



ICT in Dunedin to 2040
A Work Futures Otago Report

June 2018

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Work Futures
OTAGO

Trends,
Disruptions
& Transitions

Ngā mihi – Acknowledgements

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Work Futures

The Work Futures Otago project analyses and forecasts the trends, future projections and potential disruptions in New Zealand with a time horizon of 2040. We utilise the power of a narrative approach to construct scenarios that draw together the drivers, differing voices and potential consequences of long-term change. By engaging people in narratives, we focus on perspectives and build sensitivities around future plausibilities. We develop scenarios using the Delphi technique to engage experts in conversations about the future. Our rigorous and in-depth data analysis informs stakeholders, policymakers and civic leaders.

In this project the *Work Futures Otago* team identifies a future vision for the Dunedin ICT industry and details the increased ICT infrastructure and capability which Gigatown will afford Dunedin. We address the key trends, future projections and potential disruptions with their associated threats and opportunities to understand the future of work in the ICT industry. Conclusions drawn from this study potentially empower organisational resilience and inform socio-economic strategic decision-making by key stakeholders within New Zealand over the next decades.

To learn more, please visit:

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THE FUTURE OF ICT IN DUNEDIN

Business models need to be resilient and future focused with an emphasis on collaboration. People will work differently with innovative skill sets. Organisations will adapt operational capability and business processes to remain competitive. Infrastructure changes will involve businesses changing assets, information and resources to drive innovation capability.

90%

ARE CONCERNED ABOUT THE FUTURE FOR WELLBEING AND HUMAN RELATIONSHIPS IN THE WORKPLACE



In 2040

AI WILL HAVE TRANSFORMED THE WAY WE WORK & ROBOTS WILL BE USED ACROSS THE WHOLE WORKFORCE.

Dunedin
ICT

NEEDS TO BE NICHE, INNOVATIVE AND CREATIVE TO FLOURISH IN 2040.



94%

WANT TO SEE ICT IN DUNEDIN IN 2040 AS A VIBRANT LARGE CLUSTER DRIVEN BY COLLABORATION & INNOVATION ACROSS ALL SECTORS.

What do we do now?

1. We do need to act now;
2. Having a shared vision is essential;
3. It takes a multi-stakeholder approach for change to occur.

Introduction

How will New Zealanders “Work” in 2030, 2060 and Beyond?

This question initiated our pilot research into the future of work which took place in the period 2012-14 (Walton, Ruwhiu, O’Kane & Cathro, 2014). It was designed to: (1) develop and test a futures-based method; and (2) pilot that method with a panel of experts by exploring the future of work in the context of Dunedin. The project aimed to make sense, in the present day, of the many societal, economic and environmental pressures that will impact work in the future by adopting a systems approach to understand both these pressures and the potential impact of them. In doing so, we used scenarios to open up dialogues between business and society in Dunedin. We initiated this research in response to much literature discussing the dynamics of the business environment in which organisations operate, and the predictions of fundamental changes to workplaces and the way in which we work (Franklin & Andrews, 2012; Randers, 2012; Rifkin, 2011). We see that the opportunities and challenges future thinking poses for business, society, and local government is significant and have been working to develop conversations in Dunedin based on our research.

ICT in Dunedin

The focus of this project is to take our research wider and further by exploring two key areas which emerged as important from our pilot study.

1. Information and Communication Technologies (ICT)
2. High-Value Manufacturing (HVM).

These two research streams each have significant potential for economic and social impact at both local and national levels in the future and will be examined with a 25-year outlook (the pilot study revealed that looking 50 years out was difficult for participants [Walton et al., 2014]).

This research was designed to explore the possibilities created for Dunedin by winning Gigatown. These result from the increased ICT infrastructure and capability which Gigatown will afford Dunedin, which should in turn lead to an increase in “weightless” industries. Our previous work defines weightless as “based on knowledge generation rather than physical products” (Walton et al, 2014, p.19), and therefore our aim is to understand the transitions needed to realise their potential. The two questions that drove the research are:

- 1: What does the future of work look like in the ICT industry?
- 2: What strategic thinking is needed now to develop resilience within the ICT industry?

This report summarises the key findings from the research and provides implications useful to, not only the Dunedin ICT community, but also wider Dunedin business and society, and to people working in ICT throughout New Zealand.

Method

To explore the future of ICT in Dunedin we used an established method designed to enable us to listen to stakeholders, integrate their thoughts and ideas and present these back to the stakeholders in an iterative process. We first analysed 48 futures-based reports which supported the design of the questionnaire used in the first round of the Delphi survey. The Delphi survey comprised three rounds of questionnaires which were circulated to identified ICT stakeholders. Only those who responded to the previous round received the next round. Table 1 below depicts the process used, and provides information on the participants from each round. In the following pages we present the results cumulating in the development of three scenarios.

Table 1: Environmental Scan of 48 Future-Oriented Reports from New Zealand:

Delphi Survey			
	Round One: Delphi Questionnaire	Round Two: Scenario Reactions	Round Three: Actions
Sample:	101 ICT stakeholders in Dunedin; 43 returns (43% response rate)	43 respondents from round one; 19 returns (44% response rate)	19 respondents from round two; 7 returns (37% response rate)
Respondent profile:	Male 74%, Female 26%; Average of 21 years business experience; 54% of organisations had a 3-5 year strategic horizon	Male 78.9%, Female 21%	
Purpose:	Explore trends, projections and disruptions.	Understand the feasibility of each scenario; Select “ideal” and “realistic” scenarios.	Consider what the ICT industry should do now to prepare for the future.
Analysis:	Factor Analysis, Means and Standard Deviations used to group responses into different viewpoints.	Counts used to establish “ideal” and “realistic” scenarios; inductive analysis of open-ended responses.	Inductive analysis of open-ended responses.

Environmental Scan

The ICT Work Futures Otago study produced a multitude of results. In this section we summarise these and draw out the pertinent findings for the ICT sector in Dunedin. The environmental scan enabled us to identify, on a broad basis, what was currently being discussed in relation to the future of work in New Zealand. Table 2 summarises these findings.

Table 2: Findings from the ICT Work Futures Otago study under the PESTEL (Political, Economic, Social, Technological, Environmental and Legal) framework

POLITICAL	ECONOMIC	SOCIAL
<ul style="list-style-type: none"> • Living standards • Industry support • Revise regulation (e.g. retirement, immigration, health & safety) • Treaty of Waitangi – (& enactments e.g. Te Ture Whenua Act) • Gov. Agency structure & mission • Gov. strategy/investment • Industrial policy • Advance education agenda • Local/national Gov. 	<ul style="list-style-type: none"> • Living standards • Productivity • Regional development • Investment opportunities • Business networking & clusters • City hubs • Export orientation • Industry specific growth • Small economy – challenge of scale and scope • R&D investment low 	<ul style="list-style-type: none"> • Living standards • High levels of education • Social responsibility • Increased global connectivity • Geographic spread • Work-life balance • Wellbeing • Low literacy & numeracy • Demographic changes • Automation & job loses • Specialist education/training • Changing workforce dynamics • Education not meeting the needs of business & society
TECHNOLOGY	ENVIRONMENTAL	LEGAL
<ul style="list-style-type: none"> • Increased productivity • Increased global connectivity • Integrated business systems • New business models • New jobs/new skills • Agility • Value adding production/customisation • Large tech and people capabilities 	<ul style="list-style-type: none"> • Primary industries • Driving innovative business models • New jobs emerging • Climatic events impacting infrastructure 	<ul style="list-style-type: none"> • New legislation/regulation required (e.g. retirement, health & safety, immigration)

Note: Items appear multiple times if they were discussed in relation to different elements of the framework

This led us to consider four key areas businesses in New Zealand and Dunedin need to focus upon in order to adapt and change to take advantage of the opportunities of the workplace of the future:

- **Business Models** need to be resilient and future focused; this can be achieved through collaboration, process integration and the development and maintenance of partnerships.
- **People** will work differently and need new and innovative skills sets. The workforce configuration will change dramatically with more cultural diversity and older workers.
- **Operational Capability** will see organisations needing to adapt their core technical skills, business processes, and organisational strengths to survive and remain competitive.
- **Innovative Infrastructure** will see organisations adapting their physical configuration and movement of assets, information and resources to the needs of a future workplace to drive innovative capability.

Trends, Projections & Disruptions

Trends for ICT in Dunedin

Participants were initially asked the extent to which they agreed with the trends identified in the environmental scan. Below is a summary of their responses.

- Technological pace of change will increase and harnessing this will be integral to the success of Dunedin ICT businesses. Some respondents see Gaming as a key growth area.
- The ICT Industry in Dunedin will continue to grow and be influenced by the reduction of global boundaries.
- Innovation, IT development skills and the use of big data will be ingrained in successful Dunedin organisations.
- The “Internet of things” (network of connected devices) will influence Dunedin ICT organisations while digitalisation of the entire economy will continue to drive growth.
- Compliance issues are likely to increase.
- Many employees will have Portfolio careers where they are contracted to more than one employer. The onus will be on the individual to continually re-skill and upskill and engage in life-long learning.
- There was debate over the need to teach basic programming skills to all school aged students.
- The average age of an employee will increase and employees will seek more flexibility.

Projections for the future

From our analysis of reports on the future we identified six key areas which would likely change in the run up to 2040. We created projections from this data and invited our experts in the ICT field to consider those projections.

Projection 1: Global ICT skills

In 2040, ICT skills are influenced by both local and global considerations.

Implications:

- Higher competition for ICT jobs in Dunedin is driven by a mobile global workforce.
- Dunedin ICT organisations ensure they have employees with the right skills by **balancing** recruitment from the global market and working with appropriate education programmes to grow their own talent pool in the region.
- There is no real “skills gap”, as jobs can be filled from the global market.
- The education sector needs to be more collaborative, innovative and connected to industry

Projection 4: Intense collaboration

In 2040, ICT organisations in Dunedin collaborate with local and global organisations in order to compete.

Implications:

- The global nature of the ICT sector is driving collaboration, which is viewed as vital to creating competitive advantage through greater creativity and efficient resource utilisation.
- Dunedin ICT firms have seen advantage in collaborating with one another to share resources, expertise and create a critical mass of ICT intelligence. This must be supported by industry and national/local government initiatives.

Projection 5: ICT innovation and investment

In 2040, Foreign Direct Investment combined with higher levels of government funded research and development is an essential success factor for the ICT sector in Dunedin.

Implications:

- Dunedin ICT firms successfully navigate the government's research and development initiatives, but also look for a wider variety of funding opportunities, such as private equity and crowd sourcing.

Projection 6: Worker-centric "work"

In 2040, work-life balance is more important as the workers in Dunedin ICT firms take more responsibility by setting their own hours, location, goals and challenges.

Implications:

- ICT firms include employee welfare as a critical KPI to attract a talented workforce.
- A highly skilled, talented and mobile workforce chooses to live and work in Dunedin. ICT firms have adopted worker-centric practices and policies that are more flexible, transparent and allow worker autonomy.

Disruptions

Disruptive systems level changes have the potential to impact on the future of work in New Zealand and the future of ICT in Dunedin. Thinking about the year 2040 from the New Zealand ICT industry perspective, participants were asked to agree or disagree with 54 statements derived from the environmental scan reports as well as key global reports on the future of work.

Key findings (disruptions that scored a mean agreement of more than 70/100 across participants):

- The gap between the rich and the poor has continued to rise.
- Thousands of connected sensors contribute to big databases (“the Internet of things”) driving our everyday life.
- People have to work for longer (than current retiring age).
- Artificial Intelligence has changed the way we work.
- Large countries are buying land, where appropriate, to produce food and obtain water for their people.
- New ways of thinking about economic growth are emerging.
- Robots are used across all workplaces – not just for hazardous jobs.
- Advances in technology have increased due to demand for low carbon economies.
- Increased foreign investment in ICT/HVM sectors is driving innovation and growth.
- Augmented reality is commonplace for providing experiences for people and workers.

Participants also disagreed with some potential disruptions. For example:

- They do not see a clear demarcation between work and personal lives in 2040.
- There will not be a minimising of personal digital footprints – indeed a slight majority see more personal data being shared online.
- Globalisation will not reverse but it is unlikely that Australia and New Zealand will become one economic entity.



What Keeps Participants Awake at Night?

Participants were asked to think about the future and consider what three things kept them awake at night. Four key areas emerged.

Table 4: What keeps participants awake at night

Theme	Participant Quote
1. Children are our number one priority	<ul style="list-style-type: none"> • “how will my children keep up?” • “what the world will look like for my children and how I can prepare them to be ready for what the future could be for them” • “will my children have jobs that keep them fulfilled and able to maintain a good standard of living?”
2. Consequences of an inequitable society	<ul style="list-style-type: none"> • “increased inequality in NZ and access to basic resources” • “the gap between the rich and the working poor” • “lack of ethical framework in our societal structures”
3. Importance of wellbeing and human relationships	<ul style="list-style-type: none"> • “how our penchant for digital technology may adversely impact our health” • “balance of work and life for the next generation” • “the mental health of our nation”
4. Concern about global systems: <ul style="list-style-type: none"> • Climate change • Global political or financial instability • Good leadership at a national and local level is a concern. 	<ul style="list-style-type: none"> • “climate change, global economic meltdown and political meltdown” • “can our government think ahead and prepare for the future and not be ruled by big corporates?” • “population growth and the ability to feed the world”

And finally one participant summed it up by stating *“probably all of this tonight. A little disturbing but exciting to think about that all at once.”*

Summary: Trends, Projections and Disruptions

The data we received from the quite comprehensive first round questionnaire had a number of strong but at times conflicting messages from participants. There are some clear trends in the IT sector in Dunedin emerging (e.g., some clear projections and some clear disruptions). However, in amongst, that there are a number of big societal level changes that are keeping people awake. After both qualitatively and quantitatively analysing the data we made sense of the results by developing a series of scenarios. The next section outlines these scenarios and the reactions to them from participants in the study.

Bringing it Together: The Scenarios

As a result of the first round of the Delphi survey, scenarios based on the responses from the participants were developed. These were produced in a narrative style to bring together the ideas from the responses in a consequential manner. Stories are a powerful way to connect issues and possibilities and to draw responses from participants about how they see the connectedness and consequences. The following pages present each of the three scenarios accompanied by the participants' reactions to each.

<h3>Scenario 1</h3> <p>Dunedin ICT workers are global contractors</p>	<h3>Scenario 2</h3> <p>Dunedin ICT workers work in-house</p>	<h3>Scenario 3</h3> <p>Dunedin ICT workers are working in a collaborative vibrant sector</p>
		
<ul style="list-style-type: none"> • Business in Dunedin is dominated by large, long-standing business-as-usual organisations... • Lack of specialist ICT companies in Dunedin. Individual ICT workers and micro-firms compete for contracts both globally and locally... • Dunedin-based ICT workers have developed niche, in-demand skills through substantial individual investment in their education and development... 	<ul style="list-style-type: none"> • Dunedin is globally connected but geographically isolated... • In this digital economy ICT expertise is critical for business innovation. Therefore, having ICT skills in-house is essential. • There is increased digitisation in the form of augmented reality, artificial intelligence techniques such as self-driving cars and the use of robotics across all industries and sectors. 	<ul style="list-style-type: none"> • Dunedin is a vibrant town. People are attracted to Dunedin as a destination to both work and live... • Dunedin is part of the innovative change globally, created through small, agile ICT companies collaborating with their peers... • The growth of ICT firms in Dunedin has been positive for the city. Education and training around ICT has flourished...

Scenario 1: Dunedin ICT Workers are Global Contractors

It is the year 2040 and the population of Dunedin has increased slightly to 132,000. This increase has resulted from people moving to Dunedin from both within New Zealand and around the world, to take advantage of the quality of life Dunedin offers. Dunedin is considered a safe place to live and work in, has short commuting distances and easy access to the great outdoors. The business landscape in Dunedin is dominated by large, long-standing business-as-usual organisations. Its location facilitates 24/7 working with Northern Hemisphere companies. Therefore, Dunedin is an attractive place to contract workers from. This has given Dunedin ICT workers, in particular, an advantage when seeking contracts.

There is a lack of specialist ICT companies in Dunedin. Instead individual ICT workers and micro-firms compete for contracts both globally and locally. Most of these contracts come from those global firms who have embraced digitisation of the economy and are therefore driving global economic growth. Thus ICT workers in Dunedin are involved with creating value at a global level, and the city of Dunedin does not benefit directly from this. Economic growth is no longer the norm.

Worldwide, the numbers of workers with ICT in their roles has increased. In Dunedin there is a high level of workers with ICT expertise. These ICT workers are contracted into portfolio type work that usually involves multiple contracts, many of which can be global – and are increasingly from new and emerging economies, such as Latin America and Africa. To compete for these contracts Dunedin-based ICT workers have developed niche, in-demand skills through substantial individual investment in their education and development, frequently through online global institutions. Dunedin education institutions, with their embedded traditional structures, have failed to step up and provide the skills ICT experts need to succeed; these institutions adapt slowly. Indeed the New Zealand innovation system as a whole has failed to deal with the complexity of automating traditional human roles and the constant drive for more efficiency.

The workers work both from home and in shared spaces provided through the city. Operating in shared spaces enables collaboration between ICT experts, which also supports their individual development. Dunedin ICT workers are sought after around the world. Similar to precarious employment relationships, there is a lack of employee benefits, such as sick leave and holiday pay. Consequently, this competitive environment creates stress and mental health issues. Often the balance between work and life is heavily skewed in favour of work. Furthermore, those without the unique skills demanded globally find themselves in even more precarious employment arrangements; as lower skilled Dunedin workers are competing globally with people who are prepared to work for less than them.

Reaction to Scenario 1

NOT an ideal vision:

- This global model does not support a flourishing Dunedin ICT industry.
- Paints a picture of poor quality of life in the city.
- Depicts a bleak picture of people in survival mode.
- Nothing to suggest that people want change and growth.

Participant Examples:

Lack of any real value in ICT being captured for the local economy.

Describes a city in decline where people survive in a non-sustainable way fighting for work which negates the attractive quality of life that people seek.

Future Proofing Against this Scenario:

- Supporting practices for development of partnerships.
- Be competitive according to global trends
- Change to workforce dynamics
- Positive leadership
- Creating a positive and a stimulating work environment.
- Improving work-life balance and well being
- Encouraging community engagement

Participant Examples:

The university, council and other key partners need to ensure that they are front and centre in the future ICT development. Salaries are at a global nature and the industry is credited for the future of the city through the 2040-50 period.

A business can only survive and flourish if it has a solid foundation based on relationships, quality, ethics and financial, social and environmental sustainability.

Scenario 2: Dunedin ICT Workers Operate In-House

The year is 2040 and Dunedin is globally connected but geographically isolated. The population has stagnated at 110,000, and is generally older than the New Zealand average. As such, the working population is older. The increased gap between the rich and poor has resulted in people living in sub-standard accommodation in areas of Dunedin which have suffered from low investment in infrastructure and negative consequences of climate conditions. These people work in low paid jobs and have little opportunity for advancement.

Technology is thriving in the global business environment. There is increased digitisation in the form of augmented reality, artificial intelligence techniques such as self-driving cars and the use of robotics across all industries and sectors. Lives are digitally connected, with the “Internet of Things” enabling smart devices to control homes, and employers to use technologies to increase worker productivity. Harnessing “Big Data” in decision-making is integral to organisational success.

In New Zealand, successful organisations tend to be larger and have embraced in-house technical expertise. Dunedin is no different. Its successful companies use technology to create value and drive innovation. The Dunedin ICT cluster, seen in the 2010s, has devolved as those small innovative organisations have not been able to provide the same working conditions as the larger organisations. Thus talented workers have shifted in-house to head-offices situated outside Dunedin. ICT as a specialised sector in Dunedin has somewhat disbanded resulting in a decline in the number of ICT professionals in Dunedin

In this digital economy, ICT expertise is critical for business innovation. Therefore, having ICT skills in-house is essential. At the same time, innovation is stifled by increased compliance requirements which results in valuable time being spent on reporting. For example, companies with more than ten employees must track their employees’ working day through smart ear clips. This lets employers know where their staff is at all times, tracks their minute-to-minute physical and mental health and supplies data in real time to both workers and the organisation. This addresses both security and safety issues.

In-house ICT is a crucial part of a company’s success, not just for tailored innovative technology but also to ensure the ICT system operates successfully. There is an expertise split within the ICT sector; few are highly-paid, much sought after jobs, while the bulk are considered low-skilled roles. Those workers with high levels of expertise are well educated. The education system focuses on building creativity and innovation skills, including high end programming. Those who are not educated end up in low level service jobs of which there are few. Automation has depleted many of these roles. Overall, the number of both ICT roles and workers in Dunedin has decreased.

Reaction to Scenario 2

Not an ideal vision:

- This scene portrays a picture of a stagnant Dunedin with no innovation or development in the ICT industry.
- It indicates the work practices that are not resilient and future focused.
- In this scene, ICT firms and employers don't assume a greater responsibility for the welfare of their employees.

Participant Examples:

Dunedin's prosperity hinges on strong ICT development and growth, neither of which is evident in this scenario.

No, the innovative companies meet different needs for their staff. Employees in those companies do not want the security and stress of the corporate world.

Lack of productivity and innovation in local industry. High levels of inequality erode quality of life. Brain drain to big companies located elsewhere. Compliance burden on those that remain.

Future Proofing Against this Scenario:

- Innovative ideas and opportunities encouraged by business environment.
- Support and induct employees with required skills.
- Lower business compliance costs.
- Positive leadership
- Encourage global and local collaboration
- Attract and retain human capital
- Enhancing Dunedin culture through investment

Participant Examples:

Big Data – just another buzz word? Probably not but it will be irrelevant if it is not interpreted, analysed and communicated effectively. So people with these skill are required.

I believe the remote workforce is going to be Dunedin's big winner. The city will be chosen for its lifestyle and environment. Niche businesses will become the leaders with companies like Xero utilising the Dunedin work market to assist its global footprint. Companies from the global tech market will see the benefits of having offices/staff working in Dunedin.

Scenario 3: Dunedin ICT Workers are Employed in a Vibrant ICT Sector

The year is 2040 and Dunedin is a vibrant town. The population has increased to 140,000. People are attracted to Dunedin as a destination to both work and live. The cultural diversity of people living in New Zealand has increased, and while there is an aging population of kiwis in general, there is a younger vibe in Dunedin. This is because Dunedin has attracted people in their 30s from throughout the world looking for the best place to work, live and raise a family. This shift has resulted from political unrest globally. Those who have the means are choosing cities like Dunedin to escape living in places where crime is high, basic infrastructure is not maintained or climate change is having an unsettling impact.

The business environment in Dunedin is dominated by a large cluster of ICT companies that collaborate locally and compete globally. These companies keep up with the ever increasing pace of change. Dunedin is part of the innovative change globally, created through small, agile ICT companies collaborating with their peers. Dunedin is an incubation hub for technologies, applications and gamifications that are released globally. Funding for ICT companies is a mix of global angel investors, government sources and significant foreign direct investment, some of which is crowdfunded. As a result, the ICT sector in Dunedin is vibrant and strong.

The growth and innovation evident in the Dunedin ICT cluster has emerged from increased collaboration between ICT companies, combined with a values-based orientation towards worker well-being; efficiency is no longer the key performance metric. This approach has enabled the development of strong teams with talented workers. Dunedin ICT companies emphasise work-life balance through offering flexibility in employment and value the skills workers bring to their organisations. This has also been the catalyst for collaboration between the ICT sector and Dunedin's educational institutions facilitating joint projects and skills development. Dunedin's ICT cluster has the strength to compete globally for work.

The growth of ICT firms in Dunedin has been positive for the city. Education and training around ICT has flourished. In this digitised economy, school children learn basic programming and tertiary institutions are more flexible in their approach to ICT education. At the Polytech, students receive customised learning which takes into account their on-the-job experience in classroom learning. Practical skills are valued as much as theoretical. The University concentrates on life-long learning and offers a more flexible approach for the development of knowledge. Together the collaborative approach to ICT education and training offered in Dunedin attracts people.

Reaction to Scenario 3

AN IDEAL VISION:

- Dunedin is projected as a vibrant town with innovation and development opportunities.
- The ICT sector in Dunedin is vibrant and strong.
- Education and training around ICT has flourished.
- Dunedin has attracted people to live.
- Dunedin's ICT cluster has the strength to compete globally for work.
- Ultimate future goal of ICT industry.
- Steps towards innovative thinking around infrastructure.
- Focus on people's wellbeing.
- Dunedin as an ideal place to live.
- Focus on improving the environment.

Participant Examples:

It will be the future of Dunedin. The learning is suited to the student. The University and Polytech are internationally regarded and this attracted students that are sought after. The environment is attractive to those in the tech space. Global companies have been attracted to Dunedin to the talent here and the environment.

Yes, this is where we have to be. We are heading in this direction – it is a long game. There are some key organisations, businesses and people who are aiming for this and they appear to be getting some attraction. Keeping people at the forefront of the vision is important – technology should exist to serve people, the environment and create a better quality of life, to create an inclusive society. Inclusive means allowing people to choose the community they wish to be part of.

Scenario Summary

94% of participants want to live and work in a Scenario 3 Dunedin which sees “Dunedin ICT Workers employed in a Vibrant ICT Sector” in 2040; and the majority of participants (65%) see this scenario as plausible. This positivity is great for the Dunedin ICT sector.

We also asked participants: **Did the scenarios miss anything?**

Responses tended to mainly reflect some of the ideas contained in either scenario 1, 2 or 3. However, they added the following information to the conversation about these scenarios:

1. *The scenarios do not account for the full impact of AI.* For example:
 - “A Domesday scenario is that all local ICT skills are hollowed out by a combination of job automation (AI, robots etc) and centralisation, with local labour employed as low-grade technicians.”
 - “If artificial intelligence arrives 10 years earlier than modal prediction of 2040 and displaces majority of workforce, scenario would vary greatly from those put forward here.”
2. *The reality will be a mixture of all three scenarios.* We agree with this thinking and, while the narratives are crafted to make sense individually, we see that the future will consist of many differing paths across the three scenarios. For example:
 - “I think there will be a combination of all three but we are better placed than many communities around the world to prosper.”

Actions for Now: Implications

“Dunedin needs to think about three key issues: how to leverage off the presence of the University to create more starts-ups and hence more jobs; how to make Dunedin a destination that competes with the likes of Queenstown and Auckland; how to use the size and growing international reputation of Auckland to advantage (as opposed to lamenting the fact that Auckland is just betting bigger while Dunedin is staying the same). On the latter point, Dunedin businesses need a strategy for getting the most from Auckland, where the people and the demand are in NZ, and as a gateway to the world.”

While most of the participants want to become part of Scenario 3, they indicate Scenario 1 as being closer to depicting the status quo and more likely to happen. As such, participants recommend the following steps to be taken to enable a future more like Scenario 3:

Recommendations for Change	
1. Significant change to existing thinking, including aspects such as aspirational culture change and strong leadership	“Scenario 3 is great, but requires significant change to existing thinking in many areas. Also requires the population growth. However, Scenario 1 is closer to status quo, so more likely to happen if we don't do anything.”
2. Enabling access to capital	“A sense of urgency to ensure that this happens could make the difference between 3 and the other options. Scenario 3 describes very well the future that city leaders and influencers need to articulate. For this scenario to come into reality and it requires a number of levers and actions to come into play. Supporting a start-up scene in Dunedin, access to capital...”
3. Work location mix, population growth and better physical connections	“Shared working and research environments with flexible work arrangements...would be good in combination with creative people who offer insightful and resourceful solutions to future problems.”
4. Developing smaller innovative organisations, strong work life balance and the collaboration of education with industry	“I hope with all heart that the education institutions continue to recognise working with Industry and not naval gazing is a must. We are seeing enormous change in work location mix already - we have remote workers, an enormous part of our revenue is now driven outside of Dunedin - it won't be long I believe when it will be driven outside of New Zealand. I love being a part of this change and look forward to continuing this involvement.”
5. Having deliberate policies to achieve a vibrant ICT sector	“Every city in the world will have a similar vision, so competition for talent and resources will be intense. We don't have a monopoly on quality of life, in fact distance can have the effect of negating it somewhat. Dunedin will not compete effectively by accident, it will require deliberate policies to achieve a vibrant ICT sector.”

What do we do now?

Our key question from the final round of the survey was to ask participants their thoughts on action for now to ensure the future they wanted emerged. The participants' main thoughts can be summed up as:

1. We **do** need to act now
2. Having a **shared vision** is essential
3. It takes a **multi-stakeholder** approach for change to occur

It is hoped that this report is one step in the process of future thinking for ICT in Dunedin and will encourage open debate and dialogue into how Dunedin as a city and community can create the vision it aspires too where 'Dunedin ICT Workers are Employed in a Vibrant ICT Sector'.

