

Western Australia 2015-16

STARTUP ECOSYSTEM REPORT

Report on the People, Groups and Companies involved in Western Australia's digital & internet technology industry.

JULY 2016

Produced by Boundlss for:

STARTUPWA

STARTUPS

TECHNOLOGY STARTUPS (422)

*A list of active and inactive internet and digital technology companies founded in Western Australia between January 2010 and November 2015. Throughout the report we refer to these companies as **Startups for short**.*

1-PAGE (HR-Tech)
2015 Jobs (HR-Tech)
3D Graphtech Industries (3D Printing)
3D Image Automation (Resource-Tech)
3D Printing Perth (3D Printing)
4DS Inc (Semiconductors)
6Q (HR-Tech)
7-min.com (Health-Tech)
90 seconds.tv (Media & News)
AccessVIP (eCommerce/Marketplace)
Accweb (Fin-Tech)
Activistic (Fin-Tech)
Advanced Oilfield Applications (Resource-Tech)
Adventure Snacks (eCommerce/Marketplace)
Aegle Life (Health-Tech)
Aerial Aspects (Resource-Tech)
AgroPy (Ag-Tech)
Airing IPTV (Internet Software/Services)
Airport Downtime App (Travel & Tourism)
Airscope (Robotics-Drones-AV)
ALLK (Game Studio)
Altitude Imaging (GIS)
Amaroo (Unknown)
APE Mobile (Construction-Tech)
Apeshift (HR-Tech)
Aponomy (Transportation-Tech)
Appbot (Internet Software/Services)
Appcircl (eCommerce/Marketplace)
Appdroid Technologies (Unknown)
Artemis Technologies (Resource-Tech)
Arvista (Resource-Tech)
Asset Farm (Resource-Tech)
Astirian-Rae Games (Game Studio)
Aura (Mobile Software/Services)
Aurora Labs (3D Printing)
Australian GeoTomography (Resource-Tech)
Autronics (Robotics-Drones-AV)
Axieos Technologies (Internet Software/Services)
Barrta (Fin-Tech)
Batex (Health-Tech)
BBCOnline (Game Studio)
Bear-Tooth Studios (Game Studio)
Beeloyal (eCommerce/Marketplace)
Bet your mate (Game Studio)
Big Help Mob (Internet Software/Services)
Bigforest (Internet Software/Services)
Bikebookings (Transportation-Tech)
Binary Space Games (Game Studio)
Bingybongy (Game Studio)
Binkd (Game Studio)
Bird Software t/a Team Ahoy (HR-Tech)

Birds Eye Media (Internet Software/Services)
Blank-IT (Transportation-Tech)
Blix Co. (Internet Software/Services)
Blu (Suspended) (Electronics & Hardware)
Booze Droid (Mobile Software/Services)
Boundlss (Health-Tech)
Brainchip (Big Data)
brightpath | Pairwise (Ed-Tech)
BuildingApprovals.com (Construction-tech)
BusinessZoom (Internet Software/Services)
Buzd (Big Data)
Buzzy (On-Demand)
Bytesize (Mobile Software/Services)
ByteSprite (Game Studio)
Calico Global (Health-Tech)
Canteen4Schools (Internet Software/Services)
Cardnap (eCommerce/Marketplace)
CGR (Internet Software/Services)
ChatStar Mobile Application (Social)
Cheersy (eCommerce/Marketplace)
Cine Surfer (Media & News)
Circadyn (Health-Tech)
Cirrena IVS (Internet Software/Services)
ClassCanary (Ed-Tech)
Clinical Excellence Technologies (Health-Tech)
Clivir (Ed-Tech)
Clock-E (Electronics & Hardware)
ClockItEQ (Mobile Software/Services)
ClothesLine (eCommerce/Marketplace)
Cloudmine (Resource-Tech)
CoachSource (Health-Tech)
Cointainer (Fin-Tech)
colourcolorgame (Game Studio)
Community2Go (Internet Software/Services)
Coptercam (Robotics-Drones-AV)
Cosmic Games (Game Studio)
Cost Compare (eCommerce/Marketplace)
Covocate (HR-Tech)
Crisp Brake MTB (Transportation-Tech)
Crowded.In (Fin-Tech)
Crowdfunding Blueprint (Ed-Tech)
Crowdfundup (Fin-Tech)
Crunchy Frog (Game Studio)
Cruxcee (eCommerce/Marketplace)
Cycliq (Electronics & Hardware)
Dataresource (Resource-Tech)
Databee Business System (Ed-Tech)
Datagami (Big Data)
Deal Slammer (eCommerce/Marketplace)
Deceasedestatesharesales.com.au (Fin-Tech)
Delivery Engine (eCommerce/Marketplace)
Devisd (eCommerce/Marketplace)
Digital World Ventures Exchange (Fin-Tech)
Diji (Internet Software/Services)
Dinner Twist (eCommerce/Marketplace)
DishyLooks (eCommerce/Marketplace)
Docmosis (Internet Software/Services)
Drenalina (Internet Software/Services)

Dressed (Mobile Software/Services)
duinoPRO (Electronics & Hardware)
DuJour Technologies (Media & News)
Dukbill (Fin-Tech)
Dusty Dynamics TM (Electronics & Hardware)
Easy Trace (Fin-Tech)
Eat Cheap (eCommerce/Marketplace)
Ecocentric Energy (Internet-of-Things)
Educaze (Ed-Tech)
Eebudee (Social Media)
Eggmaps (Mobile Software/Services)
Eight Spots (eCommerce/Marketplace)
eKarma (eCommerce/Marketplace)
Electronic Pain Assessment Technologies (ePAT) (Health-Tech)
Engagement Coach (Social)
Engineering Institute of Technology (Ed-Tech)
Epic Delivery (On-Demand)
Episafe (HR-Tech)
Espressoland (eCommerce/Marketplace)
Eternal Eve (Health-Tech)
eTool (Construction-Tech)
Everythere (Mobile Software/Services)
Expenseworks (Fin-Tech)
Exploco (Travel & Tourism)
Fact4Foto (Mobile Software/Services)
Fans2Cash (Internet Software/Services)
Farugi (Music-Tech)
Fast Brick Robotics (Robotics-Drones-AV)
FastIQ (Fin-Tech)
Fastvue (Internet Software/Services)
FIFO House Mate (eCommerce/Marketplace)
Fifo RNR (Resource-Tech)
Fiink.com (Internet Software/Services)
Filter Squad (Music-Tech)
Fit Jak (Health-Tech)
Flashtax (Fin-Tech)
Fleetsu (Transportation-Tech)
Floq (Internet Software/Services)
Fly Like a Bird (Robotics-Drones-AV)
Focalyz (Mobile Software/Services)
foodloggr (Health-Tech)
Fr33Bay for Aussies (eCommerce/Marketplace)
Freewheeler (Health-Tech)
Friendly Phonics (Ed-Tech)
Fundifest (Music-tech)
Gadget Games (Game Studio)
Generic Vending (Fin-Tech)
Geo Oceans (Robotics-Drones-AV)
Geolify (Internet Software/Services)
GeoMoby (Mobile Software/Services)
Get Trakka (Resource-Tech)
Get your Coffee (On-Demand)
Gigger (Music-tech)
Gilmo Password Manager (Electronics)
Glass Terra (Resource-Tech)
Glasses Online (eCommerce/Marketplace)
Global Empowerment Portal (HR-Tech)

Global Unmanned Systems (Resource-Tech)	Kinchip Systems (Health-Tech)	Platform News (Mobile Software/Services)
Glyma.co (Internet Software/Services)	Klaimed (Mobile Software/Services)	PlayAR (Virtual & Augmented Reality)
Golf Great Real Estate (Property-Tech)	Koalabox (Transportation-Tech)	Pointerra (Big Data)
GordianTec (Health-Tech)	KodaChat (Social Media)	Positiv Flo (Health-Tech)
Gotapp (eCommerce/Marketplace)	Koffee Order (Internet Software/Services)	Power Pedals (Electronics & Hardware)
Green Unity (Construction-Tech)	Kojai (Social)	PozWorx (Fin-Tech)
Grit Centre (Unknown)	Launch Mii (Fin-Tech)	Practice Insight (Big Data)
GroPrint (Mobile Software/Services)	Letzbookit (Internet Software/Services)	PressSnap (Internet Software/Services)
GroupMap (Mobile Software/Services)	Livehire (HR-Tech)	Prezentt (Ed-Tech)
GTH (eCommerce/Marketplace)	LodgeiT (Fin-Tech)	Privvi (Internet Software/Services)
Guestplus App (Mobile Software/Services)	Luckey (Social)	Processworx (HR-Tech)
Guusebump (Mobile Software/Services)	MA Ideas (Unknown)	Professional Development Online (Ed-Tech)
Halo Medical Devices (Health-Tech)	Matrix Formula Group (Social)	Progolfme (Health-Tech)
Handi Shark (eCommerce/Marketplace)	Meteorite Games (Game Studio)	Project 52 CRM (Internet Software/Services)
Happy App (Mobile Software/Services)	Meterly (Fin-Tech)	PropertyMyWay (Property-Tech)
Hard Hat Bookkeeper (Fin-Tech)	MiBand (Music-tech)	Prosthetic Knee Joint (Health-Tech)
Harvey Energy Group (Resource-Tech)	MiKastle (Fin-Tech)	Psyx (Unknown)
Hazer Group (Resource-Tech)	Mineler (Resource-Tech)	Publicate (Internet Software/Services)
Healthiris (Health-Tech)	MinerSpares (Resource-Tech)	PuggleFM (Internet Software/Services)
Hedventures (Ed-Tech)	Minnovare (Resource-Tech)	pumpkynHead (Internet Software/Services)
HEDventures (Ed-Tech)	MiPlan (Resource-Tech)	Qualitem (Internet Software/Services)
Hello Directories (eCommerce/Marketplace)	Mobi Safe (Mobile Software/Services)	Quantify Technology (Internet-of-Things)
Hey Mate (Mobile Software/Services)	Mobilyser JKP Tech (Fin-Tech)	QuoteSeek (On-Demand)
Hipflask (Music-tech)	MobiRoam (Mobile Software/Services)	rdrcr.it (Internet Software/Services)
Hiresquare (Property-Tech)	Momble (Social)	Reach Out (Health-Tech)
HiSeis (Resource-Tech)	Mulpin Research Laboratories (Electronics & Hardware)	Realtailers (eCommerce/Marketplace)
Hitch a Ride (Transportation-Tech)	My Fitness File (Health-Tech)	ReferMatch (Unknown)
HiVE interactive (Game Studio)	My Footy Hub (Health-Tech)	Remote POS (Fin-Tech)
Hivint (Internet Software/Services)	My Local Savings (Internet Software/Services)	Rentify (Property-Tech)
Hiya (HR-Tech)	My Makeup Collection (Social)	Resapp Health (Health-Tech)
Homecamp (Travel & Tourism)	Myfiziq (Health-Tech)	Resource Governance International (Resrc-Tech)
Hydralert (Resource-Tech)	MyGuru (Ed-Tech)	Rewardle (eCommerce/Marketplace)
iCollege (Ed-Tech)	mypreorder (Internet Software/Services)	Robot Gear (Robotics-Drones-AV)
Icomics (Media & News)	Nano Solutions (Resource-Tech)	Rubbers (eCommerce/Marketplace)
id4Football (eCommerce/Marketplace)	Newton Labs (Resource-Tech)	SafeWorks Matrixx (HR-Tech)
iiSnap Corp (eCommerce/Marketplace)	Norwood Systems (Big Data)	Saybubble (Social)
Image Correction (Internet Software/Services)	Notis (Ed-Tech)	ScanCam Industries (Fin-Tech)
iMaker 3D (3D Printing)	Nuheara (Health-Tech)	Schrole (Ed-Tech)
IMR Technologies (Transportation-Tech)	Offpeak Games (Game Studio)	Sciosity (Ed-Tech)
Induxion Intelligence (Big Data)	oneVR (Virtual & Augmented Reality)	Seafasten (Resource-Tech)
Insite Systems (Internet Software/Services)	OpenLab (Electronics & Hardware)	Seek Local (eCommerce/Marketplace)
Inspection Toolbox (Internet Software/Services)	OpRock (eCommerce/Marketplace)	Sensorem (Resource-Tech)
Instatruck (On-Demand)	Orowa (Internet Software/Services)	Sharperlight (Internet Software/Services)
InventX (Health-Tech)	OVASS (Ag-Tech)	Shift Geophysics (Robotics-Drones-AV)
INXSoftware (HR-Tech)	OZeating (eCommerce/Marketplace)	Shifthub (HR-Tech)
iPrint3D (3D Printing)	Paleo Paddock (eCommerce/Marketplace)	Shneebz (eCommerce/Marketplace)
iSOL8 (Resource-Tech)	Paradigm (Game Studio)	ShockWiz (Electronics & Hardware)
iSpyConnect (Internet Software/Services)	ParkUp App (eCommerce/Marketplace)	Simply Wall Street (Fin-Tech)
Jaksta Technologies (Music-tech)	Passcard (Mobile Software/Services)	SK Games (Games Studio)
Jam Jar (Media & News)	Payconomy (Fin-Tech)	Sketchmen (Fin-Tech)
Jaytraxx (Music-tech)	Paytradie (Fin-Tech)	Skill Social (Ed-Tech)
Jobbed (HR-Tech)	Peepable (Internet Software/Services)	Skrydata (Big Data)
Jobs and Services (eCommerce/Marketplace)	PieHire (HR-Tech)	Sky Vision Photographic Solutions (Drones-AV)
Jumpstartz (eCommerce/Marketplace)	PinPayments (Fin-Tech)	Snappy Recruit (HR-Tech)
Jungle Juniors (On-Demand)	Pigeonhole (eCommerce/Marketplace)	Snaptch (Mobile Software/Services)
justgraph.it (Internet Software/Services)	Pitches for Stitches (Game Studio)	Solais (Geospatial-Information-Systems (GIS))
Kickertape (Game Studio)	PixelPrint Studio (3D Printing)	Spring Tech (Analytics)
Kikka Capital (Fin-Tech)		Spookfish (Geospatial-Information-Systems (GIS))

STARTUPS

Standout App (HR-Tech)
Start Kit | Start Digital (Internet Software/Services)
Startup News (Media & News)
Stirfire Studios (Game Studio)
Stockbo (Internet Software/Services)
Stockphoto.com (eCommerce/Marketplace)
Stonehenge Metals (Resource-Tech)
Storage Seeker (eCommerce/Marketplace)
Stratus Solutions (Internet Software/Services)
StrykeTax (Fin-Tech)
Subcool (Resource-Tech)
Sun Heels (eCommerce/Marketplace)
Sunny Beach Labs (Internet Software/Services)
Switch My Loan (Fin-Tech)
Swytchy (eCommerce/Marketplace)
Synaptor (Resource-Tech)
Tagroom (Media & News)
Take 5 Apps (HR-Tech)
Tales from Electric Eve (Game Studio)
Tap into Safety (Ed-Tech)
Teacheria (Ed-Tech)
Techboard (Media & News)
techPOTTSs (Ag-Tech)
Tek Tools (Mobile Software/Services)
TestScreening (Internet Software/Services)
Textie (Social)
The Local Grocer (eCommerce/Marketplace)
The Mining Hub (Resource-Tech)
Thiv (Internet Software/Services)
Thrillseeker Adventures (Travel & Tourism)
TicketBooth (Fin-Tech)
tiing (Internet Software/Services)
Tiinkk (Social)
SwipeMeNot.com/HookUpHero (Social)
Today We Learned (Ed-Tech)
Touchgram (Social)
Touchline Connect (Ed-Tech)
Trackem (Resource-Tech)
Trade Platform (Construction-tech)
Trades Cloud (Internet Software/Services)
Tradiepoint (eCommerce/Marketplace)
Trading Roo (eCommerce/Marketplace)
Tradr (eCommerce/Marketplace)
Travel Eggs (Travel & Tourism)
TravelBug (Travel & Tourism)
Triplify (Travel & Tourism)
Tuggle (eCommerce/Marketplace)
Typed Clojure (Internet Software/Services)
Udaly (Internet Software/Services)
UniteMe (Virtual & Augmented Reality)
Uproov (Photography)
Uranium Mobile (Mobile Software/Services)
Urban Locavore (eCommerce/Marketplace)
urbansocialz (Social)
VentureCast (Fin-Tech)
Venue Menu (eCommerce/Marketplace)
Verbivoregame (Game Studio)
Verist (Fin-Tech)
Vibeguide (Mobile Software/Services)
Vine Collective (eCommerce/Marketplace)
Viracocha Enterprises (Fin-Tech)
Virtual Gaming Worlds VGW Holdings (Game Studio)
Virtual Gsale (eCommerce/Marketplace)
Virtualiis (Virtual & Augmented Reality)
Visionball (Virtual & Augmented Reality)
WAMart (Media & News)
Wealth Tank (Fin-Tech)
Welcome To Country App (Ed-Tech)
Whats Next (Music-Tech)
Where's Lois (Mobile Software/Services)
WhereItsAt (Mobile Software/Services)
Whisk Mobile Development (Mobile Software)
Who Said app (Social)
Who threw the goo (Game Studio)
WordTapper (Internet Software/Services)
World Skies Holidays (Travel & Tourism)
x-cite digital (Game Studio)
XOcomm (Electronics & Hardware)
XTV Networks (Ad-Tech)
Yabble (Social)
Yellowbanana (Ed-Tech)
You Plate It (Internet Software/Services)
Your Social Voice (Ad-Tech)
Your Tunes World (Music-tech)
YourButler (On-Demand)
Yurn.it (eCommerce/Marketplace)
ZAP Bikes (Electronics & Hardware)
ZettaGrid (Internet Software/Services)

ESTABLISHED TECH COMPANIES

ESTABLISHED TECHNOLOGY COMPANIES (145)

*A list of active and inactive internet and digital technology companies founded in Western Australia prior to 2010. Throughout the report we refer to these companies as **Established Tech Companies** or **Est-Tech Co for short**.*

Acquire Technology Solutions (Resource-Tech)
Agriculture Guided Implement Systems (Ag-Tech)
Agworld (Ag-Tech)
Alcotrack (Electronics & Hardware)
Allcredit (Fin-Tech)
Amristar (Geospatial-Information-Systems (GIS))
Argon Technology (Robotics-Drones-AV)
Atmosphere Industries (Game Studio)
Aussiehome.Com (Property-Tech)
Auto Controls (Electronics & Hardware)
Autumncare (HR-Tech)
Bidrivals (Information Technology and Services)
Bigredsky (HR-Tech)
Bizzbuild (Fin-Tech)
Black Box Control (Transportation-Tech)
Black Lab Games (Game Studio)
Bloo (eCommerce/Marketplace)
Boozle (eCommerce/Marketplace)
Btc Trade Center (Fin-Tech)
Bungarra (Game Studio)
Calytrix Technologies (Virtual & Augmented Reality)
Cat Tech (eCommerce/Marketplace)
Cityswagga (Social)
Clicksend (Information Technology and Services)
Colleagues Information Solutions (Information Technology and Services)
Costeng (Internet Software/Services)
Culturehack (HR-Tech)
Cv Check (Security and Investigations)
Davies Wear Plate Systems Australia (Resource-Tech)
Debtone Enterprises (Electronics & Hardware)
Decimal Software (Fin-Tech)
Different Methods (Game Studio)
Digital Mapping Solutions (GIS)
Digital Matter (Transport)
Digital X (Fin-Tech)
Diomades (Game Studio)
Downunder Geosolutions (GIS)
Drewfx (Game Studio)
Dspcomm (Information Technology and Services)
Dti Group (Security and Investigations)
Dynamic Digital Depth (Virtual & Augmented Reality)
Ebiosys (Information Technology and Services)
Engineering Intelligence (Resource-Tech)
Event Weather (eCommerce/Marketplace)
Expedio (Resource-Tech)
Eziworx (HR-Tech)
Ezone.Com (Game Studio)
Fairport Farm Software (Ag-Tech)
Fast Brick Robotics (Robotics-Drones-AV)
Faulkner Lab | Atapa (Ad-Tech)

Frosty Badger (Game Studio)
Game Ranger Technologies (Game Studio)
Genesis Petroleum (Resource-Tech)
Geovia (Resource-Tech)
Global Dial t/a 1St Red (Information Technology)
Global Tracking Solutions (Resource-Tech)
Globaltech Mining Solutions (Resource-Tech)
Gnomic Studios (Game Studio)
Go Business (Fin-Tech)
Gopc.Net (Security and Investigations)
Greensense (Property-Tech)
Health Engine (Health-Tech)
Icetana (Security and Investigations)
Imdex (Big Data)
Immersive Technologies (Virtual & AR)
Industrial Automation Group (Ag-Tech)
Inhouse Group (Big Data)
Injury Connect (Health-Tech)
Insmart Innovative Smart Technologies (Mnfact)
Intelligent Ip Communications (IT and Services)
Inxsoftware (HR-Tech)
Isa Innovation (Internet Software/Services)
Iss Group (Resource-Tech)
Iwebgate (Information Technology and Services)
Juto (Internet Software/Services)
Kanopy (Ed-Tech)
Kruger Heavy Industries (Game Studio)
Lingopal (Ed-Tech)
Magentys (Internet Software/Services)
Magnepath (Health-Tech)
Maxwell Geoservices (Resource-Tech)
Meercat Riskview (IT and Services)
Metro Power (Big Data)
Micromine (Resource-Tech)
Migme (Media & News)
Millstream Web Software (Information Technology and Services)
Mindfuse (Game Studio)
Minemap (Resource-Tech)
Minemax (Resource-Tech)
Minti (Media & News)
Moboom (Internet Software/Services)
Moodle (Ed-Tech)
Mrx Technologies (Transportation-Tech)
Near Map (GIS)
Norg Media (Media & News)
Odusee (Internet Software/Services)
Optika Solutions (Internet Software/Services)
Orbital Corporation (Robotics-Drones-AV)
Outline Imagery (GIS)
Overtech Technologies (IT and Services)
Panorama Synergy (Electronics & Hardware)
Peppermint Innovation (Fin-Tech)
Petrescue (eCommerce/Marketplace)
Phinar Software (GIS)
Popfossa (Health-Tech)
Precision Agronomics Australia (Ag-Tech)
Procure Communication (eCommerce/Market)

Quickflix (On-Demand)
Raez (Game Studio)
Red Nightingale (Property-Tech)
Rent.Com.Au (Property-Tech)
Rezbot (Internet Software/Services)
Rhinofile (Internet Software/Services)
Romteck (GIS)
Scanalyse (Resource-Tech)
Scientificaerospace (GIS)
Secure Systems (Electronics & Hardware)
Sensear (Health-Tech)
Sentient Computing (Resource-Tech)
Seqta - Saron Education (Ed-Tech)
Sitevisuals (Construction-tech)
Soundfolder (eCommerce/Marketplace)
Souptoys (Game Studio)
Specterra Services (GIS)
Stochastic Simulation (Resource-Tech)
Stream Group (Insurance-Tech)
Structural Monitoring Systems (Transport-Tech)
Sureclix (Media & News)
Takor Group (GIS)
Tech Mpire (Ad-Tech)
Technology One (Internet Software/Services)
Thebroth (Game Studio)
Tidyclub (Internet Software/Services)
Tieline (Electronics & Hardware)
Total Pets (Media & News)
Transaction Solutions International (Fin-Tech)
Velpic (Internet Software/Services)
Veriluma (Information Technology and Services)
Virtual Observer (GIS)
Web Interactive Solutions (Game Studio)
Wingstar Software (Ed-Tech)
Xemplex (Fin-Tech)
Your Tunes World (Music-tech)
Zetta Group (IT and Services)
Ziptel (Information Technology and Services)

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A LETTER FROM STARTUP WA

STARTUPWA

In 2013, the City of Perth commissioned the inaugural Startup Ecosystem Report.

This data mining exercise painted an invaluable picture of the state of Perth's then-nascent startup community, the growth of which was centered around Spacecubed, the CBD coworking space which had just celebrated its first birthday, Meetups and events such as Startup Weekend, and entrepreneur-focused education programs like Founder Institute.

The report was designed to quantify and report on the startup ecosystem, providing a platform to monitor progress and inform policy. The WA Startup Ecosystem Report 2015-16, funded by the City of Perth and WA Department of Commerce now provide us with another chance to reflect on the growth of the startup ecosystem to date, and provide deeper insights as to the opportunities and challenges that lie ahead if we are to unlock the potential of digital technology and disruptive innovation as a creator of new jobs and wealth in the years to come. The 2013 report identified a core of 100 digital and internet-based early-stage startups businesses in Perth. As you will see from the pages that follow, we have already seen this number balloon to 335 active startups - a 235% increase in just over two years.

The first report identified nine key opportunities for development within the ecosystem, a number of which have already borne fruit. Although still in their early stages, we have seen the handful of accelerator programs, university programs and corporate partnerships launch in the past 18 months - including Bloom and Start Something at UWA; Amcom(now Vocus) Upstart (from which the first cohort of companies graduated in 2015), RAC SeedSpark, and the Unearthed program - which launched from Perth with a mandate to drive innovation in the resources sector, and has already expanded to an international hackathon series and accelerator program.

And, as the WA Startup Ecosystem Report 2015-16 makes abundantly clear, countless growth opportunities remain - particularly in the context of partnerships with government, universities, and industry, helping to deepen capital pools and develop infrastructure to support entrepreneurs' continued development.

Deloitte forecasts that "one-third of the Australian economy is facing imminent and substantial disruption by digital technologies and business models by 2025". With Gross State Product forecast to reach ~\$300 billion in 10 years, up to ~\$100 billion is therefore 'at risk' of digital disruption - how much of the value of this disruption will be captured by WA companies?

StartupWA would like to thank the City of Perth and the WA Department of Commerce for supporting the research that underpins this report.

Many of you read and provided feedback on the draft of this report and its recommendations that were released in early December, 2015. StartupWA has utilized your input and the information from the preliminary report in its discussion with State Government and as a basis for engaging with stakeholders.

Since conducting the research for the report:

- The Australian Federal Government announced the National Innovation and Science Agenda, which contains many provisions for supporting innovation in Australia
- The QLD, NSW, and VIC governments have announced significant funding for innovation
- The WA Government announced the creation of the State's innovation portfolio and named a Minister for Innovation
- The WA Government allocated an additional \$20 million over 4 years to support the growing tech sector
- The WA Government announced an innovation summit to seek community input into the best way for Government to support the local innovation ecosystem

This makes it an opportune time to publish this report.

Although the data in the report represents a snapshot in time from the end of 2015, the messages of the report could not be more relevant. As we in WA work with a renewed focus to diversify and expand our economy through the creation and support of new entrepreneurial ventures, we should align our efforts by raising the awareness of the local tech startup sector, setting goals for its growth, and measuring our progress.

Therefore it's with great enthusiasm about our future that we introduce this WA Startup Ecosystem Report. We look forward to working with you to diversify and strengthen our WA economy by building a robust startup ecosystem.

Sheryl Frame

Justin Strharsky

Samuel Birmingham

Brodie McCulloch

Andrew Outhwaite

Mark Shelton

Zane Prickett

THIS REPORT ESTIMATES THE POTENTIAL ECONOMIC IMPACT OF DISRUPTIVE DIGITAL AND INTERNET TECHNOLOGIES ON WESTERN AUSTRALIA'S ECONOMY IN 2025 COULD BE OVER \$76 BILLION PER ANNUM. APPROXIMATELY 25% OF GROSS STATE PRODUCT.

EXECUTIVE SUMMARY

We are delighted to present the second of our reports on the early stage digital and internet technology sector in Western Australia. This report builds on the 2013 Perth Startup Ecosystem Report and demonstrates that the ecosystem has grown substantially since then. This report is version two of the 2015 report and includes recommendations and numbers on both early and later stage technology companies.

This report focuses on digital and internet technology operating throughout Western Australia. By digital and internet technologies we mean those companies developing their own intellectual property in technologies such as computing, software, mobile applications, internet focused companies, electronics & hardware; particularly those that incorporate software such as wearables, sensors, drones, robotics and autonomous vehicles.

We call those companies born after January 2010 **Startups** for short throughout the report, and those prior to 2010 are called **Established Tech Companies**, or **Est-Tech**. Collectively, these two groups are referred to as **All-Tech** throughout the report.

NUMBER OF TECH COMPANIES

The report identified over 420 digital and internet technology **startups** operating throughout Western Australia (WA), formed after January 2010. The report found approximately 3,000 people who are working in and building early stage scalable technology startups.

The report identified over 140 **established** digital and internet technology companies operating throughout Western Australia (WA) formed prior to January 2010, of which 116 remain active. The report found over 5,000 people who are working in and building scalable established technology companies.

FUNDING

The report identifies over \$101 million in total funding over the past 6 years (January 2010 to December 2015) period to 77 **startups**, ten of which raised funding by listing on the Australian Stock Exchange (ASX). There have been a number of new additional listings in the form of reverse take overs (RTOs) in the first quarter of 2016. Total funding results in an average per capita funding ratio of \$6.61, one of the highest levels seen nationally, however still substantially lower than international ratios which go up to \$183 in Israel and \$4,341 in Silicon Valley.

The report also identified over \$549 million in total funding over the past 19 year period to 57 **established technology companies**. Comparing established tech funding for the 2010 to 2015 period, total funding was \$381 million. Total funding over the 19 year period results in an average per capita funding ratio of \$10.86, and over the 2010-2015 period a ratio of \$28.73.

AUSTRALIAN STOCK EXCHANGE (ASX)

This report identified 23 established tech companies and 10 startups listed on the Australian Stock Exchange. The 33 companies have a combined market capitalisation of near \$3 billion, with an average market cap of \$87 million for established tech companies and a surprisingly large average for startups of \$93 million.

We identified over \$112.7 million raised through the ASX - an average of \$3.42 million per company. The ASX was the largest avenue for investment, with government matched funding and associated private investors, along with Venture Capital also featuring prominently.

Surprisingly we found the average age at listing was 2.5 years for startups and 9.3 years for est-tech companies. While opinion is mixed on the value of startups listing at such an early stage, we found that the quality of listed startups was mixed. With both exceptionally good and weak companies raising money through the ASX. While listing at such early stages isn't normal in the US technology industry due to the financial and regulatory costs of the ASX and the dearth of private investment in startups the ASX provides a viable vehicle within Australia and WA.

PRODUCT MARKET FOCUS

Of the 420 startups, a wide range of market focus was evident, with particular clusters emerging in eCommerce, Fin-tech, Health-tech, Resource-tech, Education-tech and more unexpectedly in areas such as Gaming and Human Resources. Product and technology types were diverse, ranging from mobile applications and machine learning to 3D printing. Technologies overall seemed to favour less complex technologies rather than more complex emerging technologies such as drones, advanced robotics and machine learning.

By contrast Established Technology companies had a much higher focus on Resource technology and Geospatial Information Systems.

We were particularly disappointed at not being able to identify a single startup working on autonomous vehicle technology despite the adoption of autonomous vehicles by all three large resource companies.

This could be due to both the relatively small number of computer science graduates and electronic engineers completing university courses in Western Australia, and the scarcity of available capital to fund more resource intensive technology development.

MEETUPS, EVENTS, CO-WORKING SPACES & UNIVERSITIES

This report found that across Western Australia there was a substantive number of meetups, hackathons and community driven educational activity in the ecosystem. Co-working spaces have arisen in the past 6 years in the Perth CBD, Leederville, Joondalup, Fremantle, Geraldton

in the Mid West, and as far south as Pollinators in Bunbury. These places serve as a vibrant catalyst for innovation and entrepreneurship and are increasingly moving up the innovation value chain from offering sharing office space to formal startup accelerators providing seed capital for early stage commercialisation. Spacecubed in Perth's CBD now hosts 5 accelerators and seed accelerators, along with multiple hackathons throughout the year.

WA Universities have a history of commercialising innovation, out performing east coast universities when viewed through the lens of company formation and university spinouts. There is also an increasing number of student led programs, hackathons and incubators arising out of universities, such as UWA's Bloom Labs. However compared to US and UK university company formation rates there is still much Western Australia can do to develop more innovative startups. As former Chief Scientist Ian Chubb states:

"We can wait for the one in a million natural-born entrepreneur to successfully seize the once in a lifetime opportunity to create change. Or we can make our own luck by using the education system to give people the skills and knowledge that will make them entrepreneurs."

GLOBAL COMPARISONS

Comparing this region with mature technology clusters in the US and Europe we found Western Australia underperforms on a range of measures including lower startup formation rates and lower funding ratios than comparable global tech hubs, however the industries growth over the last 6 years provides encouragement that Western Australia can develop a strong technology sector over the coming decade.

FUTURE GROWTH

Technology is increasingly restructuring the global economy with technology companies increasingly entering traditional industries such as mining, transportation, insurance and accommodation. Foreign companies are taking market share at a rapid pace with a case in point being Uber which is estimated to have secured near 8.8% of the Australian taxi market in under three years, as of early 2015.² Based on current economic and technology trends this report estimates the potential economic impact of disruptive digital technologies on Western Australia's economy in 2025 could be over \$76 billion per annum, approximately 25% of Gross State Product (GSP).

This shift in economic value provides a tremendous opportunity for new and established companies to rapidly create substantial value. If Western Australia is to do this successfully, taking advantage of our proximity to the worlds largest and fastest growing consumer markets in Asia, is almost certainly necessary.

KEY STATS - ALL TECHNOLOGY CO.

NO. ALL TECHNOLOGY COMPANIES

451/560+

Estimated number of active & total (includes active & inactive) Established WA Technology Companies born prior to the 1st Jan 2010.

NO. MEETUPS GROUPS

109

Number of startup and entrepreneurship related groups in WA since 2010.

NO. CO-WORKING SPACES

12

Estimated number of co-working spaces in WA.

NO. OF ACCELERATORS & INCUBATORS

3/12

Estimated number of [Seed Accelerators](#) in WA and total seed accelerators, accelerators and incubators.

NO. EMPLOYEES AT ALL TECHNOLOGY COS

8,406

Estimated number of people that currently work in an Established WA Technology Company.

NO. OF PEOPLE IN ICT

44,925

Total number of people involved in Information Computer Technology (ICT) in WA in 2013.³

NUMBER OF ICT GRADUATES

355

Domestic tertiary ICT completions in WA in 2014.³

TOTAL FUNDING RAISED BY STARTUPS

\$651.3M+

Estimated total amount of funding raised by Established WA Technology Companies between January 2010 and December 2015.

WA STARTUP BY TYPE

Internet Software & Services	55
eCommerce/Marketplace	53
Fin-Tech	35
Mobile Software & Services	28
Health-Tech	27
Resource-Tech	26
Game Studio	25
Ed-Tech	24
HR-Tech	19
Social	15
Electronics & Hardware	12
Music-Tech	10
Media & News	9
Robotics & Drones	9
Big Data	8
Transportation-Tech	8
Travel & Tourism	8
On-Demand Services	7
Unknown	6
3D Printing	6
Virtual & Augmented Reality	5
Construction-Tech	5
Property-Tech	4
Ag-Tech	3
Geospatial Information Systems (GIS)	3
Internet of Things (IoT)	2
Ad-Tech	2
Semiconductors & Semiconductor Equipment	1

WA ESTABLISHED TECH CO BY TYPE

Game Studio	16
Resource-Tech	16
Information Technology & Services	13
Geospatial Information Systems (GIS)	11
Internet Software & Services	11
Fin-Tech	8
eCommerce/Marketplace	7
Electronics & Hardware	6
Ag-Tech	5
Health-Tech	5
HR-Tech	5
Media & News	5
Ed-Tech	4
Property-Tech	4
Security and Investigations	4
Big Data	3
Robotics & Drones	3
Transportation-Tech	3
Virtual & Augmented Reality	3
Ad-Tech	2
Construction-Tech	1
Manufacturing	1
Music-Tech	1
On-Demand	1
Social	1
3D Printing	0
Mobile Software/Services	0
Travel & Tourism	0

KEY STATS - STARTUPS

NO. STARTUPS

335/420+

Estimated number of **active** & total (active & inactive) WA tech startups born since 1st Jan 2010.

NO. FOUNDERS

830+

Estimated number of people that have founded a WA tech startups since 2010.

NO. STARTUP EMPLOYEES

2,974

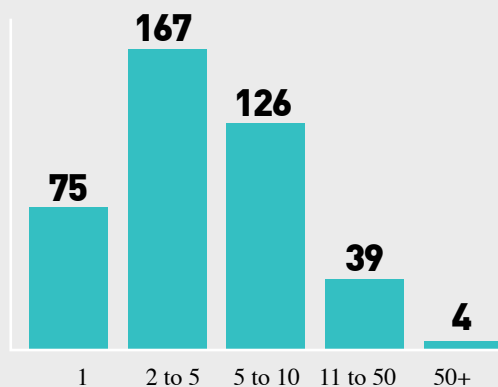
Estimated number of people that have worked in WA tech startups since 2010.

TOTAL FUNDING RAISED BY STARTUPS

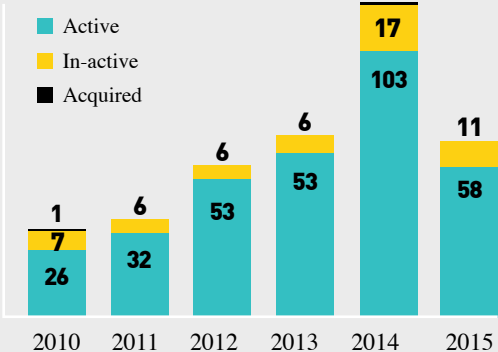
\$101.7M+

Estimated total amount of funding raised by WA startups between January 2010 and November 2015.

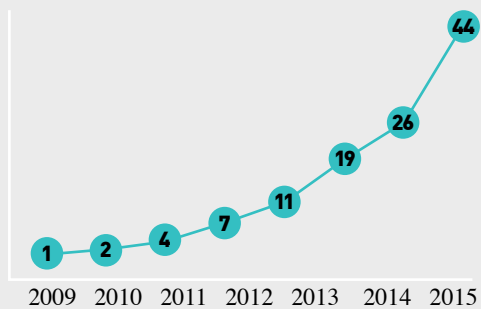
NO. STARTUPS BY STAFF SIZE



DEAD OR ALIVE: #STARTUPS BY YEAR ESTABLISHED



NO. MEETUP GROUPS FORMED BY YEAR



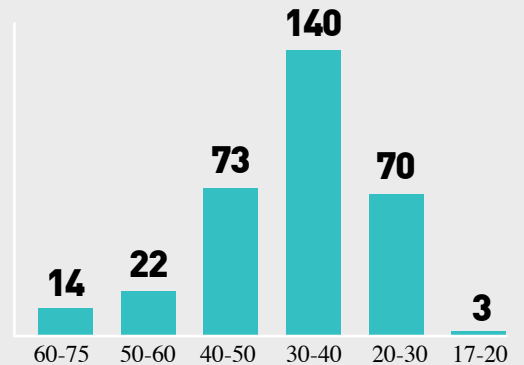
NO. STARTUP MEETUP GROUPS BY SIZE (TOP 10 ONLY)

Morning Startup - Perth	1586
Agile Perth	1328
Perth Small Business Meetup	910
Perth Startup Founder 101	902
Port80 Perth	879
Silicon Beach Perth	854
Perth Solo & Small Business Owners' Hangout	849
Perth Rapid Startups	788
Perth Agile Meetup	698
Perth iOS Developers	670

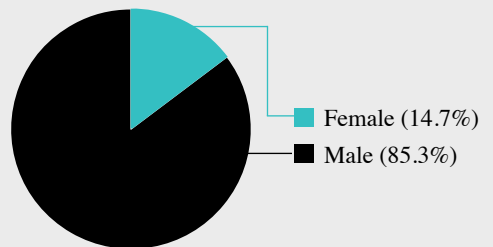
PEOPLE: COMMON SKILLS*

Web & Mobile Software Development	36%
Marketing, SEO & Social Media	10%
Leadership & Management	10%
Strategy & Planning	6%
Other	6%
Design, Animation, UX, UI	5%
Sales & Business Development	5%
Consulting & Advisory	4%
Entrepreneurship & Startups	3%
Business Analysis & Modelling	3%
Finance, VC, PE & Accounting	2%
Product Development & Management	2%
Advertising	1%
Public Relations & Stakeholder Mngmt	1%
Electronics, Hardware & Semiconductors	1%
Education & Training	1%
Digital Games	1%
Ecommerce	1%

PEOPLE: AGE %



GENDER: TECH INDUSTRY FOUNDERS*



* Percentages based on analysing people on LinkedIn in Perth or Mandurah with "Founder" or "Owner" in their job titles, working in digital technology companies.

KEY STATS - ESTABLISHED TECH CO.

NO. ESTABLISHED TECH CO.S

116/140+

Estimated number of active & total (includes active & inactive) Established WA Technology Companies born prior to the 1st Jan 2010.

NO. ESTABLISHED TECH CO.S EMPLOYEES

5,432

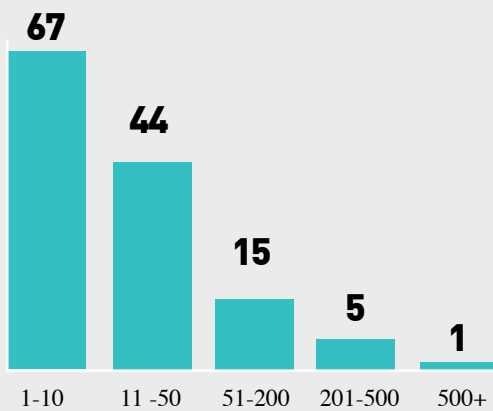
Estimated number of people that currently work in an Established WA Technology Company.

TOTAL FUNDING RAISED BY EST-TECH CO.S

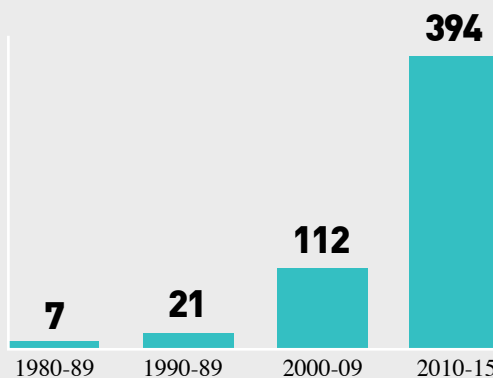
\$549.6M+

Estimated total amount of funding raised by Established WA Technology Companies between 1998 and March 2016.

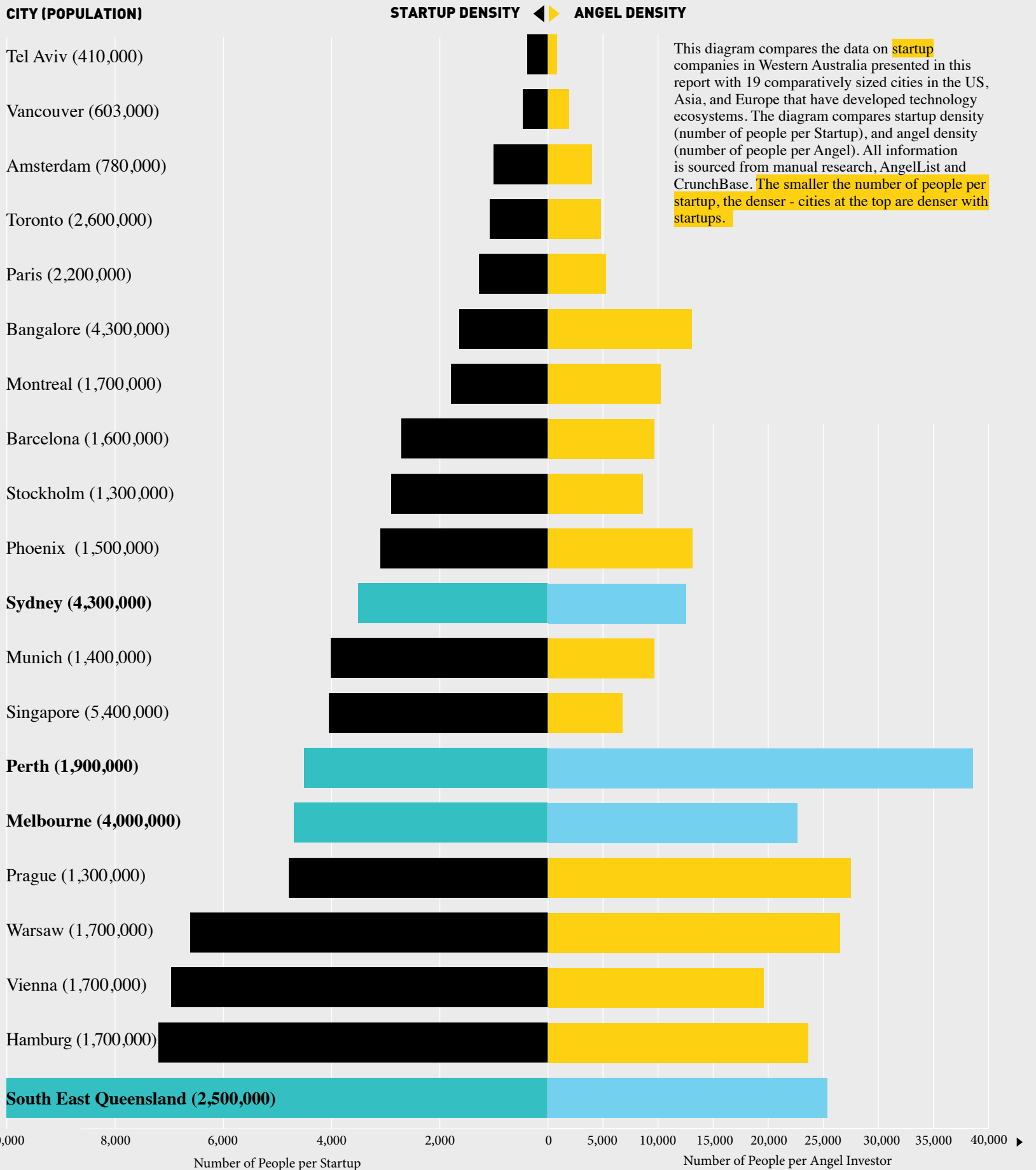
NO. EST-TECH CO BY STAFF SIZE



#TECH COMPANIES BY YEAR ESTABLISHED



ANGEL & STARTUP DENSITY



**“STARTUPS BEGET STARTUPS.
PEOPLE WHO WORK FOR
STARTUPS START THEIR OWN.
PEOPLE WHO GET RICH FROM
STARTUPS FUND NEW ONES.**

**I SUSPECT THIS KIND OF ORGANIC
GROWTH IS THE ONLY WAY
TO PRODUCE A STARTUP HUB,
BECAUSE IT’S THE ONLY WAY
TO GROW THE EXPERTISE YOU
NEED.”⁴⁵**

**PAUL GRAHAM
FOUNDER, YCOMBINATOR**

GROWTH STAGES

FROM SEEDS TO KARRI TREES

Companies, like trees grow through different stages of development, from seeds and saplings to giant Karri trees. At each stage different challenges face companies and different support, regulation and funding is needed to help them grow to the next stage.

Company stages are often conceptualised as a combination of product maturity, market fit, risk, staff size, customer engagement rates, revenue levels, culture, company structure and market trends.

At early stages founding teams often need education and mentoring along with relatively small amounts of investment. At later stages access to large numbers of talented staff is essential and greater amounts of capital.

Additionally at each stage young companies provide different value to the ecosystem surrounding them. Small early stage companies are often more efficient at developing innovative technologies and business models and testing new markets, unburdened by corporate legacies.

On the other hand large mature companies can deliver high quality sustaining technologies to large numbers of people and employee large numbers of people. As companies mature increasing opportunities arise for early investors, employees and founders to realise the inherent value captured in the company, through acquisition, dividends and listing on public markets.

At each stage risk and failure rates generally decrease, unless of course the market has radically shifted.

Infrastructure at each stage also varies. At early stage skills training, education and research is supported by the likes of universities, courses and community groups. At the seed and company formation stage pre-accelerator programs such as Founder Institute, and accelerators like Amcom (now Vocus) Upstart helps small teams develop innovative technologies and business models, often supported by relatively small amounts of seed investment from Angel investors, and/or government grants like the Department of Commerce's Innovation Vouchers Program.

As companies mature large amounts of capital and more experienced mentors can be sourced from entities such as the Federal Government's Accelerating Commercialisation program, or Venture Capital firms (of which there are virtually none active in Western Australia). Beyond this the public markets traditionally provide access to larger funding pools, however given Western Australia's history with listing small cap resource companies and the dearth of funding opportunities across most stages the ASX has increasingly become a viable option for relatively young technology companies.

By comparison to more advanced technology industries such as those seen in the USA and Korea, and the mature resource sector in Western Australia, the WA digital technology industry is still in a relatively youthful phase. This is both a function of the technology industry being relatively new when compared to older industries and the State's focus on the resources sector. However with the increasing impact of technology on the global economy this is certain to shift, as our estimates show.

COMPANY GROWTH STAGES

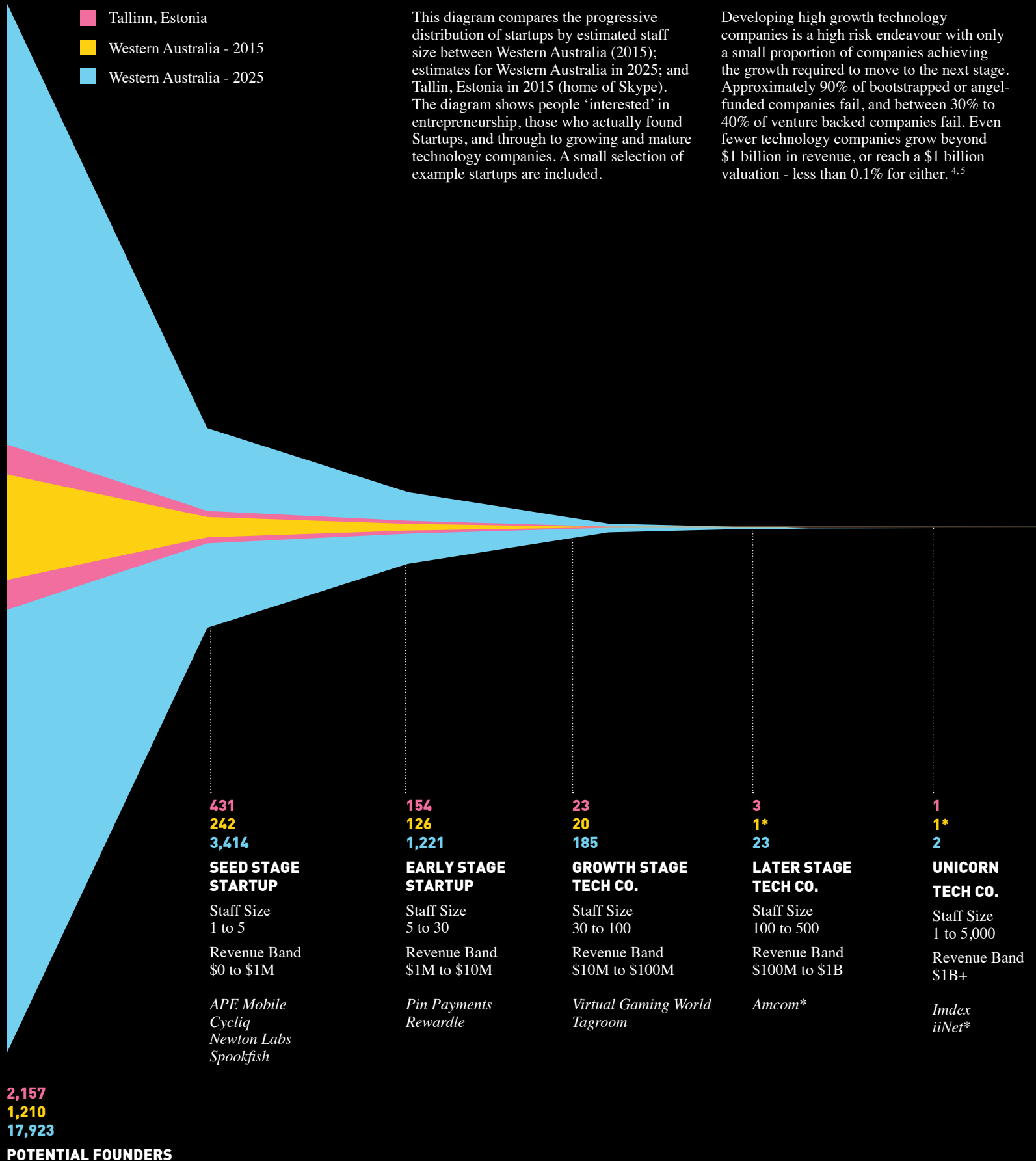
To understand the needs, challenges and opportunities for the industry we examined the industry through the lens of this stage model - mapping the life cycle of technology companies from: being interested in entrepreneurship to starting a company and breeding a unicorn (a term commonly used to describe technology companies that have achieved a \$1 billion plus valuation).

We assumed several stages/states based around estimated revenue brackets. Given revenue is challenging to identify for private companies in most cases we have used staff size as a proxy for revenue:

1. Potential Founders: a portion of whom (~20%) would actually form a startup.
2. Seed Stage Startup: \$0 to \$1M in revenue,
3. Early Stage Startup: \$1M to \$10M
4. Growth Stage Tech Co: \$10M to \$100M
5. Later Stage Tech Co: \$100M to \$1B, and
6. Unicorn Stage: \$1B+

The graph on the following page shows our estimated numbers for startups and later stage technology companies in Western Australia as of 2015, along with projections for potential numbers in 2025 given appropriate support. By way of comparison we have included estimated numbers for Tallin, a small Estonian town with a population of 400,000 that gave birth to Skype in 2003.

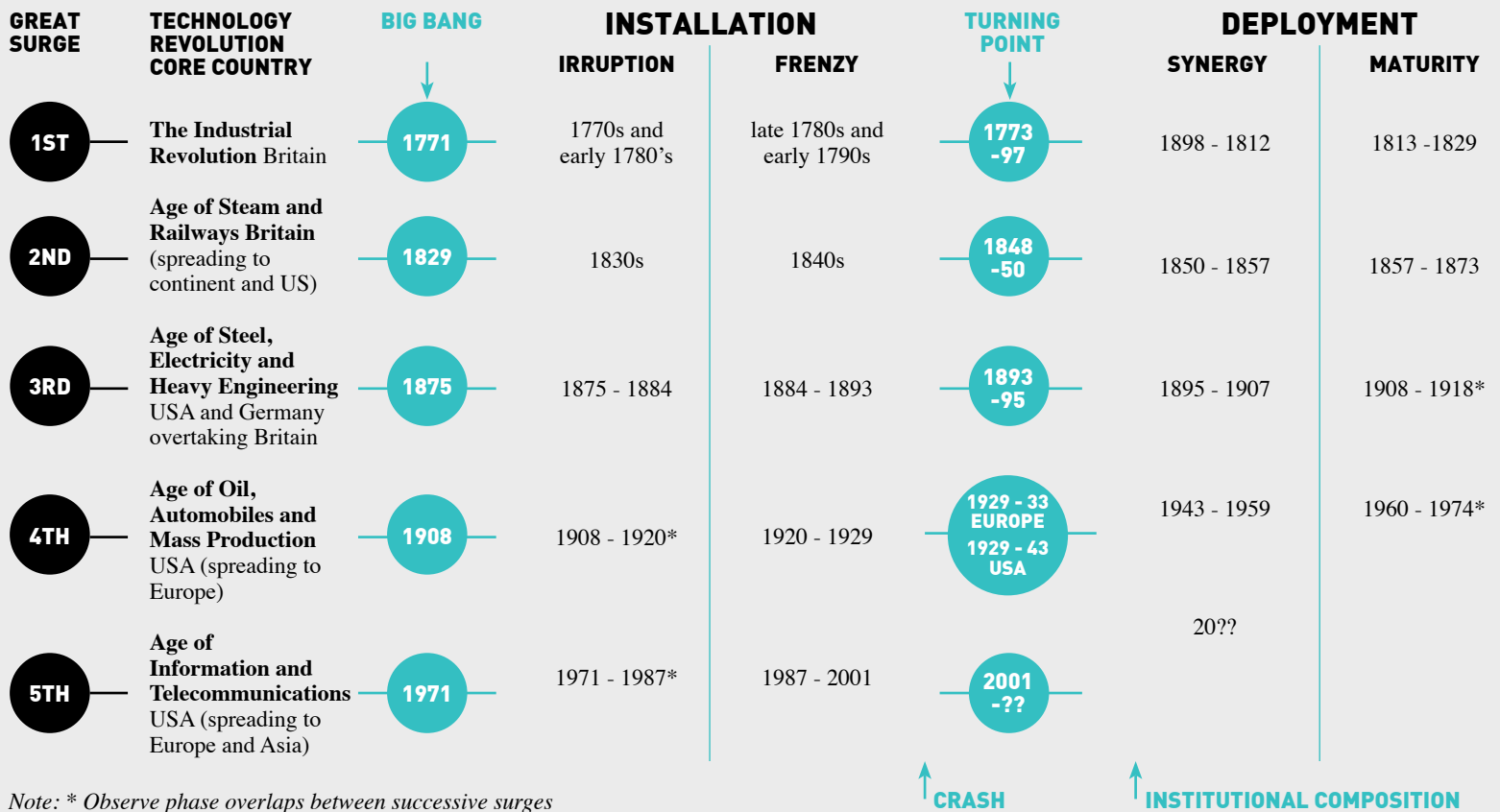
WA TECH 2015 VS 2025



*Amcom and iiNet are included as examples of local later tech companies only. They are not early stage startups and are outside the technology scope of this report.

TECHNOLOGY REVOLUTIONS

APPROXIMATE DATES OF THE INSTALLATION AND DEPLOYMENT PERIODS OF EACH GREAT SURGE OF TECHNOLOGICAL DEVELOPMENT⁶



Note: * Observe phase overlaps between successive surges

FROM INDUSTRIALISATION TO THE INFORMATION AGE

The largest companies of the last century were born in the industrial revolution in the 1800s: mass-production companies such as Ford, Volkswagen, Toyota, GE, Bayer; and the suppliers of raw materials such as Exxon, Shell, BP and BHP.

However over recent decades computer, software and internet companies such as Apple, Google, Microsoft and Facebook have been outpacing more traditional companies. PWC's 2014 report on the *Global Top 100 Companies* by Market Capitalisation shows that Technology and Financials are the leading sectors to have grown market cap in the top 100 (+149% and +136% respectively). Apple—the largest by market cap—having almost quadrupled in value during the past five years.⁷ Digital and internet companies are increasingly disrupting more and more sectors, from finance, media and health to more traditional sectors such as transportation, insurance and energy.

TECHNOLOGY REVOLUTIONS & THE DEPLOYMENT PHASE

To understand the current technology revolution and ensuing economic restructuring that takes place it is useful to look back at history. Carlota Perez in *Technological Revolutions and Financial Capital* looks at the past five

technology revolutions- industrial, steam, steel & electricity, oil & mass production, and the current information and telecommunications revolution. Her research shows all technology revolutions have two main phases, the installation phase and the deployment phase.⁶

Today's technology sector is a long way from the dot-com bubble of the late 1990s. The initial excitement of new technology has subsided and through this installation phase, from 1970 to 2001, the underlying foundations for the growth in the technology sector have been progressively laid. Core technology infrastructure has been installed such as the digitisation of information, increased computing power, broadband proliferation, wireless networks, near complete adoption of smart mobile devices and cloud computing.

We are now at the beginning of the deployment phase a period of productive growth where all sectors are repurposed around the maturing technology. Some companies are failing to adapt quickly enough and are at risk of decline, however, for those companies nimble enough to embrace the change and allow it to drive their growth there is tremendous value to be created. These industry structural shifts are sizeable enough to override underlying economic conditions for companies taking advantage of them.^{6,8,9}

FULL STACK TECHNOLOGY COMPANIES

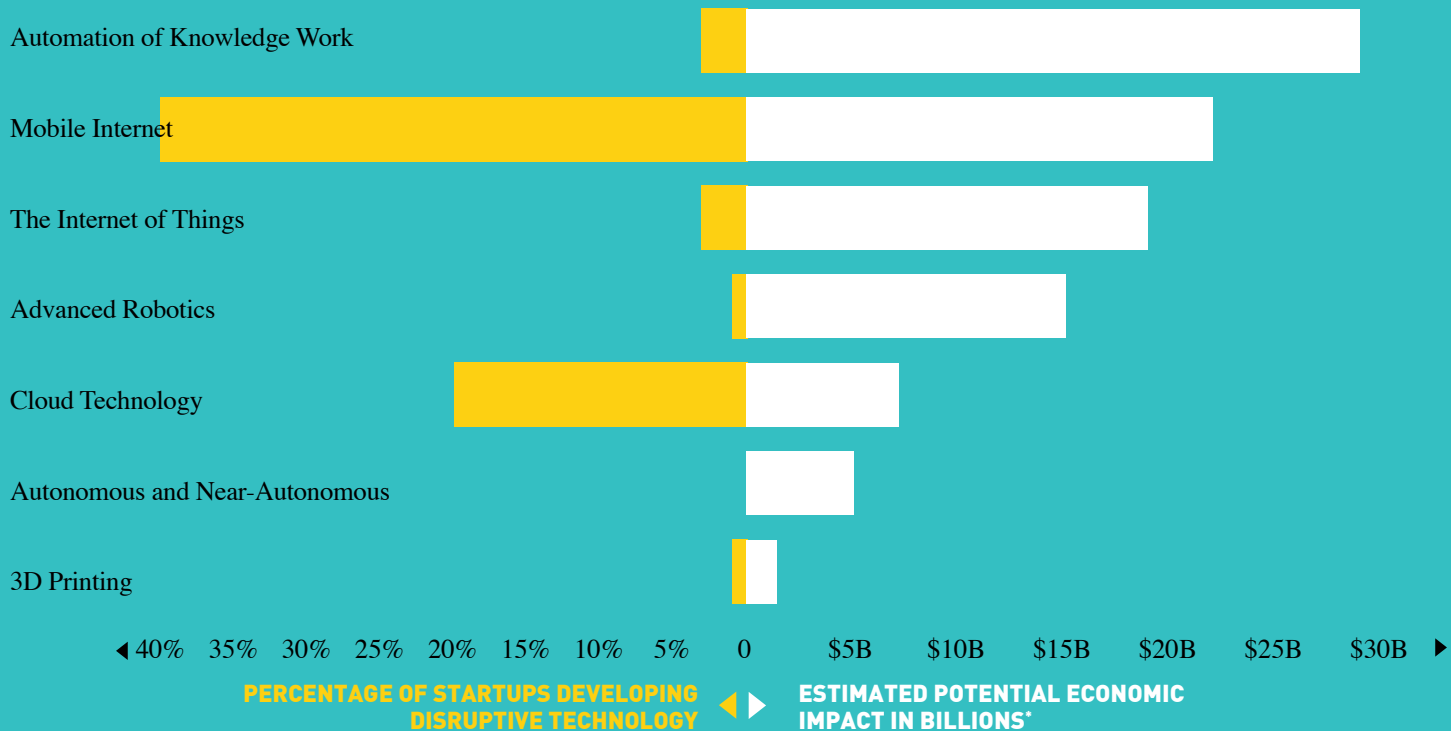
Computing technologies are being deployed across all industries, with information technology becoming an ever increasing portion of a company's operations. Increasingly the normal borders between industries are being eroded making it increasingly difficult to say whether a new company like Uber is a transport company or a software company. Much like access to electricity, cars and cheap mass products are considered a given when starting any business, soon we will consider the application of digital technology as equally fundamental. In this deployment phase we should expect that people will re-imagine existing industries from the ground up, formed around the best technology we have today; and that entrepreneurs will use technology to capture an increasing portion of the value chain within a market. To quote, US tech entrepreneur, angel investor and partner at a16z Chris Dixon:

"The old approach startups took was to sell or license their new technology to incumbents. The new, "full stack" approach is to build a complete, end-to-end product or service that bypasses incumbents and other competitors."¹⁰

Notable examples of this "full stack" approach are riding sharing or taxi services such as Uber, health insurers such as Oscar and car manufacturers like Tesla (and most probably Google & Apple).

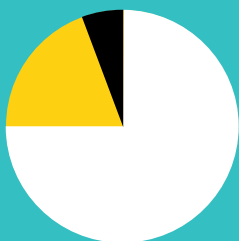
DISRUPTIVE TECHNOLOGY

DISRUPTIVE DIGITAL TECHNOLOGIES - POTENTIAL ECONOMIC IMPACT WITHIN WESTERN AUSTRALIA VS NO. STARTUPS¹¹



*Estimated potential economic impact of technologies within Western Australia in 2025 based on the McKinsey Institute's 2013 report *Disruptive Technologies: Advances That Will Transform Life, Business and the Global Economy*. Note these estimates do not represent GDP or market size (revenue), but rather economic potential, including consumer surplus. They are not directly additive due to partially overlapping applications and/or value drivers across technologies.⁹

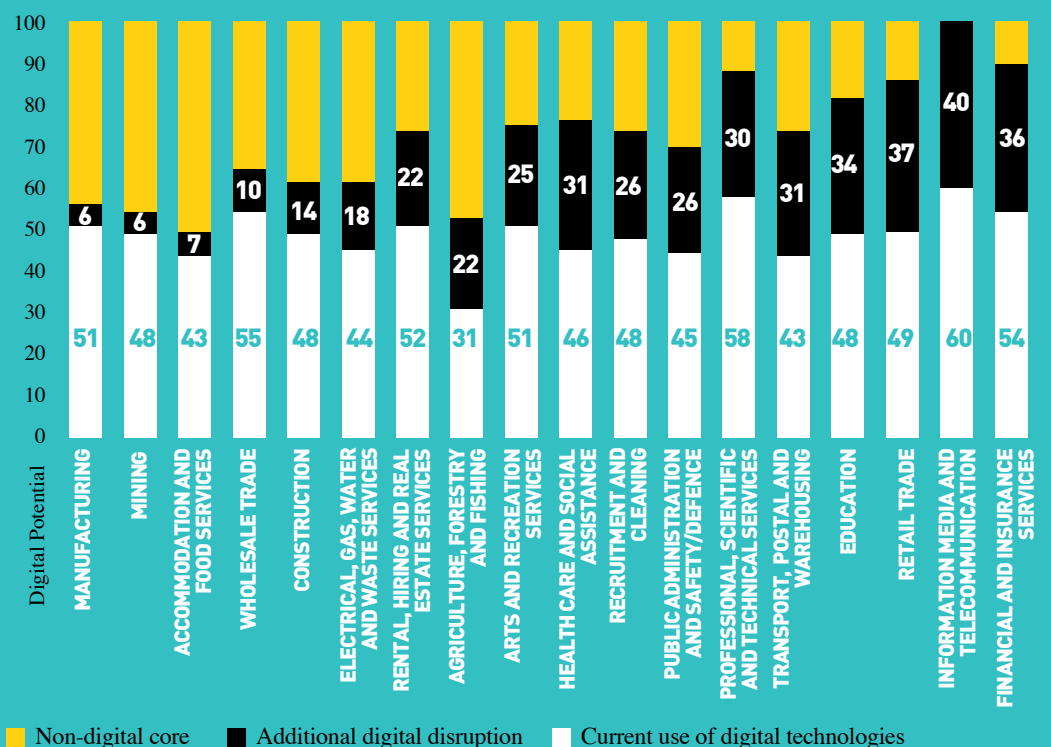
ESTIMATED IMPACT OF DISRUPTIVE TECH ON THE AUSTRALIAN GDP IN 2025 (AUD\$B)¹²



- Gross Domestic Product \$2,096B
- Estimated GDP 'Disrupted' Digital Technology \$524B (@25%)
- Estimated Revenue for Digital Technology Companies \$115B (5.5% of GDP)

DIGITAL DISRUPTION: CURRENT INTENSITY AND INCREMENTAL DISRUPTION

Source: Deloitte - Digital Disruption: Short fuse, big bang?¹



CAPTURING DISRUPTION

DISRUPTIVE TECHNOLOGIES

Within Australia the software and internet technology sector is still relatively youthful. However as information technology is increasingly deployed throughout industries the composition of the national economy will change. The question is, will this wave of economic and social disruption be driven by companies imagined and built on Australian soil, or will it be driven by foreign technology companies?

In order to understand the potential impact of digital disruption on the Australian economy in 2025 we looked at a range of estimates. McKinsey's 2013 report "Disruptive Technologies: Advances That Will Transform Life, Business, And The Global Economy", identified the top 12 disruptive technologies that have the greatest potential for economic impact by 2025.¹¹ McKinsey estimated the potential economic impact that these 12 technologies alone had: "the potential to drive direct economic impact on the order of \$14 trillion to \$33 trillion per year in 2025."¹¹ Approximately 11% to 26% (or a mid range of 19%) of total world GDP, with higher disruption in developed world economies.

Seven of the twelve disruptive technologies McKinsey identified fall within our definition of digital technology: Mobile Internet, Automation of Knowledge Work, The Internet of Things, Cloud Technology, Advanced Robotics, Autonomous Vehicles and 3D Printing.

IMPACT OF DISRUPTIVE TECH ON WA

Deloitte's 2012 report "Digital Disruption: Short fuse, big bang?" analyses the impact of digital technology on Australian industries. It is more bullish and estimates 33% of the economy facing disruption from all digital technologies. Approximately \$732 billion of economic impact in 2025 on the Australian GDP (assuming Australian GDP is approximately \$3 trillion).¹

"One-third of the Australian economy faces imminent and substantial disruption by digital technologies and business models – what we call a 'short fuse, big bang' opportunities, for both business and government."

Deloitte: Digital Disruption: Short fuse, big bang?

Using these two reports as a guide we estimate an upper and lower range for the impact of digital technology on the Western Australian economy in 2025 of between 18% to 33% of Gross State Product (GSP), or \$55 billion to \$101 billion of economic impact per year in 2025. Our mid range estimate is that 25% of the Western Australian economy is impacted by digital and internet technology in 2025, equating to approximately \$76 billion of GSP.

Based on our mid range we estimate between \$5 billion to \$25 billion of the 'disrupted GSP', could be directly captured by digital technology companies in 2025.¹³

GROWING UNICORNS

With these estimates in mind we examined what the digital technology sector could look like in 2025, assuming that all this 'disrupted GDP' was captured solely by local tech companies. Using our startup formation model and current formation & failure rates at each stage of growth we estimate the total number of technology companies required to capture the disruption in economic value in 2025 ranges between 4,846 to 6,000 companies, across all stages of development, from potential founders to mature unicorns. With over 20,000 people directly employed by high-tech companies and an additional 100,000 that provide or extract value from the industry.¹⁴

Our modelling estimates that startup formation in 2025 would be 788 companies, or 292 startups formed in 2025 per million people in WA. By way of comparison US technology hubs such as Boulder, San Jose, Cambridge and San Francisco had yearly startup formation rates per million people ranging between 97 to 256 in 2010 (the last recorded data we could find on the US). Given the age of US figures and the methodology the Kaufmann Foundation used to come to these figures we think that actual formation rates in the US are currently higher and are almost certainly set to increase substantially by 2025. And if tech startup formation rates approach normal business formation rates we still have along way to go, with the formation rate across all business types in the USA at 1,342 per million people.¹⁵

With this in mind a formation rate of 292 per million people is not unreasonable given substantive support to grow the WA sector.

ESTIMATED TOTAL FUNDING REQUIRED 2014-2015 BY STAGE

Stage Stage (\$50K per company)	\$535M
Early Stage (\$300K)	\$909M
Growth Stage (\$2M)	\$792M
Later Stage (\$20M)	\$1,000M
Unicorn (\$80M)*	\$240M

ESTIMATED TOTAL FUNDING REQUIRED

Based on these company numbers we estimated the total required funding to seed and develop this number of technology companies by 2025.

Assuming average total lifetime investments per company ranging from \$50,000 for seed stage to \$80 million for unicorns, we estimate the total funding required to develop the industry over the coming ten year period is approximately \$3 to \$3.5 billion.^{16,17,18} With per year funding levels, across all sources, increasing from an average of ~\$17 million on the trailing six year period to between \$700 million to \$1.5 billion in 2025. Average funding per capita over the ten year period of \$106 to \$129 per person, and as high as \$266 per person in 2025.

By way of comparison average per capita VC investment across the USA is \$81, in Israel it is \$183 and in Silicon Valley estimates have it as high as \$4,241 per person (note these numbers exclude angel investment, public markets and government grants).^{18,20,21}

Compared to traditional industries all these numbers pale in comparison with \$47 billion invested in Mining & Resource projects in WA in 2014FY: \$18,319 per capita of investment.

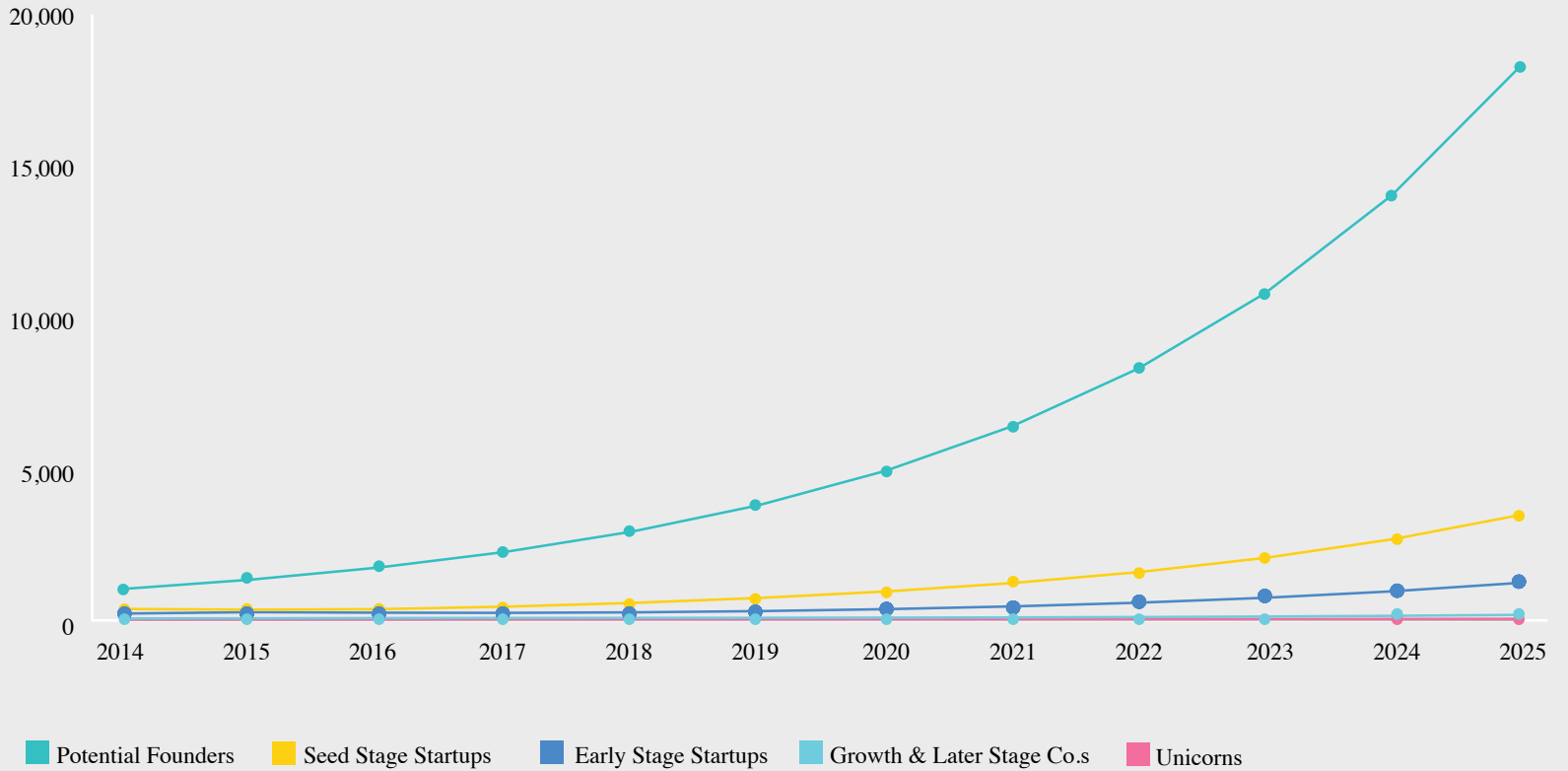
WA RESOURCES VS TECH FUNDING



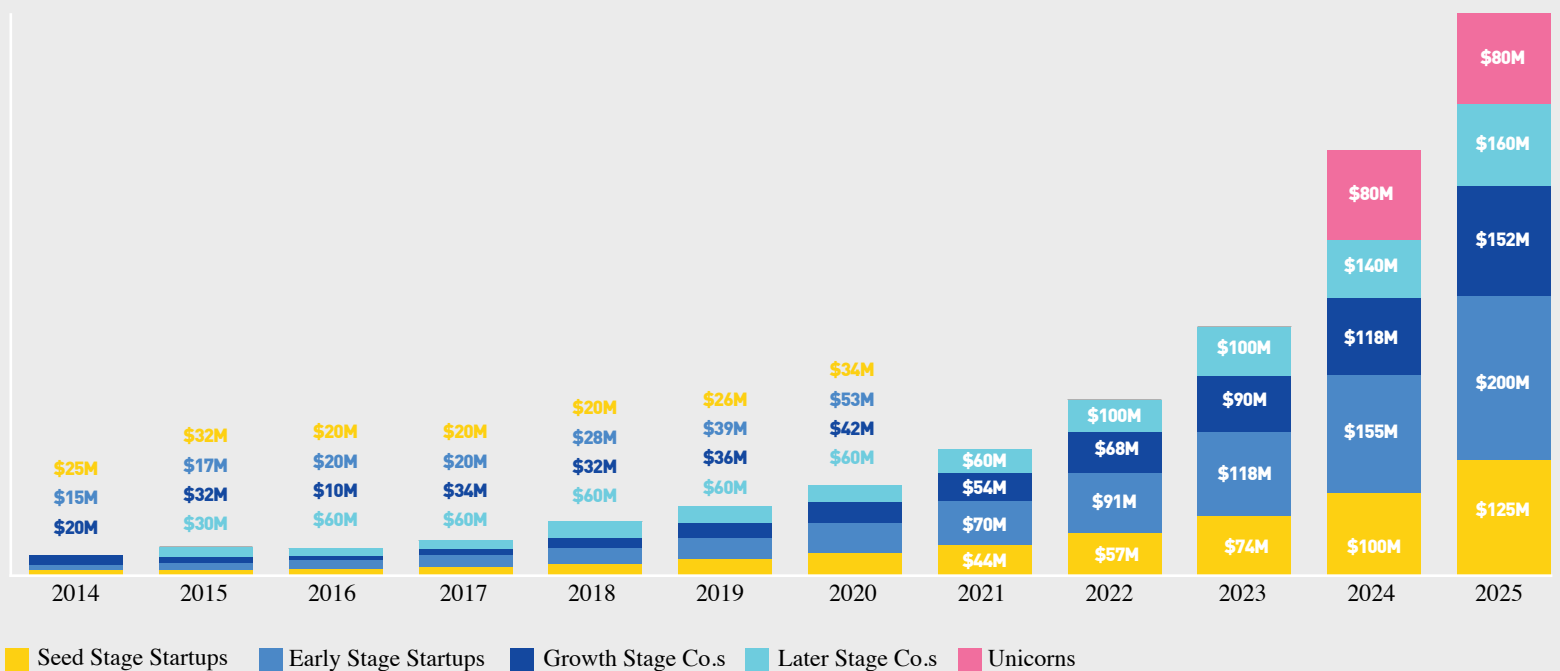
- Investment in Resources - 2014FY (\$47B)
- Investment in all Tech - 2025 (\$1B)
- Investment in all Tech - 2014 (<\$100M)

GROWING UNICORNS

ESTIMATED TOTAL NUMBER OF INTERNET & DIGITAL TECHNOLOGY COMPANIES 2014 TO 2025 BY STAGE



ESTIMATED TOTAL FUNDING FOR INTERNET & DIGITAL TECHNOLOGY COMPANIES 2014 TO 2025 BY STAGE (AUD\$ MILLIONS)



STAGE 1: EDUCATION & SKILLS

"In the 21st century, you cannot separate the prospects of a nation from the calibre of its universities. The ideas, skills and attitudes which fuel economic growth, as well as social progress, come increasingly from centres of learning and research." – Chief Scientist Ian Chubb, October 2015²²

THE ROLE OF THE UNIVERSITY IN THE INNOVATION ECONOMY

The role of the university is fundamental to the national innovation system.²³ Its main functions are to research, educate and engage with industry. Universities are therefore assets in an innovation economy, investing and fostering talent, capital and R&D, and contributing to the generation of new ideas, commercialisation of new technology, entrepreneurship and business innovation, which in turn increases economic competitiveness and prosperity.²⁴ With governments across the world looking to technology innovation as a driver for national economic growth, universities are expected to be the incubators of this national capacity.²⁵

In 2013, the McKinsey Global Institute identified twelve technologies that will disrupt industries between now and 2025.²⁶ University researchers in WA are involved in leading research and innovation for eight of these technologies: Automation of knowledge work; Advanced robotics; Autonomous and near autonomous vehicles; Internet of things; Energy storage; Advanced oil and gas exploration and recovery; Advanced materials; and Renewable energy.²⁷

RESEARCH R&D

20% of all Australian R&D is conducted within universities.²⁸ Australia's Higher Education Research & Development (HERD) expenditure was \$9.6 billion in 2012, and is one of the fastest growing in the world, increasing on average by 7% a year in real terms between 2000 and 2010 which is almost three times the OECD average of 2.6%. Australian universities rank relatively well compared with other OECD countries on levels of HERD investment as a % of GDP (8th behind Sweden, Canada, Switzerland, Finland, Australia, Denmark and The Netherlands).²⁹ In contrast however, China's R&D investment has been growing at 17% per year since 2000.³⁰

In WA, universities spend only 9% (\$845 million) of the total national R&D, but dedicate 36% (\$302 million) to applied research.

HIGHER EDUCATION R&D



POWER OF STEM

Universities are primary contributors to a specialised, educated talent pool and workforce across STEM disciplines: Science, Technology, Engineering and Mathematics, which is essential for innovation industries to thrive. 65% of Australia's economic growth per capita in the last 50 years can be attributed to improvements in the use of capital, labour and technological innovation made possible in large part by STEM.³¹ STEM skills are more important now than ever before and across the world, investment in STEM is seen as a means to increase innovation and economic prosperity.

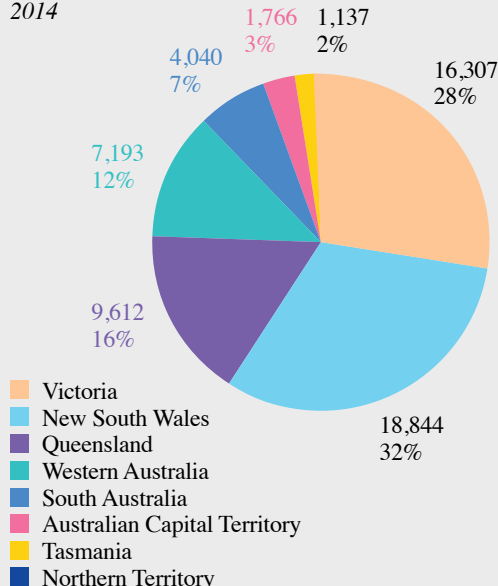
The Office of the Chief Scientist of Australia refers to STEM as the "lifeblood" of emerging knowledge-based industries such as biotechnology, information and communications technology (ICT) and advanced manufacturing. It also reinforces our competitive advantage in established industries such as agriculture, resources, healthcare and education sector.

More than 40% of jobs (5.1 million) in Australia are at risk from digital disruption.³² STEM contributes to job creating industries: 75% of the fastest growing occupations now require STEM skills and STEM-skilled jobs grew at about 1.5 times the rate of other jobs in recent years – 14% growth compared to 9% between 2006 and 2011.^{33,34} If Australia was to shift just 1% of its workforce into STEM roles, in line with other leading STEM countries, PwC estimates that it would generate, an additional \$57.4 billion in GDP over the next 20 years.³⁵ Unfortunately, Australia has a declining proportion of STEM graduates, down from 22% in 2000 to 16% in 2014.

34,035 students (domestic and international, 23,729 domestic only) were enrolled in a STEM

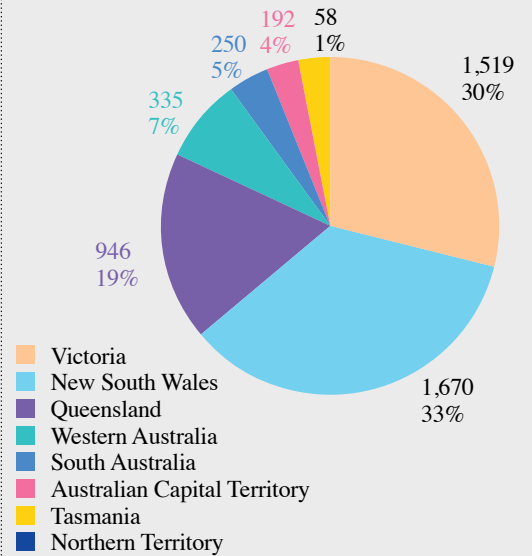
2014 % STEM GRADUATES BY STATE/ TERRITORY

Source: Department of Education and Training, 2014



2014 NO. DOMESTIC INFORMATION TECHNOLOGY GRADUATES BY STATE/ TERRITORY

Source: Department of Education and Training, 2014



degree at a WA university in 2014; only 12% of the total Australian STEM student numbers. WA universities also only produce 12% of Australia's STEM graduates (933 domestic and international, 355 domestic only). Of these, less than 8% were in ICT, well below that of Victoria (34%), NSW (31%) and Queensland (17%).³⁶

There is a large drop off rate in particular for undergraduate ICT courses across the country: Only 20% of domestic students enrolled in an ICT course complete the course after three years; lower than the overall Australian overall completion rate of 23.5% and the international student completion rate of 26%.³⁷

"A lack of skilled people is cited as the number one barrier to innovation. STEM provides the core educational competencies needed for an economically productive future. In addition to building STEM skills we need to provide more opportunities for not just graduates but tertiary, secondary and even primary school age students to engage with businesses and learn commercial skills by working on commercial problems." – Trent Lund, Australian Lead for the Innovation and Incubation of Digital Ventures, PwC

In order to increase the uptake and completion of STEM disciplines, in 2015 the WA Government identified STEM education and community outreach in its first ever science statement.²⁰ WA Chief Scientist Professor Peter Klinken cites STEM education as a key factor in developing the State's science priorities – mining and energy, health and medicine, agriculture and food, biodiversity, marine science and radio astronomy – and it will be even more important in developing next generation industries.

“Time is running out. The development of the next generation of industries, visionary leadership and advanced STEM education are matters of urgency that we need to work together to address. Now is the time to display resilience and embrace transformational change to bring forward a practical and viable broadening of our economic base.” – WA Chief Scientist Professor Peter Klinken

THE ENTREPRENEURIAL UNIVERSITY

With the shift towards a global knowledge economy, universities are being challenged to develop new strategic partnerships and collaborations that go beyond traditional research projects and teaching to deliver a third mission of entrepreneurship. This means fostering links with industry to transfer knowledge and generate new technology that contributes to economic growth. The entrepreneurial university has an enhanced capacity to provide students with new ideas, skills and entrepreneurial talent, and extends its capabilities to educate organisations through entrepreneurship, acceleration and incubation programmes and inter-disciplinary centres. Rather than only being a source of new ideas for existing industry, leading universities are combining research and teaching capabilities in new ways to become a source of new enterprise formation, especially in advanced areas of science and technology.³⁸

When viewed through the lens of a university’s capability to establish new commercial enterprises – to form startups – this is a significant challenge. Australia’s university sector is relatively small, with only 39 institutions (4* in WA), and the range of tasks they are expected to cover is wide.³⁹ So while university R&D helps to build a pipeline for innovation and technology development and commercialisation, by international standards we demonstrate poor rates of translating publicly funded research into commercial outcomes.⁴⁰

**The four WA public universities are: Edith Cowen University (ECU), Curtin University, Murdoch University, The University of Western Australia (UWA)*

Our national data shows that while research expenditure translates into a range of commercial outcomes including training and knowledge exchange, research consultancy, licencing and other IP activities, startup formation is rare and

therefore an incredibly expensive exercise within current university institutional frameworks. It is a challenge for all universities, but Australia ranks consistently lower than Canada, the UK and US on startups formed for every \$100 million invested in research – merely 0.4. Based on this ratio, an individual startup is leveraging a \$250 million investment.

Within the four public WA universities, there are 4 times more FTEs dedicated to commercialisation on average than at universities in the UK.⁴¹ However from 2000-2013, with \$4.5 billion in research expenditure, WA universities spun-out only 42 startups, making the cost of an average startup \$107 million+ (compared to the national average in 2013 of \$250 million).

It is worth noting research in the US which finds that historically startups formed out university IP tend to be disproportionately successful.⁴²

It is widely recognised that entrepreneurship at universities may not be compatible with the core university functions of teaching and research (and associated metrics of research income, citations and rankings). The metrics therefore need to change, and a university’s E&I culture, connectivity and influence on the regional entrepreneurial community needs to be accounted for.⁴³

DEVELOPING ENTREPRENEURSHIP AND INNOVATION (E&I) SKILLS

WA universities offer a number of courses on entrepreneurship and innovation (E&I) that refer closely to the development of technology-based companies. Many of these have run since the late 1990s. Broadly, these are aimed at enabling students to understand a range of business factors involved in innovation and entrepreneurship and applications across small to medium-sized enterprises (SMEs) and large organisations.

10+

New E&I courses in last 2 years

In the last two years, several new E&I courses and units have been introduced, including Entrepreneurship, Innovation and Creativity (ECU) and *Applied Entrepreneurship and Innovation* (Murdoch), and targeting high-growth sectors such as *Biotechnology Commercialisation* (UWA).

Curtin’s Ignition program, which has been running since 2010 through its Centre for Entrepreneurship, continues to provide opportunities for new businesses to accelerate their growth.

“The Atlassian founders Scott Farquhar and Mike Cannon-Brookes may have ‘dropped out’ of university but their partnership was forged at an Australian university and their start-up’s beginnings reflect aspects of university culture at its best - inquiry, challenge and even subversion. Possibly Farquhar and Cannon-Brookes needed to ‘drop-out’ to ‘tune in’ their model. Universities shouldn’t see that as a failure. Quite the opposite. It’s an evolution.” - Professor Barney Glover, Chair Universities Australia

New courses are seeking to share knowledge on tech startup methodology and disruptive innovation practices. *Innovation and Startup Practice*, developed with Sam Birmingham, who runs Startup Weekend Perth, will be available from 2016 at UWA’s Faculty of Engineering to introduce the theory and practice of founding a disruptive tech startup. It aims to equip students with the mindset and tools to move from academia to real market opportunities.⁴⁴

“In five years, we want it to be as natural for high achieving, engaged students to do a startup as to join a graduate corporate program.” - Mark Shelton, Bloom CEO

Another novel program, Start Something piloted at UWA in August 2015, aims to tap into entrepreneurial interest and build commercialisation capability in individual researchers and students; and the rise of student-led E&I activity, notably the set up of student innovation hub Bloom, is building a capable undergraduate network of entrepreneurs within the university and across disciplines.

“I learnt how to plan and think about business. The program has removed my fears and insecurities about being able to run a viable, dynamic business. It has allowed me to think of my research in context of the real world, real exciting stuff – now the lean canvas drives the research,” UWA Researcher, Start Something graduate

The increasing number of initiatives aimed at promoting STEM to school children should also be noted, with strong uptake of learn-to-code initiatives such as CoderDojos, and tech start up foundation skills, with stand out program Just Start IT.

START-UP COMPANY ACTIVITY - START-UP COMPANIES FORMED PER \$US100M RESEARCH EXPENDITURE (NO.)

Source: National Survey of Research Commercialisation 2012-2013 (published January 2015)

Issues	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Australia	0.9	1	0.9	0.8	0.3	0.5	0.3	0.3	0.4	0.4
Canada	1.4	1	0.8	1.1	0.9	1	1	1.5	1.3	1.5
UK	2.4	2.9	3.1	2.9	2.1	2.6	2.9	2.1	1.6	-
US	1.1	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.3

STAGE 2: GROUPS, HUBS & PROGRAMS

JUST START IT

2,000+

School students engaged in 2015

Recognising that entrepreneurial development can start young, the Just Start IT program was founded by Lainey Weiser in 2014 to teach high school students the skills to develop their own tech startups. Run as an 18 week mentored program at high schools in Perth and now across Australia, it has engaged 2000+ students across 42 schools in 2015, has been endorsed by the WA Certificate of Education as a Personal Development Program, and counts 5 points towards the TEE score. It is currently being developed as a VET program for Cert I, II and III in Business and Cert I in IT.

ARTIFACTORY

3

Mechanical Steam Ostriches built

Established in 2009 as a not for profit community group, the Artifactory is the primary makerspace/hackerspace in Perth. The Artifactory currently occupies a large warehouse in Osborne Park and shares resources such as 3D printers, laser cutters, robotic and non-robotic tools, welders, sewing machines, jigsaws, desks and workstations. It has 50+ paying members and there have been 18 build your own modular synth nights, 52 NoizeMaschin experimental music nights (highest musical voltage achieved 40,000Hz), 103 Arduino nights, 3 mechanical steam ostriches built and one giant robot installed.

LEVEL ONE

GAMES+

Perth's only co-working space exclusively for game developers (both digital and physical).

Level One, on Fitzgerald Street in West Perth, began as a Film & Television Institute (FTI) initiative running once a week at the State Library of Western Australia. Thanks to a partnership between FTI and SK Games, Level One is now running a trial fulltime co-working space until at SK Games. Since its establishment in April 2015 Level One has been an invaluable resource for both established and up and coming Perth game makers offering a place to meet, network, collaborate and showcase their games.

ROBOGALS

6,813+

Number of attendees over two and half years

Robogals is a global not-for-profit that aims to encourage more young women into studying engineering and maths based sciences at a tertiary level. Robogals was started by 2012 Young Australian of the Year Winner Marita Cheng in 2008 at the University of Melbourne. The organisation has grown into five regions (Asia Pacific, North America and Europe, Middle East and Africa) and 30 chapters across the world. Robogals main activity is running free robotics and engineering workshops for female primary and secondary students in order to educate them on what engineering is and what the possibilities are. Since 2008 Robogals has globally taught and inspired over 30,000 girls to pursue careers in engineering.

SPACECUBED

750

Number of Spacecubed members

Founded in 2012 Spacecubed is a social enterprise with the primary purpose of supporting 20,000 Western Australian Entrepreneurs by 2025. Spacecubed runs an increasing number of inspiring and collaborative spaces including Spacecubed and FLUX. It has also recently started supporting a series of startup programmes and accelerators including Founder Institute, Vocus Upstart, RAC SeedSpark, HBF Activate and resource focused accelerator Unearthed. It is a central location for over 230 startup, entrepreneurship and social enterprise related events in 2015 alone. Spacecubed has 750 members and estimates that over 30,000 people have attended events since 2012. Spacecubed with Hawaiian launched FLUX in June 2016 with a Resources Innovation Hub called CORE and a Maker Space called SOLDER designed to support hardware startups.

CISCO GLOBAL IOE INNOVATION CENTRE

\$35M

2015 Investment in Cisco IoE Centre

In July 2015, Cisco established the Cisco Internet of Everything (IoE) Innovation Centre, Australia, in Perth and Sydney – its 8th open innovation hub worldwide, citing Australia as an emerging hub for global start-ups, innovation, and the global knowledge economy. Based at Curtin University, the Centre aims to develop projects with technology partners, startups and industry experts using cloud, analytics, cyber security and IoT network platforms to build potentially disruptive solutions in the partners' core areas of strength: resources, agriculture, astronomy and smart campus. The Centre links to Cisco's global IoE Centre network, and will expand to include CSIRO and other industry partners and focus areas in the future.

BLOOM

25+

Student startups in 2015

Founded in 2013 by University of Western Australia student Mark Shelton, Bloom is a student-led non-profit organisation that encourages and supports entrepreneurial young Western Australians, primarily university students and recent graduates. It opened its first co-working space, the Bloom Lab at St Catherine's College (adjacent to The University of Western Australia) in March 2015. Since then, it has held more than 75 events with 2,500+ attendees, and has helped launch 25+ startups with the support of a 50+ strong mentor network. In 2016, Bloom plans to form new strategic alliances, including Asia-focused partnerships and funding to expand its programs.

TOP 30 STARTUP MEETUP GROUPS BY MEMBERSHIP

Morning Startup - Perth	1586
Agile Perth	1328
Perth Small Business meetup	910
Perth Startup Founder 101	902
Port80 Perth	879
Silicon Beach Perth	854
Perth Solo & Small Business Owners' Hangout	849
Perth Rapid Startups	788
Perth Agile Meetup	698
Perth iOS Developers	670
Entrepreneurs in Perth	660
WordPress Perth	652
DevOps Perth	595
District32 Business Reboot	555
Front End Web Developers Perth	481
Perth Entrepreneurs	478
Experience Design Perth	462
Perth MS Cloud Computing User Group	426
Joondalup Women in Business	419
Inspired Entrepreneurial Women of Perth	395
Big Data Perth	371
Perth .Net	357
Graphic Designers Perth	352
Business Bootcamp & Networking Group	343
Ruby on Rails Oceania	329

TOP 30 STARTUP MEETUP GROUPS BY NO. EVENTS

Silicon Beach Perth	217
Perth Project Crowd Fund	152
Morning Startup - Perth	131
Perth Small Business meetup	102
Perth iOS Developers	95
Joondalup Women in Business	92
District32 Business Reboot	91
Lean Startup Perth	87
Agile Perth	86
Ruby on Rails Oceania	71
Perth Web Accessibility & Inclusive Design	68
Perth Small Business Networking Group	67
Perth Business Club	66
Perth Networking Group	66
Enterprise Clubs of Australia	62
Perth Linux Users' Group	57
Experience Design Perth	56
Port80 Perth	55
Front End Web Developers Perth	51
Perth Entrepreneurs	47
Makers and Changemakers	44
eGroup WA	42
Drupal WA	39
SAGE-AU WA	38
Perth Appreneurs MasterMind Group	37

“We have a lot of talented people in the Perth games industry, but not a lot of government support. Co-working spaces have been proven to be a key success factor for growing local industries, providing amplification and cohesion for the community. Melbourne has The Arcade which has been hugely successful, and we’re aiming to do the same thing here.”

Dr Kate Raynes-Goldie
Director, Games & Interactive Programs FTI / Program Manager, Level One

STAGE 3: INCUBATION & ACCELERATION

STARTUP FACTORIES

13PLUS*

Number of pre-accelerators, accelerators or incubators currently operating in Western Australia.

Western Australia has seen an increasing number of pre-accelerator programs, accelerators, seed accelerators and incubators launch in the last three years. In this report we define an accelerator as a structured program to help innovative early stage companies swiftly come to market. They generally provide mentoring, structured programs (often of 3 to 6 month duration) and provide opportunities for potential investors to meet startups - generally in the form of a 'demo day'. Startup teams must apply to attend. We differentiate accelerators from seed-accelerators in that seed-accelerators provide seed funding for companies that attend the program. This is often in the range of \$20,000 to \$150,000 for a small portion of equity. In this report we define an incubator as an unstructured program and environment for developing innovative early stage companies. As with accelerators mentoring and administrative assistance can be provided, and investment may or may not be involved. In Israel seed-incubators are a common model, and in the USA seed-accelerators are increasingly favoured.

RAC SEEDSPARK

1ST

Seed-fund startup accelerator in WA

Launched in 2014 by the RAC and led by Jamin Hirte and Nathan Sturcke (RAC) in partnership with Spacecubed, SeedSpark is WA's first corporate accelerator program providing seed-funding for Western Australia startups. In its first run in September 2014, 220+ startups entered a 5 week selection and education process, of which 3 ideas were awarded \$42,500 and their teams entered into an 8 week RAC-supported accelerator program. SeedSpark returned in October 2015, this time involving RAC's 820,000 members in the selection process and with \$60,000 in funding. In a demonstration of how the local startup ecosystem is honing skills and reinforcing itself, two of the three first year SeedSpark winners had been successful graduates of the Founder Institute Perth.

**We've included two WA resource focussed accelerators (Unearthed and KPMG Energise) on page 48 and 49 of the report, within the resources section. A full list is on page 72.*

CURTIN ACCELERATE

\$20K

Four researcher startups launched

Curtin Accelerate is Curtin University's annual program run over 11 weeks to support first-time entrepreneurs develop their early stage innovative business idea. It is open to students, staff and Curtin University alumni. In 2015, 4 teams were selected to commercialise their ideas, receive mentorship, access to work space, industry networks and receive \$5,000 in equity-free grant funding. Teams then pitch their developed ideas at a Demo Day to potential investors. The first round concluded in March 2014 and was run by Jeremy Lu (GroupMap); the developed businesses included a flexible work skills program, development of precision agriculture algorithms, a system to insert referees into job applications, and the synthesising of a quad copter with a jump jet for drones. A second round launched in October 2015 and will be run by VC Matt MacFarlane (Yuwaa Capital) in 2016.

START SOMETHING

37

Deep research ideas mobilised

Start Something is a pilot activity of UWA's new Innovation Quarter (IQ), an initiative to foster innovation, industry engagement and entrepreneurship for students, staff and the wider community. Developed in partnership with Peter Rossdeutscher (Innovation Cluster) and with content provided and implemented by Atomic Sky, the program is designed to build researcher and post-graduate student entrepreneurship capability and build up the skills needed to commercialise their research and better engage with industry. 122 researchers attended Start Something's first commercialisation seminars, with 37 researchers completing the commercialisation workshops with a focus on social impact, sciences, engineering and technology, with 3 prize-winners. It is intended to extend the program to other universities and research organisations.

VOCUS UPSTART

\$320K

Investment in first tech startup cohort

Launched in early 2015 with the support of Amcom (now Vocus), Upstart was the first tech accelerator in WA and first to provide seed funding in return for equity. The program was founded by Robert Nathan (eGroup WA) and Tony Grist (Amcom Chair) and offered \$40,000 in return for an 8% equity stake. It ran for 13 weeks at Spacecubed with 8 startups and 32 mentors, including local VCs Rob Newman and Matt Macfarlane as lead mentors, investing \$320,000 in total in its first cohort. Fact: 25% of startup founders in the first cohort were women and 25% were French.

FUSION FOUNDERS PROGRAM

32

Investable tech businesses

The Fusion Founder Program, developed by the investor-led startup studio Atomic Sky was founded in 2012 by Andy Lamb and Simon Macfarlane and is an intensive 3 month business building program for tech startups run at Atomic Sky. Aimed at building the capability of founders, the program brings together experienced entrepreneur and industry mentors, guest speakers, in-house workshops, collaboration sessions and startup seminars for the 8 startups participating in each cohort. The program includes membership of TechHub and access to a mentor network, discounted software development, hosting credits and marketing and PR services. By the end of the program, a founder should be able to present a viable, investable business to potential clients and investors.

ORBITAL ACCELERATOR

\$100M

Total value of manufacturing equipment accessible to program participants.

The Orbital Accelerator program is run by the publically listed Orbital Corporation (originally founded by billionaire automotive engineer Ralph Sarich). The accelerator focuses on helping mid-stage technical entrepreneurs developing industrial technology and hardware (either electronic, mechanical or mechatronic).

Orbital's accelerator program includes a combination of cash and in-kind services in engineering; including conventional services such as CAD design, CAE analysis, and prototyping as well as validation support using an extensive range of testing facilities. Participants get access to Orbital Corp's extensive manufacturing facilities, and can also leverage Orbital's market access including the global automotive sector, aerospace (including access to divisions of Boeing and Textron through its drone engine propulsion business), and the local resources and energy sectors when it comes time to conduct site trials. Intake into the program is open all year round.

FOUNDERS INSTITUTE

15

Founder Institute graduates

The Founder Institute is a leading global idea-stage accelerator program to support the development of tech startup businesses across the world by providing high-potential entrepreneurs with a Silicon Valley developed curriculum and mentorship. The Perth chapter was launched in 2013 by Directors Claire McGregor and Dash Dhakshinamoorthy and graduated 15 startups in 2013 and 2014 through its 4 month program. It maintains a network of 20-40 experienced mentors per semester. A Directors' Prize is awarded to send a founder at the end of each semester to Silicon Valley for 10 days to attend Founder Lab, which follows on from the Founder Institute and links founders to venture capitalists and advisors on the global stage. Andrew Hall and Kirsten Rose are the 2015 Perth Directors.

“I don't think capital is a problem for experienced management teams in Perth, its certainly a problem for an unproven management team, the type that typically enters the accelerator ecosystem.

We can't ignore this part of the funnel, we need to work out how to ramp up funding and surround these deals with experience if we really want to try and re-shape the Perth start up ecosystem for the better.”

**Andrew Hall
Director,
Founders Institute**

STAGE 4: VENTURE CAPITAL

“Over the next ten years the average Australian will donate (via the tax system) \$1,700 to other Australians buying a second or third house. The same average Australian will (through their super fund) invest less than \$35 in venture capital.”
Ivor Ries, Senior Analyst, Morgans Financials⁵⁰

STATE OF WA VENTURE FUNDS

Research by Boundless estimates that there are currently five Venture Capital funds headquartered in WA; Yuuwa Capital, Stoneridge Ventures, Brandon Capital, Go Capital and Eve Investments. However only Go Capital and Eve Investments have made local investments within the past 12 months.

Our research identified 9 startups in WA that have received over \$13 million in funding since 2010 from Venture Capital firms. Of these, 7 have accessed funds from other regions, with the remaining 3 (APE Mobile, Filter Squad and Drenalina) successfully raising funds from local funds (Viburnum Funds, Yuuwa and Crowded Space respectively).

IMPACT OF VENTURE CAPITAL

In the US, high growth venture capital backed companies, of which there are 24,000, account for 21% of GDP (\$3.1 trillion in revenue) and 11% of private sector employment (12 million jobs). In Israel, 70% of economic growth has been attributed to high growth, venture capital backed technology companies. In contrast, Australian VC backed firms (of which there are around 500 in total) generate only 0.01% of GDP.⁴⁶

FUNDRAISING AND INVESTMENT

According to AVCAL, VC firms fundraising in Australia for FY2014 was 21% lower compared to 2013, totalling \$120 million across four funds. And yet it is recognised that Australia currently has the world's 3rd largest pool of investable funds, with \$1.7 trillion assets under management.⁴⁷

Total Australian VC investment rose nearly four-fold year-on-year to \$516 million in FY2014. A large part of this increase was due to US-based Insight Venture Partners' US\$250 million (A\$266 million) investment in Campaign Monitor. This was the largest ever single VC investment in an Australian technology company.⁴⁸

Further analysis from AVCAL suggests that VC and PE investments in Australia currently neglect the start-up/seed stage (less than 4% of funds invested), instead investing in the de-risked growth and buyout stages. It remains evident that owing to regional isolation, WA based entrepreneurs are at a disadvantage in getting the attention of customers and late stage Venture Capital Firms. Therefore there exists the need to focus on building the most efficiently scalable business possible.^{12,48}

LOCATION, LOCATION, LOCATION

New research by Stanford Graduate School of Business professor Shai Bernstein found that despite a variety of state and local initiatives to

TOTAL WA STARTUP VC FUNDING

\$13M

Total funding to WA startups in 2010 to 2015 from Venture Capital firms.

VENTURE CAPITAL PER CAPITA ^{19,20,21}

Silicon Valley	\$4,241
Israel	\$183
USA	\$81
Switzerland	\$74
Norway	\$54
Melbourne Cup Bets	\$52
Sweden	\$40
Western Australia 2015 - All Tech ^(a)	\$35
Western Australia 2015 - Est-Tech Co ^(a)	\$29
Finland	\$28
Denmark	\$16
France	\$15
Britain	\$15
2012 Aus Olympic Team	\$14
Ireland	\$14
Netherlands	\$14
Belgium	\$12
New Zealand	\$11
Austria	\$8
Perth 2015 - Startups ^(a)	\$7
Perth 2013 - All tech ^(a)	\$6
SE Queensland - All tech ^(a)	\$5
Australia	\$4
SE Queensland - All tech ^(b)	\$4
Perth 2013 - All tech ^(b)	\$3
Regional Queensland - All tech ^(a)	\$1

help create vibrant startup ecosystems and generate VC investment, infrastructure (specifically transportation access to a region) — was crucial for a city to attract capital. The research proved that face time, not just Skype meetings and conference calls, had a significant impact on a startup's success.

ALTERNATIVE SOURCES OF FUNDING

There is very few growth funds focussed on technology in Western Australia. Given the sparsity WA tech companies are often forced to seek capital from foreign markets or the public markets (the Australian Securities Exchange) at a much earlier stage than is ideal.

(a) Note these funding figures include all funding sources: venture capital, private equity, angel, accelerators and government funding.

(b) Note these funding figures all funding sources, but exclude government funding.

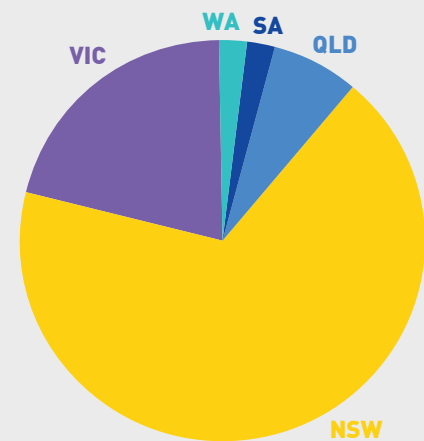
TOTAL WA EST-TECH VC FUNDING

\$24.6M

Total funding to WA established technology companies in 1998 to 2015 from Venture Capital.

TOTAL VC FUNDING 2010-2014 BY STATE

Source: AVCAL 2014 ⁴⁸



“Australian investors have traditionally had a strong appetite for liquidity when investing, particularly when investing in the early stages of a company's lifecycle. Compared to larger ecosystems there is a lack of depth in the private markets here in Australia, however there is proven support for early stage companies that provide liquid investment options, as the mining industry has shown over decades.

An LIC (Listed Investment Company) is not restricted in its investment mandate and can invest in the private markets, thereby allowing early stage companies to raise money and remain private which has tremendous regulatory cost and disclosure benefits. At the same time an LIC can provide the liquidity that Australian investors desire.”

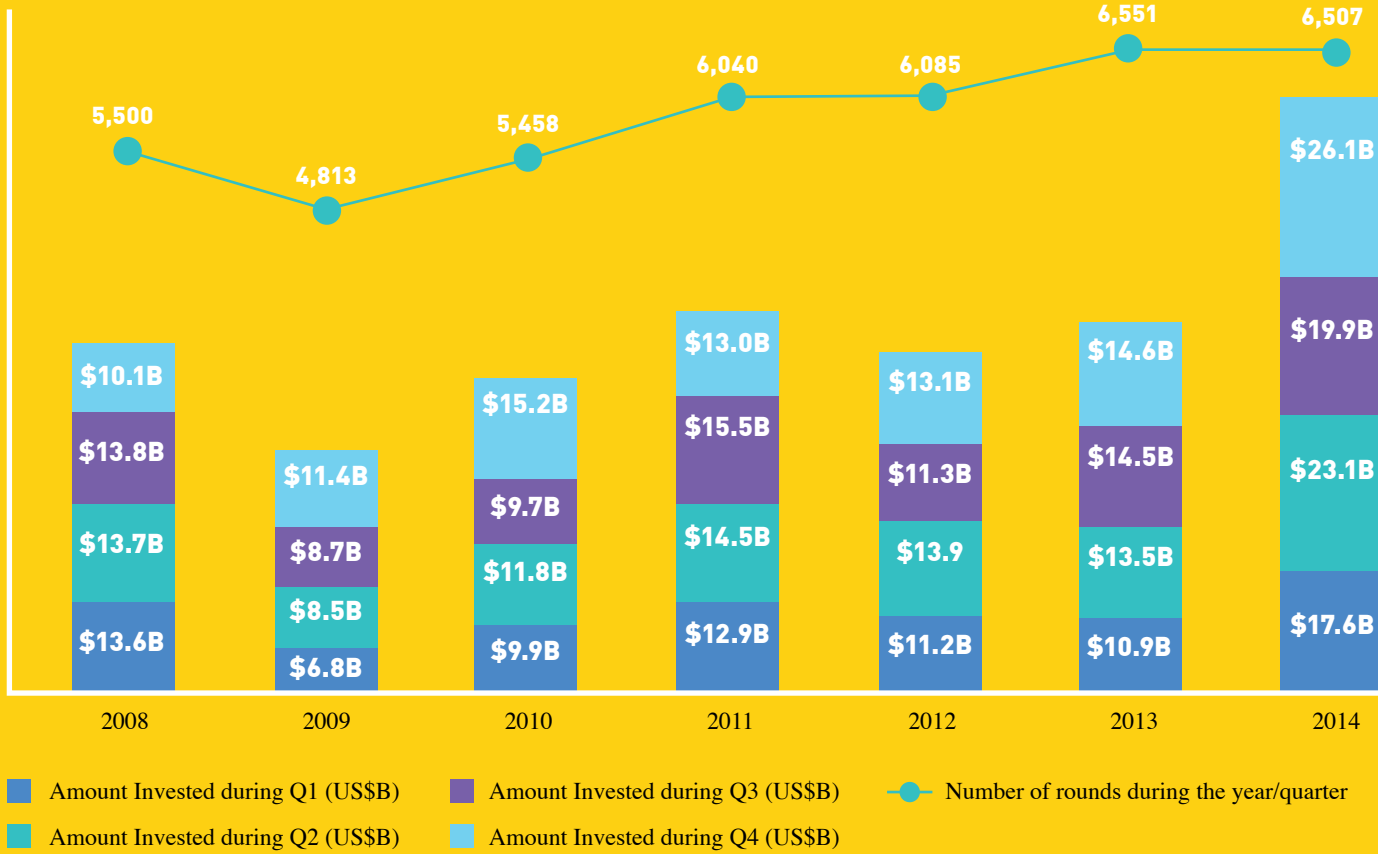
Ben Rohr, Investment Director, Eve Investments

EVE INVESTMENTS (ASX CODE: EVE)

Eve was formerly known as Energy Ventures and used this Listed Investment Company (LIC) structure to investment in Mining opportunities for over a decade. Since mid 2015, Eve has stripped out those previous investments and is now focusing on early stage technology opportunities. Since its refocus Eve has made one investment of \$3.2M into a Melbourne based food technology company, Omniblend Innovation, to commercialise a product to help people living with diabetes - GlucoControl. Investors and the founders of Omniblend Innovation have found the LIC structure aligns well with requirements on both sides. Eve continues to actively seek opportunities and looks forward to growing its portfolio of investments in the next 12 months.

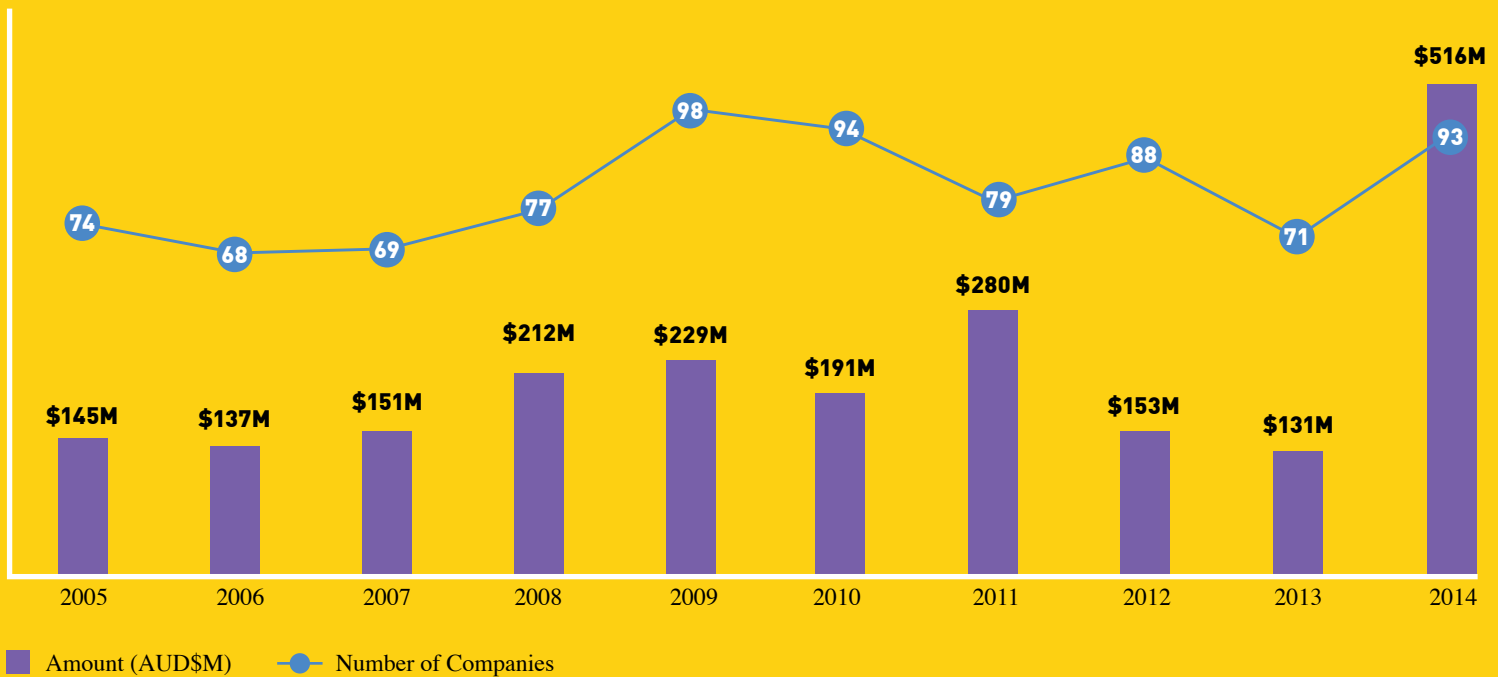
TOTAL GLOBAL VENTURE CAPITAL FUNDING 2008 - 2014

Source: EY Global VC Insights and Trends Report 2014⁴¹



TOTAL AUSTRALIAN VENTURE CAPITAL FUNDING 2005 - 2014

Source: AVCAL 2014⁴⁸



STAGE 5 - ASX*

AUSTRALIAN STOCK EXCHANGE

Australian has the world's 3rd largest investment fund asset pool with over \$1.6 trillion of funds and over 2,100 listed companies spread over a range of geographies and sectors. By free-float market capitalisation the Australian Stock Exchange (ASX) ranks 2nd in Asia and 5th in the world, and consistently ranking in the world's top 5 exchanges for capital raising. It is a gateway to global capital given that 45% of investors on the ASX are international.^{52,53}

TECH STOCKS

In foreign developed markets technology is seen as a good investment option and an important hedge against disruptions to traditional sectors. In the US public market technology companies are very well established, with the ICT sector now making up 20% of the S&P 500 index - a larger sector than financial services or healthcare. The NASDAQ Internet Index has returned 17.9% per annum over the past four years and is one of only two sectors rated Outperform by Schwab.⁵³

In comparison the market capitalisation of Information technology companies listed on ASX represents only 0.8% of the ASX 200, and Telecommunications slightly more at 5.4%. This compares to financial services comprising 47.7% of the ASX 200 (Aug 2015).⁵⁴

However, investor interest in tech stocks, both small and large cap, is increasing with over 141 technology and telecommunications companies listed on the ASX. Many Australian investors are looking to gain exposure to the technology sector, recognising that the industry breakdown in Australia is likely to trend towards other developed markets over time. The S&P/ASX 200 Info Tech Indices has outperformed the S&P/ASX 200, with price returns over the last 10 years of 8.53% compared to the benchmark S&P/ASX 200 of 1.62%.⁵⁵

SMALL CAP FUNDING

The ASX has a long history of funding and listing early stage companies, particularly those in the resource & energy sectors. But recently technology, media and telecommunications have been leading new listings with 47% of listings and 27% of all IPOs leading the listings by sector in the first half of 2015. Tech companies are also taking advantage of failing resources companies using these shell companies to facilitate Reverse Takeovers (RTO).⁵⁶

WA STARTUP ASX LISTINGS

This report identified 10 listings by early stage digital and internet technology companies based in Western Australia – all within the past 2 years. Raising a total of \$49 million and an average of \$4.9 million per company. Six of the ten have seen share prices increase since listing with 1-Page radically growing its share price over the 3 years since listing. Many are still in the research and development stage with almost all having revenue under \$1 million per year in the 2015FY with the exception of Rewardle which recently began to monetise its merchant loyalty network. While it appears early for these startups to raise the challenges involved with raising within public markets and the downturn in resources conspire to create a situation where Reverse Listings are an attractive option for early stage technology companies.

**Please note while we have included information about startups listing on the ASX as Stage 5 in the report, the current data shows these startups listing on the ASX at an earlier stage, especially in terms of revenue, than those in Stage 4 that are raising money from Venture Capital firms. As far as we could identify those that raised money from Venture Capital firms had average revenue above the average revenue for listed startups.*

NO. ASX LISTED COMPANIES BY GICS INDUSTRY GROUP⁵⁷

Materials	712
Energy	247
Not Applicable	215
Diversified Financials	132
Software & Services	112
Capital Goods	99
Real Estate	84
Pharmaceuticals & Biotechnology	74
Health Care Equipment & Services	74
Commercial Services & Supplies	63
Consumer Services	56
Retailing	49
Food, Beverage & Tobacco	40
Media	37
Utilities	28
Classification Pending	28
Technology Hardware & Equipment	26
Telecommunication Services	25
Consumer Durables & Apparel	24
Transportation	22
Insurance	14
Banks	14
Automobiles & Components	8
Household & Personal Products	6
Food & Staples Retailing	4
Semiconductors & Semiconductor Equipment	3

TOTAL INVESTMENT FUND ASSETS BY COUNTRY (US\$B) - 2014⁶⁰

United States	\$14,306
Luxembourg	\$2,872
Australia	\$1,647
France	\$1,491
Ireland	\$1,387
United Kingdom	\$1,101
Brazil	\$1,072
Canada	\$912
Japan	\$782
China	\$420

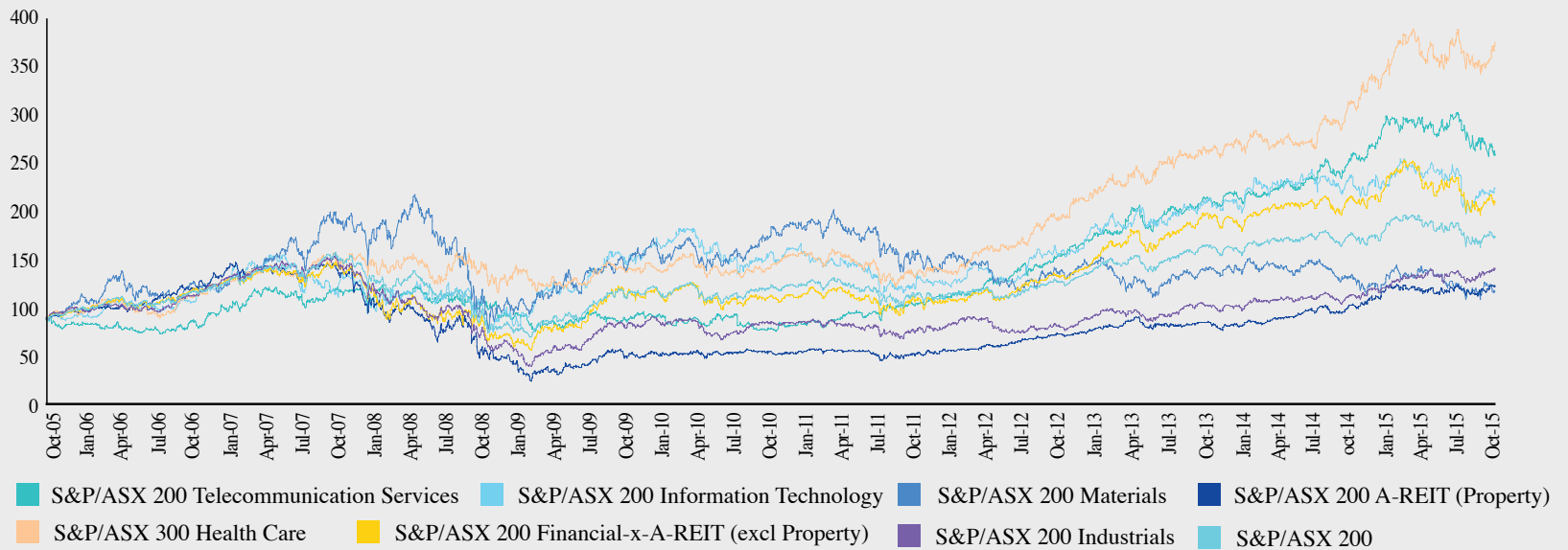
TOTAL EQUITY CAPITAL RAISED BY EXCHANGE 2009-2013 (US\$B)⁶⁰

New York Stock Exchange (NYSE)	\$886
Hong Kong Stock Exchange	\$333
London Stock Exchange	\$291
NASDAQ	\$241
Australian Securities Exchange (ASX)	\$241
Japan Exchanges	\$200
Shanghai Stock Exchange	\$178
Toronto Stock Exchange (TSX) & Toronto Venture Exchange (TSX-V)	\$178
BM&F Bovespa (Brazil)	\$157
Shenzhen Stock Exchange	\$147
Singapore Stock Exchange	\$54

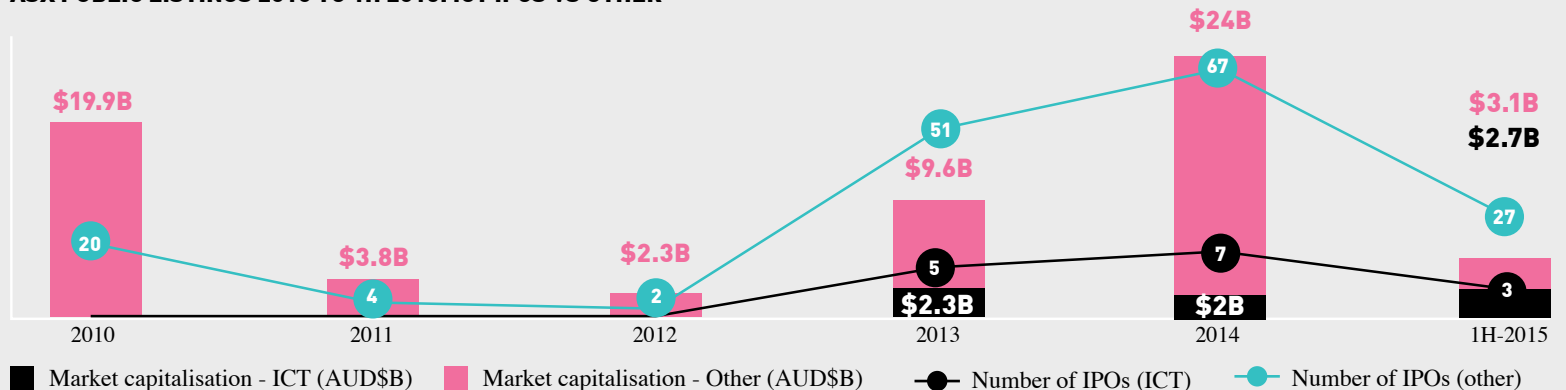
WA STARTUP LISTINGS: IPOs AND RTOS⁵⁸

Startup	Startup Type	Year Est	Revenue 2015FY	Revenue 2014FY	Listing Type	Date Listed	\$ Raised Listing	Share Price at Listing	Share Price at 27Nov15	% Chnge Since Listing	Mkt Cap 27 Nov 15	No. Years to List
1-Page (1PG)*	HR-Tech	2011	\$300,000	\$130,214	RTO	Oct-14	\$8.5M	\$0.20	\$3.85	1825%	\$526M	3
Norwood Systems (NOR)	Communication	2011	\$72,680	\$0	RTO	Apr-15	\$5.5M	\$0.02	\$0.14	575%	\$99M	4
Resapp Health (RAP)	Health-Tech	2014	\$0	\$0	RTO	Jul-15	\$4M	\$0.02	\$0.08	305%	\$46M	1
Spookfish (SFI)	GIS	2013	\$131,021	\$15,000	RTO	Feb-15	\$5M	\$0.04	\$0.06	57%	\$43M	2
Brainchip (BRN)	Big Data	2011	\$0	\$0	RTO	Sep-15	\$3.5M	\$0.15	\$0.22	43%	\$144M	4
Activistic (ACU)	Fin-Tech	2012	\$100,000	\$9,859	RTO	Nov-15	\$3.9M	\$0.11	\$0.13	18%	\$21M	3
Rewardle (RXH)	eCmrce/Market	2011	\$1,240,000	\$20,000	IPO	Oct-14	\$4M	\$0.20	\$0.20	0%	\$24M	3
MyFiziq (MYQ)	Health-Tech	2014	\$5,267	\$0	IPO	Aug-15	\$6M	\$0.20	\$0.15	-25%	\$5M	1
XTV Networks (XTV)	Ad-Tech	2011	\$754,000	\$31,000	RTO	Jul-15	\$6M	\$0.02	\$0.01	-45%	\$13M	4
iCollege (ICT)	Ed-Tech	2014	\$670,000	\$3,000	RTO	Apr-14	\$2.6M	\$0.20	\$0.09	-54%	\$6M	0
Total			\$3,272,968	\$209,073			\$49M	\$1.16	\$4.92	2700%	\$928M	25
Average			\$327,297	\$20,907			\$4.9M	\$0.12	\$0.49	270%	\$93M	2.5
Median			\$115,511	\$6,430			\$4.5M	\$0.13	\$0.13	31%	\$33M	3

TECH STOCKS: PERFORMANCE OF KEY S&P/ASX INDICES 2005 TO 2015⁵⁹



ASX PUBLIC LISTINGS 2010 TO 1H 2015: ICT IPOs VS OTHER⁶¹



*Note: 1-Page was founded in San Francisco and maintains a US HQ. As far as we could identify the Perth office is solely to enable listing on the ASX.

WA ESTABLISHED TECH COMPANY LISTINGS: IPOs AND RTOS

Startup	Startup Type	Year Est	Revenue 2015FY	Revenue 2014FY	Listing Type	Date Listed	\$ Raised Listing	Share Price at Listing	Share Price at 22Mar16	% Chnge	Mkt Cap 22Mar16	No. Years to List
Aconex (ACX)	Construction	2000	\$82,000,000	\$66,000,000	-	-	-	-	-	-	\$762M	-
Migme (MIG)	Social	2005	\$6,058,190	\$1,948,759	RTO	Aug-2014	\$11M	\$0.20	\$0.66	230%	\$177M	9
Objective Corp (OCL)	HR-Tech	1987	\$50,000,000	\$49,000,000	-	Aug-2000	\$0	\$0.00	\$1.65	-	\$148M	13
Near Map (NEA)	GIS	2000	\$23,626,000	\$17,846,000	-	Dec-2000	\$0	\$0.00	\$0.39	-	\$142M	1
Iwebgate (IWG)	Info-Tech	2004	\$953,183	\$1,569,331	-	Jan-2011	\$0	\$2.10	\$0.13	-94%	\$83.8M	7
Transaction Solutions (TSN)	Fin-Tech	2001	\$290,929	\$3,646,941	-	Aug-2001	\$0	\$0.00	\$0.03	-	\$62.5M	1
Imdex (IMD)	Big Data	1980	\$188,227,000	\$183,485,000	-	Sep-1987	\$0	\$0.00	\$0.24	-	\$62.2M	7
Panorama Synergy (PSY)	Electronics	2001	\$170,279	\$19,055	-	May-2001	\$0	\$0.00	\$0.10	-	\$55.7M	1
Structural Monitoring Sys (SMN)	Transport	1995	\$0	\$150,000	-	Aug-2004	\$0	\$0.00	\$1.51	-	\$49.4M	9
Orbital Corp (OEC)	Drones	2000	\$9,660,000	\$18,337,000	-	Jan-1989	\$0	\$0.00	\$0.54	-	\$41.7M	
Ziptel (ZIP)	Info-Tech	2004	\$651,000	\$570,000	RTO	Jul-2014	\$5M	\$0.20	\$0.41	103%	\$35.2M	10
Alcidion Corp (ALC)	Health-Tech	2000	\$4,843,321	\$2,365,504	RTO	Feb-2016	\$2M	\$0.05	\$0.05	2%	\$34.9M	16
Digital X (DCC)	Fin-Tech	1988	\$36,600,625	\$4,409,335	RTO	Mar-2014	\$9.1M	\$0.04	\$0.17	346%	\$33.8M	26
Velpic (VPC)	Internet	2008	\$330,193	\$228,420	RTO	Nov-2015	\$4M	\$0.03	\$0.06	136%	\$27.8M	7
Dti Group (DTI)	Security	1995	\$14,706,000	\$19,798,000	IPO	Dec-2014	\$2M	\$0.35	\$0.36	1%	\$27.5M	19
Tech Mpire (TMP)	Ad-Tech	2008	\$11,849,518	\$1,137,818	RTO	Jul-2015	\$3.1M	\$0.24	\$0.45	88%	\$27.3M	7
Rent.Com.Au (RNT)	Property	2000	\$171,197	\$294,045	RTO	Jun-2015	\$5M	\$0.20	\$0.19	-5%	\$17.8M	15
Fast Brick (FBR)	Robotics	2006	\$226,603	\$125,684	RTO	Nov-2015	\$5.75M	\$0.02	\$0.02	0%	\$16.6M	9
Stream Group (SGO)	Insurance	2000	\$34,627,298	\$29,502,483	-	-	\$0	\$0.00	\$0.08	-	\$16.4M	-
Decimal (DSX)	Fin-Tech	2006	\$2,560,000	\$1,390,000	-	-	\$0	\$0.00	\$0.05	-	\$11.9M	-
Quickflix (QFX)	On-Demand	2004	\$19,222,000	\$18,043,965	IPO	Jun-2005	\$3M	\$0.20	\$0.00	-100%	\$2.2M	1
Cv Check (CV1)	Security	2004	\$2,629,225	\$1,110,125	IPO	Sep-2015	\$9.9M	\$0.20	\$0.35	75%		11
Peppermint Innovation (PIL)	Fin-Tech	2007	\$31,137	\$0	RTO	Dec-2015	\$3.9M	\$0.02	\$0.02	-10%		8
Total			\$489,433,698	\$420,977,465			\$63.7M	-	-	-	\$1,836M	-
Average			\$21,279,726	\$18,303,368			\$2.89M	\$0.17	\$0.34	59%	\$87M	9.3
Median			\$4,843,321	\$1,948,759			\$2M	\$0.02	\$0.18	2%	\$35M	9.0

“OVER THE NEXT TEN YEARS THE AVERAGE AUSTRALIAN WILL DONATE (VIA THE TAX SYSTEM) \$1,700 TO OTHER AUSTRALIANS BUYING A SECOND OR THIRD HOUSE.

THE SAME AVERAGE AUSTRALIAN WILL (THROUGH THEIR SUPER FUND) INVEST LESS THAN \$35 IN VENTURE CAPITAL.”

IVOR RIES

**SENIOR ANALYST,
MORGANS FINANCIALS⁵⁰**

STAGE 6 - UNICORNS

WHY UNICORNS ARE IMPORTANT

The term “unicorn” has become widely adopted worldwide as a label for tech startups that achieve significant scale with a market capitalisation of \$1 billion or more. The network effects of the digital economy mean that they exist in increasingly winners-take-all markets and grow with astonishing speed, creating large numbers of jobs both within the company and as part of the larger local ecosystems that surround them.

Companies that achieve this scale are relatively rare, but are vital to the creation of a vibrant startup ecosystem. Their impact is to spawn hundreds (or thousands) of new entrepreneurs who have been employees of the unicorn, many of whom will go on to form their own startups and invest in others.^{62,63}

The PayPal Mafia - a nickname given to a group of alumni of PayPal, the payments company that went public in 2002 and was acquired by eBay — has its hands in the creation of many of today’s most valuable private tech companies including; LinkedIn, Youtube, Yelp, Palantir, Yammer, SpaceX and Tesla.

VALUE OF MULTIPLE UNICORNS

According to the Crossroads 2015 report, there are currently around 2,400 companies listed on the ASX with a combined value of A\$1.65 trillion, of which software companies comprise 4% by number and 1.4% by value. In contrast, the top 150 companies in Silicon Valley are all technology based and have a combined market capitalisation of A\$2.4 trillion, exceeding that of the entire ASX.⁴⁶

EXPONENTIAL UNICORN GROWTH

The modern digital revolution is disrupting and dividing the world of work on a scale not seen for more than a century. This third great wave of industrial revolution is rapidly disrupting traditional markets. Relative digital newcomers are capturing vast swathes of market share from incumbents at unstoppable speed, and the number of these unicorn startups is growing by the week.

According to data from CBinsights, the number of private tech companies valued at \$USD 1 billion or more worldwide has surged so much this year that on average 1.3 unicorns have been created every week in 2015.^{64,65}

WA’S UNICORNS

Whilst WA can lay claim to having the highest number of companies listed on the ASX in Australia, we are yet to witness our first software Unicorn arising from the West. Nevertheless, two companies, iiNET and Amcom were born on the sunset coast. Whilst they are typically classified as Telecommunication firms, this report recognises them as local unicorns based on our belief that these firms lay the ground work and provide the critical factors for any successful unicorn breeding to occur. Their growth patterns and financial success mirror those seen in successful software unicorns from across the globe.

TOP 10 ASIAN TECH UNICORNS BY VALUATION⁶⁴



TOP 10 AUSTRALIAN TECH COMPANIES

Source: Crossroads 2015⁴⁶

SEEK	\$6.3b
REA Group	\$6.3b
Atlassian	\$3.5b
Carsales	\$2.5b
Campaign Monitor	\$1.0b
Wotif	\$0.7b
OzForex	\$0.6b
Kogan	\$0.4b
Freelancer	\$0.3b
aconex	\$0.3b

CAMPAIGN MONITOR

\$1B+

Estimated valuation based on current funding

The latest member to join Australia’s elite Unicorn club, Campaign Monitor secured \$250m in venture funding from Insight Venture Partners in 2014. Founded by Ben Richardson and David Greiner in 2004, the business was bootstrapped for 10 years until its latest funding round. The startup now employs 150 staff in 20 countries, and has more than 150,000 paying customers including Apple, Facebook and Spotify using the service sending 1+ billion emails every month.

GLOBAL DISTRIBUTION OF UNICORNS

Source: CBinsights Unicorn List⁶⁴

United States	62%
China	15%
India	5%
United Kingdom	4%
Germany	3%
Sweden	1%
South Korea	1%
Israel	1%
Singapore	1%
Canada	1%

iiNET

\$1.56B

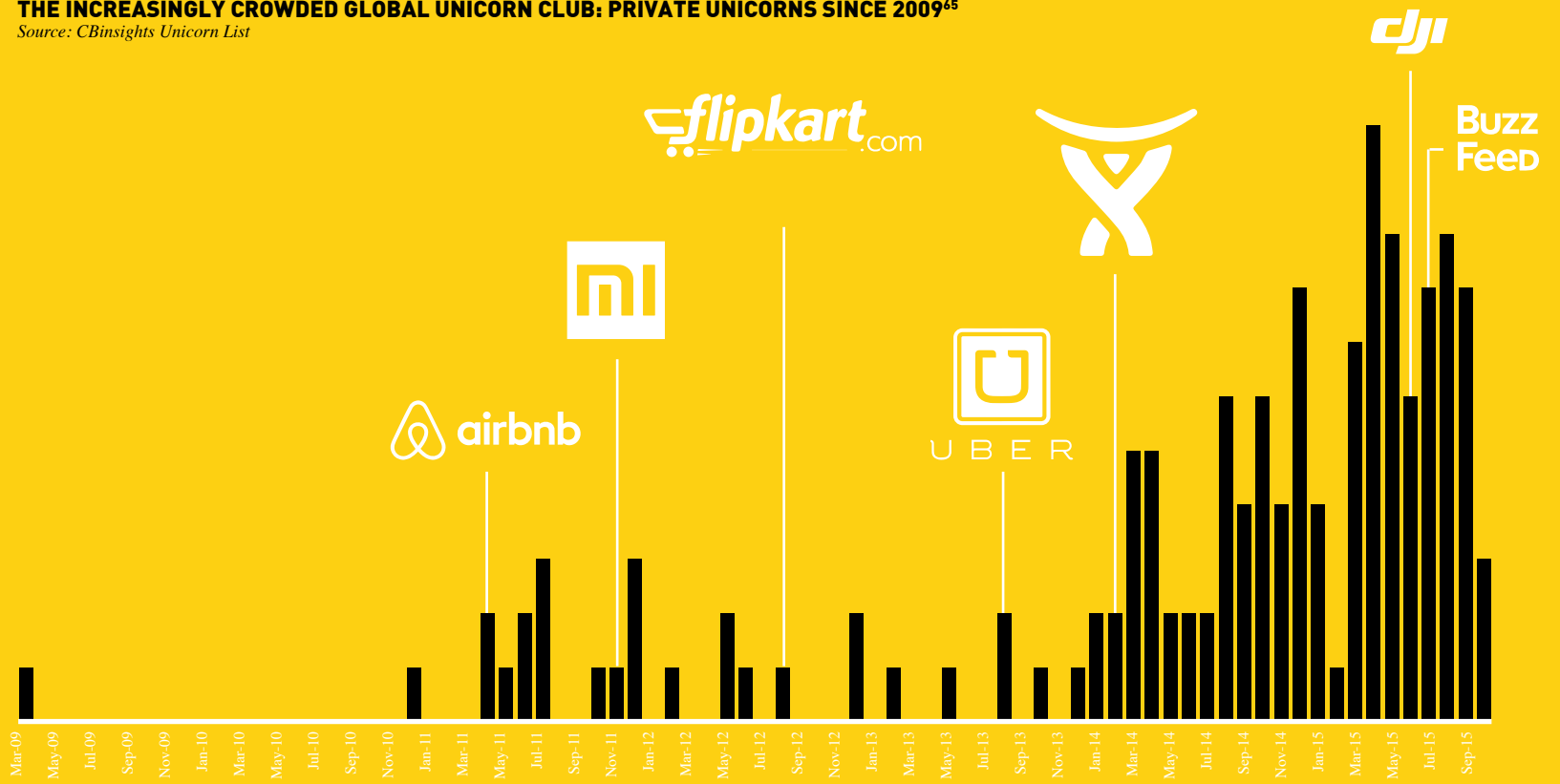
Acquisition cost of iiNet by rival TPG in August 2015

iiNet was founded in 1993 by Michael Malone and Michael O’Reilly, who started the business in a suburban garage in Perth. iiNet provides Broadband and IP telephony communication services to consumers and business customers. In August 2015, iiNet was acquired by rival TPG for \$1.56 billion, one of the largest telecommunication deals in Australian history.

THE UNICORN CLUB

THE INCREASINGLY CROWDED GLOBAL UNICORN CLUB: PRIVATE UNICORN SINCE 2009⁶⁵

Source: CBinsights Unicorn List



FUNDING - STARTUPS

TOTAL FUNDING RAISED - STARTUPS

\$101.7M

Total public market, venture capital, private equity, government grants, crowd funding and angel funding raised by Startup internet and digital technology companies located in Western Australia, from 2010 to November 2015.

AVERAGE FUND POOL SIZE PER YEAR - STARTUPS

\$16.96M

Average total funding pool per year for all Startups in WA from 2010 to Nov 2015.

AVERAGE FUNDING PER FUNDED STARTUP

\$1.32M

Average total funding per funded Startup in WA from 2010 to Nov 2015.

MEDIAN FUNDING PER FUNDED STARTUP

\$183,500

Median total funding per funded Startup in WA from 2010 to Nov 2015.

No. STARTUPS THAT RAISED

77

Total number of Startups in WA that raised funding from 2010 to Nov 2015.

No. ROUNDS & TRANSACTIONS

113/137

Number of funding rounds for WA Startups (113) and the total number of individual transactions identified (137).

PER CAPITA FUNDING FOR WA STARTUPS

\$6.61

Average per Capita funding for Startups in WA from 2010 to Nov 2015. Average Funding per Year divided by WA population.

TOP 40 STARTUP INVESTORS

White Star Resources	\$12M
Moko Social Media Limited	\$10M
InterMet Resources	\$9M
Triple C Consulting	\$8M
KTM Capital	\$6M
Monteray Mining Group	\$6M
Unknown Angel Investor	\$5M
Commercialisation Australia	\$5M
Unknown	\$5M
Aziana	\$4M
Vix Investments	\$3M
DGI Holdings	\$3M
Yuuwa Capital	\$3M
UST Global	\$2M
Kickstarter	\$1M
Viburnum Funds	\$1M
Jolimont Global Mining Systems	\$1M
Accelerating Commercialisation	\$1M
Blumberg Capital	\$0.8M
Georgetown Angels	\$0.8M
Artesian Capital Management	\$0.6M
Useful Inc.	\$0.6M
TMT Investments	\$0.5M
Amcom Upstart	\$0.3M
Indiegogo	\$0.3M
Applabs Technologies	\$0.3M
Western Technology Investment	\$0.3M
Zac Zeitlin	\$0.3M
Talent Equity Ventures	\$0.3M
Orange Fab	\$0.3M
Stuart McLeod	\$0.3M
Tony Fairbairn	\$0.3M
Stanski Ventures	\$0.3M
PlayAR	\$0.1M
Amazon Web Services	\$0.1M
AWI Ventures	\$0.1M
Rahman Menon	\$0.1M
Shark Tank	\$0.1M
KPMG Energise	\$0.1M
Unearthed	\$0.1M

TOTAL FUNDING BY STARTUP TYPE

Gaming & Gambling	\$16M
Geospatial Information Systems	\$12M
HR-Tech	\$12M
Big Data	\$10M
Media & News	\$10M
Health-Tech	\$9M
Communications	\$6M
Resource-Tech	\$6M
Fin-Tech	\$5M
Internet Software/Services	\$3M
Ed-Tech	\$3M
Construction-tech	\$2M
Ad-Tech	\$2M
Electronics & Hardware	\$1M
Music-tech	\$1M
Robotics-Drones-AV	\$0.9M
eCommerce/Marketplace	\$0.8M
Internet-of-Things	\$0.6M
Travel & Tourism	\$0.5M
Social	\$0.3M
Virtual & Augmented Reality	\$0.1M
Transportation-Tech	\$0.08M
Mobile Software/Services	\$0.07M

NOTABLE STARTUP: APE MOBILE

\$2M

Series A Investment Round

Founded by Matthew Edwards and David Hayward, APE Mobile (Applied Project Experience), which launched in early 2014, has developed an innovative paperless site app for the Construction, Mining and Oil & Gas industries to enable greater efficiency in managing on-site documents on iPads and web devices. In August 2015, it announced the raising of \$2 million in a series A funding round led by Jolimont Global and Viburnum Funds.

FUNDING - STARTUPS

FUNDING SUMMARY: STARTUPS

This report's funding data covers the January 2010 to November 2015 period, and includes all funding events related to early stage digital and internet technology companies (that is startups born since 2010) based in Western Australia. Funding includes equity investments, public market capital raisings (RTO, IPO and placements), partial acquisitions, awards and governments grants (where no equity was exchanged).

The report identifies 77 Startups that raised over \$101.74 million in total in the 6 year period. We identified 110 rounds with 188 individual transactions. The total funding raised gives an average \$16.96 million per year of total funding, or an average \$6.61 per capita per year invested in early stage startups in Western Australia. The average total amount raised per startup was \$1.32 million, however the median amount raised was only \$183,500 per startup. The averages are high due to a small number of startups (such as Spookfish, 1-Page, Tagroom, Virtual Gaming Worlds and Brainchip) which all raised between \$9 to \$15 million each.

Funding levels within Western Australia are on par with norms across Australia for startup investment if not slightly higher on a per capita basis. Our previous report on South Queensland identified an average per capita startup funding of \$1.43 for the 2009 to H1 2014 period. While the Australian average for per capita investment in Venture Capital is \$4.09 and South East Queensland is \$4.90 for all funding in digital & internet technology (startups and mature companies).

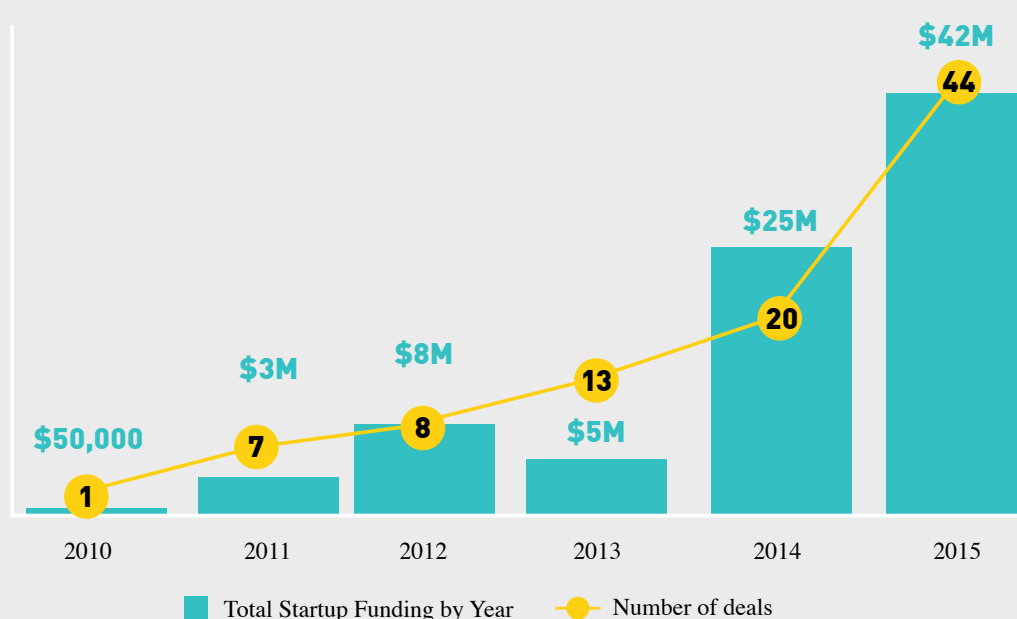
NOTABLE STARTUP: PIN PAYMENTS

\$3.1M+

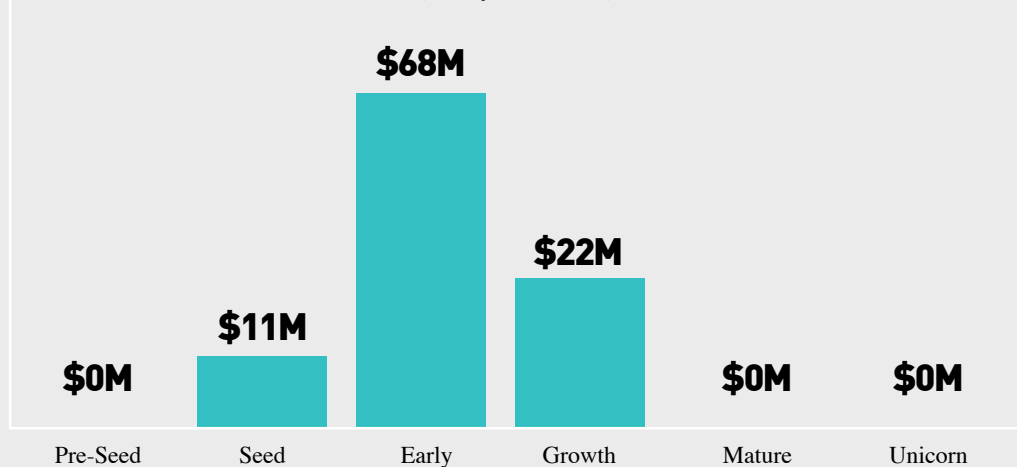
Series A Investment Round

Founded by Grant Bissett and Dominic Pym in November 2011 and launched in 2013, the startup is the first Australian all-in-one API for processing sales, including multiple foreign currency sales. In October 2015, it announced a \$3.1 million Series A raise from Vix Investments Limited. The PinPayments system was designed specifically for start-ups and entrepreneurs by simplifying the multiple financial and user accounts required to sell online.

TOTAL STARTUP FUNDING AND NO. DEALS BY YEAR (AUD\$ MILLIONS)



TOTAL FUNDING BY STARTUP STAGE (AUD\$ MILLIONS)



TOTAL FUNDING BY FUND TYPE

ASX	\$39M
Venture Capital	\$12M
Unknown	\$12M
Private Equity	\$10M
Established Technology Company	\$10M
Government	\$6M
Angel Investor	\$6M
Kickstarter	\$1M
Accelerator or Incubator	\$0.9M
Indiegogo	\$0.3M
Internet or Technology Startup	\$0.1M
Pozible	\$0.01M

TOTAL STARTUP FUNDING BY INVESTMENT TYPE

Private Investment	\$42M
Reverse Listing	\$38M
Govt Grant	\$10M
IPO	\$9M
Crowd Funding	\$1M
Public Market	\$1M
Sponsorship	\$140K
Prize or Award	\$38K
Unknown	\$5K
Debt Financing	\$0

TOP RAISES - STARTUPS

TOP 38 STARTUPS BY TOTAL FUNDING	TOTAL FUNDING	YEAR/S	# ROUNDS	STARTUP TYPE	YEAR EST	SELECTED INVESTORS
Virtual Gaming Worlds	\$15M	2013-2015	2+	Gaming/Gambling	2011	Triple C Consulting, Unknown Investors
Spookfish	\$12M	2014, 15, 15	3	GIS	2013	White Star Resources
1-Page	\$12M	2012, 13, 15	3	HR-Tech	2011	Blumberg Capital, Western Tech Investment
Tagroom	\$10M	2014	1	Media & News	2012	Moko Social Media
Brainchip	\$9M	2015	1	Big Data	2011	ASX, Unknown Angel Investor
Norwood Systems	\$6M	2012, 2015	2	Communications	2011	Monteray Mining Group, Angel Investor
Myfiziq	\$6M	2015	1	Health-Tech	2014	KTM Capital
HiSeis	\$4M	2012	1	Resource-Tech	2010	Commercialisation Australia, Unknown
Pin Payments	\$4M	2013, 2015	2	Fin-Tech	2011	Vix Investments, CA
iCollege	\$3M	2014	1	Ed-Tech	2014	DGI Holdings
APE Mobile	\$2M	2015	1	Construction-tech	2012	Viburnum Funds, Jolimont Global Mining
XTV Networks	\$2M	2013, 2014	2	Ad-Tech	2011	UST Global, Archimedes Labs
GordianTec	\$1M	2011	2	Health-Tech	2011	Yuuwa Capital, Commercialisation Australia
Filter Squad	\$1M	2011	2	Music-tech	2010	Yuuwa Capital, Commercialisation Australia
Fastvue	\$1M	2011, 2012	3	Internet Software	2014	Unknown Angel Investor
Skrydata	\$1M	-	2	Big Data	2013	Commercialisation Australia, Unknown
GET Trakka	\$1M	2015	1	Resource-Tech	2013	Accelerating Commercialisation
Cycliq	\$935,315	2014, 2015	2	Electronics & Hardware	2014	Kickstarter
Simply Wall Street	\$700,000	2015	2	Fin-Tech	2014	Artesian Capital Management, AWI Ventures
Ecocentric Energy	\$600,000	2015	2	Internet-of-Things	2010	Commercialisation Australia, KPMG Energise
Big Help Mob	\$575,000	2012	1	Internet Software	2014	Useful Inc.
The Feel Great Company	\$550,000	2015	1	Health-Tech	2015	John Poynton
Shift Geophysics	\$516,868	-	2	Robotics-Drones-AV	2011	CA, Dept of Commerce Innovation Voucher
Mineler	\$500,000	2015	1	Resource-Tech	2013	Unknown
DishyLooks	\$500,000	2013	1	eCommerce/Marketplace	2012	Unknown Angel Investor
ScanCam Industries	\$500,000	2015	1	Fin-Tech	2013	Unknown Angel Investor
Trades Cloud	\$500,000	-	1	Internet Software	2010	Commercialisation Australia, Unknown
Peepable	\$500,000	2015	1	Internet Software	2014	Stuart McLeod, Tony Fairbairn
Electronic Pain Assessment Tech	\$500,000	2014	2	Health-Tech	2014	Applabs Technologies, Unknown Angel Investor
Halo Medical Devices	\$470,000	2010, 2012	5	Health-Tech	2012	CA, Innovation Centre WA
PD Online	\$394,388		1	Ed-Tech	2011	Commercialisation Australia, Unknown
Publicate	\$374,530	2011	2	Internet Software	2011	Unknown Angel Investor
Geo Oceans	\$360,500		1	Robotics-Drones-AV	2010	Commercialisation Australia, Unknown
Tiink	\$300,000	2013	1	Social	2013	Unknown Angel Investor
Boundlss	\$250,000	2013	0	Health-Tech	2012	Angel Investor, Innovation Voucher
World Skies Holidays	\$250,000	Unknown	1	Travel & Tourism	2012	Unknown Angel Investor
id4Football	\$250,000	2009	1	eCommerce/Marketplace	2010	Stanski Ventures
Calico Global	\$250,000	2012	1	Health-Tech	2011	Commercialisation Australia

“WE ARE SEEING AN INCREASING NUMBER OF EMERGING IDEAS BUT OFTEN THE ENTREPRENEURS DON'T HAVE THE MONEY TO SELF-SUSTAIN TO THE POINT OF HAVING EVEN AN EARLY STAGE PROTOTYPE.

WE'RE IN DESPERATE NEED OF SEED FUNDING IN THE EARLY STAGES TO GET COMPANIES FROM THE IDEA TO THE BASIC PROTOTYPE/ MVP STAGE.”

SHERYL FRAME

**COMMERCIALISATION ADVISER,
ACCELERATING COMMERCIALISATION**

FUNDING - ESTABLISHED TECH

TOTAL FUNDING RAISED - EST TECH

\$549.6M

Total public market, venture capital, private equity, government grants, crowdfunding and angel funding raised by Established Technology Companies located in Western Australia, from 1998 to March 2016.

AVERAGE FUND POOL SIZE PER YEAR - EST TECH

\$73.71M

Average total funding pool per year for all Established Technology Companies in WA from 2010 to Dec 2015.

AVERAGE FUNDING PER FUNDED EST TECH

\$9.635M

Average total funding per funded Established Technology Company in WA from 1998 to Mar 2016.

MEDIAN FUNDING PER FUNDED EST TECH

\$3.929M

Median total funding per funded Established Technology Company in WA from 1998 to Mar 2016.

No. STARTUPS THAT RAISED

57

Total estimated number of Established WA Technology Companies that raised funding from 1998 to Mar 2016.

No. ROUNDS & TRANSACTIONS

117/165

Number of funding rounds for WA Est Tech Co (113) and the number of individual transactions identified (165).

PER CAPITA FUNDING FOR WA STARTUPS

\$28.73

Average per Capita funding for Startups in WA from 2010 to Dec 2015. Average Funding per Year divided by WA population.

TOP 44 ESTABLISHED TECH CO. INVESTORS

ASX	\$106.16M
P2 Energy	\$38.00M
Unknown Investors	\$37.82M
Unknown-Govt-Matched Funds	\$30.82M
AusIndustry	\$28.88M
Canadian Venture Exchange	\$28.00M
Ipernica	\$16.00M
ST Synergy	\$13.85M
London Stock Exchange's (AIM)	\$13.00M
Technology One	\$12.00M
Latin Gold	\$11.00M
Select Exploration	\$10.70M
HBO	\$10.00M
Exto Partners	\$7.10M
Meitu Investment	\$6.99M
Yuuwa Capital	\$6.75M
Continental Corporation	\$6.00M
Bermuda Commercial Bank	\$6.00M
DMY Capital	\$5.75M
ERM Power	\$5.25M
Seven West Media	\$5.20M
Telstra Ventures	\$5.20M
Skywards Ltd	\$5.00M
Syngenta Ventures	\$4.00M
International Coal	\$4.00M
Greg Roebuck	\$4.00M
Parmelia Resources	\$3.25M
Fortunis Resources	\$3.10M
Blue Sky Private Equity	\$2.78M
Biotech Capital	\$2.00M
Reed Elsevier Ventures	\$2.00M
Commercialisation Australia	\$1.94M
Peter Wade	\$1.20M
Peter Larsen	\$1.20M
Chris Ellison	\$1.20M
Sean Tomlinson	\$1.20M
Neil Hamilton	\$1.20M
Chrysalis Resources	\$1.10M
Go capital	\$1.0M
Keiretsu Forum	\$1.0M
Peter Rossdeutscher	\$0.9M
Curtin University	\$0.75M
Unknown Government Org	\$0.51M
Allure Capital	\$0.38M

TOTAL FUNDING BY COMPANY TYPE

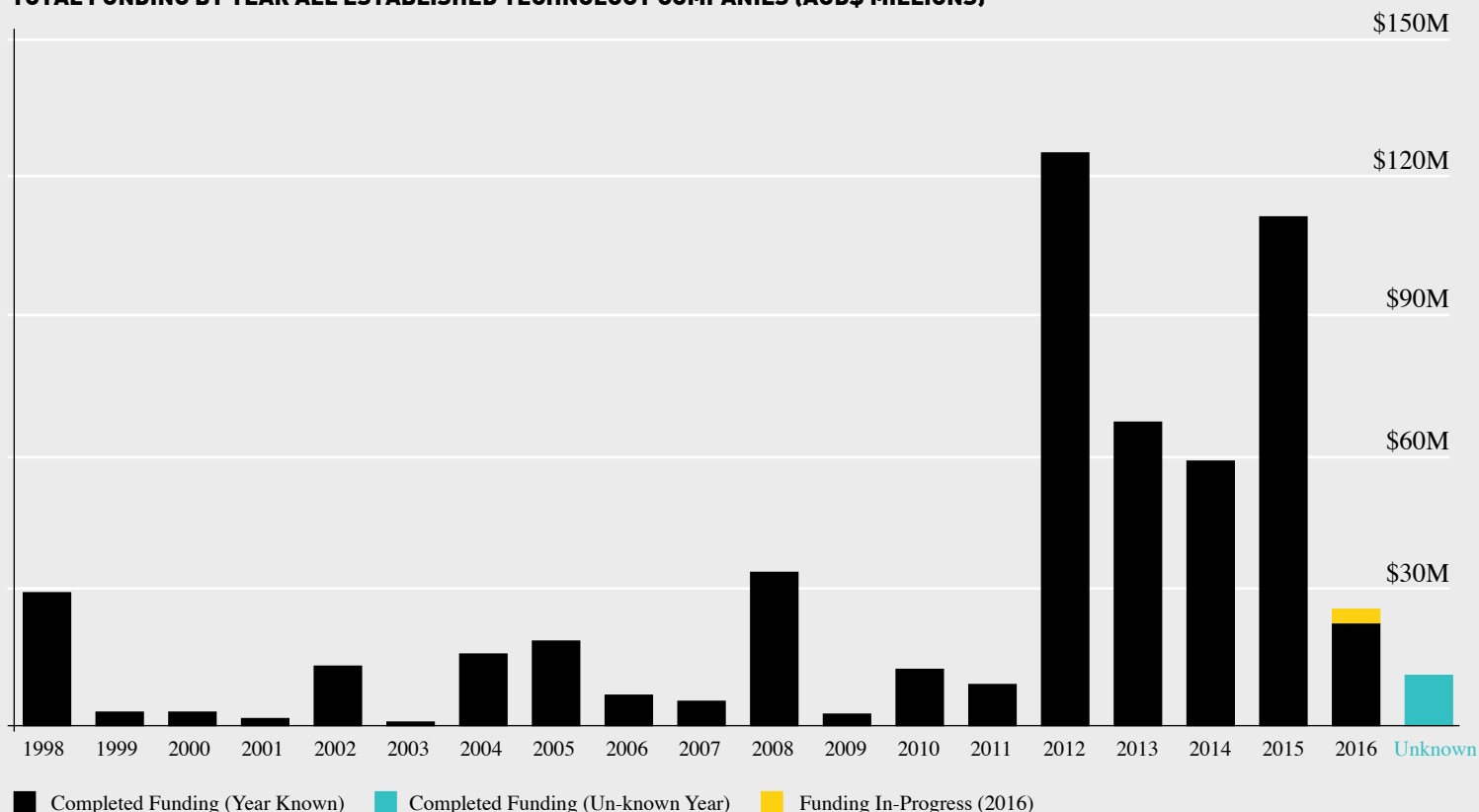
Big Data	\$110.06M
Resource-Tech	\$76.11M
Virtual & Augmented Reality	\$43.00M
Health-Tech	\$36.01M
Robotics, Drones & Autonomous Cars	\$33.79M
Geospatial Information Systems	\$30.84M
Financial Technology	\$29.44M
Information Technology & Services	\$29.39M
Social	\$28.62M
Property Technology	\$24.69M
Security and Investigations	\$22.03M
On-Demand Services	\$19.80M
Electronics & Hardware	\$14.93M
Agriculture Technology	\$13.42M
Advertsing Technology	\$9.26M
Education Technology	\$7.20M
Energy & Resource	\$6.16M
Transportation Technology	\$5.97M
Internet Software & Services	\$4.75M
Creative Industry (fashion, music, arts)	\$2.74M
3D Printing	\$0M
Internet-of-Things	\$0M
Mobile Software/Services	\$0M

TOTAL FUNDING BY INVESTMENT TYPE

Acquisition	\$183.20M
Public Placement	\$110.76M
Equity Investment	\$78.44M
Govt Matched Funding	\$61.65M
Reverse Listing	\$43.90M
Post IPO Equity	\$25.99M
Undisclosed	\$16.98M
IPO	\$11.90M
Convertible Note	\$10.50M
Debt Round	\$4.26M
Seed funding	\$1.00M
Govt Grant	\$0.51M
Prize / Award	\$0.10M
Crowd funding	\$0.02M

FUNDING - ESTABLISHED TECH

TOTAL FUNDING BY YEAR ALL ESTABLISHED TECHNOLOGY COMPANIES (AUD\$ MILLIONS)



FUNDING SUMMARY: ESTABLISHED TECHNOLOGY COMPANIES

The funding data for West Australian Established Technology Companies covers the January 1998 to March 2016 period, and includes all funding events related to established digital and internet technology companies (that is technology companies born prior 2010) based in Western Australia. Funding includes equity investments, public market capital raisings (RTO, IPO and placements), partial acquisitions, awards and governments grants (where no equity was exchanged).

The report identifies 57 Startups that raised over \$549.2 million in total in the 19 year period. We identified 117 rounds with 165 individual transactions. The total funding raised gives an average fund pool of \$27.875 million per year, and an average \$10.86 per capita per year invested in early established technology companies in Western Australia over the 19 year period.

When looking at the same period used for startups (2010 to December 2015) the total funding raised over that period is \$380.86 million giving an average fund pool of \$73.71 million per year, and an average \$28.73 per capita per year invested in early established technology companies in Western Australia over the 6 year period.

Over the entire 19 year period the average total amount raised per established technology company was \$9.64 million, however the median amount raised was only \$3.93 million per startup. The averages are high due to a small number of startups (such as Imdex, ISS Group, Dynamic Digital, Migme, Orbital, Rent.com.au, Decimal and Quickflix) which each raised between \$19 million to \$110 million each.

TOTAL FUNDING BY INVESTOR TYPE (AUD MILLIONS)

Exchange	\$177.15M
Corporate Investor	\$109.40M
Listed Resource Company (RTO)	\$43.90M
Angel Investor	\$36.49M
Unknown Investor (Matched Govt \$)	\$30.83M
Government Matched Funding	\$30.58M
Venture Capital	\$24.63M
Angel Group	\$1.00M
Government Grant	\$0.76M
University	\$0.75M
Accelerator	\$0.10M
Crowdfunding	\$0.02M

TOP RAISES - ESTABLISHED TECH

TOP 46 EST-TECH CO BY TOTAL FUNDING	TOTAL FUNDING	# ROUNDS	STARTUP TYPE	YEAR EST	SELECTED INVESTORS
Imdex	\$107,500,000	3	Big Data	1980	ASX
Iss Group	\$47,326,746	4	Resource-Tech	1995	AusIndustry, ASX, P2 Energy
Dynamic Digital Depth	\$42,000,000	2	VR/AR	1993	Canadian Venture Exchange, London Stock Exchange (AIM)
Migme	\$28,490,000	4	Media & News	2005	ASX, Meitu Investment, Latin Gold
Orbital Corporation	\$28,040,413	6	Drones	2000	ASX, Continental Corporation, Bermuda Commercial Bank
Rent.com.au	\$24,687,565	3	Property-Tech	2000	ASX, Select Exploration
Decimal Software	\$20,757,500	7	Fin-Tech	2006	Unknown
Quickflix	\$19,800,000	4	On-Demand	2004	ASX, HBO
Micromine	\$18,251,442	3	Resource-Tech	1986	AusIndustry
Near Map	\$16,000,000	1	GIS	2000	Ipernica
Iwebgate	\$15,575,000	3	IT	2004	ASX, AusIndustry
Health Engine	\$15,400,000	2	Health-Tech	2006	Seven West Media, Telstra Ventures, Go Capital, Greg Roebuck
Sensear	\$14,211,734	4	Health-Tech	2006	Exto Partners, Biotech Capital, AusIndustry
Panorama Synergy	\$13,850,000	2	Electronics	2001	ST Synergy
Agworld	\$13,000,000	4	Ag-Tech	2009	CA, Reed Elsevier Ventures, Syngenta Ventures, Yuuwa Capital
Cv Check	\$12,400,000	3	Security	2004	Commercialisation Australia, ASX
Digital Mapping Solutions	\$12,000,000	1	GIS	1994	Technology One
Ziptel	\$10,000,000	2	IT	2004	ASX, Skywards
Tech Mpire	\$9,100,000	2	Ad-Tech	2008	ASX, Fortunis Resources
Seqta - Saron Education	\$6,504,350	2	Ed-Tech	2006	AusIndustry, Chris Ellison, Peter Wade, Sean Tomlinson
Greensense	\$6,157,672	2	Energy & Resource	2006	AusIndustry, ERM Power
Structural Monitoring Systems	\$5,967,074	1	Transportation-Tech	1995	AusIndustry, Unknown
Alcidion Corporation	\$5,900,000	3	Health-Tech	2000	ASX, Blue Sky Private Equity, Allure Capital
Fast Brick Robotics	\$5,750,000	1	Robotics	2006	DMY Capital
Peppermint Innovation	\$5,000,000	2	Fin-Tech	2007	Chrysalis Resources, ASX
Dti Group	\$4,700,000	2	Security	1995	ASX
Globaltech Mining Solutions	\$4,201,308	3	Resource-Tech	1999	AusIndustry
Velpic	\$4,000,000	1	Internet Software	2008	International Coal
Icetana	\$3,929,294	3	Security	2009	Yuuwa Capital, Curtin University, AusIndustry
Scanalyse	\$3,559,904	2	Resource-Tech	2004	AusIndustry, Outotec
Digital X	\$3,500,000	1	Fin-Tech	1988	Unknown
Veriluma	\$3,250,000	1	IT	2005	Parmelia Resources
Tieline	\$2,739,214	1	Creative	2003	AusIndustry, Unknown
Inhouse Group	\$2,558,160	2	Big Data	2009	AusIndustry, Peter Rossdeutscher
Downunder Geosolutions	\$2,135,180	1	GIS	2003	AusIndustry, Unknown,
Stochastic Simulation	\$1,200,000	1	Resource-Tech	2008	Commercialisation Australia
Calytrix Technologies	\$1,000,000	1	VR/AR	2001	AusIndustry
Gopc.Net	\$1,000,000	1	Security	2005	Unknown
Mindfuse	\$1,000,000	1	Gaming Studio	2006	Keiretsu Forum
Secure Systems	\$999,474	2	Electronics	2001	AusIndustry
Genesis Petroleum	\$976,618	2	Resource-Tech	2005	AusIndustry
Lingopal	\$700,000	2	Ed-Tech	2008	Stone Ridge Ventures, Lance Wiggs
Odusee	\$500,000	1	Internet Software	2008	Unknown
Magnepath	\$499,610	1	Health-Tech	2005	AusIndustry
Intelligent Ip Communications	\$496,566	1	IT	2005	AusIndustry
Specterra Services	\$440,796	1	GIS	2000	AusIndustry

“THERE’S HEAPS OF HIGHER-RISK INVESTORS IN PERTH. THEY JUST HAPPEN TO HAVE INVESTED HISTORICALLY IN MINING, ENGINEERING AND PROPERTY INSTEAD OF IN SOFTWARE, BIOTECH OR SIMILAR STARTUPS.

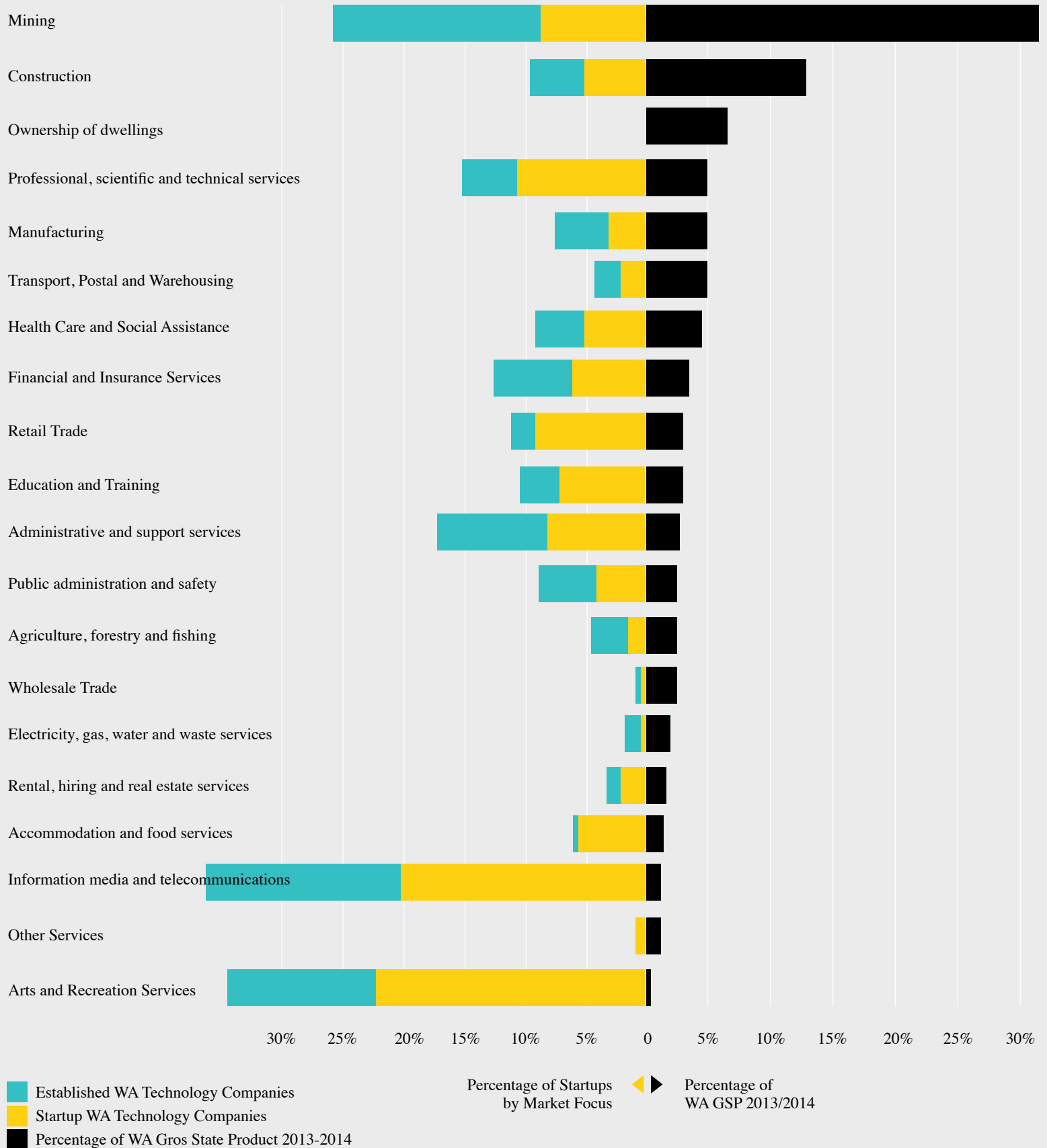
THERE’S PLENTY OF RISK CAPITAL AROUND. THERE’S PLENTY OF PEOPLE WHO KNOW HOW TO DO CAPITAL INVESTING. THERE ARE VERY FEW WHO UNDERSTAND THE TECHNOLOGY MARKET.

EARLY STAGE TECH IS NOT AN AREA THAT HAS GENERATED HIGH RETURNS HISTORICALLY FOR WA INVESTORS, SO THEY NEED SOME EDUCATION, SOME SUCCESS STORIES AND A BIT OF A SHOVE FROM THEIR PEERS TO GET INVOLVED.”

**MATT MACFARLANE
INVESTMENT DIRECTOR
YUUWA CAPITAL**

MARKET FOCUS

TARGET MARKET OF STARTUPS COMPARED TO TOP 20 WESTERN AUSTRALIAN INDUSTRIES



PRODUCT MARKET MIX

PRODUCT MARKET MATRIX: TOP 10 TECH AND PRODUCT TYPES COMPARED TO MARKET FOCUS	ARTS AND RECREATION SERVICES	ENTERTAINMENT TOURISM & SPORT (SUB-INDUSTRY)	INFORMATION MEDIA AND TELECOMMUNICATIONS	COMMUNICATION (SUB-INDUSTRY)	ADMINISTRATIVE AND SUPPORT SERVICES	RETAIL TRADE	ENERGY MINING & RESOURCES	EDUCATION AND TRAINING	ACCOMMODATION AND FOOD SERVICES	FINANCE AND INSURANCE SERVICES	PROFESSIONAL SCIENTIFIC AND TECHNICAL SERVICE	MARKETING & ADVERTISING (SUB-INDUSTRY)	CONSTRUCTION	HEALTH CARE AND SOCIAL ASSISTANCE	PUBLIC ADMINISTRATION AND SAFETY	DEFENCE SECURITY & SAFETY (SUB-INDUSTRY)	TRANSPORT POSTAL AND WAREHOUSING	RENTAL HIRING AND REAL ESTATE SERVICES	MANUFACTURING	AGRICULTURE FORESTRY FISHING AND HUNTING	WHOLESALE TRADE	ELECTRICITY GAS WATER AND WASTE SERVICES	GRAND TOTAL
Web Application	16	10	14	4	14	14	4	11	11	5	3	7	3	1			1	3	2		1		125
Mobile Application (only)	12	13	6	8	5	6	1	2	5	5		1	1	3	1	1	3		1		1		78
Cloud Technology	1	2	10	5	6	3	6	5	2	5	7	2	3	4	1	2		1				1	66
Web & Mobile Application	6	7	6	4	7	6	4	6	4	1	1	3	4	4			1	1					66
Marketplace	2	7	2	1	7	6	4		4	1	2	4	1				1	1					43
Analytics		1	6		4	1	3	1		2	7			1		1							27
Big Data			2		1		8	1		1	2	2		2						2		1	22
Communication		1	4	5	4			1	2			1		2				1					21
Ecommerce	1		2			7		1	4	2	2	1						1					21
Collaboration	2		3	4	1	1		3			1		1	2		1	1	1					21
Game	20	1																					21
Financial or Payment	1				3	1				12											1		18
Photography	6	1		2	1		3				1		3							1			18
Social	2	3	5	4		2	1																17
Electronics (consumer)	3	1	2	1		2					1			3			1		1				15
Drones							4				2		2			2				2			12
Software (offline)	1		1		1			1			2		1										7
The Internet of Things							2						1							2		1	6
3D Printing			1			1		1			1							2					6
Automation of Knowledge work			1							3						1							5
Total	73	47	65	38	54	50	40	33	32	37	32	21	20	22	2	8	8	8	7	7	3	3	

INDUSTRY SPOTLIGHT - MINING TECH

The resources industry offers incredible opportunities to innovators in Australia. It is the biggest driver of the economy, with the minerals industry alone accounting for 10.4% of Australia's GDP in 2013-14, and earning \$194.6 billion in export income representing 58.6% of Australia's total export income. It is also experiencing declining productivity and international competitiveness due to low commodity prices and high capital and operating costs. Operators and service providers are therefore seeking new ways to reduce costs and improve performance.^{66,67}

While mining is traditionally an innovative sector (6,539 Australian mining inventions filed between 1994 and 2011), it is widely acknowledged that the industry needs to accelerate its adoption of new technologies if it is to increase efficiencies and global competitiveness.⁶⁸

Mining Equipment, Technology and Services (METS) firms spent \$1.6 billion in R&D in 2012, 65% of the total mining R&D spend. However, the impact of disruptive technologies has not yet been fully realised.⁶⁹

By 2050 the world's population will increase by a third to 9 billion people⁴, with relative global demand for the petroleum, metals and minerals that underpin modern life. As of April 2015, Australia has 39 resources projects at the committed stage with a combined value of \$225 billion. Of these, there are 16 mineral, mining and processing projects worth more than \$19 billion.⁷⁰

POSITION OF STRENGTH

Western Australia is the world's number one diversified minerals and energy province.⁷¹ The significance of WA to the national resources economy:

- Minerals and petroleum accounted for 91% (\$114.1 billion) of the State's merchandise exports in 2014, approximately 60% of national exports.
- WA mining accounts for \$73.9 billion (4% of GSP)
- 8 out of 9 of the largest resources companies are headquartered in Perth;
- WA produces global market shares in more than 10 commodities;
- WA leads the nation with \$171 billion worth of resource projects under construction or committed as of March 2015;
- WA has the largest single resource development in Australia's history and one of the largest natural gas projects in the world with Chevron's \$55 billion Gorgon Project, a 15.6 million tonne per annum LNG plant on Barrow Island, off the north-west coast;
- From 2013-2014, WA was home to 513 mineral projects with 1,050 operating mine sites, producing more than 50 different commodities, more than any other State or Territory in Australia;
- WA produces two-thirds of Australia's minerals, over forty kinds;
- Oil and gas onshore and offshore developments in WA are supported by a diverse oil and gas and related services sector of more than 350 international companies;
- In 2013, the national METS sector exported \$27 billion worth of supplies, information

ENGINEERS PER 1000 EMPLOYED PEOPLE IN CITIES OVER 1 MILLION PEOPLE:

Source: State of Mind, 2015⁷¹

Silicon Valley	45
Calgary	36.9
Houston	22.4
Perth	22.3
Brisbane	17.9
Melbourne	14.1
Adelaide	12.7
Sydney	12.5

technology, contract mining and professional services like consulting and engineering in 2013.

- The sector has attracted global finance, business, legal, aviation, transport and logistics firms.

BUSINESS EXPENDITURE ON R&D (BERD)

Business spending on R&D was \$18.3 billion in 2011-12, with the mining industry a major contributor (22%).⁷² WA spends significantly more on R&D in mining than any other sector: \$2.43 billion over 2011-2012 (13%+ of the national spend), more than 7 times that spent by the next sector. Across sectors, almost half of all businesses classified their field of research as engineering, followed by information and computing sciences.

The State of Mind 2015 report outlines the impact that significant advances in disruptive technology in WA is having on the industry. Notably automation of knowledge work and autonomous vehicles – opportunities afforded by the Internet of Things (IoT) and data analytics, advanced robotics, energy storage, advanced materials and advanced oil and gas exploration and recovery. These technologies are enabling the industry-wide shift from construction to operations and maintenance as major expansion projects reach completion and transition to an operational phase, by providing predictive maintenance capability and optimisation of assets and asset life, and significant improvements in safety and productivity at lower cost.⁷¹

Only a very small number of startups are having an impact in these areas. The opportunities remain open to vastly more startup talent and activity.

WA STARTUPS

The opportunities provided by the mining industry are underserved by the startup sector (see Market Focus): Less than 10% of WA startups are focused on innovating for the resources industry.

However, while small in number these startups are taking advantage of advances in disruptive technologies including interactive web and mobile applications to improve asset management

WESTERN AUSTRALIAN MINING INVESTMENT IN R&D VS OTHER WESTERN AUSTRALIAN INDUSTRIES, 2011-12

Source: State of Mind, 2015⁷¹

Mining	\$2.43B
Manufacturing	\$348M
Professional, scientific, technical services	\$295M
Construction	\$207M
Financial and insurance services	\$69M
Agriculture, forestry and fishing	\$65M

and automate information capture and relay, cloud technology, industrial electronics and the Internet of Things (IoT) and data analytics, which enables predictive insights from the enormous amount of data being collected from increasingly ubiquitous sensor networks. Many of these technologies and platforms are aimed at improving safety, optimising operations and maintenance, cutting costs, empowering frontline workers to make decisions based on real-time information. Secondary technologies and capability underpinning these startups include wearable tech, Geospatial Information Systems (GIS) and big data analytics.

This capability is being displayed on a small scale, but better access to industry problems could attract startups to develop solutions, to ramp up the scale and scope of innovation to reach a critical mass of new enterprises required to fuel Australia's competitiveness as a global resources tech hub into the future.

WA SUCCESS STORIES: ACQUIRE & MICROMINE

It is imperative that startups embrace these opportunities in order to grow into the next generation enterprises such as Perth-based Acquire and Micromine. Acquire was launched in 1996 and develops Geoscientific Information Management (GIM) Solutions for the natural resources industries with a focus on exploration, resource development and mining assets. It delivers these solutions across 450 sites with 120 staff in 7 offices around the world, and invests 20-25% of annual revenue into R&D. Micromine, which launched in 1986 and develops mining software solutions from geological exploration and 3D mine design to mine production management, mine production control and data management solutions, now has 18 offices around the world.

With the scale of opportunity, it makes sense that Australia's first resources-focused startup accelerator programs, Unearthed and KPMG's Energise launched out of Perth in 2014, in order to support the rise of innovative solutions to industry.

WA MINING TECH TYPES NO. STARTUPS

Web & Mobile Application	7
Cloud technology	6
Electronics (industrial)	4
The Internet of Things	3
Drones	2
Mobile Application (only)	2
Hardware	1
Sensors (enterprise)	1
Advanced Robotics	1

NO. RESOURCES TECH STARTUPS

26

8% of all WA startups

AUTONOMOUS VEHICLE TECHNOLOGIES

ZERO

Number of resource-tech startups using UAV

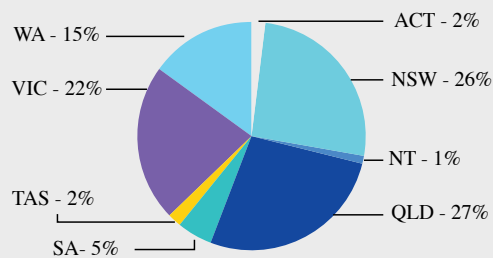
The uptake of autonomous vehicle technology across the resources industry is considered to be inevitable, with safety as the primary driver. However, no startups have been identified as developing automation technologies.

Out of 90 Australian mines surveyed in 2014, 19% are already using autonomous vehicles on site – from driverless trucks, pilotless trains to robots and drones - and a further 15% are planning on using the technology in the next 10 years.⁷³ The three major iron ore producers, Rio Tinto, BHP Billiton and Fortescue Metals Group, have all introduced the technology to their operations, with plans for expansion.

Rio Tinto has invested \$7.2 billion in autonomous technologies and is the global leader having launched first in 2008 with its Mine of the Future program.⁷⁴ Mine of the Future foresees a fully autonomous mine, supported by a centralised Remote Operations Centre (ROC) for remotely managing operations, an Autonomous Haulage System (AHS) with fleets of driverless trucks, autonomous train operations and autonomous drilling.⁷⁵ The autonomous vehicles run 24 hours a day, 7 days a week with no breaks or shift changes, and posing not threat to worker safety.

Rio Tinto sees automation as a key to the future competitiveness of Australia's miners.^{76,77} It reports that its autonomous vehicles outperform its manned fleet by 12%. As of October 2015 in a world first, its Yandicoogina and Nammuldi mine sites are operating only with driverless trucks. Rio currently has 69 driverless trucks across three

WA SHARE OF DRONE CERTIFICATES



sites, which is expected to grow to 150 trucks in the next 3 years, which is expected to provide a cost saving of \$200m/year years in maintenance costs by using predictive analytics and real-time data to enhance maintenance planning systems.⁷⁸

“Rio Tinto’s first-mover status in autonomous equipment has resulted in significant productivity gains while our use of big data analytics has allowed us to safely extend maintenance cycles.”
– Greg Lilleyman, Rio Tinto Technology and Innovation CEO

The growth potential is immense. Of the world’s roughly 40,500 mining haul trucks currently in use, only 0.5% are driverless.⁷⁹

WA DRONE COMPANIES

TWO

Number of resource-tech startups using drones

There are a number of startups in WA that are delivering drone services to the resources industry, but not developing drone technology itself. The use of drones is relatively new and demand for the technology will continue to grow across the industry, presenting significant opportunities for startups.

Applications for drones, also known as Unmanned Aerial Vehicles (UAV), Unmanned Aircraft System (UAS) or Remotely Piloted Aircraft System (RPAS), have increased significantly in the last two years. Capability and performance is doubling every 18 months, alongside decreasing prices. However, there is still a rigorous approval process and cost to applicants, equivalent to completing 90% of a conventional private pilot’s licence.⁸⁰

More than 70% of Civil Aviation Safety Authority (CASA) drone operator certificates in Australia are held by micro enterprises or startups. Commercial drone operators are most numerous in Victoria, New South Wales and Queensland but with rapidly increasing numbers in WA. There are currently 269 registered UAS Operator Certificate Holders in Australia, with 40 (15%) registered across WA.

As part of an autonomous and remotely controlled technology environment, with ground-based

autonomous and semi-autonomous vehicles and driverless trucks and trains, drones provide a safe and more efficient way to inspect and monitor assets across large-scale operations (mines, railways, pipelines and ports covering hundreds of kilometres), machinery, plant and equipment. Drones can be built to withstand heat, chemicals, and toxins, and be fitted with video or thermal imaging cameras to inspect equipment much faster, safer and cheaper than risking workers or using helicopters. They can venture into areas where people cannot, and can work while equipment or a plant is still operating, saving time and cost in shut downs avoided.⁸¹

Rio Tinto and BHP Billiton use UAVs to survey and inspect mine pits, mineral stockpiles, and to monitor operations, and FMG has trialled them.⁸² The benefits are also applicable to oil and gas operations; Woodside is also investing heavily in similar technology, to dramatically cut their maintenance costs.

“Did a job get lost? Yes maybe a scaffolder, but we added a drone pilot; that’s an example of change, new jobs, new skills.” – Shaun Gregory, a senior Woodside executive

MINING TECH INVESTMENT 2014/2015

Mining companies around the world are making investments in different types of technology.⁸³ Data from over 630 mines shows that the top category for technology investment differs across regions: In Africa, 84% of planned investment is in fatigue management technology; in North America, 57% is in collision avoidance/proximity detection; in Asia, 54% on mine management software (scheduling/optimisation); in Europe, 52% on Fleet management equipment/vehicle monitoring; and in Latin America, 50% on remote control equipment/machine automation.⁸⁴ Australia’s top investment categories are environmental monitoring and emissions management tools (35%); equipment health monitoring and diagnostics (34%) and collision avoidance/proximity detection (30%). These plans reflect the shift from project expansion to production, as mining companies look to optimise operations and maintenance performance and maximise the life of their heavy equipment, but do not reflect the scope of disruptive technologies impacting on the sector.

MINING TECH FUNDING 2010-2015

The mining industry presents high growth investment opportunities for venture capitalists. The Australian-based Jolimont Global is the primary fund for best-in-breed mining tech products. It has helped commercialise 29 mining technologies since 2003, in a joint venture with Resource Capital Funds, one of the first resource-focused capital funds. Recent investments in its portfolio include APE Mobile, a productivity software company for the resources and construction sectors, which was successful in raising \$2 million in venture capital in August 2015.⁸⁵

INDUSTRY SPOTLIGHT - CASE STUDIES

MIPLAN SOLUTIONS

Remote data capture for the mining industry



\$10M+

Operating cost savings

MiPlan Solutions is a Perth based startup founded in 2010 providing business intelligence tools aimed at creating cost savings and process improvements for the mining industry. MiPlan's product suite is designed to simplify daily data entry and management tasks via a common tablet platform with user-friendly, interactive interfaces for field-based and operator tasks which are traditionally recorded on paper. It enables real-time remote and on site data capture and access to live data across multiple systems from a single location. The data is then enriched and presented to decision-makers for action. MiPlan has 15+ clients, including two of Australia's largest mine contractors, with 200+ daily users across its 150+ projects.

TRACK'EM

2015 WA Innovator of the Year



Founded in 2006 in Perth by CEO Kashif Saleem, Track'em is a tracking system that allows companies to track assets in real-time using a combination of GPS, RFID and Barcoding technology and view their on Google Maps. The system is adaptable to a range of sectors but has been particularly popular with resources companies. Track'em is extending its services to include drone/UAV technology, having successfully trialed in 2015 a custom UAV equipped with an RFID reader to read tags between the heights of 30-70 metres over long distances and in hostile terrain and conditions, in what it believes to be a world first. This will provide significant cost-savings for companies wanting to manage large-scale assets with minimal resources, and can be overlaid with aerial photography to add a visual dimension for users. Track'em services 40+ clients around the world and won the \$75,000 WA Innovator of the Year Award in November 2015.

UNEARTHED RESOURCE ACCELERATOR

1st Resources Accelerator in Australia



1,000+

Innovators prototyped industry solutions

Unearthed is an innovation program for the global resources sector started in 2013 by founders Zane Prickett and Justin Strharsky.

Through hackathons, online challenges, and a technology accelerator, Unearthed creates opportunities for entrepreneurs and helps improve the efficiency and competitiveness of industry. Unearthed has run more than 10 events that have generated 150+ prototype technology solutions to opportunities from large resources companies including BHP Billiton, Rio Tinto, Anglo American, Newcrest, and Woodside.

Unearthed has built an active network of more than 1000 data scientists, engineers, and developers from around the world.

In 2015, the Unearthed Ore-X Challenge connected a Gold Fields dataset to independent data scientists and developers from around the world to automate the classification of gold ore in real time. The competition was conducted over a two-month period during which time over 275 competitors from over 20 countries competed to develop the best algorithm. Most competitors had limited or no exposure to the resource sector. Despite this, the algorithms they produced more accurately and quickly classified the data than the geologists from Gold Fields.

In 2015 Unearthed ran a pilot accelerator program. Participating startup Newton Labs went from prototype to product in six months and successfully ran trails at Tier 1 mining sites. Upon graduating Newton also won WA Innovator of the Year in the Emerging category.

In 2016 Unearthed will run the full 6 month accelerator program and will accept up to 10 participating companies. Unearthed invests \$70,000 per startup for 10% equity with participants getting access to workspace and industry mentors.

Some of the companies that have worked with Unearthed include BHP Billiton, Woodside, Anglo American, Iluka Resources, Gold Fields, Newcrest, and CSIRO.

SENTIENT COMPUTING

KPMG Energise Accelerator Winner



\$100,000

Prize to roll out tech into resources

Sentient Computing is an award-winning Perth-based software development company that develops immersive 3D visualisation and automation solutions for the resources industry. Founded in 2002, with 18 staff and contractors and 250+ solutions deployed in 30+ countries, Sentient's business is an advanced stage startup. With its below \$5 million annual revenue (requirement for entry), it was the winner of KPMG's Energise 3 month accelerator program and \$100,000 prize to roll out its new MVX product, which uses data to create interactive 3D environments, to the resources sector.⁸⁶

MVX uses 3D game engine technology to visualise real time and historical data, enabling clients to understand and organise their data by displaying dynamic data from different sources in realistic 3D scenes. It has applications for operational training and simulations, relating complex concepts and processes and challenging environments and displaying parts of operations which are hard to access, such as internally mounted components, underground facilities, remote unmanned facilities, offshore equipment, subsea pipelines or a remote railway track). It also services remote operations by rapidly locating equipment and/or people without having to access original data or control systems, 'see' spatial information such as distance, size, and height, show operations from different vantage points, and replay actual events for incident analysis.⁸⁷

KMPG ENERGISE ACCELERATOR



\$400,000

In contracts generated

In 2015 KPMG Australia's Perth office launched Energise, an accelerator program targeting the energy and natural resources sector with potentially disruptive technologies. At the end of a three-month intensive program, 8 tech startups received \$650,000 in prizes, support and connections with 14 leading resources companies. These connections generated 10 agreements for a further total of \$400,000+ with FMG, BHP, Laing O'Rourke, South32, Woodside and others, to trial, test and deploy the startup technologies in their businesses. Conditions were more demanding than other WA accelerator programs in that participating startups were required to have a technology solution applicable to energy and natural resources or supporting services, 2 person or more founding core team in place, a customer validated market value proposition and seed funding or development spend of at least \$100,000 or a customer base with not more than \$5 million in annual revenue.

"By keeping the focus on the immediate and actionable needs of the mining, oil & gas and utility sectors for Australia, and augmenting it with input from some of the best global minds in the startup ecosystem, we have truly plugged startup innovation into the energy and natural resources sector." - Gary Smith, WA Chairman KPMG

NEWTON LABS

Inaugural Uearthed Winner and 2015 WA Innovator of the Year (Emerging)

NEWTON LABS

\$100M

Per mine gained in efficiency

Newton Labs won first prize in the inaugural Uearthed hackathon in May 2014 with a prototype solution to detecting large boulders as they are loaded into haul trucks. Since then, they have grown into an industrial engineering and manufacturing business that builds precision inspection, non-contact measurement and robotic systems and tools for industry that make innovative use of robotics, machine vision and laser sensing technologies. They have conducted their first paid site trial at an iron ore mine in WA and are in on-going discussions with major mining companies and their supply chain partners about use and distribution of their products globally.

With support from Uearthed and its global resource partners, Newton Labs went from having no resources industry experience to having developed a product focused on a >\$100 million per mine site annual efficiency opportunity in less than 6 months, with demonstrable value to industry and significant investor potential.⁴ Newton Labs were awarded WA Innovator of the Year (Emerging Category) 2015.⁸⁸

MINESPACE

minespace

MineSpace brings the co-working environment to the geoscience and mining industry. Established at the start of 2014 in West Perth, in close proximity to numerous mid tier miners, explorers and service providers, it encourages mining-related individuals and companies to use MineSpace as their own equipped office at a significantly lower cost than traditional own office space. It has a tech-corner for companies to demo new software and hardware, a training facility and pay-as-you-go access to online geoscience software (MapInfo and Discover 3D, Geosoft, ioGAS, ERDAS IMAGINE, and Micromine) and in-house drill hole database management systems.

LOCATION, LOCATION, LOCATION

NO. STARTUPS BY SUBURB

Perth CBD	29
West Perth	9
Subiaco	7
South Perth	5
Northbridge	5
Leederville	5
Unknown	4
Como	4
Victoria Park	3
Perth	3
Osborne Park	3
Malaga	3
Fremantle	2
Scarborough	2
East Victoria Park	2
Belmont	2
Bayswater	2
Balcatta	2
Applecross	2
Ascot	1

“Place is supplanting the industrial corporation as the key economic and social organizing unit of capitalism. Density, the clustering of creative people – in cities, regions, and neighborhoods – provides a key spur to innovation and competitiveness.” Richard Florida⁸⁹

FLORENCE, PARIS & PERTH

From the studios of Florence, to the coffee houses of Paris and the skunkworks at Google [x], vibrant environments in which people from wide and varied backgrounds can freely interact have always been the engines of economic growth and innovation. Social, cultural and environmental infrastructure can support and encourage social density, a critical mass of interactions and connections between people that create a cocktail of creativity, intelligence and courage.⁹⁰

As you would expect we found a clustering of early stage companies and supporting infrastructure within the Perth CBD and its surrounding suburbs. Startups appear more frequently in the CBD, West Perth, Subiaco, Leederville, Northbridge and South Perth.

While formal office locations are useful indicators of where entrepreneurial teams are based, they spend a reasonable amount of the time outside their registered office addresses (assuming

they have one at all) in what Richard Florida calls the “4th space”: central, easily accessible places where people can network in a leisurely but intensively productive manner. Co-working spaces, incubators and cafés are examples of this trend. Inner city cafes, bars, pubs and co-working spaces such as Spacecubed also feature highly as the most frequented places for technology and entrepreneurship related Meetup groups. Startup offices also tend to be located in suburbs that have a range of these spaces within easy reach.

The Technology Park in Bentley also ranks highly on Meetup for the number of members attending events but it does not rank highly for startup location, we assume this is due to a number of factors such as poor transportation, lack of social infrastructure such as restaurants, bars and cafes

that appear to be attractive to startup teams. Additionally the structure of the Technology Park seems more suitable for later stage companies. However there are some notable startups such as Heisis, Brainchip and the VC firm Yuuwa that are based within the Bentley Technology Park.

“Despite all the predictions that technology — from the telephone and the automobile to the computer and the Internet — would lead to the death of cities, the creative economy is taking shape around them. Urban density, the clustering of people and firms, is a basic engine of economic life. Place is the factor that organically brings together the economic opportunity and talent, the jobs and the people required for creativity, innovation, and growth.” Richard Florida⁹⁰

SUBURBS BY NO. MEMBERS

Perth CBD	11230
Leederville	4425
Northbridge	2918
West Perth	1553
Como	1304
Bentley	879
Wangara	791
Kardinya	653
Osborne Park	555
Wanneroo	555
Currambine	555
Hillarys	555
Plaistowe Mews	462
Kings Park	329
Claremont	287
Bibra Lake	236
Craigie	236
Joondalup	213
Cottesloe	183
Floreat	183
Nedlands	158
Carine	157
Beeliar	157
Warwick	157
Willetton	142
O’Connor	129
Rockingham	108
Inglewood	66
East Victoria Park	51
Mt Lawley	51

TOP 30 VENUES BY NO. GROUPS

Spacecubed	31
Bankwest Place	13
Sync Labs	9
Atomic Sky Tech Hub	5
The Frontier Group	5
The Windsor Hotel	5
Rydges Hotel	4
Central Institute of Technology	4
Ignia	4
The Nest	4
43 Below	3
Caffissimo West End	3
Frisk Espresso	3
Hillman Hall	3
Holiday Inn Perth CBD	3
PICA	3
Professionals Ultimate	3
Rigby’s Bar	3
Rosie O’Grady’s	3
Terrazza Applecross	3
The Oxford Hotel	3
TIBCO Software	3
see below (30+)	2

AgWorld, Ajilon Offices, Belgian Beer Cafe, Bouncing Orange, Canton Lounge Bar, Code Drop, Deloitte Offices, Doghouse Media, Dome, Enigma Digital, Greens & Co, Hula Bula Bar, IBM, Institute of Chartered Accounts, K&L Gates, Lalla Rookh Bar, Mooba Espresso Bar and Cafe, Permeance Technologies, Precedent, RAC Head Office, Seasons Perth Hotel, The Cheeky Sparrow, The Grosvenor Hotel, The Lucky Shag, The Saint George Hotel, The Village Bar, This is a Webinar, ThoughtWorks, University Club of Western Australia, Western Australian Museum

**“THERE’S A TEMPTATION
IN OUR NETWORKED AGE
TO THINK THAT IDEAS CAN
BE DEVELOPED BY EMAIL
AND ICHAT. THAT’S CRAZY.
CREATIVITY COMES FROM
SPONTANEOUS MEETINGS,
FROM RANDOM DISCUSSIONS.
YOU RUN INTO SOMEONE, YOU
ASK WHAT THEY’RE DOING,
YOU SAY ‘WOW,’ AND SOON
YOU’RE COOKING UP ALL
SORTS OF IDEAS.”**

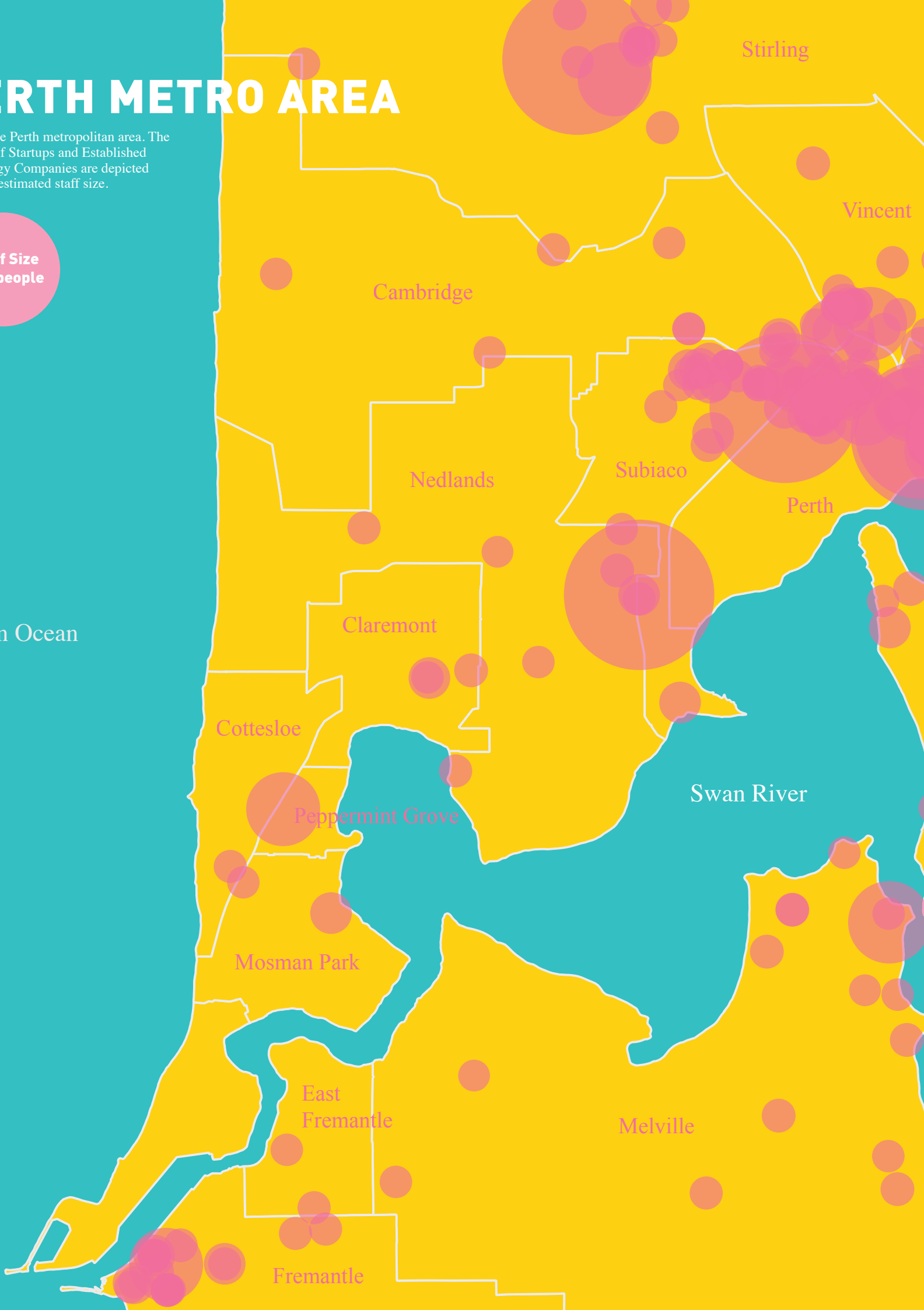
**STEVE JOBS
FOUNDER
APPLE**

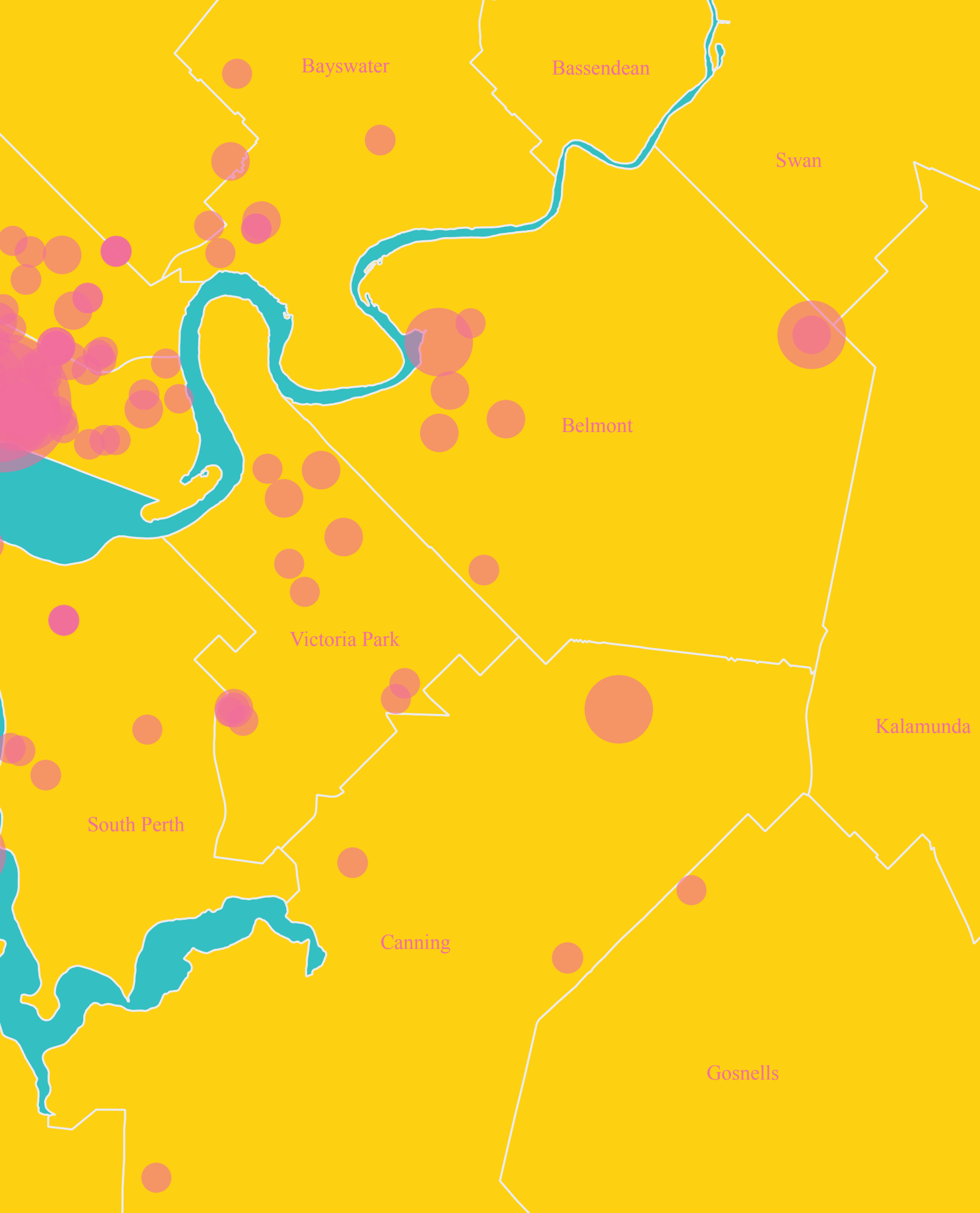
PERTH METRO AREA

Map of the Perth metropolitan area. The location of Startups and Established Technology Companies are depicted based on estimated staff size.



Indian Ocean





Bayswater

Bassendean

Swan

Belmont

Victoria Park

Kalamunda

South Perth

Canning

Gosnells

ASIAN OPPORTUNITY

THE ASIAN CENTURY

A consistent theme emanating out of the community workshops and interviews was that of WA's proximity to Asia highlighted as a key market opportunity for the startup ecosystem.

Australia's economic growth has been closely tied to the continued prosperity of the greater Asian economy over the last two decades. From resources to agriculture to manufacturing, historic trends in Asian trade have laid the foundations for current economic success. However, recent global economic slowdowns perpetuated by failing financial markets and hiccups in the resources sector have shifted the landscape considerably. The need to re-examine the future economic relationships between Australia and Asia has never been stronger.

The Asian century is certainly an Australian opportunity. As the global centre of gravity shifts to the region, and with the projected exponential growth of Asian technology markets, there has never been a better time for Australian startups to leverage historic close ties and scale innovations into the most populous region in the globe.

MARKET SIZE

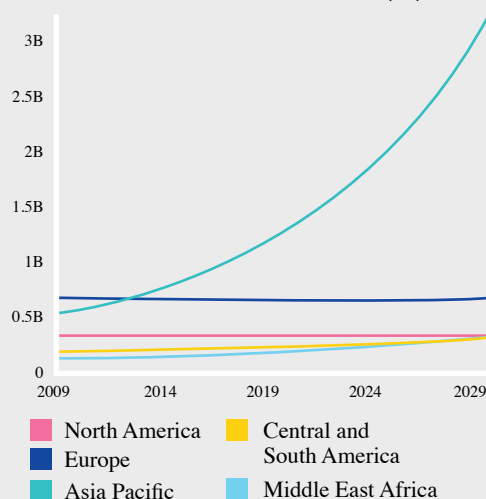
More than half of the world's 7 billion population sits directly above Australia on the map, meaning we are uniquely positioned to tap into the Asian markets. However, whilst many Australian startups have tended to head to the US or UK to pursue growth opportunities, the potential in Asia shouldn't go unrecognised.

With an estimated population of 1.7 billion living directly within the GMT+8 time zone (roughly 24% of the world's population), it is the most populous time zone in the world.

PROJECTED MARKET GROWTH

According to research by Kharas & Gertz, 2010, the potential increase in the global consumer class is associated with a significant geographical redistribution, as almost all of the new members of the global middle class will reside in Asia.

GLOBAL CONSUMERS 2009 - 2029 (M)

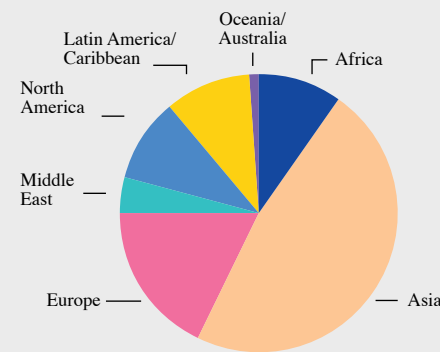


ASIAN SHARE OF INTERNET USERS

In 2015 Asia boasts nearly 50% of the global number of internet users with 1.56 billion people connected to the internet. China alone (674 million) represents nearly 22% of the global total, and has more internet users than the next three countries combined (USA, India, and Japan).

WORLD SHARE OF INTERNET USERS

Source: *Internet World Stats, 2015*⁹¹

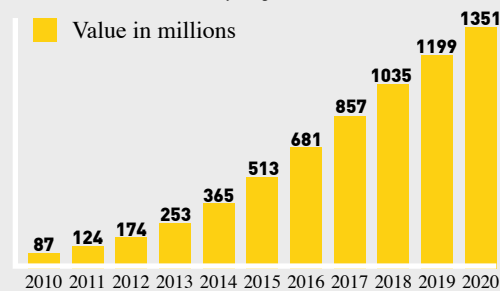


ASIAN SMARTPHONE PENETRATION

According to Ericsson's latest Mobility report, in 2015 there are 2.6 billion smartphone users globally. The authors estimate that by 2020, there will be 6.1 billion smartphone users led by huge growth in less mature Asian markets.

SMARTPHONE PENETRATION IN ASIA

Source: *Ericsson Mobility Report 2015*⁹²



New research by eMarketer states that the smartphone penetration rate across Asia Pacific is expected to rise from 34% in 2014 to 51.5% by 2019, representing nearly 1.2 billion new Asian smartphone users in the next five years.

TRENDS AND PATTERNS

The Mobility report from Ericsson in 2015, suggests that Asia Pacific will generate 45% of total global smartphone data traffic by the end of 2020 with video projected to sharply rise with better infrastructure foundations.⁹²

Further research by Nielsen in 2015, suggests that smartphone owners in Asia Pacific markets are relatively receptive to mobile advertising. In China, nine in 10 (90%) smartphone owners

clicked on a mobile advertisement in the past month, as did 87 percent of smartphone owners in India, and 78 percent in Japan and Hong Kong.^{93,94}

Close to nine in 10 (89%) Japanese consumers and around two thirds (67%) of Korean consumers were found to having participated in mobile commerce activities in the past month.

MARKET OPPORTUNITIES

China is Western Australia's largest export market, accounting for 51.2% of the State's total exports. With the historic trend of Western Australia's manufacturing industry being outsourced to the Asian market, new possibilities will inevitably open up in regards to new trends in Hardware and the internet of things, where minimal viable products and prototypes can be built at a fraction of the cost of local manufacturing.

Asian markets that rely on the export of low-value, labour-intensive manufactured goods will seek to improve productivity through investment in technology and skills development, providing excellent opportunities for vocational training.

Exporting up to 80% of its agricultural production, Western Australia possesses some of the most in demand agricultural produce in Asia. The advent of AgTech and the efficiencies that will entail will provided numerous possibilities for WA companies to exploit Asian market opportunities.

CHALLENGES TO GROWTH

It is worth noting however that Asia is a vast collection of nations in various stages of development. These individual nations have complex and changing political and social structures, cultural preferences, economic circumstances, regulatory and trade environments, and market demands. And even within those nations there are many distinct markets, with their own characteristics and drivers.

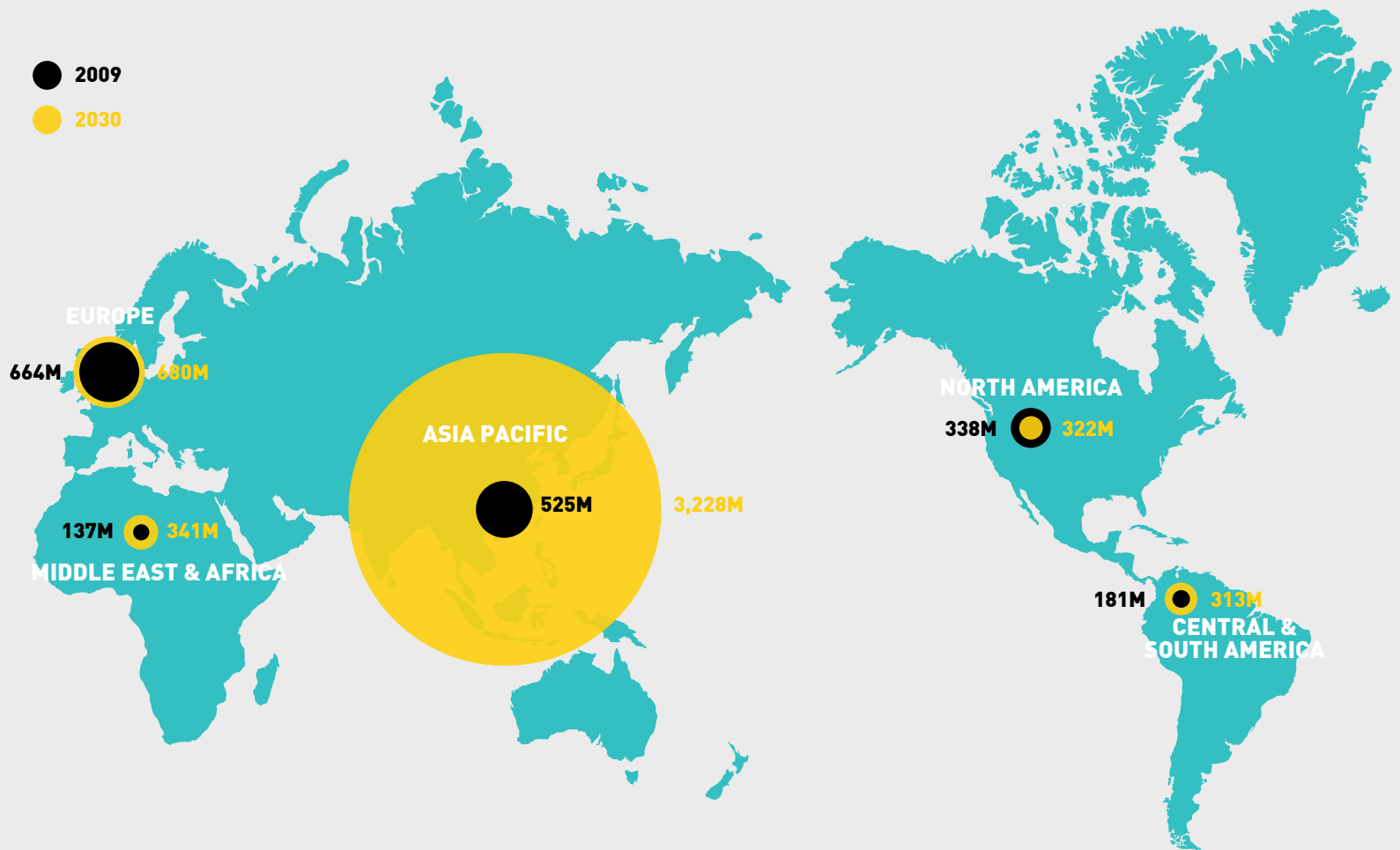
WA SUCCESS STORY: MIGME

Founded by Steven Goh and Mei Lin Ng in Perth, in 2006, migme is a global digital media company focused on emerging markets. In 2007, it shifted operations to Silicon Valley where it focused on developing its engineering and technology capabilities and secured new venture capital. In 2012, it shifted its headquarters in Singapore to be closer to its key markets in Asia. To date it has secured over \$44 million in funding.

Seeing its app pre-loaded onto new mobile Android handsets sold in India for a fee plus a share of revenue is helping migme to capture wide adoption. A large share of new handset sales in Indonesia are already shipped pre-loaded with migme.

migme currently connects over 65 million registered members around the world and hosts a fast-growing virtual economy. The company delivers social entertainment services through portfolio brands migme, LoveByte, alivenotdead and Sold. Migme Limited (ASX: MIG) is registered in Australia and listed on the ASX on 11 August 2014.

CONSUMERS 2009 VS 2030



FUND FLOWS FROM ASIA

CHINESE INVESTMENT IN AUSTRALIA

China is Australia's fifth largest investor with 4% of investment stock, behind the United States (24%), the United Kingdom (13%), Japan (10%) and the Netherlands (6%), equal to Singapore (4%) and ahead of Canada (3%). In 2014, China invested \$8.35 (USD billion) in Australia compared to 12 in USA.¹¹⁰

Traditionally China was a strong investor in mining and resources, but in 2014 investment trended towards commercial real estate, infrastructure, agribusiness and services¹¹¹, with AUD \$4,372.08M spent on commercial real estate alone compared to \$992.30M on mining and \$667M on oil and gas investments. New South Wales received the lion's share of investment (72%) followed by WA (12%), Qld (8%) and Victoria (8%).¹¹²

CHINESE DIRECT INVESTMENT IN AUSTRALIA BY INDUSTRY: 2014 (AUD)

Commercial real estate (46%)	\$4.4B
Infrastructure	\$2B
Leisure & retail	\$1.1B
Mining	\$992M
Energy (oil & gas)	\$667M
Manufacturing	\$165M
Agribusiness	\$140M

Chinese investment in Australia was down by 9.1% during 2014 due to the downward trend in mining and energy investment.¹¹³ The figure below shows the historical trend of Chinese investment in Australia by value.

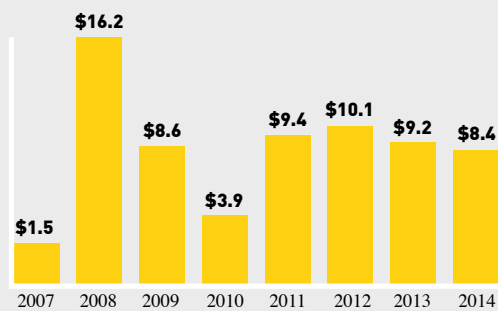
SIGNIFICANT INVESTOR VISAS

Since its implementation in 2012, the Significant Investor Visa (SIV) has paved the way for wealthy foreigners to invest in Australia in a bid to secure permanent residency. Over this time, millionaire migrants, 91% of them hailing from China, ploughed \$3.8 billion into Australian assets.¹¹⁴

Prior to 2015, investment through the SIV programme was largely in passive investments like government bonds and residential real estate schemes – areas that already attract large capital flows. This changed on July 1, 2015 when the government altered the SIV in a bid to re-direct capital flows from property and government bonds to higher risk investments.

Under the new law, investors can no longer throw funds into government bonds and there's a 300k cap on investing in residential property. Now, foreigners must invest \$5m over a minimum of four years with at least 10% of that allocated to a VC or private equity fund that invests in start-ups and small private companies. This amount may

CHINESE INVESTMENT IN AUSTRALIA (USD BILLIONS)



increase to \$1 million for new applicants within two years.

Investors must also allocate a minimum of \$1.5M in eligible managed funds or listed investment companies that invest in emerging companies listed on the ASX. Up to \$3 million can be spread across managed funds, bonds, notes or indirectly into property through managed and LICs.

The changes mean SIV applicants will be encouraged to invest across the whole risk spectrum, from early stage ventures right through to more established businesses, government bonds and commercial property. A SIV holder can still independently invest in residential real estate so long as it complies with foreign investment rules, but this would not count as a complying investment to qualify for a visa.

Interestingly, 751 investor visas were granted from November 2012 to March 2015, which would have amounted to \$375.5M allocated to VC funds had the compulsory \$500,000 rule applied.¹¹⁵

With 40% of the \$5m payment diverted to high-risk ventures, Investment bank Goldman Sachs says the new scheme could quadruple Australia's VC pool to \$500M. Last financial year, \$120m was raised by VC funds in Australia with over half that amount sourced from high net worth individuals. If 1,000 visas were granted, Goldman Sachs estimated the capital inflow at \$5 billion.

"If demand increased and all the available visas were granted to SIVs, capital flows would total \$AU10 billion p.a., with 'emerging companies' seeing an annual investment of A\$3bn, or 30 days' current market turnover," Goldman Sachs equity strategist Matthew Ross is quoted as saying in a Business Insider article.¹¹⁶

Despite the potential, there have been only 70 applications (equating to \$350M in investment) in the 6 months since the rules changed compared with around 50 applications a month under the old regime.¹¹⁷ "It's been a slow start," said Douglas Loh, head of equities at Acorn Capital in Melbourne, which oversees about \$600 million.

"The bottom line is that SIV applicants want to be able to get permanent residency in Australia. They are not really looking to make a lot of money from the equity investment, but rather to protect their capital."¹¹⁸

Victoria has proven to be the most popular destination for investment, representing over half the total applications. This popularity has been attributed to the state's ongoing courtship of wealthy Chinese investors.¹¹⁹

Others have more positive reviews: Andrew Martin a managing director at investment bank Moelis said his firm had conducted four road shows around China since July and the reaction to the new rules had been "positive". He believes the bigger game for Australia is to attract additional investment from successful SIV applicants.

"Our aspiration is to go beyond the SIV, but that will take time as we are really only two years into the scheme and it takes time to build up trust with investors."¹²⁰

INCREASING DEMAND

Building up trust and relationships, thinking big and having a killer team are the key ingredients to potentially snagging a Chinese investor, according to Tim Fung, CEO of Australian startup, Airtasker, which raised \$6m from Shanghai-based VC fund, Morning Crest Capital in 2015.

"Our experience in working with Chinese investors tells us that they view Australia as a hub for smart, feasible tech innovation that can eventually be scaled into larger international markets. They believe Australia has a really strong pool of talent which is not being effectively tapped by the US market."

"Chinese investors also see Australia as a source of great ideas because the smaller market size forces start-ups to build viable business models that are not built purely on massive "blue sky" projections. This is attractive to investors who are used to seeing entrepreneurs with a big vision but no real plans to generate a profit until many years into the future."¹²¹

And while the process was gruelling and lengthy (it took 9 months), Fung said Australians too often look past the opportunities in nearby Asia for the apparent glamour of Silicon Valley, a sentiment reiterated by Sydney-based Right Click Capital partner Benjamin Chong. Chong attended a VC conference in Bali to find he was the only Australian there.

"We need to think of Asia not just as a holiday destination but as a real business opportunity," Chong says Australian need to take advantage of Asia's proximity and start to develop relationships now.

“Relationships take a long time to develop – it takes years and years of cultivation. There’s a need for us to continue our engagement, to invest, learn and make mistakes to set us up for future success.”

China isn’t the only country playing the field. In early 2016, the Australian Financial Review reported that Schwin Chiaravanont, a reclusive Thai billionaire was scouring the Australian tech scene.

He’s jumped on board the share register of sport tech firm Catapult Group and invests through Sydney-based Aura Group which focuses on tech and disruptive startups.¹²²

Mr Chiaravanont told AFR his large network of potential investors with portfolios of up to \$500m have all focused their attention on Australian tech, which have “cash cow” qualities, particularly when exported to the bigger markets of Asia”

Given that by 2030, Asia is expected to host 64% of the global middle class and account for over 40% of global middle-class consumption, it’s time to start getting friendly with our neighbours.

HEADING TO THE ASX

Another strong pull to the land of Oz is the tendency of SouthEast Asian tech startups to list on the ASX.

According to a Business Insider article published in March 2016, “The ASX is preferred against the Singapore Exchange and Hong Kong because of access to investors used to putting a proportion of their cash in tech stocks.”

The same article states that out of the 11 ASEAN (Association of Southeast Asian Nations) tech IPOs in past 15 years, five listed on the ASX.¹²³

A number of Singapore firms are choosing to list in Australia, where small technology firms tend to trade at higher valuations. Industry players said the ASX will continue to attract Singapore tech startups, so long as investors in Singapore remain conservative.¹²⁴

Social media firm MigMe, which was founded in Perth by Stephen Goh and now based in Singapore, listed on the ASX in 2014 following a reverse takeover of mining explorer Latin Gold.¹²⁵ A year later, the Singapore-based Netcentric Group made its debut following an IPO, which raised A\$12.5 million.¹²⁶

Over in China, Juwai.com, the country’s biggest international real estate portal, is currently seeking to list on the ASX. The company is based in Shanghai and was founded by two Australians, Andrew Taylor and Simon Henry.

Given that by 2030, Asia is expected to host 64% of the global middle class and account for over 40% of global middle-class consumption, it’s time to start getting friendly with our neighbours.

SUMMARY

Since the introduction of the SIV program in 2012, which allowed foreigners to invest \$5m in order to gain residency, Australia has seen a shift in the allocation of foreign investment from the mining and resources sector to that of commercial real estate and infrastructure. From 2012 – 2014, Asian investors were throwing their funds into largely passive investments in the form of government bonds and property that according to the government were doing little to help Australia’s economy.

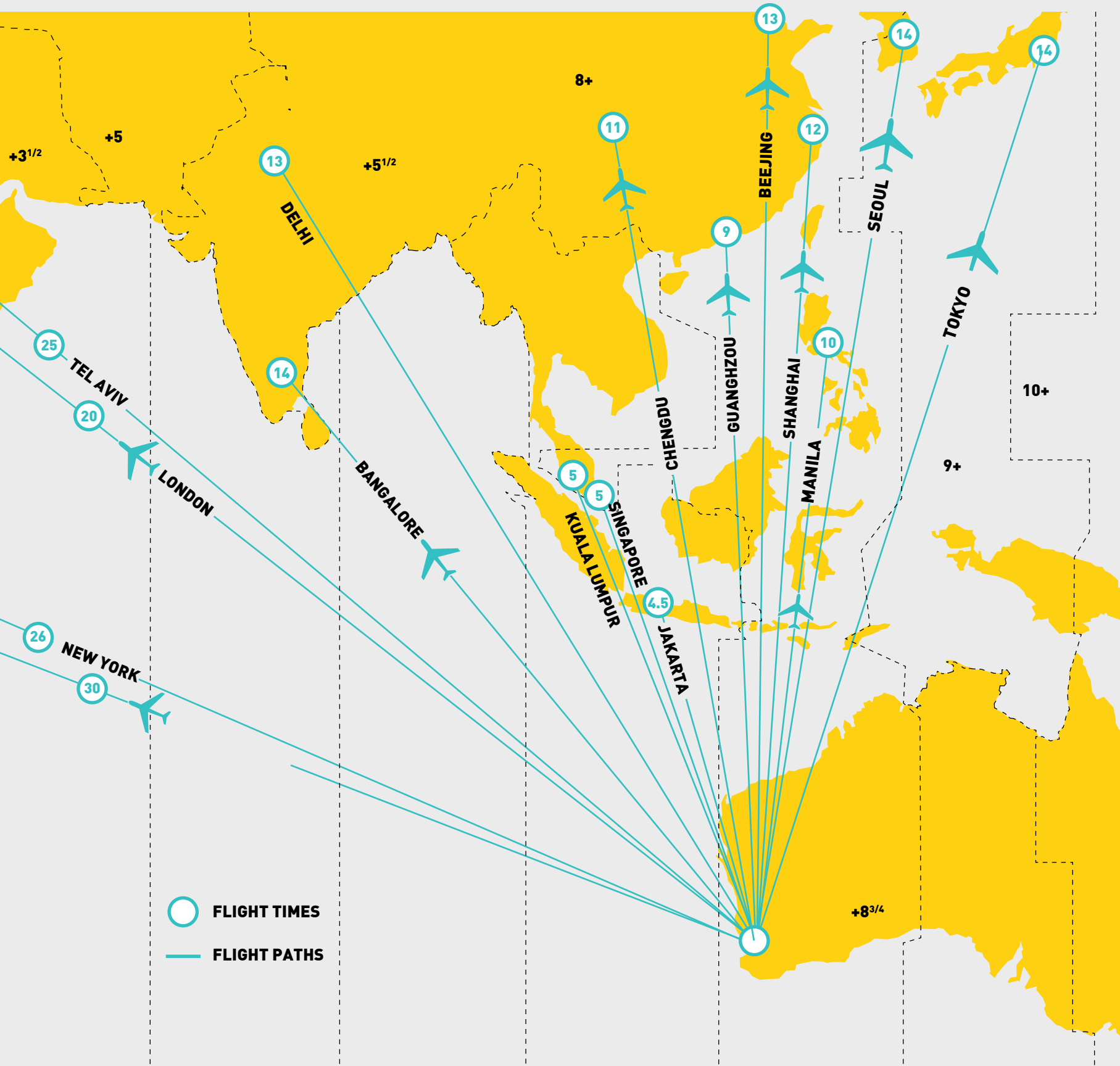
In July 2015, the government amended the SIV program in a bid to attract foreign talent and boost the economy. Under the new laws, foreign investors must now invest part of their \$5m investment into high risk funds in order to gain residency, paving the way for a potential boom in VC funding that could aid Australian tech startups and drastically boost our innovation. They also have an appetite for ASX-listed technology companies and listed investment companies where technology stocks attract higher valuations than Singapore Exchange and Hong Kong.

Asia is hungry and ready to invest in Australian tech with wealthy individuals already scouring the market for potential unicorns. In turn, Australian tech needs to think more seriously about the opportunities that await them in Asia given the proximity and burgeoning markets.

Given the amount of money coming from Asia into Australia but the amount of money allocated to technology via foreign investors is infinitesimal, additionally the amount coming to WA is well below the economy size. Technology entrepreneurs and fund managers could do a lot better to court Asian investment given the size of the opportunity available.

FLIGHT TIMES

Flight times compared: approximate number of hours flight from Perth international airport to various capital cities.



SISTER CITIES

The City of Perth has a number of international relationships with Asian cities through Sister City partnerships or Charters of Mutual Friendship. Each one of these Sister City relationships is an opportunity for Perth businesses and entrepreneurs to connect with peers, potential investors and customers in key international markets. Below is a brief description of each city, their key industries and current areas of innovation and technical specialisation.⁹⁵

CHENGDU, CHINA

14M

Population of Chengdu sub-provincial city

Chengdu, the capital of China's Sichuan province, has long been regarded as one of China's innovation capitals. Its High-Tech Zone (CDHT), established in 1988, has attracted more than 1,000 foreign companies to establish a presence there. Construction of China's first National Innovation Demonstration Zone, within the High-Tech Zone, commenced in the city earlier this year. The aim of the Zone, when complete, is to attract 20,000 technical companies to the zone, develop between three to five new industrial clusters with a target of generating an estimated \$235 billion in additional GDP from within the wider CDHT. More recently, it was announced that China and South Korea would partner in the development of a new China-South Korea Innovation & Entrepreneurship Park in Chengdu within the CDHT.

TAIPEI, TAIWAN

2.62M

Population of Taipei city

Taipei is looking to shift its focus from being a technology manufacturing hub to being a creator of new and emerging technology and innovation. In support of this aim, the Taipei City government will introduce a new co-working space known as the Taipei Co-Space within the Neihu Technology Park Service Building. This initiative will assist in coordinating industry and associated resources to focus on the creation of business opportunities. Additionally, Taipei is home to the AppWorks accelerator program which was founded in 2010 and has graduated more than 190 startups in this time. Seeking to expand their support for the Taiwanese startup sector, AppWorks launched a new \$50 million multistage venture fund focussed on mobile commerce as well as hardware and software for the Internet of Things in March 2015.

SEOCHO, KOREA

433K

Population of Seocho District

The Seocho district of Seoul is the home to major technology companies such as Samsung as well as the R&D Campus of LG Electronics and the Hyundai Motor Company. The South Korean Government have supported the use of co-working spaces, such as the Smart Work Center in Seocho, for government workers to use for daily office work if they are not required to be physically present in the new administrative centre of Sejong City, two and a half hours out of Seoul. Tech companies, such as Samsung and LG, have also now started offering smart work centres for their employees to access, challenging the previous corporate collective work mentality that permeated Korean culture. The South Korean Government is also supporting research and development in new technology and innovation, launching a new US \$48 million fund to assist development of products capitalising on the emerging Internet of Things. The Cisco Internet of Everything (IoE) Innovation Centre in Songdo opened in 2014 with a focus on Smart Cities, and links with the Cisco IoE Innovation Centre at Curtin University in Perth, the 8th in the world.

KAGOSHIMA, JAPAN

606K

Population of Kagoshima Prefecture

The Kagoshima prefecture has historically been regarded as a gateway for innovation to Japan, given its location at the southwest tip of Kyushu island. The Kagoshima University Innovation Center (KUIC) was established in April 2006 and promotes cooperation between industry, the university and government. A feature of KUIC is the Venture Business Laboratory which acts as a technology incubator. Additionally, Kagoshima University has a specialist Computing and Communications Center with three research divisions focussed on media and information technology, academic information resources and information systems. Kagoshima is also home to Japan's largest solar power plant, the Kyocera Corporation's Kagoshima Nanatsujima Mega Solar Power Plant. The plant, which can generate enough electricity to service approximately 22,000 homes, was built on reclaimed land developed within Kagoshima Bay and was opened in November 2013.

NANJING, CHINA

8.2M

Population of Nanjing sub-provincial city

Nanjing is one of the ancient capitals of China and the second largest city in eastern China after Shanghai. The city has developed several specific industrial zones, including the Baixia Hi-Tech Industrial Zone; the Economic and Technological Zone, with a particular focus on electronic information and bio-pharmaceutical industries; and the New and High-Tech Industry Development Zone. Nanjing is also home to several universities dedicated to technology and innovation including the Nanjing University of Information Science and Technology (NUIST), one of China's most prestigious universities. The University has Individual Experts and Expert Teams of Programs of Innovation and Entrepreneurship of Jiangsu Province as part of their teaching staff. Nanjing's city administration are committed to attracting talent and fostering the development of technological innovation as part of the Nanjing 321 Strategy that seeks to increase the city's capacity and capability as related to innovation, setting goals such as attracting 3000 entrepreneurs to the city within five years. As an example of the growing links and partnerships between China and Australian research bodies, the Burnett Institute (Victorian-based medical research institute) launched a R&D laboratory facility for their Chinese spin-off venture, Nanjing BioPoint Diagnostics Technology Co Ltd, in May 2015.

NOTABLE STARTUPS

Resapp
HEALTH
\$42.69M

Market Capitalisation on ASX

Founded in September 2014 by Tony Keating **Resapp (RAP)** helps users instantly diagnose and manage respiratory disease using a smartphone application.

Resapp uses technology originally developed by Associate Professor Udantha Abeyratne at the University of Queensland. Abeyratne and her team had been researching and developing the technology since 2009 and were funded by the Bill and Melinda Gates Foundation, The University of Queensland and UniQuest. Tony was former commercialisation director at UniQuest, the University of Queensland's venture capital arm. He left UniQuest in July 2015 to take on the chief executive role at ResApp.

*"At UniQuest I was probably focused on four or five projects. I thought this one had a top chance of making a difference"*⁹⁵

Resapp uses machine learning to develop algorithms to diagnose disease from cough and respiratory sounds. Currently, doctors use stethoscopes and X-rays, but by enabling diagnoses through smartphones ResApp helps doctors to consult online or over the phone, or patients to self-diagnose. Over the last five years the research team led by Abeyratne have pioneered a unique set of signatures and classifier technology that diagnoses pneumonia and asthma with above 90% accuracy.

*"Our levels of accuracy are comparable not just to a doctor listening to a stethoscope but a doctor listening to a stethoscope then sending you off to an X-ray, looking at that those X-rays and even looking at the response to antibiotics for example to get a final clinical diagnosis," says CEO Tony Keating "We skip the X-ray altogether; we're breaking the model of health consultations."*⁹⁶

In June 2015, with only one employee at the time, ResApp completed a reverse takeover of ASX listed Narhex Life Sciences following an oversubscribed capital raise of \$4 million. The company is now valued at \$42.69 million with its share price increasing from a listing price of \$0.02 to \$0.082.⁷ Resapp is currently running clinical studies with Sardjito Hospital (Indonesia), Joondalup Health Campus (Perth), Princess Margaret Hospital (Perth) and the the University of Queensland.

Resapp aims to submit its technology to the US Food and Drug Administration in the middle of 2016 and enter the US market by the end of 2016. It is targeting the US first as telehealth is reimbursed by US insurers (in Australia neither insurers or Medicare reimburse telehealth).⁹⁷

tagroom.

\$5M+

Monthly Page Views

Launched by Nirojan Yamunarajan (Sydney), Patrick Varden (Sydney) and Yasmin Walter (Perth) in 2013, Tagroom is a Australian version of BuzzFeed aggregating trending news and entertainment content from across web. The site generates upwards of five million monthly page views with an average user spending more than 11 minutes on the site each day.

In October 2014 New York and Perth based app developer Moko Social Media (NASDAQ: MOKO, ASX: MKB) acquired an 80% stake in Tagroom. In a statement from Moko Social Media they state the terms of the acquisition were:

"the deal will be a combination of cash and shares in MKB, plus an option based incentive package to be issued against agreed performance targets over 2 years. The consideration to be paid for the acquisition will not have a material impact on the financial position or issued capital of MOKO and as such at the request of the vendors, it has been agreed to keep the commercial terms of the deal confidential."^{98,99}

The Wall Street Journal states MOKO is currently trading at USD \$1.15 with a USD \$23.3 million market cap, and MKB at AUD \$0.038 with a market cap of AUD \$31.90 million¹⁰⁰ (on parity based on today's exchange rate). Moko, which was founded in 2004 and initially started in Australia, targets micro-social communities through its mobile applications. Its mobile apps cover the collegiate, political and sports verticals.¹⁰¹ Its 2015 FY revenue was just over \$6 million AUD, down 24% from \$8.3 million in 2014 FY. 2015 FY revenue was driven predominantly by mobile advertising (\$3.6M), which will presumably be complimented by the addition of a new advertising platform in Tagroom.¹⁰²

Perth based Yasmin, a former model & DJ and recent mother, became involved in the Tagroom after meeting Mr Varden, who wanted to start an online magazine.¹⁰³

The team will remain based in Australia, with a view to travel to the United States on a quarterly basis to spend time at MOKO headquarters.

appbot
96,000

Total apps tracked

"solving some sort of pain point you have yourself is always a great opportunity."

Founded in 2012 by Stuart Hall as a bootstrapped side project, app store reviews and ratings tracker **Appbot** is used by developers and product managers from across the world to track over 96,000 apps in the Apple, Google Play, Windows and Amazon stores. Clients include industry heavy weights such as Twitter, Snapchat, eBay, Path, Disney, Evernote, Etsy, Tinder and American express. With over half of their clients in the USA, a large portion in Europe (such as banks and insurers) and an increasing number of large Asia companies.

Stuart previously founded music app startups Discover which had over 3 million downloads and received over \$2 million in funding from Yuuwa before being closed down. He is joined by co-founder Claire McGregor who joined after launching Perth Founder Institute before pulling back to focus on Appbots growth.

Appbot began as a regular email product managers would receive with a summary of their appstore reviews and ratings, since its early days it has grown into a full web application with sentiment analysis, language translations, and integrations including to Salesforce, Slack and Zendesk.

For the first year Appbot grew organically with no promotion or marketing for the product, however teams at companies such as Disney, Twitter and Evernote were using the product. In August 2014 Claire and Stuart focussed on monetising Appbot and driving growth – increasing their plans from \$6 per month to the highest plan at \$300 per month as they server an increasing number of enterprise clients.

As revenue has grown Stuart and Claire have increased the Appbot team to five staff total. Having both previously experienced the challenges of running venture funded startups they are keen to self fund this new venture.¹⁰⁴

NOTABLE ESTABLISHED TECH



moodle

84.6M

Registered Users

Moodle was founded by Martin Gougiamas, and the first version of Moodle's software was released in 2001. Moodle is an open source online platform for educators to develop and manage courses online. Moodle allows people to freely download, change and install Moodle, and setup and run educational courses.

"Unlike many technology companies today, Moodle is not funded by venture capitalists or indeed any type of investors. We've been making free software for a long time and we prefer business models that are based on our community, not on investors seeking returns or by selling customer data."

In 2004 Moodle introduced the Moodle Partner Program which now funds the majority of the Moodle project. Moodle partners offer Moodle services, such as Moodle hosting, or content services for corporations using the Moodle platform. In 2015 Moodle launched Moodle Cloud, a free Moodle hosting for smaller teaching settings, to get any teacher, also those without a budget or IT skills, started. In 2016 Moodle reached over 70 partners.

Moodle core development is funded almost entirely by a network of certified Moodle Partners who will help anyone who needs it. They give 10% of their revenue to Moodle HQ and this funds Moodle's developers to maintain and improve Moodle. Currently, 35 people work for Moodle, and over 200 developers contribute to the community.

In the higher education market in the United States as of 2013, Moodle is the second largest provider with 23% market share, following Blackboard (41%) and Desire2Learn (11%) and Instructure as number three and four providers.

Moodle has been translated into over 100 different languages and is accessible in many countries worldwide. The Open University of the UK currently uses a Moodle installation for their 200,000 users while the UK government uses a Moodle installation for their Civil Service Learning platform serving half a million employees. Moodle currently has 84,589,597 users across 71,600 registered sites.



imdex
LIMITED

\$188.3M

Revenue in 2015 Financial Year

Imdex Limited is an ASX listed company that provides drilling fluids and instrumentation to the mining, oil and gas, water well, and civil engineering industries worldwide.

Imdex started in 1980 as Pibara Gold NL and changed its name in 1987 to Imdex. Unlike many tech startups we see now, the original founders are no longer mentioned in the company's history, nor are they active in the board. During the next 35 year Imdex has acquired over 15 companies, and is now divided into two divisions: Minerals and Oilfield services.

Although mature tech companies are less associated with innovations, Imdex leverages its deep domain knowledge which it acquired over the past 35 years, and applies it to drive innovative solutions. One example is its subsidiary Reflex which does data collection and analysis for the global minerals industry. The company delivers integration of field operational data, and leverages modern, paperless and mobile solutions. For example, Reflex HUB, a data solution for drilling and mining organisations. In Reflex HUB data is automatically transmitted, whenever an internet connection is available, directly to REFLEX HUB's central database. Clients can then access their data via a web browser from any location worldwide.

Imdex recognizes that "the Minerals industry is traditionally slow to adopt technology". But current cost pressures help Reflex to innovate: "It is forcing people to step outside of their comfort zone," a reflex employee said. "They realise they can't do things the way they always have because they can't have as many people as they've always had." & "The only way they can do the work, or do the work more effectively than in the past, is with technology."

Imdex has 524 employees, and is one of the largest innovative technology companies in Western Australia.



HealthEngine

\$15M

Raised between 2013-2015

HealthEngine.com.au was founded in 2006 by Mike Cadogan and Colin Parker, and acquired by current CEO Marcus Tan in 2010. HealthEngine is a service for people to find and book health appointments in Australia. HealthEngine allows users to book appointments with GP's, Dentists, Physio's, Psychiatrists, Surgeon's and more.

The company started out as a directory of medical practices, and offered a service to build websites for these practices.

In 2011 Marcus and Adam saw in a TechCrunch article that American Startup Zoedoc raised \$50 million with a business model that they could adopt for HealthEngine. They decide to start building functionality to book doctors' appointments on HealthEngine.

On 14 February 2012 HealthEngine launches their booking service with 20 practices available. Australia turns out to be ready for online booking and on 19 June 2015 HealthEngine reaches 1 million bookings. By March 2016, 60% of all booking come from mobile devices.

The first external investment came from Larsen Ventures at the end of 2011, which invests an undisclosed amount. In 2013 HealthEngine raised \$10.4 million from Telstra Ventures and Seven West Media, and raised another \$5 million in another investment round from Go Capital and Greg Roebuck in 2015.

In March 2016 HealthEngine states that it completed over 2 million bookings, lists over 70,000 practices and attracts over 750,000 unique visitors each month.

AGTECH & AGWORLD

FARMERS USING AGWORLD GLOBALLY

39,000+

Number of farmers using the Agworld platform

AGRONOMISTS USING AGWORLD

75%

Percentage of Agronomists in Australia using the Agworld platform.

HECTARES UNDER MANAGEMENT GLOBAL

37M+

Number of hectares of global farmland under management in Agworld platform.

TOTAL FUNDING RAISED

\$12M

Reed Elsevier Ventures	\$6M
Other (not disclosed)	\$4M
Yuuwa Capital	\$1.5M
Commercialisation Australia	\$0.75M

COST OF BUILDING AGWORLD PLATFORM

\$15M+

Total cost of building in Agworld platform since 2009. Figure includes re-invested revenue.

EMPLOYEES

45+

Total number of employees across 3 offices, including 20 ruby on rails developers in Perth.

OFFICE LOCATIONS

3

Number of Agworld offices including Perth, New Zealand and Windsor, Colorado.

ABOUT AGWORLD¹⁰⁵

Agworld, based in West Leederville, Perth, provides services in Australia, USA, New Zealand and South Africa with a unique data capture and data management system connecting all major players within the agricultural industry.

Using cloud technology, Agworld has created a communication platform for those involved in crop production. Agronomist recommendations, crop production plans, and finance reporting are a few of the features that can be uploaded and shared on the Agworld platform. With its hub of data collaboration, Agworld is arming farmers from all corners of the ag world with the information needed to make the most educated decisions.

AgWorld was launched in December 2009 by Doug Fitch and Chris Ramsey following a year of market validation and the engagement of software developer Matthew Powell. They now have 39,000 farms across key markets using the Agworld platform to inform decision making and improve farm productivity.

Major clients include international companies such as Land o' Lakes, Winfield, Bayer, BASF, Crop Care, Syngenta, and Australian based companies such as CSBP, Elders and Landmark.

DOUG FITCH, AGWORLD CEO

Agworld is a shining local success story that highlights real innovation in WA aligned to clear market needs. CEO Doug Fitch has been involved and contributed to the agricultural industry for the past 30 years, and is passionate about the challenge of feeding the growing global population. In a recent interview, Doug shared the following insights:

*"Farms in the US receive substantial government subsidies, have access to abundant water, and great soil conditions. Here in Australia, farmers have no access to subsidies, have incredibly challenging water issues and soil quality is typically poor. These challenges lead to your average WA farmer having to ensure they are focused on innovation and new technology to maximise the efficiencies of production. WA is the ideal testing ground for new agricultural technologies. Necessity really is breeding local innovation."*¹⁰⁵

THE GLOBAL AGTECH REVOLUTION

Global agriculture is in the middle of a digital revolution. The benefits of converging the digital and physical worlds are too valuable for Western Australia to ignore. In the not-so-distant future, constant connection between people, companies and products, in real-time, will be the norm.¹⁰⁶

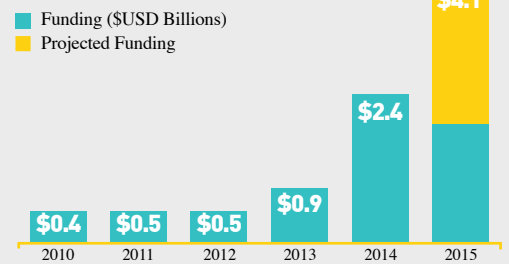
A rising tide of Australian and international reports have identified advances in agricultural technology as the key to long-term productivity gains.

According to AgFunder's AgTech Investing report, 2014 AgTech funding had a record breaking year in the USA with USD \$2.36 billion raised across 264 financing deals.¹⁰⁷

This figure surpassed well-known sectors like fintech (\$2.1 billion) and cleantech (\$2 billion) and was 40% higher than the entire Australian venture and private equity investments over the same period across all industries. 2015 AgTech funding is expected to be USD \$4.1 billion.

GLOBAL AGTECH FUNDING 2010-2015

Source: AgFunder 2015 Mid Year Report ¹⁰⁸



TOP 10 COUNTRIES FOR AGFUNDING

Source: AgFunder 2015 Mid Year Report ¹⁰⁸

United States	\$1028m
Israel	\$510m
China	\$155m
India	\$111m
United Kingdom	\$85m
Canada	\$35m
Sweden	\$27m
France	\$24m
Germany	\$23m
Switzerland	\$22m

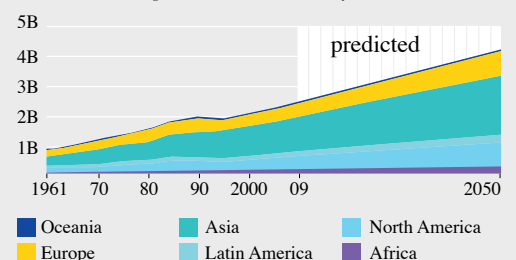
Notably absent from the AgFunder's data is Australia. AgFunder states that "whilst Australia has a large agriculture industry, we are not seeing much AgTech activity at all."¹⁰⁶

INCREASING DEMAND

The global population is projected to reach 9 billion by 2050. The increase in demand for agricultural produce is expected to rise by 70%, with the majority of this coming from the emerging middle class in Asia. Current growth rates in agriculture are simply not sufficient to meet these challenges.

CEREAL CROP PRODUCTION (tonnes)

Source: Farming First Green Economy ¹⁰⁹



THE GLOBAL POPULATION IS PROJECTED TO REACH 9 BILLION BY 2050. THE INCREASE IN DEMAND FOR AGRICULTURAL PRODUCE IS EXPECTED TO RISE BY 70%, WITH THE MAJORITY OF THIS COMING FROM THE EMERGING MIDDLE CLASS IN ASIA. CURRENT GROWTH RATES IN AGRICULTURE ARE SIMPLY NOT SUFFICIENT TO MEET THESE CHALLENGES.

COMMUNITY INSIGHTS

As part of the project, three workshops with over 30 participants and 15 interviews were held with key members of the WA ecosystem. Participants were asked to discuss, identify and vote on which issues were critical to the growth of the regions startup ecosystem; what opportunities there were for developing the ecosystem and to identify the actions which would address these challenges & opportunities. The averaged top seven issues, opportunities and actions were:

TOP 10 ISSUES BY CATEGORY (% OF VOTES)

Culture	27%
Talent & Skills	21%
Funding	16%
Raise Awareness	10%
Collaboration & Networking	9%
Leadership	6%
Education	6%
Procurement	3%
Government Policy	2%
Infrastructure	1%

TOP 7 ISSUES BY CATEGORY

Culture

Participants said a culture of entrepreneurship and technology innovation needs to be developed within the local ecosystem if WA is to create globally-relevant technology companies. Specific cultural themes that inhibited innovative technology entrepreneurship included: technology entrepreneurship not being ingrained and celebrated in the WA culture; conservative attitudes towards technology startups in the general population, including investors and students, were identified.

Talent & Skills

Participants identified a lack of depth in technology talent and a lack of large numbers participating in the ICT sector were identified as critical obstacles to growth. Small STEM completion rates were also identified. As a young ecosystem there is also very little recycling of experienced technology talent back into the industry, and few large scale technology companies feeding back into the early stage.

Funding

Participants identified a lack of accessible funding options across all stages of company development. While participants did see large pools of capital being deployed in other sectors, they stated investors were often poorly educated and experienced in technology investing. Access to investors and funding entities was also seen as an issue with only one, inactive, technology

venture fund in Perth. More government funding was thought to be required to address apparent market failure.

Collaboration & Networking

Participants in our second workshop saw portions of the ecosystem as fragmented with a disconnect between government, tertiary education and industry. With a lack of engagement between multiple stakeholders in the ecosystem.

Leadership

Participants identified a lack of government support and leadership on issues surrounding innovation and technology venture creation. With a lack of clear State Government strategy or Minister for Innovation seen as a critical blocker to growth.

Education

Participants thought STEM education could be improved and encouraged across the State. Additionally education for both early stage entrepreneurs and investors was identified as critical.

Procurement

Conservative corporate and government procurement policies were also identified as critical challenges for early stage enterprise technology companies seeking early market proofs.

TOP 10 OPPORTUNITIES BY CATEGORY (% OF VOTES)

Playing to Strengths	18%
WA Culture	15%
Availability of risk capital	14%
Proximity to Asia	12%
New Federal Government	12%
Catalyst Event	10%
Improving Talent Diversity	6%
Economic Climate	6%
Celebrate Existing Successes	6%
Closely linked networks	3%

TOP 7 OPPORTUNITIES BY CATEGORY

Playing to Local Strengths

Participants identified several strengths that they thought should be encouraged, such as our shared timezone & proximity to Asia, our superb lifestyle and the Square Kilometer Array. Participants also suggested that startups and other stakeholders within the State should focus on developing strong local markets and relationships with existing industries such as mining, oil & gas, agriculture, aquaculture, water, energy, tourism and aged care.

WA Culture

Further to this the WA culture and environment was identified as an attractive destination for talented engineers given the right economic opportunities.

Availability of Risk Capital

While participants saw access to funding as a large challenge they also recognised that WA has large pools of available capital, and has experience deploying it in high risk early stage mining ventures, not unlike the risk profiles on startups. These well developed resources-focused capital markets and financial services could be educated or re-oriented towards the tech sector. Accessing these funds together with Australia's extremely large superannuation pool was seen as a key opportunity.

Proximity to Asia

As mentioned previously our proximity to Asian markets and shared timezone was seen as a key opportunity, especially given the limited size of local state and national markets. Participants saw an opportunity to build trade links, agreements, envoys, missions and frameworks, with our Asian neighbours.

New Federal Government

With the new Turnbull government participants saw an opportunity for the state and nation to reformulate how the government supports and develops innovation within the economy. Participants thought the Federal Government's new innovation policy could provide greater access to funding: through tax incentives and better financial incentives for investors and for companies to fund innovation.

Catalyst Event

The World Wide Web Conference 2017, a global technology conference on 'the web' coming to Perth in April 2017 was identified as a superb opportunity to promote the State's startup industry.

Improved Diversity

Improving the diversity of talent, including more immigrants, more women and the inclusion of more entrepreneurs with cross-disciplinary or alternative industry backgrounds, was also seen as a strong opportunity for growth.

COMMUNITY ACTIONS

TOP 15 ACTIONS BY CATEGORY (% OF VOTES)

Education Programs & Mentoring	22%
Govt Incentive - Investment	18%
Govt Provide Supportive Role	15%
Raise Awareness	7%
Form Leadership Group	4%
Attract Talent	4%
WWW2017	4%
Communication Hub	4%
Develop Best of Breed Structures	3%
Industry Focus	3%
Collaboration & Networking	3%
Attract a Global Tech Company	3%
Procurement	3%
Develop Social & Cultural Side of Perth	2%
Develop international networks	1%

TOP 7 ACTIONS BY CATEGORY

Education Program

To develop the industry, participants would like to see STEM & entrepreneurship deeply embedded into the education system – across primary, secondary and tertiary education. Additionally participants thought community, and particularly investor, education would be highly valuable at attracting capital into the industry.

Government Investment Incentives

Participants would like to see State Government matched funding for Startups and supporting entities such as accelerators, co-working spaces and training. Other suggestions include: freeing up rules around capital; tax incentives; equity crowd funding; repurposing the Department of Commerce's Innovation Vouchers to support WA startups; increasing tax incentives for research commercialisation; and tax changes to promote inward investment.

Government Provide Supportive Role

The appoint of an Innovation Minister was seen as a critical action to raise awareness and grow the startup. Government was also seen to be best situated to develop strong relationships with Asia.

Form Leadership Group

Creating a leadership group to harness opportunities from the WWW2017 conference was seen as a useful action,

Participants would like to see STEM & entrepreneurship deeply embedded into primary, secondary and tertiary education.

Attract Talent

Participants thought the attracting of a major international technology company to WA due to the Square Kilometer Array would be useful.

Raise Awareness

Participants thought raising awareness of the industry and successful outcomes within the industry was critical to the ecosystem growth and investment.

WWW2017

Participants suggested that the State use April 2017, the start date of WWW17, as a deadline to grow the ecosystem and showcase its strengths. Participants thought the injection of government funds into the organisation of this event was critical to taking advantage of this rare opportunity.

RECOMMENDATIONS

Based on the research, workshops and interviews conducted through this report, along with a review of current global best practice for developing technology innovation hubs, we recommend the following actions to foster the development of a robust high-growth technology industry within Western Australia.

The suggested actions fall under nine main themes with an overarching objective for each area. These themes and objectives reflect key areas of need and opportunity within the industry. Note that in many cases suggested activities address multiple needs. They are:

1. Vision & Leadership
2. Culture & Awareness
3. Critical Mass & Participation
4. Education, Talent & Skills
5. Networks & Density
6. Regulation & Competition
7. Infrastructure
8. Markets
9. Funding

Additionally, we have indicated (in brackets) which stage of company development each activity primarily supports.

1. VISION & LEADERSHIP

Aim: Facilitate the development of a shared vision for the WA 'startup' ecosystem and its role in the state's economy. Establish a collaborative multi-stakeholder leadership group, comprised of startup companies, big business, academia and government, to drive change.

- a. State Innovation Strategy: In consultation with diverse stakeholder groups, develop a state innovation strategy. Setting out a clear strategy and making it publicly available helps the government and innovation ecosystem to come together around a unified vision. (All Stages)
- b. Strategy for Disruptive Domains: Explore, identify and create a strategy to support potentially disruptive domains in which WA can be globally competitive. Based on the reports findings we think specific domains that WA should focus on are resource-tech, ag-tech, GIS and autonomous vehicles. (All Stages)
- c. Strategy for Geographic Engagement: Explore, identify and create a strategy to engage with specific geographic regions. Based on the reports finding it is considered specific geographic regions that WA is ideally suited to engage with are SE Asia and China. (All Stages)
- d. Political Stability: In order to encourage entrepreneur and investor confidence it is important that there is a politically stable environment around current and future government regulations, funding and incentives. (All Stages)
- e. Digital by default' Government Services: Encourage all government services to be provided via digital technology wherever possible. Citizens expect more of their interactions with government to be via digital and mobile. Additionally, a 'digital first'

government policy is a way for government to lead by example and sends a strong signal that government is fully committed to the digital economy. (All Stages)

2. CULTURE & AWARENESS

Aim: Build a strong, supportive entrepreneurial 'startup' culture. Increase community awareness of the 'startup' industry and an understanding of the value of high-growth technology companies to the state's future economy.

- a. Startup Awareness Campaign: Implement a campaign to raise awareness of the state's startup ecosystem, encourage participation in the sector and increase understanding of the role digital technology will increasingly play in our society. (All Stages)
- b. Support Community Events & Groups: Support community startup events & groups, including expanding the scale and exposure of the West Tech Festival. (Potential Founders, Seed Stage startup)
- c. Publish Open Government Data: Publish government data in machine-readable format under open license with APIs accessible to all citizens. Open data allows entrepreneurs to create new services and businesses. (All Stages, Potential Founders)
- d. Support Open Data Initiatives: Encourage and support open data initiatives, hackathons and prizes that enable the creation of new products and services from public or private datasets. Open data and hackathons are ways government and private organisations can leverage entrepreneurs to develop and test new solutions to complex problems. (Potential Founders, Seed Stage startup)

3. CRITICAL MASS & PARTICIPATION

Aim: Increase the number of entrepreneurs developing high-growth technology companies and other participants in the 'startup' sector.

- a. Emerging Entrepreneur Visa: Explore ways to increase the number of foreign entrepreneurs that can, and do, obtain Entrepreneur Visas. For example reducing the current condition on the Business Talent Visa to have raised \$1M AUD in funding from an Australian VC, to raising a more achievable amount such as \$50,000 in funding from an Australian, or international, VC or accelerator. (Seed Stage startup, Potential Founders). Immigrants are twice as likely to start a business than a native-born citizen. This benefits the local ecosystem by attracting a diverse group of entrepreneurs to establish startups in WA. (Seed Stage startup, Potential Founders)
- b. Startup Welcome Package: Create a startup welcome package that assists new technology businesses to setup in the City of Perth. Starting a new business can be daunting as well as exciting. A simple welcome package could assist young startups in accessing critical infrastructure, networks and incentives. (Seed Stage startup, Potential Founders)
- c. Overseas Immersion Program: Develop an overseas immersion program that places university students as interns in startup

hubs such as Silicon Valley and Singapore. (Potential Founders, Seed Stage startup)

- d. Female Founders & STEM Programs: Support and amplify programs that encourage female founders and increase female participation in STEM education, such as RoboGals. (Potential Founders, All Stages)

4. EDUCATION, TALENT & SKILLS

Aim: Increase the number of people with entrepreneurship and STEM skills. Increase the participation of Universities in the development of entrepreneurs and startups.

- a. Young Entrepreneurs Education Program: Implement an entrepreneurship and technology 'startup' curriculum at high schools across the state, including supporting and expanding existing activities such as CoderDojo, Just Start It and RoboGals. (Potential Founders, All Stages)
- b. University Startup Programs: Encourage and implement entrepreneurship and technology 'startup' curriculums and programs at universities, including the support of existing activities such as Bloom, Ignition, Accelerate and Start Something. Historically universities have been central in the development of strong innovation hubs such as Silicon Valley and Israel. It is critical to the development of the WA startup ecosystem that local universities play an active role in commercialising innovative intellectual property and encouraging the formation of startups. (Potential Founders, Seed Stage startup)
- c. Community Education Programs (founders): Include entrepreneurship and technology education activities in the City of Perth programs, such as providing sessions on how to code for youth, and how to found & grow startups. (Potential Founders, Seed Stage startup)
- d. Community Education Programs (corporate): Host seminars to inform the WA business community about the tech startup ecosystem, and how to partner with startups. (Early to Growth Stage Tech Co.)

5. NETWORKS & DENSITY

Aim: Develop a robust, dense and connected ecosystem in which participants have easy access to critical local, national and international networks.

- a. Perth CBD Innovation Precinct: Establish a CBD innovation precinct for startups, accelerators, co-working spaces, corporate R&D labs, venture firms and other key participants in the ecosystem. Securing an innovative established technology company as an anchor tenant in the precinct, such as iiNet, Tesla or DJI. A central precinct would provide a critical mass of office, educational and networking space for startups and supportive organisations. Additionally, it would send a strong signal to the wider community that the City of Perth and WA State Government is committed to developing a significant technology industry. (All Stages)
- b. Encourage International Networks: Facilitate

access to international networks and leverage our existing international sister-city relationships to help entrepreneurs, investors and startups build strong international networks. Due to the small size of the local market and high-tech industry, access to large foreign markets, knowledge and investment is critical to the growth of the WA industry. (Early to Growth Stage Tech Co.)

- c. Startup Launch Pad: Form a startup launch pad in Perth. Provide mentoring, access to networks, introductions to investors and guidance. The Launch Pad should facilitate access to the NISA Landing Pads overseas, particularly in Asia. Landing pads improve access to foreign markets and assist in the dissemination of knowledge and networks when entrepreneurs return to WA. (Early to Growth Stage Tech Co.)
- d. Multi-Industry Networking Events: Encourage and support networking events that connect multiple industries and stakeholders, such as startup founders, universities, financial service firms, corporates, and government agencies. While certain pockets of the startup ecosystem are highly connected there remain large portions of the wider economy that need to be engaged further. (Early to Growth Stage Tech Co.)

6. COMPETITION & REGULATION

Aim: Proactively create situations that foster step changes in innovation, such as regulatory environments that support innovative services.

- a. Develop Regulation that Encourages Disruptive Innovation: Develop regulations that support and foster innovation in key, potentially disruptive domains such as autonomous vehicles, drones, ag-tech, biotech, safety and health-tech. Regulation can hinder or encourage innovation and risk taking. Creating world-leading regulations that encourage innovation in key domains can assist WA startups to get a competitive edge on startups in other jurisdictions, and attract foreign companies to the state to develop solutions that would otherwise be illegal in more conservative regulatory climates. (All Stages)
- b. Autonomous Vehicle Regulations: Develop a roadmap for regulatory changes that allow autonomous vehicles (AV) to conduct tests and operate on WA roads. Within the next 5 years autonomous vehicles are likely to be one of the next highly transformative technology platforms. Just as computers, the internet and the smartphone fundamentally transformed our economy, in the process creating some of the world's largest companies, it is likely autonomous vehicles will have a similar impact on society. The UK, Germany, Holland, France, Spain and the US currently allow the testing of AVs in real traffic. Startups in jurisdictions that are early to support AVs on public roads will have a competitive edge over other companies. (All Stages)
- c. Government Startup Support Team: Form a cross-departmental team to provide bespoke

assistance to startups (e.g. providing guidance about available government grants or tax incentives). (Growth & Later Stage Co.)

- d. Concessional payroll tax rates for startups: implement payroll tax reform for early-stage companies that encourages job growth, rather than inhibits it. (Early & Seed Stage Startups)

7. INFRASTRUCTURE

Aim: Ensure the critical infrastructure required to develop high-growth technology companies is in place, accessible, and affordable for early stage companies.

- a. Fund Co-working Spaces: Encourage and support the growth of affordable co-working spaces for startups. While startup mythology loves garages access to low cost flexible office space is vital to startups. (Seed & Early Stage Startup)
- b. Makerspace: Encourage the growth of community makerspace for IoT technology, such as the Artifactory and SW Makers. Some of the most innovative technology companies in WA develop electronics and sensors. Easy, affordable access to expensive prototyping and manufacturing equipment, such as oscilloscopes, soldering stations, milling machines, lathes, saws, CAD software, injection molding and 3D printers, is essential when developing hardware products and robotics. (Seed Stage Startups, Potential Founders)
- c. Super Computer: Establish a startup program for accessing the Pawsey Super Computing Centre. (Seed & Early Stage Startup)

8. MARKETS

Aim: Develop technology entrepreneurs access to markets. Where possible increase the number of 'customers' using technology.

- a. Government Innovation Fund: Explore the creation of a specific government fund for the procurement of local technology solutions to solve complex problems. (Early Stage Startup, Growth Stage Tech Co.)
- b. Startup-Supportive Government Procurement: Ensure that government tenders are visible and accessible to startups, including ensuring pre-qualifying requirements are achievable by new businesses. (Early to Growth Stage Tech Co.)
- c. Bilateral Agreements: Explore, identify and form Bilateral Agreements with innovation hubs such as Singapore, Israel, Silicon Valley, New York, London, Shanghai and Hong Kong. (Early to Stage Tech Co.)
- d. Bilateral Trade Missions & Roadshows: Conduct bilateral trade missions and roadshows for startups and investors, with innovation hubs such as Singapore, Hong Kong, Silicon Valley, New York, London and Shanghai. (Early to Growth Stage Tech Co.)

9. FUNDING

Aim: Increase the availability of capital and improve entrepreneurs access to funding. Generate more investors & investment in startups, and help entrepreneurs & investors connect.

- a. Community Investment Education Programs:

Encourage education and networking events for investors, brokers, financial planners and other financial service professionals on the startup sector. (Early & Seed Stage startup)

- b. Alternative Investment Vehicles: Encourage the formation of alternative investment vehicles such as listed investment companies (LICs), managed funds and syndicates that invest in startups. Compared to innovation hubs such as Israel WA has a low level of per capita startup funding. Alternative investment vehicles that assist in managing the risk associated with startups could play a vital part in attracting larger pools of capital to the sector. Given WA has had a strong history of these vehicles it is likely they could be more suitable to the region than establishing local Venture Capital firms. (All Stages)
- c. Immigration Investment Visa: Explore adjustments to the immigration investment visa to encourage investment in high-growth technology companies. (Early & Seed Stage startup)
- d. Encourage Corporate Venture Funds: Encourage the formation of corporate venture funds or accelerators. (Early & Seed Stage Startups)
- e. Modify WA's Limited Partnership Act to allow registration of Early Stage Venture Capital Limited Partnerships in WA. The NISA introduced new tax advantages for ESVCLPs which are intended to increase funding available to startups at various stages of growth. Currently ESVCLPs cannot be registered in WA. (All Stages)

10. FUNDS

Aim: Form specific co-investment funds to encourage the creation of capital pools.

- a. Seed Stage Grants Program: Establish a grants program to develop prototypes at the conceptualisation stage. Grants in the \$1K to \$5K range. (Seed Stage startup, Potential Founders)
- b. Early Stage Investor Fund: Establish a Seed & Early Stage co-investment fund for startups seeking funding in the \$200K to \$2M range. (Early Stage Startup)
- c. University Commercialisation Fund: Establish a university grants and/or accelerator program for university students to commercialise innovative technology. Grants up to \$250K. (Seed Stage Startup, Potential Founders)
- d. Early Stage Accelerator Fund: Establish an accelerator fund that provides co-investment in domain focused accelerators, suggested focus areas include resources, ag-tech, health, GIS, drones, IoT, big data, TV or autonomous vehicles. (Early & Seed Stage Startups)
- e. Growth Stage VC Fund: Establish a VC co-investment fund with criteria and/or incentives to attract foreign funds/LPs. (Growth to Later Stage Co.)

CONCLUSION

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This report is independent: neither the City of Perth nor the WA State Government had any influence over the content or its recommendations, nor do they bear any responsibility for any errors or omissions.

Given the nature of the internet and digital technology ecosystem and private company records, it is challenging to identify all activities taking place within the state. We apologise in advance for any errors or omissions. Please contact us so we can make amendments.

REGIONAL

Due to the resources required we were unable to capture comprehensive information on Regional Western Australia. We did identify some regionally-based startups and there are some shining examples of regional technology companies, such as Westnet. We assume there are a number of current companies that we didn't identify, especially relating to primary industries and resource industries, due to the vast geography and limited number of intermediaries and networks. In future reports we hope to expand the scope of work to regional WA.

CONCLUSION

The digital and internet technology industry in Western Australia is still in its infancy with a few breakout successes that have managed to overcome regional isolation and sparse support. Nevertheless, Western Australia has a promising level of engagement in some of the most innovative new technologies coming to market, such as Fin-tech, Health-tech, Resource-tech and the Industrial Internet.

The state also has a deep history of high risk entrepreneurial activity within the resource sector, with many of the world's largest resource companies having been founded on West Australian soil during the past industrial age.

Given a substantive effort by all participants in the ecosystem – entrepreneurs, investors, educators and government – the state can almost certainly take advantage of its deep entrepreneurial roots to ride the next great economic revolution.



CITY of PERTH



Government of Western Australia
Department of Commerce

Participants in the community workshops said a culture of entrepreneurship and technology innovation needs to be developed if WA is to create globally-relevant startups.

We are extremely hopeful that as digital and internet technology matures and becomes increasingly critical infrastructure within the global economy, new global west Australian technology companies will be born. With greater education across all participants in the sector - current and future founders, engineers & designers; investors, educators and government - along with a more substantive allocation of funds to this growing sector, we are confident the State can develop a unique, competitive global technology hub.

“THE KEY IS TO MAKE THE CITY A LAB. WITHIN A CITY YOU CAN CREATE PROTOTYPES, TEST PILOTS AND ULTIMATELY USE THE ENVIRONMENT AS A SHOWCASE TO THE COUNTRY AND THE REST OF THE WORLD.”

JOSEPH M. PIQUÉ
CEO, OFFICE OF ECONOMIC GROWTH BARCELONA CITY COUNCIL

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DEFINITIONS

PROJECT AIMS

This project aims to benchmark and quantify the ecosystems around early-stage high growth digital and internet technology companies (referred to in this report as startups for short) across Western Australia. The report aims to measure Western Australia's comparative strengths, identify critical issues within the ecosystem, and identify potential areas for intervention and collaboration. The report follows on from our 2013 Perth Startup Ecosystem Report.

SCOPE

This report maps the primary people (founders, angels and other participants), organisations (startups, venture capital firms, co-working spaces, incubators and government agencies), groups (angel and community groups) and events (awards, conferences, programs) involved in or supporting early-stage technology startups across Western Australia.

The report only includes those companies and people that have made a tangible contribution to the development of regional high growth startups – whether that be through mentoring, sponsorship, investment, grants or space, etc.

Regional Western Australia

While the report aims to capture some of the activity in regional Western Australia, due to the limited time and resources available, and the challenges involved in gathering data from regional locations, we have not been able to research regional WA to a suitable extent.

METHODOLOGY

Information was gathered through two workshops with over 30 participants and from interviews with more than 20 key people. Information on people, events and companies was also gathered using data from online platforms including LinkedIn, AngelList, CrunchBase, Gust, Twitter, Eventbrite, Kickstarter, Pozible, Techboard, Business News, Meetup and the Australian Stock Exchange, and complemented with internet research.

Combining several data sources gives a more comprehensive view than one in which information is taken from any one individual source.

However, no research project can claim to offer definitive, complete coverage. The digital sector is, quite simply, evolving too rapidly. Whilst all attempts have been made to be comprehensive, some critical people, organisations and funding events in this growing sector may have been missed.

DEFINITIONS

Startups

There are varied definitions of early stage technology startups. Whilst any type of early-stage business can be called a startup, for the purposes of this report the definition used by StartupAus, Google Australia and PwC Australia was adopted: a 'startup' is a company primarily focused on developing innovative digital technology and intellectual property with a high leverage on labour, a scalable business model and capable of rapid growth. This report also defines startups as those companies born in, or after 2010. Thus companies specified as startups in this report are a maximum of five years eleven months old at time of publishing.

Digital

The project focused on companies that create value primarily around digital or internet technologies such as developing software products or services, scalable hardware based products and services such as drones, sensors, autonomous vehicle technology, Internet of Things (IoT) technology, and robotics.

Funding & Investment

The report captures information on the money raised by established technology companies and startups to fund company and product development. Startups secure funding in multiple ways: private investment, government grants, crowd funding, public investment, prizes and loans. The report did not analyse money flowing out of the State into startups in other states or countries. When the report refers to *Funding, Investment or Matched Funding* it means:

Funding: the report means all types of funding including private investment, government grants, matched funding, crowd funding, public investment, prizes and loans. This definition excludes the Tax Office's R&D Tax Incentive.

Investment: the report means private or public equity investment in a company in exchange for shares in the company, including convertible notes, options and other financial tools for purchasing shares.

Matched-Funding: a large portion of startup funding in Queensland came from the Australian Government's Commercialisation Australia (CA) grant program, established in 2009. By matched funding the report refers to the portion provided by the applicant, and the portion provided by the government is referred to as the *government grant*.

Currencies: All currencies used within this report are in AUD\$ unless otherwise stated.

STEM Qualifications

For the purpose of this report, Science, Technology, Engineering & Mathematics (STEM) qualifications refer to any non-school qualifications at the Postgraduate degree level, Master degree level, Graduate diploma and Graduate certificate level, Bachelor degree level in any of the following fields:

- Natural and Physical Sciences (includes Mathematics)
- Information Technology
- Engineering and Related Technologies
- Agriculture, Environmental and Related Studies.

EXCLUSIONS

Digital technologies are being deployed across all industries and permeate all aspects of our society. The reality is that a large proportion of Australian businesses now have digital technology as a core component of their business. To clarify, this report excludes the following:

Consulting

The project excluded companies engaged with digital technology that have a high reliance on manual labour and produce little to no intellectual property of their own, such as digital design studios, digital marketing, software development houses and computer consulting companies. Technology support, networking, and computer repair businesses were also excluded. Similarly excluded were any other organisations providing IP development as a service purely for other firms.

However, many companies build potentially scalable digital products (e.g. iPhone apps) alongside their consulting services, in which case they have been included.

ESTABLISHED TECHNOLOGY

The report excludes digital technology companies established prior to 2010 from the definition of a 'startup'. However, in some cases the report mentions companies, investment figures or entity numbers for more mature digital technology companies. In these cases, the report refers to these as Established, Mature or Later stage digital Technology Companies, or Est-Tech Co for short.

ORGANISATIONS

A list of the support organisations involved in the WA startup ecosystem including community groups, education programs, incubators, venture capital firms and organisations actively involved in the ecosystem. Please note the list is not exhaustive.

GROUPS (109)

21st Century Thinking (Business)
Agile Perth (Tech)
Amazon Web Services User Group (Tech)
Australian Equity Crowdfunding (Business)
Big Data Perth (Tech)
Bitcoin Perth (Business)
Blogging, Social Media & Online Marketing
Business Analysis Meetup (Tech)
Business Bootcamp & Networking Group (Career & Business)
Business Networking & Referral Group
Business Reboot (Business)
Crowd Funding Institute of Australia (Business)
DevOps Perth (Tech)
District32 Business Reboot (Business)
Docker Perth (Tech)
Drupal WA (Tech)
eGroup WA (Tech)
Enterprise Clubs of Australia (Business)
Entrepreneur Club (Business)
Entrepreneurs in Perth (Business)
Entrepreneurs In Perth Australia (Business)
Entrepreneursville (Business)
Expand Your Business in China (Business)
Experience Design Perth (Tech)
FBA Amazon Pro-Sellers Meetup (Business)
FinTech Perth (Business)
Fremantle Entrepreneurship Meetup (Business)
Front End Web Developers Perth (Tech)
Graphic Designers Perth (Business)
Grow Your Small Business Online (Business)
Improve your Public Speaking (Business)
Inspired Entrepreneurial Women of Perth (B)
Internet Marketing for Perth Businesses (Tech)
Internet of Everything Perth (Tech)
Joondalup Women in Business (Business)
League of Extraordinary Women (Business)
Lean Perth (Tech)
Lean Startup Perth (Tech)
Learn About Technology - Perth (Tech)
Magento WA (Tech)
Makers and Changemakers (Tech)
Meteor Perth (Tech)
Morning Startup - Perth (Tech)
Mumpreneurs WA (Business)
NServiceBus User Group WA (Tech)
Online Marketing Professionals Perth (Business)
Perth .Net (Tech)
Perth 3D Printers Meetup (Tech)
Perth 3D World Meetup (Business)

Perth Agile IM, SM and Coaching Guild (Tech)
Perth Agile Meetup (Tech)
Perth Agile Scrum User Group (Tech)
Perth Agile Testing (Tech)
Perth Appreneurs MasterMind Group (Tech)
Perth Atlassian User Group (Tech)
Perth BizTalk User Group (Tech)
Perth Business Club (Business)
Perth Business Sundowners (Business)
Perth Code Dojo (Tech)
Perth Django Users Group (Tech)
Perth Dynamics CRM User Group (Tech)
Perth Entrepreneurs (Business)
Perth Entrepreneurship Meetup (Business)
Perth Ethereum Meetup (Tech)
Perth Functional Programmers (Tech)
Perth Growth Hackers Community (Business)
Perth Infusionsoft Meetup (Business)
Perth Inventors+Product Developers+Idea MakersMeetup (Tech)
Perth iOS Developers (Tech)
Perth Java & JVM Community (Tech)
Perth Linux Users' Group (Tech)
Perth Lync User Group (Tech)
Perth MS Cloud Computing User Group (Tech)
Perth Mumtrepreneurs (Business)
Perth Network Marketing Meetup (Business)
Perth Networking Group (Business)
Perth Project Crowd Fund (Business)
Perth Rapid Startups (Business)
Perth Sitecore Meetup Group (Tech)
Perth Small Business meetup (Business)
Perth Small Business Networking (Business)
Perth Solo and Small Business Owners (Business)
Perth Sports Analytics Meetup (Tech)
Perth Startup Founder 101 (Business)
Perth Web Accessibility & Inclusive Design
Perth Women Entrepreneurs Network (Business)
Perth Women in Business Southern Suburbs
Perth.js (Tech)
Pollinators Inc
Port80 Perth (Tech)
Positive Women's Movement (Business)
Product Hunt Perth (Tech)
Rockingham Business Sundowners (Business)
Ruby on Rails Oceania (Tech)
SAGE-AU WA (Tech)
SecTalks Perth (Tech)
Silicon Beach Perth (Tech)
Software Architecture and Project Design Perth
Spotfire Perth (Tech)
Startup Agile Group - Perth (Tech)
Startup Grind Perth (Tech)
TechTalks WA (Tech)
The Australian Institute for Senior Entrepreneurs
The Perth Data Science Meetup (Tech)
The Perth Investor's Business Daily (Business)
The Pulse (Business)

The Startup Sessions (Business)
This Week in Tech (Tech)
West Coast Makers (Tech)
Western Australia R Group (Tech)

INCUBATORS (3)

Atomic Sky
Innovation Centre WA
Mustard Seed

ACCELERATORS (8)

Curtin Accelerate
Founder Institute
KPMG Energise
Orange Fab
Orbital
Unearthed
Fusion Founders (Atomic Sky)
Stump Jump

SEED ACCELERATORS (3)

Amcom Upstart
Unearthed
RAC SeedSpark

CO-WORKING SPACES (12)

Bloom Labs
Creative Corner
CityHive (run by Pollinators Inc)
F-space
Flux by Spacecubed
Innovation Centre WA
Level One (hosted at SK Games)
MineSpace
sixty27
Spacecubed
St George Bank Perth Business Hub
Sync Labs
Tech Hub by Atomic Sky

EDUCATION PROGRAMS (12)

Catalyst
CoderDojo
Curtin Ignition
EBL
Just StartIT
LESANZ
Logicus Training Solutions
Mustard Seed
PhDo
Robogals
Springboard Enterprises
Startup Brand School
Start Something
Startup Weekend

HACKATHONS (6)

Govhack

ORGANISATIONS CONT'D

Hack the Festival
Health Hack
Playup Perth
Playup After Dark
Unearthed

MAKER SPACES (3)

The Artifactory
SW Makers
Vic Park MiniLab by Enkel & the Vic Park Collective

ASSOCIATIONS & NFP (9)

Australian Information Industries Assoc (AIIA)
Enkel
Film & Television Institute (FTI)
Open Government Network WA
Pollinators Inc
Resources Innovation through Information Technology (RIIT)
Society of Precision Agriculture Australia (Vic)
StartupAus
StartupWA
Vic Park Collective
Women in Technology WA

UNIVERSITIES (4)

Curtin University
Edith Cowan University
Murdoch University
University of Western Australia (UWA)

AWARDS, GRANTS & GOVERNMENT FUNDS (11)

Accelerating Commercialisation (AC)
Commercialisation Australia (CA)
City of Joondalup Innovation Fund
City of Perth Matched Funding Business Grants
City of Perth Small Business Grants
Innovation Vouchers Program
Innovator of the Year Award
The New Enterprise Initiative Scheme
OzApp Awards
Research & Development Tax Credit
Spacecubed Intensify Scholarship

SELECTED EVENTS & CONFERENCES

Innovation Bay
Perth Web Girls
The Entourage
UKTI FinTech Mission
West Tech Fest
World Wide Web Conference 2017

GOVERNMENT (12)

Australian Spatial Data Directory
City of Perth
Department of Commerce
Department of Industry, Innovation and Science

Department of Premier and Cabinet
Innovation Centre WA
International Centre for Radio Astronomy Research
Landgate
Minerals Research Institute of WA
Office of the Government Information Officer
Technology Park (Bentley)
UK Trade and Investment Australia (UKTI)
Western Australian Centre of Excellence for 3D-Mineral Mapping

VENTURE CAPITAL -LOCAL (4)

Brandon Capital (mainly Biotech, HQ in Vic)
Eve Investments (recently launched)
Go Capital
Stoneridge Ventures
Yuuwa Capital (allocated all digital funds)

FUNDS (OUTSIDE BUT PARTICIPATE IN WA)

Adventure Capital (Melbourne)
Artesian Capital (New York/Sydney)
AWI Ventures (Sydney)
Blackbird Ventures (Sydney)
Blumberg Capital
CVC Capital Partners (Sydney)
Georgetown Angels
Jolimont Global Mining Systems (Melbourne)
Muru-D
PLUS Ventures (Ramat Gan, Israel)
Reed Elsevier Ventures
Summit Partners (Boston)
Syngenta Ventures (Basel-Stadt)
Talent Equity Ventures
Telstra Ventures (Sydney)
TMT Investments
Vix Investments
Western Technology Investment

SELECTED ANGEL OR FAMILY FUNDS (3+)

Fat Hen
Future Health
Larsen Ventures
Western Australian Angel Investors

NOTABLE STARTUP: PARADIGM

5.5M

Youtube views of PewDiePie's Paradigm video

In September 2014, Perth game developer Jacob Janerka launched a Kickstarter campaign to finish his in-development adventure game Paradigm. The campaign went viral and the game received global acclaim, including a coveted video of Youtube star Felix Kjellberg (PewDiePie) playing an early demo of the game. Kjellberg has an audience of over 30 million and his Paradigm video reached near 5.5 million views. Janerka reached his funding goal of \$14,000 after only 11 days on Kickstart and went on to raise \$35,000 at the end of the 30 day campaign. To get his game to the point where it could be successfully crowdfunded, Janerka estimates that he spent over 3000 unpaid hours, which at standard industry rates would be nearly \$250,000. While game studios in WA are small in number they are tackling a \$93 billion global market.

PEOPLE

A list of people involved in the WA startup ecosystem including founders, staff, angels and others involved in the ecosystem. Please note the list is not exhaustive.

Aaron Clements
Aaron Doggett
Aaron Gregory
Adam Diminic
Adam Fitzgerald
Adam Kroll
Adam Law
Adam Ricketts
Adam Yap
Adam Zorzi
Adeo Ressi
Adrian Hollis
Adrian Large
Aiden Gallagher
Aileen Brown
Ajaiy Paul
Alan Barkla
Alan Noble
Albert Suhardiman
Alex Apostolou
Alex Bruce
Alex Da Silva
Alex French
Alex Karis
Alex Noor
Alexandra Shannon
Alick Haangala
Alisha Hardwick
Alison Hunter
Allan Crisp
Amanda Roddy
Ambrose Bonnaire-Sergeant
Amir Farhand
Amita Arora
Andrew Cooks
Andrew Forkes
Andrew Hagen
Andrew Hall
Andrew Hyde
Andrew Karantzis
Andrew Larsen
Andrew Milner
Andrew Outhwaite
Andrew Prince
Andrew Quigley
Andrew Ravenscroft
Andrew West
Andy Dent
Andy Lamb
Andy Manassis
Andy Tong
Angela Vurens van Es
Angie Keeler
Angus Faulkner

Anh Le
Ankur Sharda
Anna Maria
Mackintosh
Anna Powell
Anna-Marie Marais
Anthony Grist
Anthony Manning-Franklin
Anthony Peacock
Anthony Spiteri
Anton Oud
Anton Pearce
Antonluigi Gozzi
Apolon Ivankovic
Arno Dolz
Art Caisse
Arthur (Buck) Connor
Ashford Pritchard
Ashlee Harrison
Ashleigh D'Mello
Ashley Aitken
Ashley Challenor
Ashley Mullaney
Ayrton Sue
Barbara Forrest Hughes
Barry Winchurch
Basil Hanna
Beata Brennan
Ben De Jonge
Ben Fillery
Ben Griffith
Ben Sullivan
Ben Walsh
Benjamin Chong
Benjamin Hicks
Bert Mondello
Bevan Clark
Bevan Griggs
Bill Bartee
Blaize Pengilly
Brack Norris
Brad Gurney
Brad McMahon
Bradley Gibby
Brendon Ross
Brett Delaney
Brett Jones
Brett Stafford
Brian Davies
Brian Elloy
Brodie McCulloch
Brooke Dawson
Bruce Mitchell
Bruce Werdshinski
Bryden Quirk
Byron Schammer
Caedmon Mullin
Calvin Ngo
Campbell Anderson
Carl Stobie
Carolyn Colley
Catherine Resnick
Charles Thomas

Charlie Gawley
Charlie Gunningham
Chris Brown
Chris Corbett
Chris Dorian
Chris Farquhar
Chris Jackson
Chris John Ryan
Chris Kruger
Chris Lewkowski
Chris Lyman
Chris Nurse
Chris Pearson
Chris Riley
Chris Rosagro
Chris Phillips
Chris Webb
Christo Fourie
Christophe Baudia
Christopher Lowe
Christopher Parkin
Chumith Siriwardana
Cian Dobson
Claire Hawker
Claire McGregor
Clay Cook
Clifford Rosenberg
Clinton Balgera
Clinton House
Clinton Keeler
Clive Stein
Cody McDowell
Colin Boyan
Colin Grant
Craig Anderson
Craig Chetty
Craig Coleman
Craig Cumming
Craig Lovelady
Craig Read-Smith
Craig Searle
Craig Sharp
Craig Suttar
Dale Carter
Damien Hatton
Damien Smith
Dan King
Dan Norton
Dan Tarasenko
Dan Williams
Daniel Engelke
Daniel Harvey
Daniel Janes
Daniel Jovevski
Daniel Sagenschneider
Daniel Smith
Danielle McNamee
Daragh Wickham
Darcy Naughton
Darius Way
Dash
Dhakshinamoorthy
Dave Kynaston
Dave McKinney

Dave Newman
David Anderson
David Brennan
David Brown
David Budge
David Coulter
David Hayward
David Hinton
David Hobbs
David Keller
David Lymburn
David McKinney
David Newbury
David Newman
David Novakovic
David Phillips
David Rose
David Shawcross
David St Quintin
David Stallard
David Xu
Davor Tomic
Dean James
Dean Langenbach
Dee Rowlands
Derek Barlow
Derek Logan
Diana May
Dinesh George
Dominic John Collins
Don Newport
Donny McDermid
Doug Bester
Doug Childress
Dr Russell Keith-Magee
Durrell Pita-Ponds
Dylan McEvoy
Eamonn Darcy
Eli Bernstein
Emma Barr
Eric Leo Winkler
Eric Purnamasidi
Evan George Cross
Fabian Le
Fabricio Rodriguez
Farhan Jamil
Fedja Hadzic
Fei Kwok
Fei Ngeow
Felix Wai
Ferenc Varga
Frank Johnson
Gabrielle Hoffmann
Gareth Flannery
Garry Garside
Garry Jowett
Garth Pendergrast
Gary Barber
Gary Labuschagne
Gary Louis
Gary Macbeth
Gary Paull
Gautham Kasinath

Gavin Burnett
Gavin Cleaver
Gavin Cooke
Geoff Bahn
Geoff Hibble
Geoffrey Lewis
Geoffrey Sizer
George Beard
Gerald Strautins
Gillian Hatt
Gino Giorgi
Glen Moora
Glen Rothlisberger
Glyn Miller
Gordon Salvage
Graeme Speak
Graham Griffiths
Graham Hughes
Grant Derepas
Grant Galvin
Grant Grosser
Grant J Mooney
Grant Moffat
Grant Morahan
Grant O'Connell
Greg Johnston
Greg Riebe
Greg Slade
Greg Smith
Gry Stene
Guangzhong Xian
Guy Perkins
Hamon Tony
Hassan Wardani
Hayley Warren
Henk de Graaf
Henrique Mendonca
Hourann Bosci
Ian Cooper
Ian Davies
Ian McFarlane
Ian Olson
Isaak Dury
Ivan Li
Jack Nelson
Jack Owens
Jack Quigley
Jacob Kamile
Jake Howard
Jake Wang
Jakub Felinski
James Clarke
James Graham
James Khng
James McQueen
James Mei
James Moffat
James Philip
James Stuart Martin
James Williams
Jamie Lyford
Jamin Hirte
Jan Ferreira
Jan Kolbusz

Jana Matthews
Jane Garrett
Jared Kim
Jarrod West
Jason Bresland
Jason Eacott
Jason Forbes
Jason Marinko
Jason Mountford
Jason O'Neil
Jay Hollywood
Jayden Rogers
Jayson Myers
Jef Rice
Jeff Broun
Jeff Harding
Jeff Leach
Jeff McCarthy
Jeffrey Broun
Jeffrey Paine
Jeremy Chetty
Jeremy Delmar-Morgan
Jeremy Lu
Jeroen van Zon
Jerome Naidoo
Jesse Emia
Jesse Hill
Jesse Robinson
Jessica Hooks
Jessica Snelling
Jessica Widjaja
Joanna Weidenmiller
Joe Ward
Joe Ziegler
Joel Edward Roberts
Joel Roberts
Joel Valli
John Bardwell
John Bishop
John Biviano
John Cinquina
John Clegg
John Daniels
John Gouteff
John Hannagan
John Hopkins
John Jeremiah
John Kerr
John Kuypers
John Leggate
John Moore
John Morlando
Jon Cahill
Jon Mather
Jonas Tyle Petersen
Jonathan Freeman
Jonathan Lau
Jordan Holzmann
Josh Winterton
Joshua Hunt
Joshua Lay
Joshua Portlock
Julian Dale
Julien Chaplier

Justin Strharsky	Marcus Holmes	Nari Jennings	Phillip Billings	Rusty Rueff	Stuart Kidd
Karen Joseph	Marcus Tan	Nat Drake-Brockman	Phillip Hains	Ryan Beckmand	Stuart Riddle
Karen Tearney	Mark Garkaklis	Natalie Kemp	Quinton Hoffmann	Ryan Price	Sue Zann Toh
Karim Yngstrom	Mark Kemp	Nataliya Senytsya	Rachael Stein	Ryan Zammit	Supriya Guha
Katheryna Lepenicheva	Mark Pivac	Nathan Barbarich	Rachel Cook	Sabine Albers	Susan Hutchins
Kate Reynes-Goldie	Mark Rawlings	Nathan Buzza	Rafael Kimberley-	Sally Porter	Susanne Bahn
Keaton Wallace	Mark Rheinlander	Nathan Harman	Bowen	Sally Roberts	Tammy Miller
Keiran Thompson	Mark Ryan	Nathan Sturcke	Ranjeev Sidhu	Salvatore Vallelonga	Thaddeus Loke
Kent Burwash	Mark Stevens	Neal Davies	Ray Beard	Sam Allen	Theresa Kay
Kerrod Gray	Mark Thomson	Nic Pollock	Rebecca Kate Pedlow-	Sam Birmingham	Thilo Kaipert
Kevin Baum	Mark Waller	Nicholas Guildhary	Collins	Sam Craig	Thomas Haines
Kevin Bellette	Mark Woschnak	Nicholas Power	Rebecca Lee	Sam Mead	Thomas Symes
Kevin Brown	Markus Weichselbaum	Nick Clarke	Rene LeMerle	Sam Najafi	Tim Evans
Kevin Fynn	Marshall Allen	Nick Ellsmore	Rene Seeberger	Samuel Bishop	Tim Pokorny
Kevin H'ng	Martin Bowles	Nick Hudson	Renu Sharma	Samuel Gibbs	Tim Radbone
Kevin Owens	Martin Dougiamas	Nick Russell	Rhiannon McDonald	Samuel Lachlan Mariu	Toby Gardner
khaled hejleh	Martin Staael	Nicki Pereira	Rhodri Thomas	Sandra Heldsinger	Tom Booler
Kieran O'Brien	Matt Fontana	Nigel Moyes	Rhys Williamson	Sarah Mateljan	Tom Lukatela
Kilian Kelly	Matt Fracassini	Nikolaus Lieb	Rich Johnson	Sarah Payne	Tony Brennan
Kim Barrett	Matt Hewitson	Olivia Humphrey	Richard Bevan	Saulo Cavalcante	Tori Bowman
Kimberley Dressler	Matt Lambie	Omar Padia	Richard Haynes	Saxon Druce	Tracey Bridges
Kimberley Russell	Matt Macfarlane	Pas Condidorio	Richard Johnson	Scott Adrian Mison	Tracey O'Keefe
Kingsley Fiegert	Matt Powell	Patima Tantiprasut	Richard Lucas	Scott McDowell	Trent Haerewa
Kirsty Danby	Matt Sapsworth	Patrick Connell	Richard Moore	Sean Craig	Trent Yates
Kishor Bhalerao	Matthew Edwards	Patrick Glovac	Richard Pace	Sean Mitchell	Trevor Brown
Kristen Clifton	Matthew Fabri	Patrick Green	Richard Thorning	Sean Tearney	Trevor Ward
Kye Leslie	Matthew Hayward	Patryk Lazarz	Rick Appleton	See-Ming Ong	Tri Suseno
Lainey Weiser	Matthew Lerner	Paul Baumgartner	Rick Ross	Seyed Nazemi	Tris Le
Larry Browning	Matthew Schneider	Paul Clark	Rikki Kiely	Shanon Loughton	Tristan Haberley
Larry Lopez	Maureen Plavsic	Paul de Grijp	Rinaldo DePaolis	Shaun Ryan	Tristan Reed
Lauren Rae Copley	Maxwell Mcclements	Paul Dewar	Rob Boulton	Shaun Scott	Tristan Senyacia
Lauren Trlin	Mel Ashton	Paul Hasleby	Rob de Bruin	Shawn Parr	Tyson Craig
Laurence Escalante	Melanie Smith	Paul Jowett	Rob Graham	Shel Williamson	Tyson Mowarin
Laurence Houghton	Melissa Chandler	Paul Knight	Rob McCready	Sheryl Frame	Umberto Anderle
Laurie Smithdale	Melvin Tan	Paul Kristensen	Rob Newman	Shivangi Maheshwari	Una Henderson
Lee Goldsworthy	Michael Collins	Paul Lucey	Robert Barion	Shlomi Bonet	Verne Smith
Leigh Pember	Michael Dunne	Paul Lyons	Robert Daw	Sid Thoo	Vickie Davy
Les Capelli	Michael Haywood	Paul Nolan	Robert Godley	Sil La Puma	Vincent Mateljan
Lewis Freiberg	Michael Jay Solomon	Paul Ostergaard	Robert Hanning	Simon Anderson	Viv Preston
Liam Poli	Michael Jelly	Paul Rankin	Robert Jeffery	Simon Cope	Wai Wan
Liddy McCall	Michael Kirkwood	Paul Wighton	Robert Nathan	Simon Creek	Wanida Chua-anusorn
Linh Le	Michael Kneebone	Paula Taylor	Robert Swift	Simon Deconde	Wayde Salfinger
Lisa Evans	Michael Kruger	Pauline Primore-	Robert Szymanski	Simon Foley	Wayne Kirby
Lloyd Lush	Michael Mack	Heaney	Robin Janfaza	Simon Hart	Will Crisp
Lloyd Smith	Michael McNamee	Perry Kelly	Robin Kay	Simon Keary	Will Griffiths
Lori Tyrrell	Michael Mujakic	Peter Bradd	Rocco Tassone	Simon MacFarlane	William Brindise
Lorica Storey	Michael O'Mahony	Pete Clarke	Rod Henderson	Simon Vellianitis	William Cameron
Louie Logdat	Michael Peter Sertorio	Pete Tickler	Rod Houston	Simon Vincent	William Mclean
Louis Marshall	Michael Pivac	Peter Bagshaw	Rod Sherwood	Siobhan Lancaster	Willie Hamann
Louise Daw	Michael Simkovic	Peter Brittain	Rodney Dunstan	Sione Murray	Yolandie McDade
Luciano Pugliese	Michael Wolley	Peter Court	Rodney Green	Sofie De Wolf	Yves Kuehner
Luke Blanc	Michael Zwiener	Peter Faulkner	Rodney Mitchell	Sonny Tham	Yvonne Whittaker
Luke Bresland	Michelle da Almeida	Peter Larsson	Rohan McDougall	Stephen Baldry	Zac Durber
Luke Brown	Michelle Davies	Peter Riggs	Rohan Wallace	Stephen Craig Power	Zaheer Ali
Luke Dawson	Mikahla Smith	Peter Rossdeutscher	Roland Becker	Stephen Langford	Zane Prickett
Luke Durrant	Mike Cadogan	Peter Sheppard	Ronald Beevor	Stephen Llanwarne	Zhen Wang
Luke John	Mike Cunneen	Peter van Bruchem	Rory Linehan	Stephen Schenck	Zhenya Tsvetnenko
Luke Taylor	Mike Fitzpatrick	Peter Wall	Ross Norgard	Steve Brown	
Luke Watson	Mike O'Hanlon	Peter Webse	Roy Husdell	Steve Carolan	
Malaika Bahizi	Mike Ottaviano	Peter Yin	Rupert Quekett	Steve King	
Marc Sputore	Mike Smith	Petr Äervenka	Russell Baskerville	Steven Dimov	
Marco Russo	Mike von Bertouch	Petr Kotek	Russell Clark	Steven Montgomery	
Marcus Figueroa	Mikey Kailis	Phil Morle	Russell Francis	Steven Tingay	
	Miles Burke	Phil Shadlyn	Russell Wilson	Stuart Hall	



CITY of PERTH

AUTHORS

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