Leveraging Social Innovation to Shape the Future of Australia

FROST & SULLIVAN

HITACHI
Inspire the Next

Contents

Hitachi partnered with global research company Frost & Sullivan to produce a new research study on Social Innovation. Frost & Sullivan's 'Social Innovation Whitepaper' identifies the key challenges impacting the future of Australia, explores what Social Innovation can do to address these challenges and highlights the ways in which Hitachi is delivering Social Innovation in Australia.

Challenges Impacting the Future of Australia

In its 28th year of uninterrupted annual economic growth (a record amongst developed nations over this same period[1]), there is much for Australia to be optimistic about. However, future progress for the country depends on how effectively it meets the significant challenges ahead.

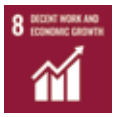
Amongst the most widely referenced frameworks to measure progress across diverse domains is the United Nations Sustainable Development Goals (SDGs) that set targets across 17 SDGs for 2030. Because the SDGs help frame the conversation around addressing key challenges to our future, insights on how we are tracking against those SDGs can be revealing.

Source: United Nations

[1]Oxford Economics, quoted in Australia 'Australia on course to celebrate 30 years of growth, says Oxford Economics'

> Australia is 'on track' with only 35% indicators under the UN's SDGs, 23% need improvement, 18% need a breakthrough to be achieved and 24% are off track.

Analysis by the National Sustainable Development Council shows that across all the indicators evaluated for Australia,[2] only 35% appeared to be 'on track',[3] 23% need improvement, 18% need a breakthrough to be achieved and 24% are off track.[4] A closer look at some examples provides further insight:



Taking into account **SDG 8**: 'Decent Work and Economic Growth', Australia's **low productivity growth** inhibits progress toward a higher pace of economic development. Australian labour productivity growth was just 0.4% in 2017-18; well below the long-run trend rate of 2.2% per year from 1974-75 to 2017-18.[5] In the context of resource efficiency, Australia is also challenged by having the **world's highest material footprint[6] per capita** (over three and a half times the world average). In addition, Australia has to contend with the transition in China's growth (towards domestic consumption and services) and its own critical **transition from a resource-centric economy** to a more diversified economy.

Evaluating **SDG 9**: Industry, Innovation and Infrastructure, Australia's **investment in knowledge-based capital** (as % of GDP) is significantly lower than a large number of OECD countries.[7] The same can be said of the indicator of 'percentage of **higher education expenditure on R&D financed by industry**'.[8] In addition, **digital transformation** is not only creating new markets and opportunities, but also challenging the country's preparedness in terms of **future workforce skilling** (and reskilling/upskilling).

Looking at **SDG 11**: 'Sustainable Cities and Communities', household financial stress is compromising access to **affordable housing**. The increase in the number of **homeless** people is a challenge to the goal of safe and adequate housing. High **urban population density** negatively impacts the target of sustainable urbanisation. By 2060, Australia is expected to be home to a population of 41 million. Sydney alone will be home to 8.4 million people. Melbourne will have surpassed Sydney to reach 8.5 million, Perth will have touched 5.5 million and Brisbane 4.8 million.[9] In addition, since urbanisation in Australia is generally taking the form of expansion of city boundaries (eventually increasing commute times), there is a **greater burden on transportation infrastructure**. By 2060, outer suburbs are likely to account for 40-48% of total population in Melbourne, 42-47% of total population in Sydney, 31-36% of total population in Perth and 36-44% of total population in Brisbane.[10]

[2] 144 separate indicators linked to 86 targets
[3] Based on 'traffic light' assessment of progress across a selection of indicators using time series trends, as well as target and benchmark values
[4] 'Transforming Australia: SDG Progress Report', National Sustainable Development Council
[5] Productivity Bulletin, Productivity Commission, May 2019
[6] Material footprint measures the total inputs of biomass, fossil fuels, metal ores and non-metallic minerals
[7] ECD Economic Survey of Australia 2017', OECD Quarterly National Accounts 2017; http://stats.oecd.org/
[8] OECD Main Science and Technology Indicators
[9] Australian Bureau of Statistics
[10] CSIRO Australian National Outlook Report 2019

Considering **SDG 12**: 'Responsible Consumption and Production', high levels of food waste generated per capita compromise the vision of halving food waste per capita by 2030. Increasing hazardous **waste generated per capita** and the low levels of hazardous waste treatment weaken the push toward environmentally sound management of **hazardous waste**. China's 2018 ban on imported waste (such as plastics) has created a **recycling crisis** in Australia (and other countries) who are now challenged to pursue circular economy principles.

Assessing progress on **SDG 13**: 'Climate Action', it is clear that **climate –change–induced disasters** including droughts, fires, floods and tsunamis, have created a sense of urgency amongst governments, industries and citizens who are committing to changing course. The inflection point has been the impact of several environmental studies and actions in close succession (with worse than expected results and predictions) that are now driving governmental and investment shifts. However, the scale of the problem in Australia is daunting. Since 2000, Australia's **greenhouse gas emissions** have risen substantially, whilst they have fallen in the UK, USA and the OECD. Australia still has the highest greenhouse gas emissions per capita in the OECD.[11] Australia's climate has warmed over 1°c since 1910.[12] This has resulted in an increase in the frequency of extreme heat events, rainfall decreases in some parts and increases in others, as well as extension in the length of the fire season and intensification of extreme fire weather. Over the last 200 years, Australia has also lost more species through mammalian extinction than any other continent, and has the highest rate of **species decline** among OECD countries.[13] **Soil erosion and salinity** remain major barriers to raising agricultural productivity. In fact, by 2030, Australia stands to lose over A$19 billion on account of reduced agricultural productivity and labour productivity as a result of climate change.[14]

> By 2030, Australia stands to lose over A$19 billion on account of reduced agricultural productivity and labour productivity as a result of climate change.

Against this backdrop, Australian governments, industries, academia and consumers are looking to identify innovative ways to leverage people, processes and technologies for improved outcomes.

[11]'OECD Statistics: http://stats.oecd.org/, excluding emissions or removals from land-use, land-use change and forestry
[12]'State of the Climate' 2018, Bureau of Meteorology
[13]Australian Bureau of Statistics
[14]'Compound Costs: How climate change is damaging Australia's economy' Climate Council of Australia Limited, 2019

Social Innovation as Growth Enabler

> Social Innovation is the deployment of technology and new business models to bring about real positive change to the lives of individuals and societies, creating shared value.

In a Frost & Sullivan survey of CEOs worldwide, 34% of CEO respondents specifically cited "managing innovation" as one of their key growth objectives in the next five years. Yet, 51% of CEOs said that their company's ability to deliver on an innovation strategy is only fair or weak.[15]

Against this background, the concept of social innovation is beginning to gain significant traction. Social innovation is the deployment of technology and new business models to bring about real positive change to the lives of individuals and societies, creating shared value.

To enable growth, social innovation needs to be at the intersection of technologies, industries, products and business models; making it a truly transformational force that leverages the power of convergence.

In particular, digital technologies (including advanced sensors, cloud computing services, machine learning, artificial intelligence, mobility solutions, big data analytics, blockchain, drones and automation) will need to be leveraged in the data economy of the future to help organisations build data-driven strategies that can fuel growth.

This explains why 92% of future jobs in Australia will need digital skills.[16] This leveraging of digital technologies by a digitally skilled workforce will prove crucial. In fact, wider adoption of digital technologies has the potential to increase Australia's annual GDP growth rate by 0.7–1.2%.[17]

[15] '5 Things that are Keeping Your CEO Up at Night', Executive Brief, Frost & Sullivan
[16] 'Australia 2030: Prosperity through Innovation', Innovation and Science Australia, 2017
[17] 'Digital Australia: seizing opportunities from the Fourth Industrial Revolution', McKinsey&Company, 2017

Delivering Social Innovation in Australia

We believe that the goal of Hitachi's Social Innovation can be summed up in two simple words: Powering Good.

> "The goal of Hitachi's Social Innovation can be summed up in two simple words: Powering Good.

To be a force in upending 'business as usual' and helping future-proof Australia, Hitachi is leveraging its expertise in Information Technology (IT) and Operational Technology (OT) to help realise new outcomes through this powerful convergence – known to most as the 'Internet of Things' (IoT).

By collaborating with government, corporations and communities, Hitachi is looking to co-create solutions that can result in safe, sustainable and resilient ways of doing business and securing our future.

Here are a few examples:

Informing Smart Agriculture

One of the recent trends impacting the agriculture sector has been the convergence of various technologies such as crop sensors, equipment telematics, enhanced efficiency fertilisers, water conservation systems, integrated pest management, drones and agricultural robots; helping create intelligent farms. These technologies enhance the decision support system of precision farming, which in turn helps farmers in improving farm management outcomes.

At Binginbar Farms in rural New South Wales (NSW), which manages up to 40,000 lambs per year, the need to improve farm management was challenged by the use of disparate sensors and software systems.

Hitachi's Pentaho Platform is now being used to pull through data on every lamb on the farm; integrated with water, weather and soil data so that there is real time, farm-wide visibility through one unified control centre. More importantly, analytics can now help inform on feed regime performance, performance breeder benchmarking, animal tracking and disease prevention.

Taking uncertainty and inconsistency out of the equation in terms data gathering and analysis, this easy to use, unified platform not only harnesses the insights from various third party software systems, but also provides opportunities for even further data-driven enhancements. For example, the deployment of drones, additional sensors across the site, improved documentation to support traceability initiatives and further development of decision-making tools for higher profitability and sustainability.

In another example of leveraging data as a strategic asset, Hitachi's Pentaho Platform and visualisation tools are being used by leading Australian rice processor and exporter, SunRice to analyse data from rice growers for improved quality, enhancing rice provenance, and profitability outcomes. 20 years of historical data (rice genetics, planting times, growing conditions, weather, harvest, etc.) will be modelled to provide insights that can improve whole grain yield so that cracking or breaking is reduced considerably in the processing stages. This will help link on-farm production approaches with processing outcomes.

Enabling A World First in Autonomous Rail

With large, geographically dispersed industrial operations, especially those operating in remote locations, there is a high risk to safety, equipment and of bottlenecks having major negative repercussions on productivity of operations. That is why operators are focused on minimising this risk through the leverage of automation and IoT.

In 2018, Hitachi Rail STS helped Rio Tinto realise a world-first[18] through its automated heavy-haul long distance rail network. Rio Tinto's Auto-Haul® involves a 200-strong fleet of 2.5km long autonomous train (three locomotives and around 240 ore cars) - aptly dubbed the world's largest robot - travelling an average return distance of 800 km without a driver on board. Powered by Hitachi Rail STS signalling, communications, train control, supervision and automation system upgrades, AutoHaul® enables trains to operate autonomously across a remote network of 16 mines and four port terminals, delivering significant safety and productivity benefits.

[18]As of 13 July 2018

Facilitating Best Practice in Mining

In the mining sector, through digital infrastructure and IT-OT convergence, miners are now gaining improved operational visibility and real-time monitoring capabilities that help achieve safety, minimise downtime, reduce energy consumption and facilitate optimal utilisation of mining assets. However, the very scale and complexity of mining operations can often make the task of deriving value from data extremely challenging.

Based in the Hunter Valley region of NSW, one of Australia's premier mining operations is using Hitachi's Lumada solution to provide insights into the operational effectiveness of the wash plant at the mine.

In 2019, Hitachi was selected as the partner for this project, based on the work completed by Hitachi with major companies within the industry.

Utilising machine learning and artificial intelligence, this is the first Lumada solution delivered in Australia, and has already proven its ability to identify and capture value across all assets and systems within the Coal Handling Preparation Plant (CHPP). Hitachi is now commencing a three year collaboration project to extend the solution across the broader business. The technology will assist staff to get better results from existing equipment, and allow staff to focus on areas that can have a real impact on business improvement.

Innovating in Vertical Transportation

Australia - already one of the most urbanised countries in the world - faces a future where limited land space for expansion in our cities will force developers and planners to go 'up' via high rise buildings. Recognising the importance of vertical transportation in facilitating this higher density future for our cities, Hitachi partnered with Australia's fastest growing Vertical Transport specialist, Orbitz Elevators[19] in 2018.

This partnership enables Australian construction, property and infrastructure organisations to benefit from access to Hitachi's industry leading elevators, escalators and walkways. Supported by senior Hitachi engineers, Orbitz Elevators will be delivering Hitachi's world class vertical transportation solutions to some of the most high profile projects in the country including the Gold Coast Airport expansion project, the Gold Coast Airport hotel and the University of the Sunshine Coast. With reliability designed into every product and component, with improved energy efficiency and ride quality, Hitachi's vertical transportation is playing its role in facilitating more efficient and environmentally friendly people flow through urban infrastructure.

[19]Named Telstra Queensland Business of the year for 2019

Loss Prevention in Retail

Even as Australia's retail industry grapples with the transformation of consumer needs and expectations, it also has to contend with the significant challenge of retail shrinkage on account of theft (losing millions of dollars in the process). On the one hand, 'casual' shoplifting activity in Australia has seen a spike with the wider rollout of self-service checkouts. At the other extreme, serious retail theft is becoming more sophisticated as criminal gangs and resale markets become more organised. This problem – if left unchecked – has more than bottom line implications for retailers as in some instances, it also puts retail staff at risk of verbal abuse or even physical aggression.

Conventional approaches (including beefing up manned guarding on premises) can be quite cost prohibitive and not always effective. Similarly, trying to manually spot repeat offenders from 24x7 CCTV footage across multiple stores can result in errors and costly misses. Against this backdrop, a large retailer in Australia is using Hitachi's Live Face Matching solution, Hitachi servers and related video intelligence services to minimise losses due to shrinkage and create a safer working environment for their staff.

The efficacy of such solutions that analyse biometric identification data from existing CCTV system outputs is expected to result in wider adoption across other use cases including monitoring against sabotage and contamination. The 2018 food safety breach – where strawberries contaminated with needles were found across multiple stores across the country; resulting in widespread shopper distress and losses to fruit suppliers – was another stark reminder of the serious ramifications of being unprepared. Moving forward, advanced facial recognition solutions such as Hitachi's Live Face Matching are expected to play a more proactive role in supporting retailers in the fight against such crimes.

Collaborating for Transformational Change in Cities

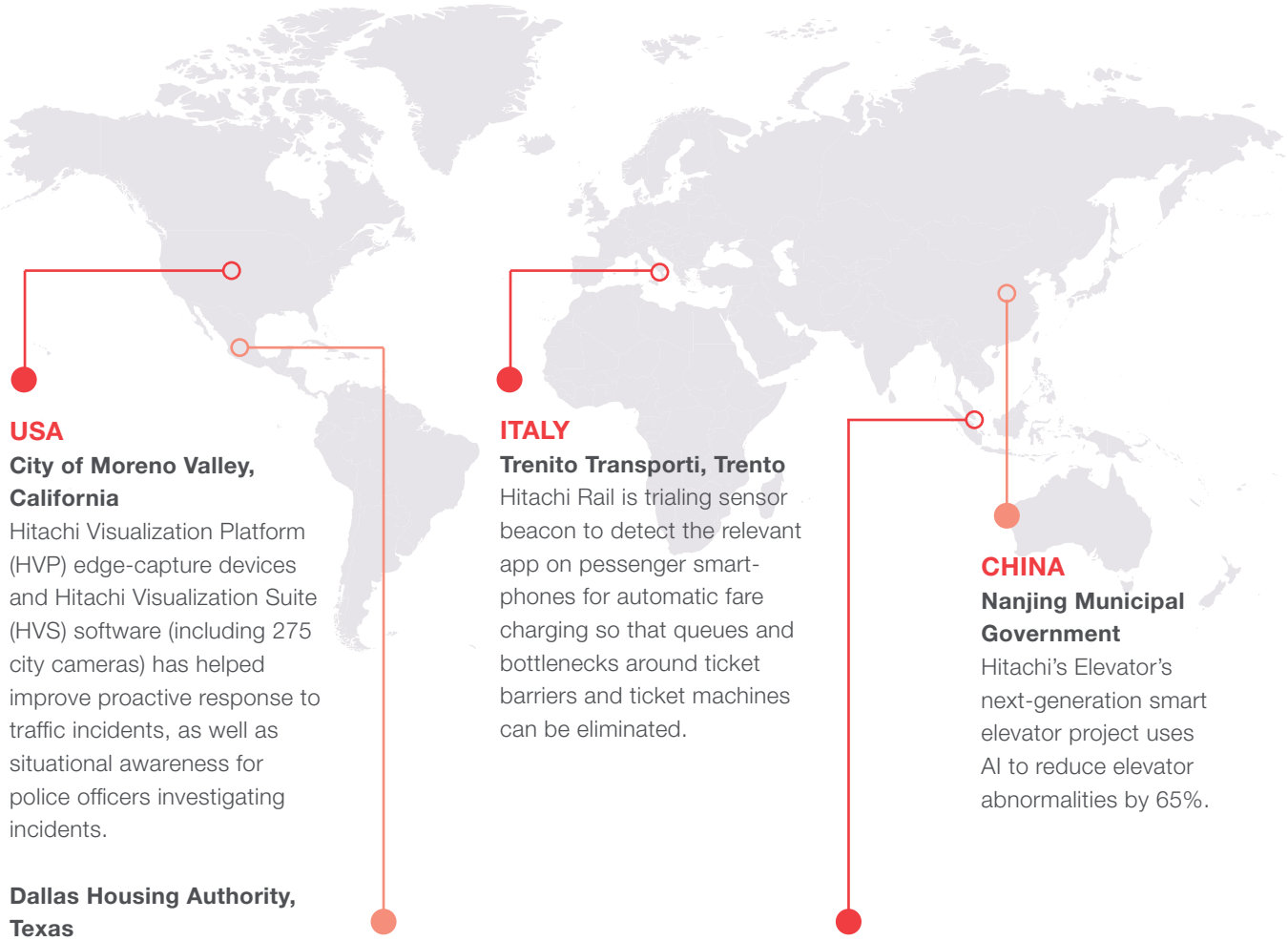
In Australia, we are witnessing the gradual shift from standalone smart building / smart facility projects to smart precinct and smart city-wide initiatives. This is expected to uncover the full value of benefits that come from embedding intelligence into the smart precinct/city using open, collaborative frameworks and leveraging a diverse set of ecosystem partners.

Amongst the most significant transformational infrastructure projects in the country is that of the Western Sydney Aerotropolis in NSW. With the proposed stage 1 airport capable of handling up to 10 million domestic, regional and international passengers per year, as well as freight traffic, this project seeks to address the surging demand for passenger journeys in the Sydney region (which will more than double, from 40 to 87 million, over the next 20 years).[20] It will also support the creation of 200,000 new jobs for Western Sydney through the establishment of a high-skill precinct across aerospace and defence, manufacturing, healthcare, freight and logistics, agribusiness, education and research industries.

As a leading foundation partner with the state of NSW, Hitachi is aligned with the different levels of government and other leading partners/stakeholders in realising the above precinct. In addition to the possibility of bringing to the project various advanced technologies in the areas of agriculture, health, smart city, mobility, logistics and others, Hitachi is also establishing the "Kyōsō-no-Mori (collaborative creation-style centre)" within the smart city to facilitate collaborative innovation, making it the first tenant at the proposed Aerotropolis development. This being a greenfield project, Hitachi believes the government can play a critical role in facilitating open solutions through legislating the appropriate models and framework for deploying smart applications in infrastructure even before it is built.

[20] Airport Plan – Western Sydney Airport, December 2016

Hitachi's Role in Transformation of Global Cities – Recent Examples



USA

City of Moreno Valley, California

Hitachi Visualization Platform (HVP) edge-capture devices and Hitachi Visualization Suite (HVS) software (including 275 city cameras) has helped improve proactive response to traffic incidents, as well as situational awareness for police officers investigating incidents.

Dallas Housing Authority, Texas

Hitachi's Lumada Video Insights is used to monitor and analyse video for enhanced resident and property safety.

ITALY

Trenito Transporti, Trento

Hitachi Rail is trialing sensor beacon to detect the relevant app on pessenger smart-phones for automatic fare charging so that queues and bottlenecks around ticket barriers and ticket machines can be eliminated.

CHINA

Nanjing Municipal Government

Hitachi's Elevator's next-generation smart elevator project uses AI to reduce elevator abnormalities by 65%.

MEXICO

Tequila Intelligente, Jalisco

Hitachi's Lumada Video Insights is used to capture foot and vehicle traffic data for improved visitor and citizen outcomes.

SINGAPORE

Hitachi Asia Ltd. and Frasers Property Limited have signed a Memorandum of Understanding (MOU) to collaborate and drive digital transformation in the real estate industry in Asia Pacific over the next five years.

Source: Hitachi

Hitachi has identified 6 SDGs that relate to its corporate commitment and 5 SDGs where it can make significant impact through business strategy.

Corporate Commitment

Business Strategy

Hitachi in the Community

Apart from the direct leverage of Hitachi's IP, expertise and services in a range of sectors, Social Innovation is also pursued through community engagement.

For example, Hitachi Construction Machinery Australia's partnership with the Humpty Dumpty Foundation has helped deliver lifesaving medical equipment to hospitals and health services across Australia.

Hitachi's monetary contributions help support charities such as Prostate Cancer Foundation of Australia, Beyond Blue and the Australian Cervical Cancer Foundation.

Hitachi's corporate initiative has helped reach families devastated by the floods in Townsville, Queensland.

In addition, through its ongoing internship programs for university students, Hitachi strives to make them future-ready, with practical hands-on work experience to improve employability outcomes for them and the wider community.

Hitachi takes its environmental footprint impact seriously and pursues sustainability initiatives to reduce that footprint. These include replacing conventional lighting with energy-efficient LED lighting, the installation of solar power systems, the use of fuel efficient vehicles, enhanced waste management, increased use of recycled products, as well purchase of carbon credits to offset carbon footprint.

Conclusion

The rebalancing of global economic power towards Asia and the maturity of global supply chains has thrown up significant opportunities and challenges for Australia.

Its competitiveness is often weakened by exposure to volatility in prices of various raw materials and products in global markets, productivity challenges, relatively high operating costs and skilled worker shortage in key sectors.

Within the country, the transition from a resources-focused economy to a knowledge- and services-driven economy presents Australia with unique challenges; especially as progress on SDGs needs further impetus.

The good news is that a range of disruptive technologies are helping to quicken the pace of innovation in Australia and scale solutions faster at the same time that innovative practices and processes are gaining traction. This is an unprecedented opportunity for innovators to thrive in.

However, on a national level, it will require a sharpened focus on R&D, education that can future-proof the next generation and a culture of holistic and sustainable development (to ensure that growth imperatives are aligned with positive social outcomes).

Ms. Chie Mashima, Managing Director, Hitachi Australia Pty Ltd, summarises the sectoral, technological and social shifts by saying "Hitachi strives for a more sustainable society by combating relevant social, environmental and economic challenges, as well as using data to improve the individual's quality of life. With our Japanese heritage, a century of OT and 60 years of IT experience, we aspire to engage in partnerships and valuable initiatives that will play a key role in driving social innovation in the region".

Hitachi – with its commitment to powering good through collaboration and its global and local success stories of deriving real value from data to pave the way to a cleaner, safer, more efficient future – is well placed to support public and private sector stakeholders as this reshaping of Australia's future gains momentum.

FROST & SULLIVAN

HITACHI
Inspire the Next

About Hitachi

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, is focusing on Social Innovation Business combining its operational technology, information technology and products.

The company's consolidated revenues for fiscal 2018 (ended March 31, 2019) totalled 9,480.6 billion yen ($85.4 billion), and the company has approximately 296,000 employees worldwide. Hitachi delivers digital solutions utilising Lumada in five sectors including Mobility, Smart Life, Industry, Energy and IT, to increase our customer's social, environmental and economic value.

For more information on Hitachi, please visit the company's website site at https://www.hitachi.com.

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, works in collaboration with clients to leverage visionary innovation that addresses the global challenges and related growth opportunities that will make or break today's market participants. For more than 50 years, we have been developing growth strategies for the Global 1000, emerging businesses, the public sector and the investment community.

www.frost.com

Published January 2020