ecosystem

18. Networking assets are particularly important and often under-valued. Networks are inherently `human' but technology increasingly plays a major role in helping to form and sustain networks.

19. Specifically, collaboration platforms have matured to the point where physical proximity – while still important – need not undermine interactions with other people. When governments and institutions think about creating innovation precincts the focus tends to be on delivering high speed connectivity (which is critical). But a smart and digitally-enabled precinct also requires collaboration tools (accessible via mobile) and underpinning infrastructure such as cyber security and analytics.

Encouraging industry to embrace digital innovation

20. Optus broadly agrees with the characterisation of the challenge, particularly the need to create a more robust innovation ecosystem in Australia. Companies like Optus have three critical roles to play:

    (a) As a major employer in its own right;

    (b) As a contributor to the wider information and communication technology sector; and

    (c) As a multinational company with the capacity to link Australian firms and institutions to its Asian ecosystem.

21. The latter is particularly important in the context of innovation. If Australia is to be more globally-oriented and integrated it needs to embed itself into global supply chains, and participate in knowledge exchange across the region.

22. Optus does this through a number of mechanisms:

    (a) <u>Investment in start-ups, scale-ups and future growth opportunities:</u> Investing directly through its venture capital fund Innov8. Investments include Jasper, Viki, Maker, MobileIron and Ruckus Wireless. Innov8 looks to invest in disruptive technologies and companies that have relevance to our core business and industry. We do this to ensure Optus adapts to change, takes advantage of cutting edge technologies and provides world class services and solutions to our customers. In particular, Optus has invested heavily in the area of cyber security – which is of fundamental and increasing importance to Australia's digital economy and future growth;

    (b) <u>Encouraging skills and knowledge exchange between Australia and the broader region:</u> A good example of this is Optus' decision to host a *Career and Technical Education Summit* in Singapore which allowed TAFE executives from across Australia, New Zealand, Singapore and Korea to discuss the implications of digital on the training sector and broader labour market;

(c) Brokering partnerships within our supply chain: The delivery of technology solutions increasingly crosses borders and Optus has provided opportunities for Australian companies including start-ups and scale-ups to create relationships and build revenues in the Asian region by leveraging our networks. Optus also has strategic talent exchange programs within the Singtel Group to expand upon our internal Group skills and learnings; and

(d) Technology transfer and smart solutions: One example is where Optus is able to leverage work being done by Singtel with the Singaporean Government in relation to their *Smart Nation* deployment to accelerate the development and rollout of Smart Cities/Regions in Australia.

Collaboration with Government

23. Optus agrees that the Australian Government has a critical role to play in bringing Australia closer to the innovation frontier. By way of international examples, the innovation ecosystem in Scandinavia shows what can be achieved when government plays its part in `triple helix' collaborations, particularly in relation to science. In many cases government plays the role of facilitator, funder and anchor tenant rather than one of those roles alone.

24. While simplifying procurement is important, it is not sufficient. Government needs to play an important role in directing more of its expenditure towards fostering innovative solutions. Too often, governments shop on value but purchase on price. There is no question that taxpayer value for money is an important consideration – but too often value is calculated on the unit price and does not account for the broader value that will come from new knowledge, technology and business models that can form part of a newer, more innovative or an alternative to the historic product or service delivered

25. An important role for government in promoting innovation is identifying compelling problems to solve and facilitating organisations and individuals to come together to solve them. These problems ideally need to have economic and social dimensions and draw a range of partners together to solve them

26. The focus on Smart Cities and Smart Regions is a good example of how to mobilise entire communities and supply chains to respond to problems. A Smart City or Smart Region for these purposes can be defined as a city/region that is able to collect and analyse data to make better decisions that improve the quality of people's lives. They are fundamentally 'citizen'-centric. The relationship between technology and data is symbiotic; critically, technology can enable the capture, analysis and visualisation of data, and better data can create productivity savings that allow cities/regions to invest in digitisation to drive improved citizen outcomes.

27. Optus has seen the value of `smart' initiatives on a grand scale to mobilise members of an innovation ecosystem. Our Group experience in Singapore – where the Government has led a multi-billion investment program in *Smart Nation* – has demonstrated the enormous benefits arising from investment in smart infrastructure at scale. This includes technology's power to fundamentally transform:

(a) Energy usage and management;

(b) Transportation including mass transit;

(c) Citizen services including car parking;

(d) Business services; and

(e) Safety and security.

28. However, the potential of digital is far broader, particularly for regions. The mass urbanisation that is occurring globally, and in Australia, has implications for the economic viability of Australia's regions. One of the major advantages of major investments in smart cities and regions is the opportunities that it creates for smart companies, innovative entrepreneurs and globally networked multinationals to stimulate employment growth. The Australian Government's recent policy to provide funding to a limited number of Smart Cities consortia is a good start and should be expanded and rolled out at greater scale to better harness the opportunities that can flow from this type of policy.

29. The Commonwealth Games in South East Queensland (where Optus is responsible for providing the event's communications infrastructure and managed services) is another example of delivering bold digitisation measures. As part of this partnership, Optus will deliver high speed telecommunications infrastructure to more than 30 Commonwealth Games venues around Queensland regions, as well as the design and implementation of the Games Network enabling connectivity for broadcasting, telephony, internet and cloud services across all Games venues.[7]

30. The Commonwealth Games project has provided an opportunity to do something bold in relation to digitisation, but we need to contemplate how digital can renew regions without needing the catalyst of a major event. This includes developing compelling regional narratives that will help to mobilise communities and industry and capture economic advantage. Local government has a particularly important role to play but impact at scale will require cooperation between all three tiers of government.

Maximising the engagement of our world class research system with end-users

31. Optus agrees that a well-supported and impactful world-class research base is necessary to Australia's future. It also agrees that research done in Australia addresses the needs of the nation, as well as global challenges, and that sufficient effort needs to be spent on translational research that has economic and societal impact. Optus strongly agrees that the Australian research community needs to exhibit high levels of collaboration – including with industry.

32. Optus is committed to deep and productive relationships with universities and other educational and research institutions in Australia. Optus has joined the Business and Higher Education Roundtable, which was formed with the explicit goal of improving the number and sophistication of collaborations between industry and universities. The roundtable was created by the Business Council of Australia and is a critical component of Australia's innovation ecosystem. The roundtable is focused on increasing the quantity and quality of collaboration recognising that Australia's capacity to innovate will depend largely on its ability to combine its academic and industry resources.

33. Optus is involved in the early stages of two major partnerships with universities. The below case studies are intended to demonstrate the types of issues that industry/universities can collaborate on and also the wide-ranging nature of the partnerships. In both cases, the partnerships have been entered into to increase Australia's innovation output, realise benefits from innovation and create opportunities for students to participate fully in the innovation economy.

Optus' partnership with Macquarie University

34. In May 2016, Optus Business and Macquarie University established a multi-disciplinary Cyber Security Hub to support businesses and government in recognising and protecting

[7] Optus will provide high speed resilient video and audio services at 23 broadcast locations to enable content captured on site to be distributed globally via more than 3,500 accredited representatives, reaching an estimated audience of more than 1.5 billion people over the course of the Games. We will provide a managed IP telephony solution for more than 2,200 on-site employees, a contact centre solution and 4G mobile services to allow GOLDOC to communicate and collaborate both in the planning period and during the event which will take place across the Gold Coast, Cairns, Townsville, and Brisbane.

themselves from increasing cyber threats. The new 'Optus Macquarie University Cyber Security Hub' will provide research, short professional courses and consultancy services to the private sector and government agencies. It supports the Australian Government's recent cyber security strategy – which outlines plans to make Australia a cyber-smart nation.

35. It represents a $10 million investment by Optus Business and Macquarie University that will draw on the expertise of Optus and leading Macquarie University academics from various disciplines and industry experts to cover three academic areas: Computing & IT, Business & Economics and Security Studies & Criminology. It will focus on providing a holistic approach to cybercrime, how it is perpetrated, how it affects the economy and how it impacts policy. The partnership includes degree programs, executive and business short courses, professional recruiting opportunities and thought leadership through cyber awareness events and international engagements in areas such as intelligence, technology, criminology, finance and governance.

36. Optus' workforce will also be a key focus, with the partnership increasing awareness, as well as equipping and upskilling staff with the latest cyber security skills and expertise. Optus will offer the same opportunity to its enterprise and government customers.

Optus' partnership with La Trobe University

37. In October 2016, La Trobe University and Optus Business announced a strategic alliance designed to deliver an integrated, digitally connected campus; a state-of-the-art 'Sports Precinct of the Future'; and the creation of a market leading Cyber Security tertiary degree.

38. The alliance will build on the strengths of both organisations to address significant global challenges such as smart cities, cyber security and the application of big data analytics. Initially, the alliance will focus on:

    (a) Digital University of the Future – combining a Smart Cities and 'living lab' approach to La Trobe's ambitious plan to develop a global exemplar of a digitally connected city of the future, commencing with a focus on campus security, people movement, way-finding and parking.

    (b) Sports Park– embedding data collection and analytics technology in La Trobe's $150 million Sport Park development, designed to focus on data collection and analytics for research in sport performance, rehabilitation and community/fan engagement which will leverage sports partnerships of both organisations.

    (c) Cyber Security– co-development with other industry partners of unique multi-disciplinary courses, providing academic and research leadership, and creating scholarships, work integrated learning and employment pathways for La Trobe graduates.

39. A Chair of Cyber Security will also be based at La Trobe University to provide world class leadership for research and teaching, and advice and solutions to real-world cyber security issues for educational institutions, government departments and agencies, and enterprise organisations.

Incentives to encourage research translation

40. Incentives are important to increasing investment in research translation by industry and the Government needs to continuously review and refine its approach. Government needs to recognise that collaboration between industry and universities tends to be done over shorter time horizons than previously, recognising that speed to market is a major imperative. Innovation within Optus is increasingly done using hacks, sprints, visioning

sessions and rapid prototyping. There is a role for government to publish its own policy and operational challenges and expose them to the `market'. Optus would welcome the opportunity to explore new ways of problem solving with government and involve our university partners. Optus also has a facility at its Macquarie Park campus called *ThinkSpace* that is regularly used by customers and stakeholders to develop new solutions and translate more fundamental concepts and research. Optus would be happy to offer use of this facility to collaborate with government and others on its challenges.

41. Government data and information is an asset that can contribute significantly to research and be leveraged by the private sector. Government should consider significant focus on opening up its data where possible in a format that is easy to find and use. Government could also sponsor opportunities to gain greater insights from its data in collaboration with large corporates, universities and start-ups alike.

42. Selection of appropriate and purposeful research focus areas is also critical. Optus believes that more research into enabling technologies is critical. Cyber security is an excellent example of a domain where Australia should strive to for global best practice and thought leadership. Optus' partnerships with universities are increasingly geared towards cyber security recognising that it is both a brake on Australia's economic performance and a major opportunity for new job creation. Increasing investment targeted focus areas such as cyber security would help scale major initiatives that are currently being planned / in design phase between universities, companies such as Optus and start-ups/scale-ups.

DIGITAL EDUCATION AND SKILLS ARE VITAL

43. Optus agrees that education and skills development are critical building blocks for an innovation economy. Skills have increasingly become the currency of the global economy. Governments and companies need to be proactive in evaluating where future sources of economic advantage and differentiation will come from. Economic growth is driven by the capacity of economies to continually renew by drawing together the right skills, talent and (increasingly) technology at the right time.

44. In order to ensure Australia's workforce, both current and future, are sufficiently enabled to take advantage of the digital economy and to embrace the innovative disruption that comes from digitalisation, Optus believes there are three major priorities for Australia to respond to the skills challenge:

Pivot our education and training systems towards areas of jobs growth

45. If Australia is to remain globally competitive it needs to pivot away from the 5.1 million jobs that have been posited as being at risk of digital disruption[8] and towards jobs that are in high demand industries and regions. Two specific examples include:

    (a) Cyber security: the current global skills shortage for cyber security professionals is at least one million jobs, and growing. The lack of cyber security professionals is potentially felt more acutely in Australia than in other countries, according to a report by US think tank, the Center for Strategic and International Studies. It found that 88 per cent of Australian IT decision makers believe there is a shortage of cyber security skills both in their organisation and within the nation - on par with IT chief's in Mexico but higher than other countries surveyed[9].

8 PwC, *A smart move* (2015), p. 1.

9 https://www.cio.com.au/article/606319/australia-hardest-hit-globally-by-cyber-security-skills-shortage-report/

(b) Data science: according to a 2015 *MIT Sloan Management Review*, 40 percent of the companies surveyed were struggling to *find and retain the data analytics talent*[10]. And the picture is starting to look even bleaker. International Data Corporation (IDC) predicts a need by 2018 for 181,000 people with deep analytical skills, and a requirement five times that number for jobs with the need for data management and interpretation skills[11].

Provide young people with the skills needed to navigate the freelance economy

46. The mass automation of jobs is only part of the challenge that needs to be faced. There is a significant movement towards freelancing or the `gig economy'. Job tenure is changing and young people will increasingly be expected to navigate the job market as `entrepreneurs' – identifying sources of work, selling their skills and keeping their capability relevant and up to date. Young people will need to apply digital tools in a work-relevant context not just a social one. These skills allow people to be productive as soon as they enter the workforce.

Focus on horizontal and soft skills, not just technical ones

47. The changing nature of work (i.e. away from process-oriented white collar work) is increasing the importance of horizontal skills or generalist knowledge and capability that allows people to perform in a variety of contexts. The focus on horizontal and 'soft' skills such as problem solving, negotiation and creative thinking shouldn't be seen as reducing the need for technical mastery. In fact, the notion of the "T-shaped professional" has been replaced by the "Pi-shaped professional": someone with two areas of domain expertise in addition to their generalist `horizontal' skillsets.

[10] http://www.cio.com/article/3025869/analytics/6-analytics-trends-that-will-shape-business-in-2016.html
[11] https://www.business.com/articles/big-data-big-problem-coping-with-shortage-of-talent-in-data-analysis/