

NZGDA

NEW ZEALAND
GAME DEVELOPERS
ASSOCIATION

Interactive Aotearoa

DRIVING GROWTH AND WELLBEING THROUGH
INTERACTIVE MEDIA

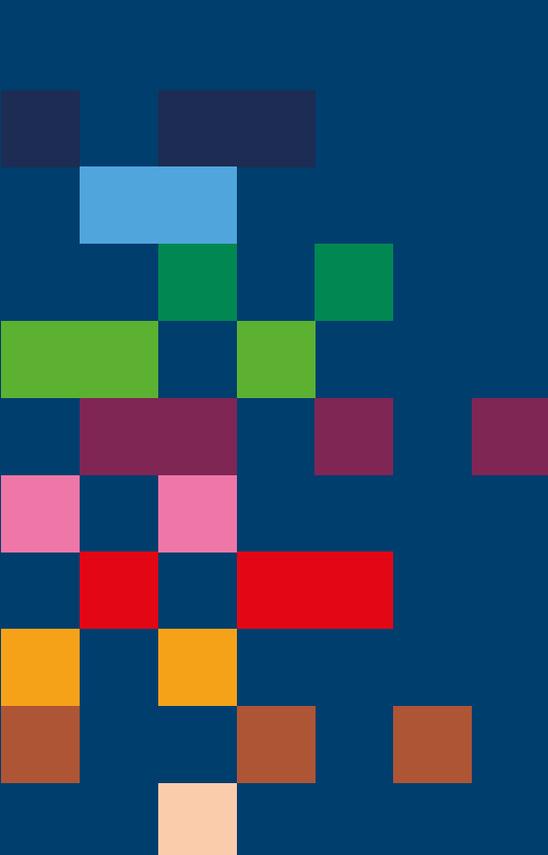


An analysis of the impact of interactive media and games on New Zealand's economy and wellbeing

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_WETA WORKSHOP_INVADERS



Acknowledgements

The NZGDA would like to acknowledge the following contributors:

Report Editor and New Zealand Game Developers Association Secretary **Stephen Knightly**.

Graeme Muller and **Melissa Firth** from NZTech for advice, leadership and reviewing the report.

Victoria Blood and **Paula Browning** from WeCreate for creative industries leadership and reviewing the report.

Vhari McWha and team from Sapere Research for economic modelling advice and literature review.

Baz MacDonald for interviewing and writing case studies with so many businesses and creators. **Tim Ponting**, **Paul O'Leary** and **Robert Jeromson** for proofreading and editing.

Robyn Henderson, **Stevie Jepson**, **Arek Wojasz** from the Ministry of Business, Innovation and Employment for review and policy input.

The NZGDA Board, past and present, including **Cassandra Gray**, **Michael Vermeulen**, **James Everett**, **Ben Kenobi**, **Mario Wynands**, **Frances Valentine** and **Tim Ponting** for industry analysis, consultation and advice over many years.

Tim Thorpe Consulting for seven years of the independent New Zealand Game Developers Industry Survey.

The many CEOs, industry association chairpersons, MPs, Government agencies, teachers, academics, business people and creative entrepreneurs that we spoke to for this report.

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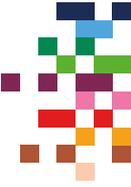
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INTRODUCTION:

The New Zealand Game Developers Association

Interactive media – video games, educational games, cross reality (virtual, augmented and mixed reality) experiences, mobile apps, interactive storytelling and other forms – is at the forefront of New Zealand's digital economy.

New Zealand's interactive games sector has had an impressive 39 percent compound annual growth rate (CAGR) over the last six years. However, that growth is unlikely to continue without support and is small considering the size of the \$258 billion potential market.

The New Zealand interactive industry is young, yet we already have many of the ingredients for more success which is evident through the accomplishments of the first generation of developers. While New Zealand has a tight-knit and supportive industry, to compete on a global stage it needs to match the commitment shown by industry and government in Canada, Finland, the United Kingdom, France and more recently Germany who have developed specific industry development policies.

We can do this in a uniquely Kiwi way. The current generation of successful New Zealand interactive studios succeeded by exporting their own original intellectual property (IP) to the world and by being early adopters when digital disruption hit the media industries.

Interactive design is a key competency in a digital economy that can be applied to education, health and wellbeing, our culture and identity, as well as our creative industries.

Our schools, universities and private training institutes are already producing creative, entrepreneurial students that don't see walls between coding, creative storytelling and business or social problem solving.



Self-publishing and exporting our own creative IP is a challenging business model, but the evidence in this report shows that New Zealand is succeeding at it. This is a new model for local investors and Government programmes. If supported in the right ways, the potential for digital and social returns is immense.

Our aspirational, yet achievable, goal is to see New Zealand become a billion dollar exporter of interactive media, sitting alongside our successful film and software sectors. We have many of the right ingredients and look forward to growing the next generation of developers, social entrepreneurs and innovative IP exporters.

FOREWORD:

New Zealand Government

The Ministry of Business, Innovation and Employment (MBIE) aims to grow New Zealand for all, and create a productive, sustainable and inclusive economy for New Zealanders.

Understanding the opportunities created by innovative technologies, working across government and with the wider digital community to make the most of these opportunities, is vital to achieving this goal. The Ministry welcomes this report and the insight into the interactive media sector that it provides.

As the nature of work changes at a remarkable speed, two things are proving to be vital to success: technological innovation and creativity. The interactive media sector is one of the best examples of this combination and its success is reflective of this.

This report highlights the significant economic, social, and educational opportunities that interactive media offers New Zealand. The case studies of globally recognised New Zealand studios and creators are examples of how these opportunities can be seized through talent, creativity and dedication.

The Ministry recognises that success for this sector is success for New Zealand as a whole. The sector offers high-value jobs, diversifies and grows our economy, and develops skills vital to success in tomorrow's workplace. The international nature of the sector results in higher exports and international investment into New Zealand. It also draws attention to New Zealand's creativity, culture and stories.



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI

MBIE has worked to establish important foundations for success in the tech sector, including the roll out of broadband infrastructure, investment in Techweek, and support of the Digital Skills Forum and research into digital skills challenges in New Zealand. We are committed to continuing to work with the tech sector, including the interactive media sector, and welcome this research as a way to further understand the landscape of interactive media in New Zealand. The Ministry recognises the report as an important input into our work exploring the potential of this sector.



Executive Summary

The majority of the content and services we consume for education, work and entertainment today are delivered digitally, and increasingly, interactively.

Interactive media is one of the highest-potential and fastest-growing parts of the digital economy. Combining creative content with software code produces powerful new experiences which engage audiences in more personalised, responsive and persuasive ways. Weightless exports of creative IP and services overcome New Zealand's tyranny of distance and open a huge global market for our knowledge-based industries.

The Interactive Aotearoa Study drew upon several data sources, research studies and 50 qualitative interviews. It presents a stocktake of interactive media globally and locally, and makes recommendations to grow the social, cultural and economic potential of interactive design in New Zealand.

Part One: The Interactive Media Landscape

Interactive media is now the world's largest and fastest-growing media sector. Growing at nine percent annually, the global market will be worth \$258 billion in 2021. Mobile apps, gaming, virtual reality, augmented reality, esports, edTech and MedTech are at the forefront of these trends.

Part Two: New Zealand's Opportunity

This study's research identified our creative industries, in this case interactive entertainment and games, as the largest growth opportunity for interactive media exports and quality jobs.

New Zealand's interactive gaming sector has gained a small, but growing, share of this global



market. The sector has grown at an impressive 39 percent annually for the last six years and 93 percent of its revenue comes from exports.

If current high growth rates could be continued with coordinated support, New Zealand's interactive media earnings would be worth \$1.01 billion in FY2024. The jobs created would combine our strengths in creativity and technology, with 1.4 creative or design jobs created for every new technical role.

We have a first generation of international successes. In 2018 we had our first \$100 million+ exit when Chinese internet giant Tencent purchased a majority stake in Auckland's Grinding Gear Games and NinjaKiwi's Bloons TD6 was one of the world's top ten selling mobile game apps. However, the emergence of significant new studios has slowed in recent years.

Part Three: Social and Cultural Opportunities

Expertise in interactive media is highly transferable. Many innovations trialed with gaming's large audiences are then applied

New Zealand's fast-growing interactive games sector has grown into a thriving creative tech industry that attracts 93% of its revenues from global exports.

to education, wellbeing and business. Fifty-nine percent of New Zealand children have used educational games at school and the export market for game-based learning is growing 20.2 percent each year. Ironically, New Zealand-made interactive stories often reach larger global audiences than local ones.

Part Four: Unlocking the Opportunities

Several governments have invested in this growth sector, and we can learn from over 30 industry development programmes around the world. Finland, with a population similar to New Zealand, has an interactive sector worth \$3.8 billion annually – 25 times the size of ours.





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Many of the success factors already exist: a curriculum that supports digital technologies, investment in tertiary education, a large export market, interest from investors, a first generation of successful studios able to contribute knowledge and connections, and healthy industry collaboration.

Creative technologies currently slip through the cracks of Government policy and a dedicated policy response is recommended. Technology stretch problems addressed by research and development (R&D) tax credits or grants are only one element of a creative product's value. Interactive media productions fall outside the traditional cultural and creative funding agency silos. These constraints apply to interactive media for education, wellbeing and social enterprise as well as entertainment.

This report makes several recommendations for industry and Government to grow New Zealand's interactive design capability and sector, including:

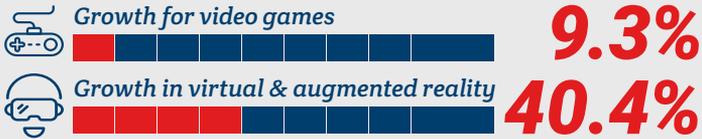
- Establish and fund a dedicated industry development organisation (such as a NZ Interactive Commission) to run an industry development programme to grow talent, employment and exports.

- Establish a contestable New Zealand Interactive Innovation Fund to fund production of original, innovative interactive projects for education, wellbeing or commercial creative IP purposes.
- Establish an industry and tertiary education working group to report on skills and competencies employers expect from work-ready graduates.
- Establish a Centre of Digital Excellence (CODE) in Otago with support from the Provincial Growth Fund.
- Include interactive media in Government culture and art programmes to tell local stories and develop talent.
- Provide professional development for teachers on game-based learning.

Growing the creative tech sector of our digital economy will benefit education and culture, make creative careers more sustainable, create knowledge economy jobs in the regions, diversify our economy and grow our weightless IP exports.

Key Highlights

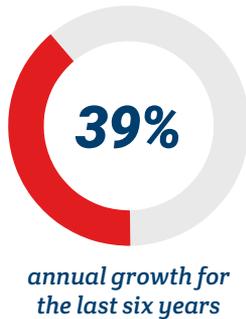
Interactive media is the world's largest and fastest growing media.



\$258B
Total
Addressable
Market in
2021

Interactive media and gaming is now one of
New Zealand's largest creative sectors.

\$143m
interactive
entertainment and
games revenues
in FY2018



A goal of \$1 billion exports annually by FY2024
if current high growth rates can continue.

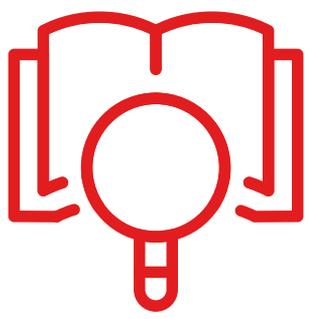
0.1% additional
market share
would
generate 

\$258 million
exports



Over 30 government interactive media and games funds exist around the world.

Economic development plans exist for our music and film industries. The lack of one for interactive media means New Zealand is missing out on export earnings and social benefits.



Creates hi-tech creative export-led careers.

1.4 creative or design jobs are generated for every new technical job

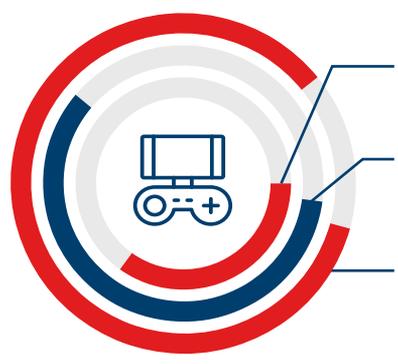
The average age of a video game player is **34**

150

new interactive game jobs expected to be created in the next year



Interactive design is a powerful tool for education and wellbeing.



35% of New Zealanders have used training games at work

59% of New Zealand children have used educational games at school

85% of virtual reality and augmented reality spending will be for businesses uses

Recommendations

The Interactive Aotearoa study drew upon several data sources, research studies and 50 qualitative interviews.

In addition to presenting a stocktake of the current state of interactive media globally and locally, this study makes several recommendations to grow the social, cultural and economic potential of interactive design in New Zealand.

Forge a Coordinated Interactive Media Industry Plan for New Zealand

Multiple industry groups, local government and central government agencies currently work separately with the interactive media sector. Establishing a coordinated industry development organisation, the proposed New Zealand Interactive Commission, would ensure efforts are aligned and increase export, job and intellectual property (IP) creation. Similar to our other creative industries economic development bodies, like the NZ Music Commission and NZ Film Commission, it would be responsible for coordinating many of the recommendations in this report.

<i>Call to Action</i>	<i>Who</i>
Establish and fund a dedicated industry development organisation (such as a NZ Interactive Commission) to run an industry development programme to grow talent, employment and exports, and administer the proposed New Zealand Interactive Innovation Fund	Ministry of Business, Innovation and Employment, Ministry for Culture and Heritage, NZ Game Developers Association, NZ VR AR Association
Develop an interactive sector export plan and export coalition programme Showcase New Zealand interactive productions at leading international events such as VR Developers Conference, Game Developers Conference, PAX Australia, WePlay Game Expo China Coordinate a joint New Zealand presence at SXSW, a leading international festival for music, film and interactive media	NZ Interactive Commission, NZ Trade and Enterprise, Ministry of Business, Innovation and Employment, NZ Film Commission, NZ Music Commission, NZ Game Developers Association, NZ VR AR Association, Auckland Tourism Events and Economic Development, Wellington Regional Economic Development Agency, Otago CODE
Establish the Otago Centre of Digital Excellence (CODE) via the Provincial Growth Fund to better align the supply of talent and scale the video games industry in the Otago region Coordinate regional CODE activities with national NZ Interactive Commission activities	Ministry of Business, Innovation and Employment, Enterprise Dunedin



Address the Investment Gap

While export earnings and a \$258 billion addressable global market make interactive media attractive to investors and publishers, there is a gap in early-stage startup or development funding to foster investment-ready projects. The hybrid nature of creative tech and interactive media means that these businesses are excluded from existing support programmes for both the hi-tech and cultural sectors. Therefore a dedicated support programme, similar to those that exist for New Zealand’s other creative industries and in other countries, is recommended. Education and social enterprise startups that combine content creation with software code would also benefit.

Call to Action	Who
Establish a contestable New Zealand Interactive Innovation Fund to fund production of original, innovative interactive projects for education, wellbeing or commercial creative IP purposes	NZ Interactive Commission, Ministry of Business, Innovation and Employment
Make interactive media and video games an eligible format for the New Zealand Screen Production Grant (NZSPG) International fund Make producing a major transmedia video game alongside a NZSPG grant film production a Significant Economic Benefit that would make the production eligible for the additional 5% uplift	Ministry of Business, Innovation and Employment
Establish a business mentoring programme for interactive media startups	NZ Interactive Commission, NZ Game Developers Association, NZ Film Commission
Grow the current Kiwi Game Starter startup challenge to create investment-ready interactive businesses	NZ Interactive Commission, NZ Game Developers Association, NZ Venture Investment Fund
Launch a New Zealand Games Investment Fund for mid-stage firms seeking expansion capital	NZ Interactive Commission, NZ Game Developers Association, private investors, NZ Venture Investment Fund

Grow the Creative Tech Talent Pool

In addition to employing hundreds of creative and hi-tech jobs, the interactive media sector requires specialist ‘creative technologists’ who combine both creative and coding skills. The tertiary education sector has worked well with industry to produce graduates with these skills, but skilled migrants continued to be needed to fill senior roles.

<i>Call to Action</i>	<i>Who</i>
Establish an industry and tertiary education working group to report on skills and competencies employers expect from work-ready graduates	NZ Game Developers Association, NZ Film Commission, tertiary education providers, interactive studios
Hold an international recruitment campaign to attract senior staff to New Zealand	NZ Interactive Commission, NZ Game Developers Association, NZ VR AR Association
Include a focus on student career pathways, diversity, wellbeing and export growth at the annual NZ Game Developers Conference	NZ Game Developers Association
Promote interactive careers through Techweek, nationwide Meetups, Global Game Jam and KiwiJam events	NZ Interactive Commission, NZ Game Developers Association, NZ VR AR Association, NZ Tech, Auckland Tourism Events and Economic Development, Wellington Regional Economic Development Agency
Encourage industry diversity through scholarships to the international Game Developers Conference/VR Developers Conference, promoting employment best practices, Working Lunch mentoring programme	NZ Interactive Commission, NZ Game Developers Association, NZ Film Commission, Diversity Works, Working Lunch



Celebrate New Zealand Identity through Interactive Media

Interactivity offers many innovative ways to express New Zealand stories and culture. However, current Government arts, culture and screen funding is organised into traditional categories that need to be modernised to include interactive media.

<i>Call to Action</i>	<i>Who</i>
Remove the exclusion of game design from Creative New Zealand funding criteria so that interactive projects for artistic, experimental or expressive purposes can be supported	Creative NZ
Establish interactive media as a distinct artform category eligible for Creative New Zealand grants	Creative NZ
Increase the funding allocated to interactive children’s media projects to match high audience demand	NZ On Air
Make interactive media and video games an eligible format for domestic productions in the New Zealand Screen Production Grant to encourage large-scale New Zealand-themed interactive productions	Ministry for Culture and Heritage

Realise the Education and Wellbeing Benefits

Interactive design and game-based learning is a powerful evidence-based tool to deliver educational content, simulations and behaviour change programmes. The creative industries are often a source of interactive design expertise that can be applied to education and wellbeing.

<i>Call to Action</i>	<i>Who</i>
Make projects with education and wellbeing purposes eligible for the proposed New Zealand Interactive Innovation Fund	Ministry of Business, Innovation and Employment
Provide Professional Development and Learning in game-based learning for primary and secondary teachers	Ministry of Education
Establish a Games for Health Innovation Hub as part of the Otago Centre of Digital Excellence (CODE) via the Provincial Growth Fund	Ministry of Business, Innovation and Employment, Enterprise Dunedin, Southern District Health Board

Improve Data and Policy Insights

Now one of New Zealand’s largest creative sectors, interactive media should be embedded in Government media, creative and cultural policy-making.

Call to Action	Who
Include interactive media, mixed reality and games in any screen industry policy work and audience research	Ministry of Business, Innovation and Employment, Ministry for Culture and Heritage, Statistics NZ, NZ On Air, NZ Film Commission
Interactive media to participate in the joint Government and industry Screen Sector Strategy	NZ Game Developers Association, Screen Sector 2030
Develop fit for purpose mapping and valuation of the creative sector including interactive media	Statistics NZ, Ministry of Business, Innovation and Employment, WeCreate
Update the Films, Videos and Publications Classification Act to classify digital apps and games in a scalable way	Office of Film and Literature Classification



_SAMSARA_JAFFAJAM

CASE STUDY

Sharing Māori Culture Through Video Games

New Zealand game developers are integrating Māori storytelling into games that connect with new generations.

Video games have become a powerful outlet for Māori storytelling. When Maru Nihoniho started Metia Interactive in 2003, she had a dream to create games which authentically presented Māori stories but initially found little interest among funders or investors for digital indigenous storytelling.

Thankfully, Maru's perseverance has been rewarded as recognition for digital indigenous storytelling grows and Metia Interactive has gone on to publish several games which promote Māori culture in Aotearoa and around the world.

These include Takaro, a game designed to encourage rangatahi (young people) to learn coding concepts through problem solving. In Māori Pa Wars for mobile phones, players

are introduced to a wide range of Māori culture and folklore while engaging in a fun and interesting fortification scenario.

Another early stage project is an interactive storybook experience called Guardian Maia, which follows a young woman named Maia on a journey exploring the legends, identity and mana of Māori culture. This project has received two grants from the New Zealand Film Commission's Interactive Development Fund which have helped develop the series bible and episode one, although further investment is being sought to complete the game.

Culture based games are hugely influential and this can be seen in the way players all over the world have been introduced to the stories, art and objects of other peoples. In the same way that Kiwi players have learned what a scimitar is (Middle Eastern sword), Maru sees a future where the rest of the world will know what a taiaha is (traditional Māori weapon) from games made in Aotearoa.

Path of Exile's \$100 million journey

In 2018 West Auckland's Grinding Gear Games was acquired by the world's largest games publisher Tencent for a figure in excess of \$100 million, making it one of New Zealand's largest tech company acquisitions in recent years.

While creative content brings their game Path of Exile to life, the addition of digital transactions that unlock user experiences is what generates its revenue. Profit margins on these digital services are far greater than royalties from music or video streaming alone, demonstrating how combining creativity with digital services generates export earnings of New Zealand-made media.

Started in one of the founder's garages a decade ago, Grinding Gear Games is now one of New Zealand's largest media companies and employs over 140 creative tech professionals. The studio's sole game, Path of Exile, has amassed over 30 million players worldwide and was named PC Game of the Year by GameSpot in 2013.

The internet and innovative digital business models have given creators a direct connection to their audiences, to better listen to their needs and develop an ongoing relationship. The entirety of Path of Exile can be played for free but its fans choose to purchase personalised clothing and effects to show off to other players and friends.

Grinding Gear Games always released new content frequently, but it wasn't until they committed to a new expansion event every quarter that audience numbers exploded. Players feel reassured that the time and money they put into the game and its online community will be rewarding on an ongoing basis. The result was a growing and more loyal fanbase.

Path of Exile's popularity drew the attention of Tencent, who initially published the game in China before investing in the studio.

The fanbase continues to grow in size and dedication, with 2000 international visitors expected for the first ever Path of Exile fan convention, Exilecon, at Auckland's Aotea Centre in November 2019.





_PART ONE

*The Interactive
Media Landscape*

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What is Interactive Media?

Interactive media combines content with software code. It is media content that responds to user interaction, rather than being scripted in advance. The content adapts to our actions, answers, behaviour and input, leading to unique entertainment, education or cultural experiences.

This study focuses on the opportunities for highly interactive media, where the design of the content and the interactive system are highly integrated. Examples include video games, interactive stories, virtual reality simulations, educational software and serious games. It does not focus on digitising existing content or software that delivers content, but on how unique and personalised media experiences can be created using our capability in interactive design.

Embracing the Creative Digital Economy

The internet and digital disruption continue to transform our society and economy in many ways. Today, the majority of the content and services we consume for education, work, information or entertainment is now delivered digitally¹.

As a result, the digital economy is the fastest growing segment of the global economy² and may already be worth six percent of the total GDP of developed economies³. This measure most likely understates the educational and cultural value of content and online services as many are provided for free.

Globally, creative tech is a fast growing segment of the digital economy and is seen as

a major economic growth opportunity by many countries. For example, the United Kingdom Government has identified creative tech as an economic driver and has established a Creative Industries Sector Deal⁴ to stimulate growth.

A significant part of creative tech – digital interactive media – is an intangible and weightless product requiring little physical infrastructure. Digital media is easily portable, has few trade barriers and is global and scalable⁵. This is particularly important given New Zealand's geographic isolation from major markets. In contrast, many other parts of the digital economy like online shopping and travel bookings still involve elements of physical goods.

The convergence of software and content adds value to media content. Content can be integrated with educational, healthcare or training software for better feedback or with in-app purchases and subscriptions to sell services at a higher margin than content alone.

¹ PwC Global Entertainment and Media Outlook, 2018-2022.

² Toward a Better Understanding of Internet Economics. Richard Adler, The Internet Association, 2018.

³ Defining and Measuring the Digital Economy Working Paper. U.S. Department of Commerce, 2018.

⁴ Creative Industries: Sector Deal Policy Paper. United Kingdom Department for Business, Energy and Industrial Strategy and Department for Digital, Culture, Media & Sport, March 2018.

⁵ Information Rules: A Strategic Guide to the Network Economy. Shapiro, C, and H R Varian, Harvard Business School Press, 1999.



Interactive Media has Broad Applications

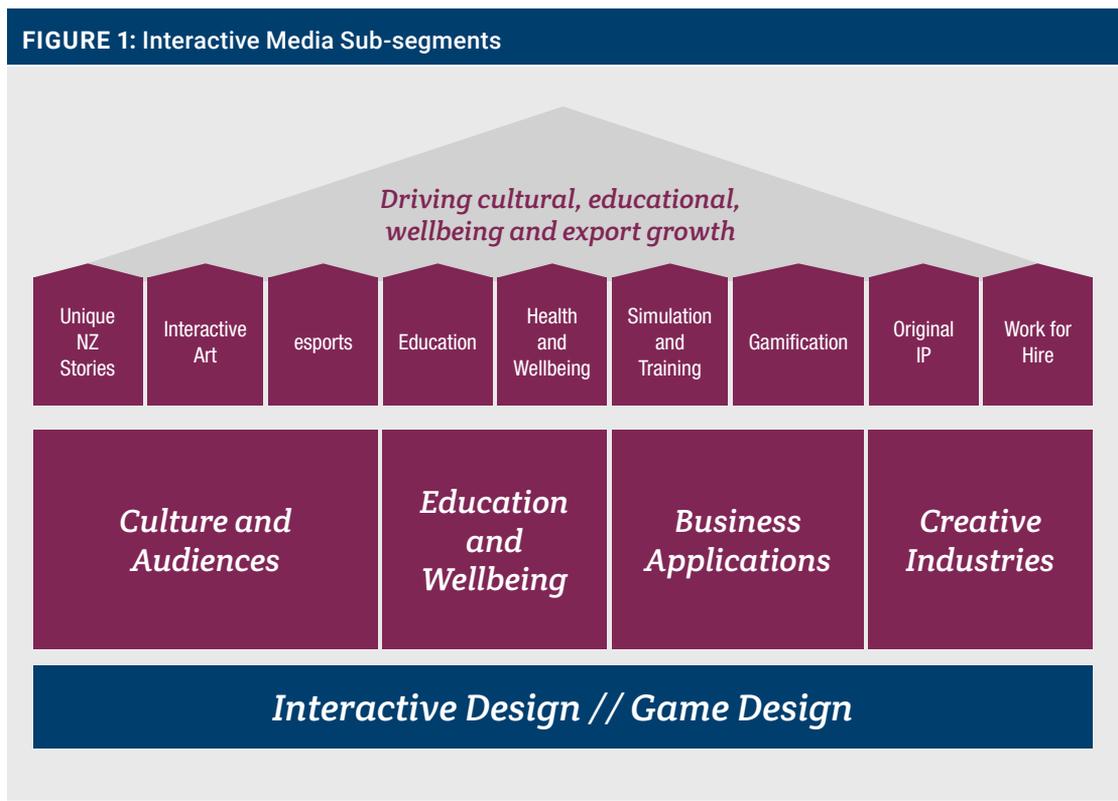
Interactive media has value beyond earning exports and job creation. It can impact society, education, wellbeing, business and our creative industries in a variety of ways. Interactive design and 'systems thinking' game design underpin all of these.

The combination of content and code is an innovative way to create value in terms of culture, education and wellbeing, as well as commercially.

While interactive media encompasses more than just video games, much of the industry data in this report comes from the video games sector, which accounts for the majority of

interactive media revenues. The term 'games' is also used broadly in the industry to mean any highly interactive media, including virtual reality entertainment, 'indie', educational and serious games, and artistic or cultural interactive fiction.

This report focuses on high-value original IP business as an opportunity for New Zealand. Applications in advertising (AdTech), non-interactive digital media (such as streaming video) or that are light on content creation (such as EdTech learning management platforms) will benefit from growing New Zealand's interactive capabilities but are not the focus of this report.



Benefits of the Digital Economy for Aotearoa

A strong digital economy, such as our interactive media sector, diversifies New Zealand's economic base and increases our high value exports.

It is a knowledge-based sector with the opportunity to:

- improve labour productivity⁶
- grow our scalable, intangible, digital exports⁷
- retain a greater share of the value chain in New Zealand⁸
- grow faster than the overall economy³
- pay above average wages⁹.

Interactive Design Creates Value

The audience reaction and feedback loops inherent in interactive media create value in ways previously not possible¹⁰. Software can measure and react to users' knowledge levels, health behaviours or story progress immediately and integrate with health, educational, training or ecommerce software.

'Interactive design' is the design of interactive products and services with a focus that goes beyond the item in development to include the way users will interact with it¹¹. Game design adds rules that form a system with incentives and complex outcomes to create meaning, motivation and provide an experience for its audience¹².

In practice, the discipline of interactive design and game design combines elements of



The combination of content and code is an innovative way to create value in terms of culture, education and wellbeing as well as commercially.

behavioural psychology, data analytics, creative direction as well as technical computing and creative discipline skills. These skills are a key creator of value in a digital economy.

⁶ Can the Kiwi Fly? Achieving Productivity Lift-off in New Zealand. New Zealand Productivity Commission, 2018.

⁷ Capitalism Without Capital: The Rise of the Intangible Economy. Haskel, J, and S Westlake, 2017.

⁸ Mapping the creative value chains – a study on the economy of culture in the digital age. European Union, Directorate-General for Education and Culture, 2007.

⁹ Digital Nation New Zealand – From Tech Sector to Digital Nation. NZTech, June 2016.

¹⁰ Art of Interactive Design. Chris Crawford, 2003.

¹¹ Interaction Design updated definition. Interaction Design Foundation, 2018.

¹² Rules of Play: Game Design Fundamentals. Katie Salen, Eric Zimmerman, MIT Press, 2003.



CASE STUDY

Addressing Mental Health Through Games

Quest: Te Whitianga and SPARX are two clinically developed cognitive behavioural therapy games made in collaboration with game developers and the Auckland Medical School.

New Zealand is facing significant mental health challenges, with the highest youth suicide rate in the OECD and one in five New Zealanders living with a mental illness or addiction.

Mental health researchers have turned to game developers to create engaging e-therapy tools accessible to New Zealand tamariki (children) which have proven clinically effective. A clinical trial of SPARX, published in the British Medical Journal in 2012, showed that for people with low to medium risk of depression, playing seven levels of the game was as effective as regular sessions with a counsellor. During 2019, Quest: Te Whitiangi is undergoing similar clinical trials.

The success of these games is in how they gamify clinically proven cognitive behavioural therapy (CBT) techniques. In addition to being appealing, the exercises actively practiced in the game are transferable real-life skills.

The first game, SPARX, was developed by the Department of Psychiatric Medicine at the University of Auckland Medical School and Metia Interactive in 2011. Players take on quests in a New Zealand themed 3D world relating to mindfulness and recognising unhelpful thinking patterns.

The Department has worked with Auckland's serious games studio InGame on a smartphone sequel, Quest: Te Whitiangi, funded by the BetterStart National Science Challenge.

In the game, players rescue the Kaitiaki spirits of seven islands by mastering exercises revolving around CBT techniques. Conveniently in their pocket, users can refer to it when they are feeling down and practise exercises that illustrate the use of CBT in real life. For instance, the app includes role playing conflicts with whānau (family), ways to restructure how unhelpful feelings and thoughts flow through our brains and structured problem solving techniques.

The app's research and development had to reinvent many face-to-face or paper based exercises for a digital format. The vision is for the app and others in the series to become freely available e-therapies recommended by doctors, school counsellors and community workers.

Creating a Global Impact

The Fastest Growing Media Sector

It is estimated that more than thirty percent of the world's population, 2.3 billion people, played digital games in 2018¹³. This created a global interactive media market worth USD\$152.1 billion in 2019 with digital revenues accounting for over ninety percent, making interactive entertainment one of the purest examples of a digital economy in action¹⁴.

Interactive games are expected to grow at a nine percent Compound Annual Growth Rate (CAGR) from 2018 to 2022¹⁵, making interactive media the world's fastest growing media industry. Interactive media surpassed the global movie sector in 2018, which achieved 2.5 percent annual growth and revenues of USD\$136 billion¹⁶.

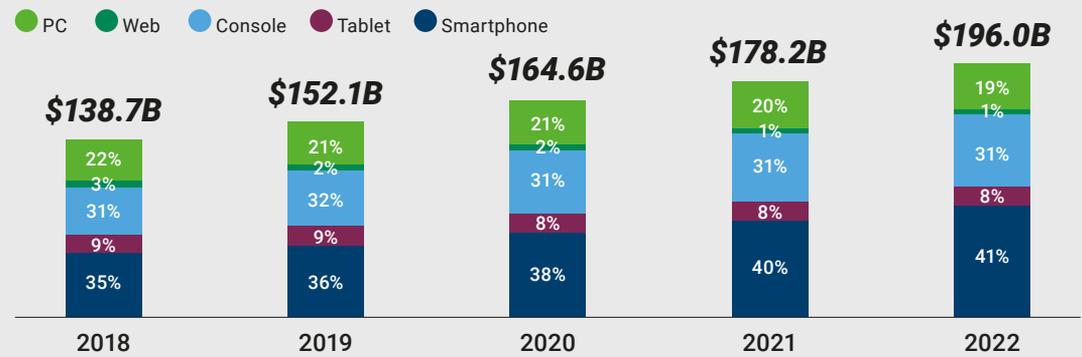
Beyond entertainment, the diversity of interactive media presents opportunities. Ranging from

Global interactive games market growing at

9%

educational games, indie games, augmented reality, virtual reality, social virtual worlds and games for health and wellbeing, all sub-sectors are growing rapidly. For example, virtual reality media is forecast to grow at 40.4 percent CAGR and e-sports at 20.6 percent CAGR¹⁷. Non-entertainment interactive media is exhibiting massive growth with sectors such as global game-based learning media forecast to grow at 20.2 percent CAGR¹⁸.

FIGURE 2: Global Interactive Media and Games Revenues



Source: Newzoo Global Games Market Report, June 2019.

¹³ Newzoo Global Games Market Report, October 2018.

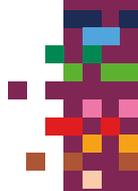
¹⁴ NewZoo Global Games Market Report, June 2019.

¹⁵ ibid.

¹⁶ Global Movie Production & Distribution Industry, IbisWorld, August 2018.

¹⁷ PwC Global Entertainment & Media Outlook, 2018-2022.

¹⁸ The 2017-2022 Global Game-based Learning Market, Metaari, July 2017.



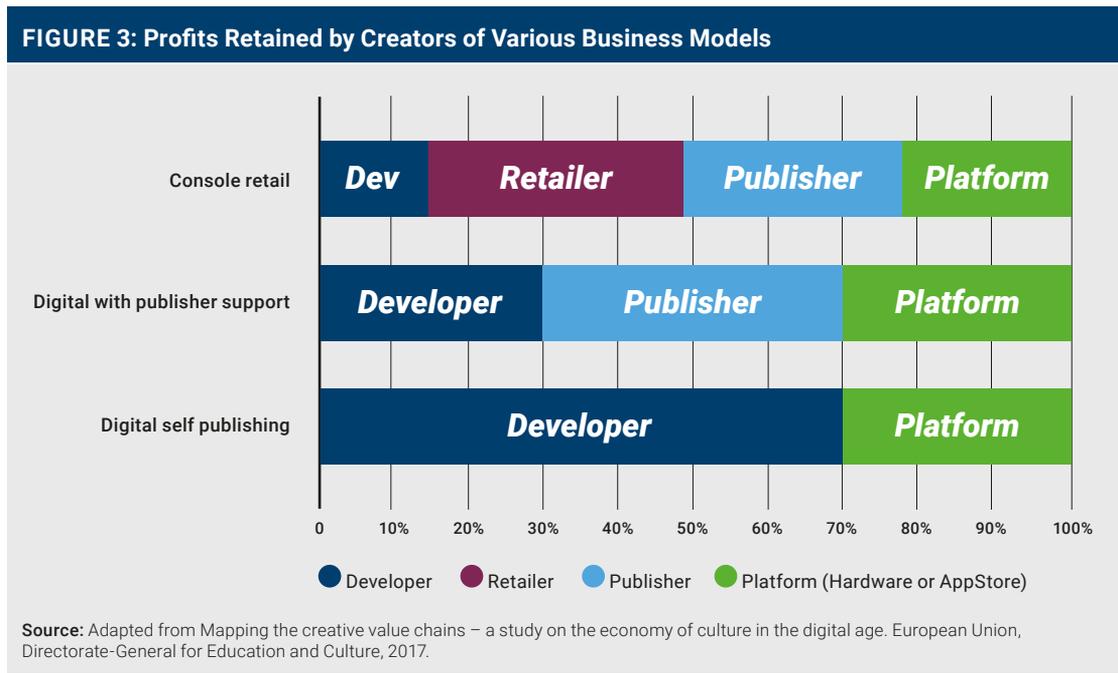
New Business Models Retain Profits Locally

Digital distribution has disintermediated middlemen such as retail stores and publishers, giving creators the opportunity to directly publish their own content on platforms such as app stores and digital marketplaces – and therefore retain a greater share of revenues. The owners of the content rights typically receive 50 to 70 percent of total revenue¹⁹.

Self-publishing, however, requires creators to take on more of the business risk, to promote the content, to upskill business capability and fund initial development²⁰.

Work for hire is a business model distinct from that of publishing original creative intellectual property (IP). Contract jobs, more common in film productions, AdTech, training and other business-to-business applications, carry less risk but with a lower, fixed share of the total profits. In contrast, creative IP businesses over time can build intangible assets from their creative franchises, loyal audiences and reputation.

With the right business models, New Zealand creators can retain more of the total profits – ultimately leading to sustainable creative businesses.



¹⁹ Internet Value Chain Economics: Gaining a deeper understanding of the internet economy. A.T. Kearney, 2010.

²⁰ Have the cultural and creative sectors found the formula for development in the digital age? A report prepared for the Forum d'Avignon. Kurt Salmon, December 2015.



Mini Metro and the Indie Studio Revolution

Digital distribution has made it possible for small creative teams to find huge success internationally.

New marketplaces for PC, mobile phones and consoles have given small teams easy access to international markets and enabled independent studios to find great commercial success.

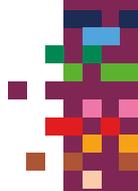
One of New Zealand's most successful indie studios is Dinosaur Polo Club in Wellington. Their seemingly simple and engaging puzzle game Mini Metro arrived on PC in 2015 and has since been released on Apple and Android devices and Nintendo's handheld console, Switch.

Across these platforms, the game has sold 1.4 million copies, representing over \$4 million in revenue. It has attracted critical acclaim including a nomination for Best Debut at the BAFTA Game Awards, and was named as a finalist in four categories at the Independent Games Festival (the 'Oscars of gaming'), both in 2016.

The rise of digital marketplaces has increasingly made independent game development a viable enterprise for New Zealand companies. Dinosaur Polo Club co-founders Robert and Peter Curry had previously worked at one of New Zealand's most successful game companies, Sidhe Interactive (now PikPok). Leaving in 2006, the brothers attempted to launch an independent game development business, but after 18 months felt it wasn't viable.

In 2013, following the rise of multiple digital marketplaces accessible to independents, they reevaluated. The success of Mini Metro proves products made by small teams in New Zealand are viable prospects for the international market.

Robert and Peter see the worth of the indie game development industry and actively support it through grants to other small studios. They also worked with developer Lucy Morris to create the New Zealand Games Festival and Play By Play conference. These annual events host workshops, keynotes and an award ceremony which further bolsters local game development talent.



Global Exports From Day One

Being digital-first, interactive media businesses often operate 'globally from day one' with worldwide launches on digital platforms.

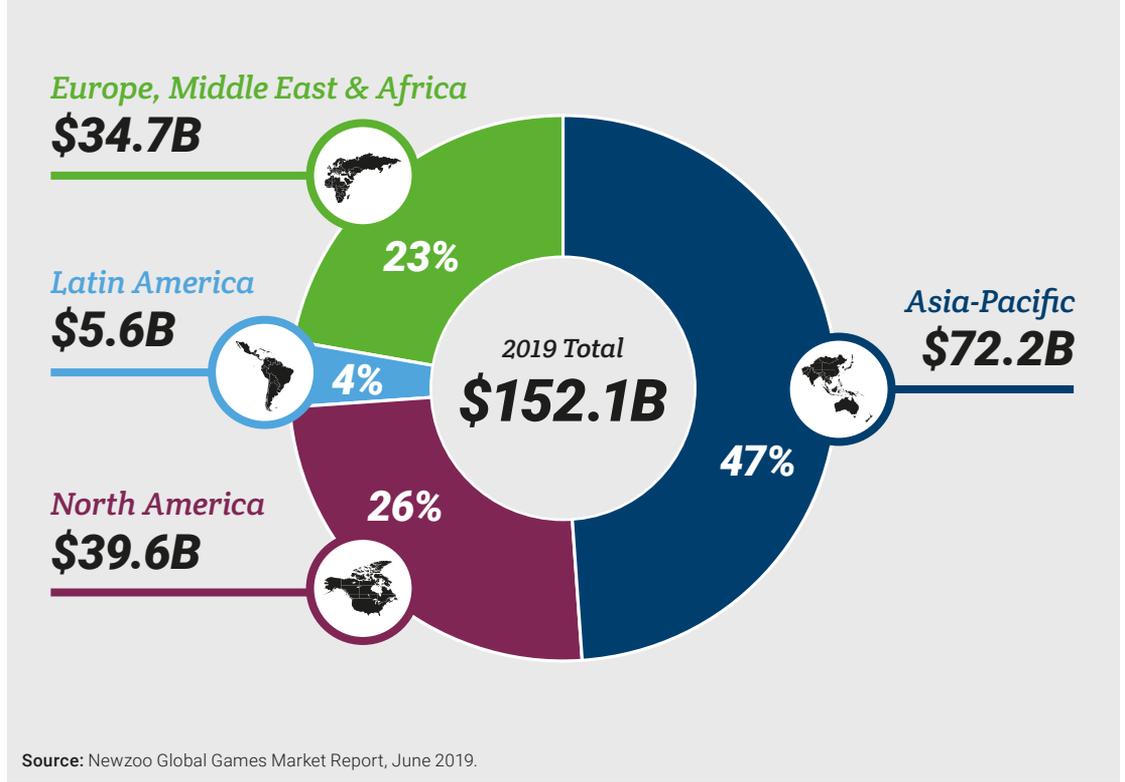
Ninety three percent of the New Zealand digital game sector's revenues comes from exports, which have grown 39 percent on average annually over the last six years²¹.

By publishing on digital platforms many traditional export business barriers such

Export Revenue	93%
-----------------------	------------

establishing payment, distribution, customer support and licensing systems are taken care of. Apart from localisation and content classification costs, there are few trade barriers.

FIGURE 4: Global Interactive Media and Games Market by Region

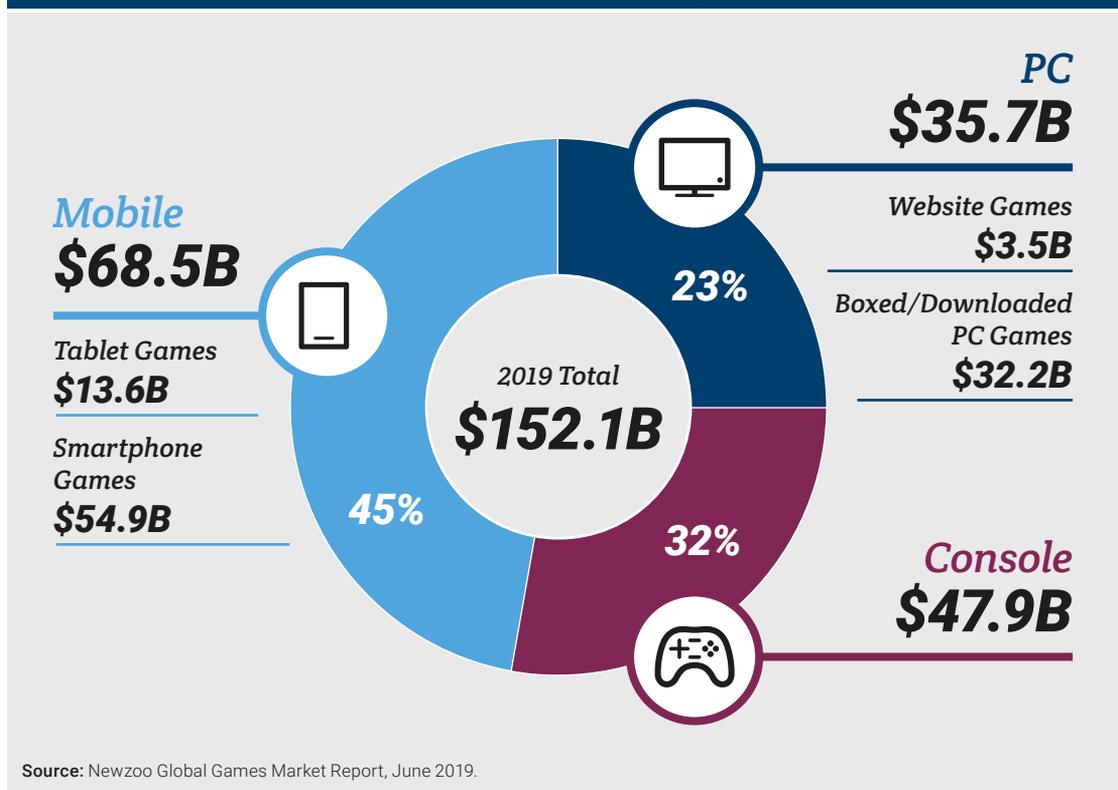


Source: Newzoo Global Games Market Report, June 2019.

²¹ New Zealand Game Developers Industry Survey 2018.

Nearly half of the global market sits right on New Zealand's doorstep with Asia Pacific accounting for 47 percent or USD\$72.2 billion²². The rise of smartphones in particular has seen China become the largest single market with 24 percent of global spending²³. Video games are one of New Zealand's largest software exports to China²⁴, with 60 percent of established studios exporting there.

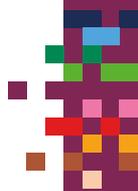
FIGURE 5: Global Interactive Media and Games Market by Segment



²² Newzoo Global Games Market Report, June 2019.

²³ *ibid.*

²⁴ Interview with New Zealand Trade and Enterprise Shanghai, 2018.



Diverse Consumers

More than two thirds of all New Zealanders play video games regularly²⁵ and stereotypes fail to represent the audience diversity.

Devices are in our pockets and classrooms and video game consoles have been in our lounges since the early 1980s. Much of our digital literacy is shaped by interactive entertainment and consumer apps, and we take these expectations into education and workplace training settings.

Interactive media benefits participants in many ways. For some, such as seniors, gaming offers mental stimulation. For many it is a social activity done with friends online and in person. For people with disabilities, the accessibility of games empowers them to participate in esports and online communities.

76%
of Kiwis play video games



The average age of a video game player is



47%

of video game players are female



44%

of seniors aged 85 and over play video games, particularly to stay mentally active



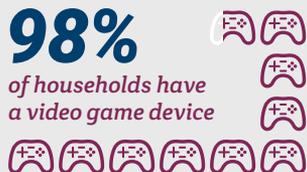
85%

of players play games with another person



98%

of households have a video game device



79%

of gaming households have more than one game device



15%

of gaming households have a virtual reality headset



3.8m

smartphones phones in New Zealand



32%

of all internet connections are fibre



70%

of all broadband internet connections have no data cap



Source: Digital NZ Report 2018. Bond University and IGEA, 2018. Internet Service Provider Survey. Statistics NZ, 2018.

²⁵ Digital NZ Report 2018. Bond University and IGEA, 2018.

Benefits of Government Support

The phenomenal growth of interactive media globally has led to several countries establishing dedicated industry support programmes that complement existing innovation, creative industry and screen programmes.

There is a strong correlation between the existence of industry support programmes and increased global market share and returns on investment for these countries. This section highlights a selected range of national approaches to stimulating interactive media. A list of over 30 international programmes can be found in Appendix 3.

United Kingdom (UK)

The Government's UK Games Fund supports the interactive sector with grants, especially for early stage development and talent development. Video Games Tax Relief is worth up to 20 percent of core production costs of a game provided it passes a cultural test (primarily if the game is made locally and in English). For every £1 of tax relief, £4 is contributed to the economy²⁹. Revenues grew from £630 million in 2013 to £1.8 billion in 2018. Meanwhile, employment grew from 9,400 in 2013 to 16,532 in 2018³⁰.



Canada

The eight largest Canadian provinces all offer incentives of 20 to 40 percent for interactive media production expenditure. As a result, Canada is the third-largest employer of interactive game developers in the world. The Business Development Bank of Canada is also mandated to aggressively support video game start-ups. The Canada Media Fund also provides repayable contributions for development, production and marketing. Government support has been widely credited with growing the revenues earned by Canadian game developers from CAD\$2.13 billion in 2013 to CAD\$3.17 billion in 2017 and jobs from 16,500 in 2013 to 21,700 in 2017²⁶.



United States of America (USA)

The long established global leader in the interactive media business, the USA earned USD\$11.6 billion in 2016 and employed 65,000 in the sector²⁷. Screen industry tax rebates are also available to game developers in 20 out of 50 states²⁸.



²⁶ Essential facts about the Canadian video game industry. ESA Canada, 2018.

²⁷ Video games in the 21st Century. Entertainment Software Association, 2017.

²⁸ The Incentives Program 2017-18. Cast and Crew Financial Services, 2017.

²⁹ Screen Business: How screen sector tax reliefs power economic growth across the UK. British Film Institute, 2018.

³⁰ Making Games in the UK Today. TIGA, 2019.

Finland

Finland led the world in government support for its interactive media industry with the Finnish Funding Agency for Innovation and Technology (TEKES) directly investing €75 million between 1995 and 2017. Its industry grew to over €2.1 billion in 2018³¹, taking 6 percent of worldwide mobile game revenues with successes such as Angry Birds and Clash of Clans – all of this from a country with a population similar to New Zealand. Government schemes support all levels: grants for Minimal Viable Products or customer research, loans for creative media research and development and grants and loans for rapid growth. Revenues grew from €0.35 billion in 2012 to €2.1 billion in 2017 with a peak of €2.5 billion in 2016. Employment grew from 1,800 in 2012 to 3,200 people in 2018.



Germany

Despite having one of the fastest growing domestic markets for interactive media, the German developers' market share dropped annually from 2014 to 2018³⁴. This was attributed to a lack of Government support. The €50 million German Games Fund was established in 2018 to help reverse the trend. This investment is expected to return over €90 million to the treasury.



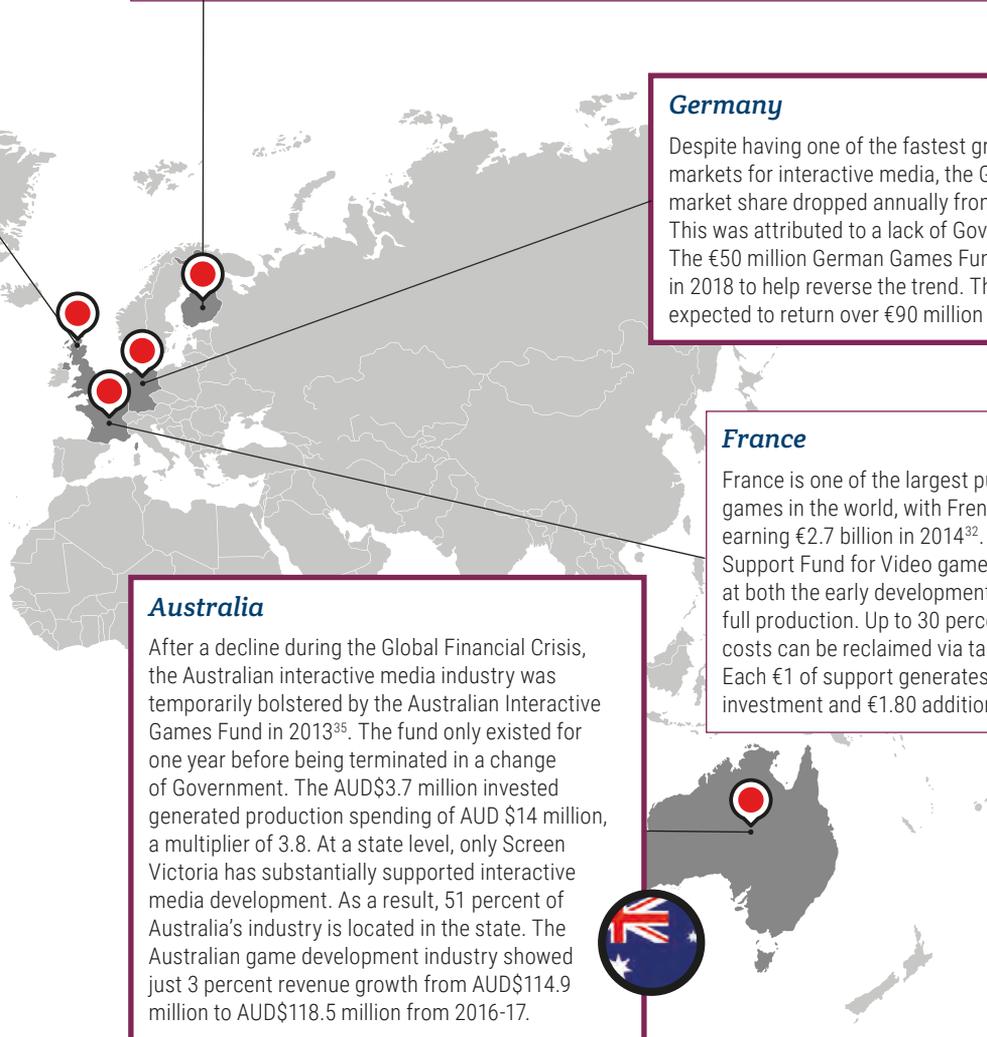
France

France is one of the largest publishers of video games in the world, with French developers earning €2.7 billion in 2014³². The Government Support Fund for Video games helps companies at both the early development stage and during full production. Up to 30 percent of production costs can be reclaimed via tax rebates. Each €1 of support generates €8 additional investment and €1.80 additional tax revenue³³.



Australia

After a decline during the Global Financial Crisis, the Australian interactive media industry was temporarily bolstered by the Australian Interactive Games Fund in 2013³⁵. The fund only existed for one year before being terminated in a change of Government. The AUD\$3.7 million invested generated production spending of AUD \$14 million, a multiplier of 3.8. At a state level, only Screen Victoria has substantially supported interactive media development. As a result, 51 percent of Australia's industry is located in the state. The Australian game development industry showed just 3 percent revenue growth from AUD\$114.9 million to AUD\$118.5 million from 2016-17.



³¹ The Finnish Games Industry Report 2018. NeoGames, 2019.

³² France is second in the world for the production of video games. France Diplomatie, 2014.

³³ Ernst & Young analysis of Fonds d'Aide au Jeu Vidéo for Game, the German Games Industry Association. Deutscher Games Fonds, 2018.

³⁴ Game, the German Games Industry Association. Deutscher Games Fonds, 2018.

³⁵ Game on: The future of Australia's video games development industry, Final report. Australian Senate. Environment and Communications References Committee, 2016.

The New Zealand Landscape

Interactive entertainment or video games has become New Zealand's fastest growing creative industry, with 39 percent compound annual growth over the last six years.

New Zealand's Interactive Games Industry

In recent years the local industry has proven its capability with international critical and commercial successes. New Zealand's interactive games sector generated \$143 million in revenues in FY2018, of which 93 percent were pure digital exports. With exports now exceeding \$100 million the overall industry outlook is positive with 63 percent of studios expecting more than ten percent growth during 2018/2019.

In 2018, our largest games studio, Grinding Gear Games, was sold to Tencent in China for an undisclosed figure in excess of \$100 million³⁶. This is one of the largest startup exits in recent New Zealand history. Bloons Tower Defense 6 by Kumeu's NinjaKiwi was the fourth most downloaded paid game in the world on the Apple App Store during 2018³⁷. Dean Hall, creator of global hit DayZ which earned over USD\$100 million, has returned home to establish a new studio, Rocketwerkz, in Dunedin.

Interactive
game sector
2018 revenue...

\$143m

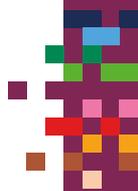
FIGURE 6: New Zealand-made Interactive Games Revenues



Source: New Zealand Game Developers Industry Survey 2018.

³⁶ OIO reveals Auckland's Grinding Gear Games sold for more than \$100m. National Business Review, May 2018.

³⁷ Apple Presents the Best of 2018, Apple Inc, 2018. www.apple.com/newsroom/2018/12/apple-presents-the-best-of-2018/



However, the local sector is still small compared to peers like Finland. Playing in a Total Addressable Market that will be worth \$258 billion in 2021 (see Part Two of this report), the number of games studios based in New Zealand could be significantly higher. There is a maturing ecosystem of tertiary education, business capability and specialist advice to support the industry, however there is limited sector coordination with Government and no sector support policy or programmes (see Part Four).

Creating Sustainable Hi-tech and Creative Careers

Original IP business models and games as a service create sustainable creative careers rather than fixed term project work.

The number of professional creative and technical game developers in New Zealand grew ten percent during 2017/2018. Additionally, studios have indicated that they intend to hire another 130 people in the coming year – an expected job growth of 23 percent.

Interactive game sector employment growth...

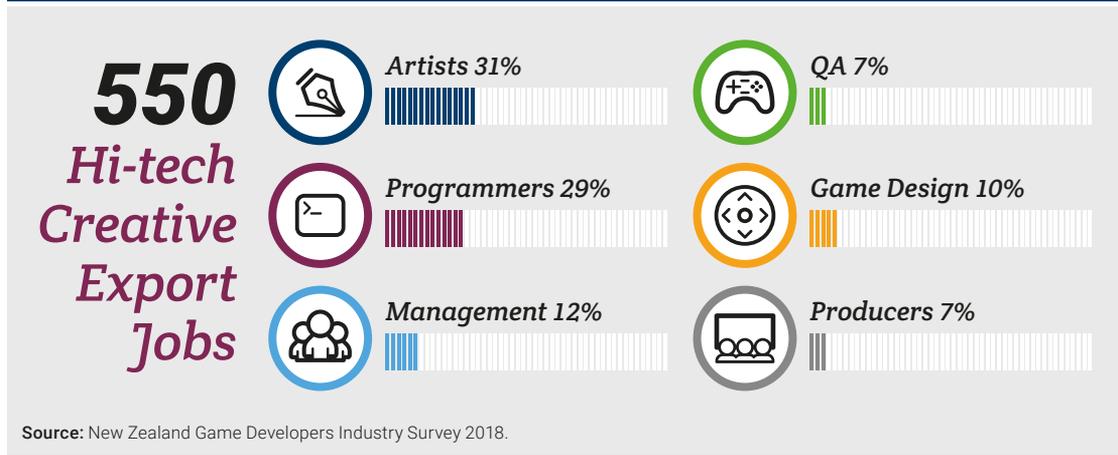
10%pa

As of March 2018, the industry employed 550 hi-tech creatives made up of a mix of creative and technical roles. Almost a third of the sector's employees are creatives with almost another third made up of coders.

However, all roles generally blend creative and technical skills. For example, artists and animators are highly trained in specialist software and may use coding to achieve visual effects. Likewise, programmers regularly make choices in their software code that impact the audience experience creatively.

For every technical role employed in New Zealand's video games industry, 1.4 creative or design jobs are generated.

FIGURE 7: New Zealand Interactive Game Sector Employment





_WETAWORKSHOP

Importantly, these careers are predominantly permanent and sustainable. The local industry's focus on original productions rather than work-for-hire contracts allows local studios to control their own workflow and schedules. This is particularly the case with the larger established studios, whereas startup teams without investment often bootstrap their own projects while juggling contract work.

Employees across a range of roles in New Zealand's interactive games industry earn above average wages and more than professionals in other creative industries³⁸. A UK study found video games employees had higher labour

productivity than other parts of the screen sector³⁹. Pay rates for comparable roles in New Zealand's film post production sector are also above average⁴⁰. Likewise, the median salary for a programmer in New Zealand is substantially higher than average at NZD\$82,000⁴¹.

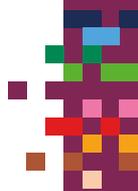
Multimedia productions create work for a range of creative sectors. In 2016, the New Zealand Symphony Orchestra recorded music for global publisher Electronic Art's game Titanfall 2. Wellington studio PikPok's long term relationship with local composer Jeramiah Ross, aka Module, has produced two double platinum albums.

³⁸ A Profile of Creative Professionals. Colmar Brunton for NZ On Air and Creative NZ, May 2019.

³⁹ Screen Business: How screen sector tax reliefs power economic growth across the UK. British Film Institute, 2018.

⁴⁰ Economic Contribution of the Screen Industry. NZ Institute of Economic Research, November 2017.

⁴¹ Digital Skills for a Digital Nation. New Zealand Digital Skills Forum, December 2017.



Success Comes From Developing Original IP

Unlike our film industry, no AAA blockbuster games for international studios have ever been made in New Zealand. The industry's success to date has been based on local creators developing their own online games and smartphone apps and 89 percent of the industry's revenue derives from original IP. Successful studios report that profits from original IP are significantly greater than those for contract work.

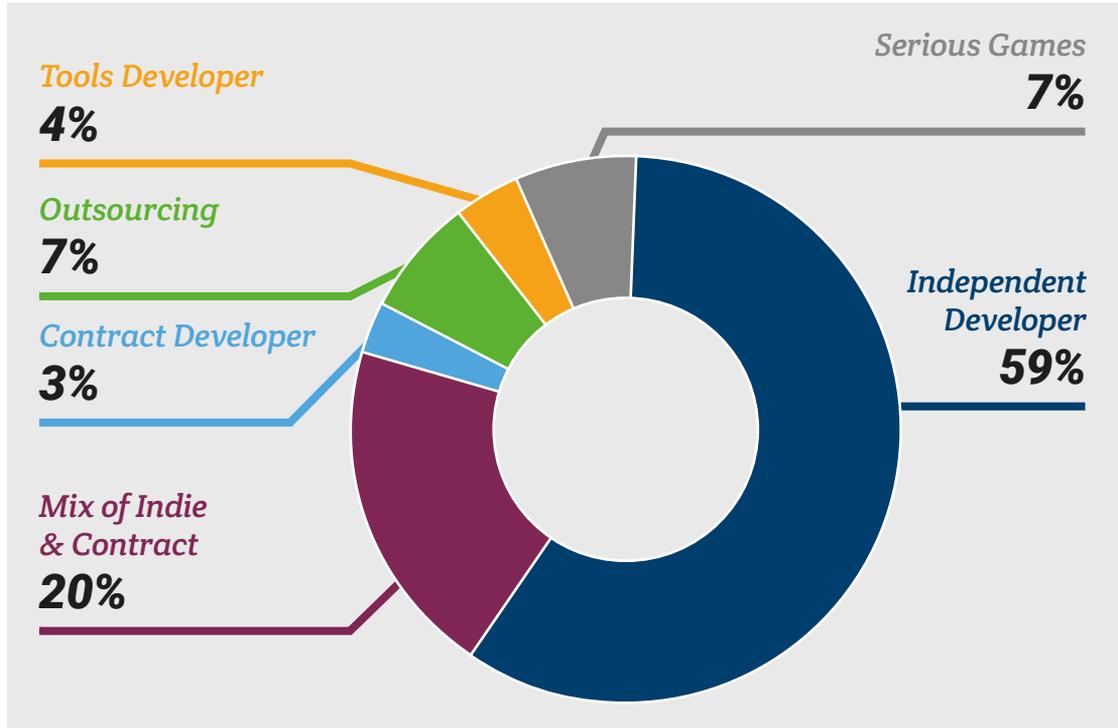
Original IP can be commercialised in multiple ways. In addition to the 77 percent of revenue that comes from consumer sales, seven

Revenue from original IP

89%

percent comes from selling advertising within games and five percent from licensing and merchandising. Revenue from contract work (nine percent) has remained constant over the last two years as original IP revenues have grown.

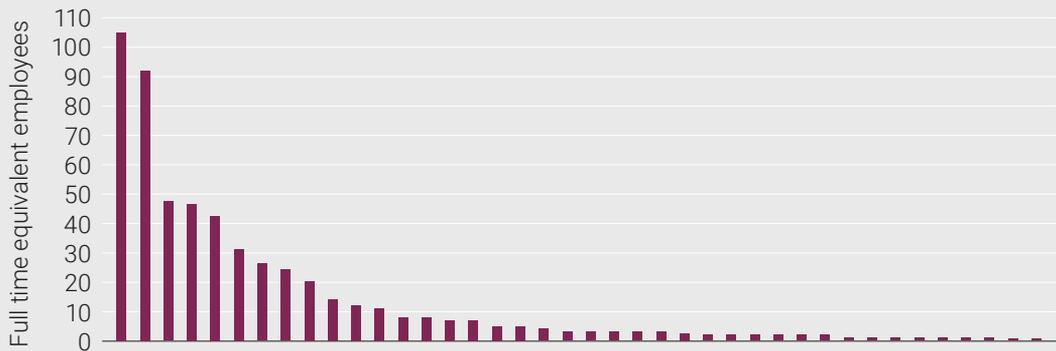
FIGURE 8: Business Models of New Zealand Interactive Game Studios



Source: New Zealand Game Developers Industry Survey 2018.

A first generation of successes

FIGURE 9: Headcount of New Zealand Interactive Game Studios



Source: New Zealand Game Developers Industry Survey 2018.

FIGURE 10: Established vs Emerging New Zealand Interactive Game Studios



Source: New Zealand Game Developers Industry Survey 2018.

The New Zealand Game Developers Industry Survey 2018 indicates there are two tiers of studio.

The first is a cohort of ten established studios who were mostly early adopters of digital distribution and self-publishing. The ten largest studios by headcount earned 94 percent of all revenues and employed 81 percent of the industry. On average, the established studios were founded around 2009, have 44.5 employees and annual revenues of \$13.5 million.

The second cohort are 31 emerging and indie studios. The average emerging or indie studio has a team of 3.5 and annual income of \$281,500. Some are young startups, while some are small, successful yet sustainable exporters.

An industry development programme would allow established studios to share experience, connections and investment with emerging firms in a structured way (see Part Four).



CASE STUDY

Building Creative Wings in Tech Companies

The app economy and games industry presents a promising avenue for New Zealand technology companies to diversify, as is the case with Auckland mobile game publisher JaffaJam.

Its parent company was founded in 2000, growing to become a highly successful web development company. It first entered game development in 2010 with the popular word game

Alpha Jax on the Microsoft Windows Phone. The team leveraged this success to produce over 75 contract titles for some of the biggest entertainment businesses in the world, including casual puzzle hit Crash, Boom, Ham! for Disney.

Its recent success with critically-acclaimed puzzle game Samsara for PC, Xbox and Nintendo Switch provided a springboard for the team to launch their new venture JaffaJam which targets the rapidly growing hyper-casual mobile games market.

Increasing Regional Activity

Games businesses are located throughout New Zealand, and hi-tech digital exporters can base themselves anywhere with the right pool of skilled knowledge workers.

The largest game studios are based in Auckland, Wellington, Christchurch and Dunedin. However, the fact that almost all of their business is exported through an internet connection has enabled studios to establish themselves in locations such as Napier, Nelson, Tauranga and the West Coast.

TABLE 1: Top Ten Game Studio Employers

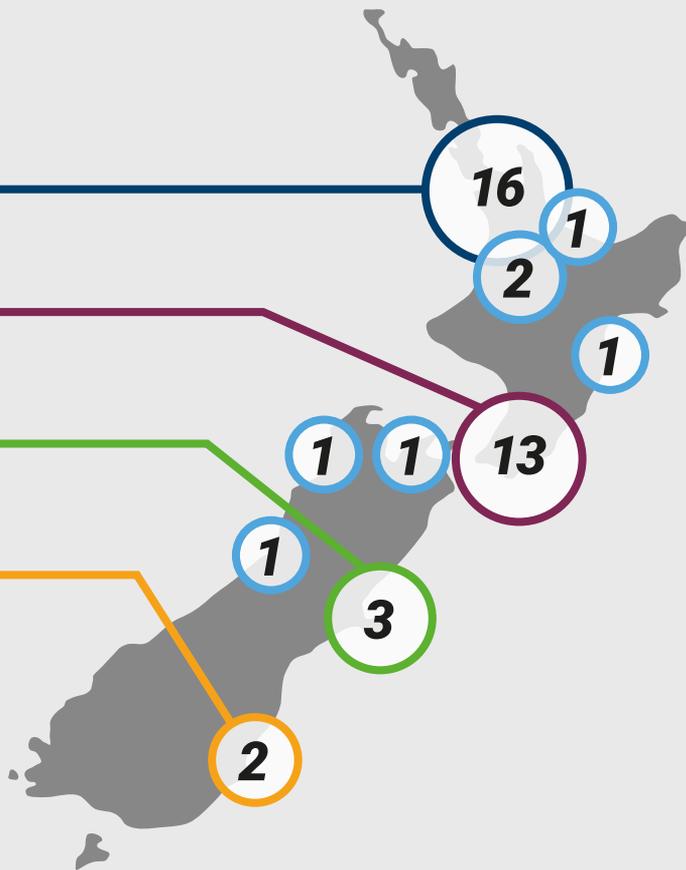
FIGURE 11: Games Businesses per City

Grinding Gear Games
Ninja Kiwi
Artrix
Staples VR

PikPok
Weta Workshop

CerebralFix
Digital Confectioners

Runaway Play
Rocketwerkz



Source: Digital NZ Report 2018. Bond University and IGEA, 2018. Internet Service Provider Survey. Statistics NZ, 2018.



Auckland Spotlight

As New Zealand's largest commercial hub, Auckland is home to some of New Zealand's most successful mixed reality and game studios which are supported by industry coworking spaces and leading tertiary education providers.

Many Auckland-based interactive studios also work in AdTech, EdTech, simulation and gamification for corporate and educational clients.

In its economic development strategy, Auckland Tourism Events and Economic Development (ATEED) identified technology and the creative industries, including mixed reality, game development and EdTech, as target sectors. In 2016, ATEED opened the AR/VR Garage, a collaborative workspace to grow talent, capabilities and international networks in the creative tech sector. The Arcade Auckland coworking space for indie game developers is part of the GridAKL space in the Wynyard Quarter Innovation Precinct. These join Manukau's new coworking and makerspace, Te Haa o Manukau, which highlights the strength of South Auckland's talent for creation and innovation.

The Tripartite Economic Alliance between Auckland, Guangzhou and Los Angeles presents opportunities for Auckland companies. Several Auckland companies, particularly those in AR/VR, have participated in Tripartite Summits in all three cities.

Auckland is also well served with specialist tertiary education. For over a decade, The Media Design School has offered specialist tertiary qualifications and the University of Auckland, AUT University and Unitec offer interactive papers and majors. Animation providers such as Yoobee School of Design and Animation College teach real-time graphics options suitable for VR/AR and gaming.

There are regular industry and community events with Meetups for AR/VR, game development, computer graphics (Siggraph) and Tech for Good.

Wellington Spotlight

Mixed reality and interactive games are key parts of the creative capital's booming creative sector.

The region's Economic Development Agency WellingtonNZ proudly promotes Wellington's many creative tech success stories including innovative gamelabs such as Weta Workshop, PikPok, A44 and Peter Jackson's augmented reality studio Wingnut AR.

A vibrant ecosystem, supported by programmes like WellingtonNZ's innovative LookSee recruitment initiative, attract creative and tech talent from around the world. Several indie games studios haven chosen to base themselves in Wellington, with some even relocating from Australia.

The creative industries enjoy a strong relationship with the tertiary sector. Massey University invested \$20 million in new facilities for its School of Music and Creative Media Production, while Te Auaha arts and creative programmes campus opened its doors in the heart of the city on Cuba Street in 2018. Victoria University of Wellington developed a computer graphics programme and the ARcentral city AR/VR lab with support from the film and gaming industries and MBIE.

Wellington's creative tech community comes alive with many festivals and conferences. The city is home to the New Zealand Games Festival, the Play by Play developers conference, and several monthly meetups for game developers, mixed reality and virtual reality teams.

The ecosystem is also supported by Mahuki, an innovation centre at Te Papa; CreativeHQ, Wellington's Tech incubator and accelerator; and several co-working spaces such as BizDojo, ProjectR, Credenza, Apopo and Digital Nomad.

Rocketwerkz Brings Global Success Home

Oamaru's Dean Hall has made a significant impact in the international game industry. Through smart management of IP rights he has brought those skills, funding and connections home to grow Otago's interactive exports.

Dean is best known as the creator of hit game DayZ, a survival simulator where a lone soldier must survive both hostile threats and the elements themselves. The game has been credited as inspiration for popular Battle Royale games such as Fortnite.

The game was inspired by survival training exercises during Dean's seven years with the New Zealand Defence Force. During one particular exercise in Singapore, Dean lost 25kg and required surgery for injuries he sustained. Dean wanted players to explore emotional and physical resilience, and DayZ's innovative game design layered in-the-moment combat with longer term survival tactics.

DayZ was a commercial and critical success, selling one million copies in its first three weeks. Industry recognition included IGN's People's Choice Award at Gamescom 2013, Best Indie Game and Best Original Game at the 2014

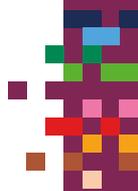
Golden Joystick Awards, and being named the 52nd best PC video game ever by PCGamer.

Successfully negotiating the game's IP rights enabled Dean to return to Dunedin in 2014 to start his studio RocketWerkz. Dean negotiated a tiered IP royalty agreement with publisher Bohemia Interactive (creators of the game Arma 2 which DayZ was an expansion mod for). He received an initial royalty cheque for USD\$5 million, with additional royalties for two years before he sold the IP outright.

To develop Rocketwerkz's portfolio of creative IP the studio employs a 'fail-fast' development strategy where teams prototype and test multiple ideas simultaneously and quickly.

The studio balances smaller projects (used to train staff) with larger scale projects. The ambition for these games is to follow DayZ's example and sell one to two million copies of each internationally. This would account for \$20-30 million in revenue from an investment of less than \$5 million each.

Dean's reputation attracted the attention of Tencent, the world's largest games company, who became a foundation investor in the studio. They are also a strategic partner who contribute valuable analytics and market insights.



Christchurch Spotlight

When the 2011 Christchurch earthquake left many tech companies without offices, the business community rallied together to create the Enterprise Precinct and Innovation Campus (EPIC). Today, gaming, EdTech and simulation businesses make up the majority of the centre's tenants. EPIC regularly hosts innovation, game development and EdTech Meetups and is a key hub in the innovation precinct.

Christchurch studios such as CerebralFix, Cloudfire, Stickmen Media and Digital Confectioners support growing the local game development community through the monthly GameDev Meetup and GameJams to find the next generation of talented developers and creators.

The University of Canterbury has a strong track record in developing and commercialising augmented reality and simulation projects and is home to the HITLab, a world-class centre of excellence for human interface technology research. The Tertiary Education Commission and the University have jointly invested \$7.7 million in the University's Applied Immersive Gaming Initiative to accelerate research and public use of immersive gaming applications.

Dunedin Spotlight

The University of Otago and the town of Oamaru have produced two of New Zealand's most globally successful game developers, Chris Butcher and Dean Hall. Chris is Director of Engineering at Bungie, creators of the billion-dollar Halo and Destiny game franchises, while Dean is the creator of the hit PC game DayZ and founder of Dunedin's Rocketwerkz studio.

The Centre of Digital Excellence (CODE) funded by the Government's Provincial Growth Fund will grow a new generation of game developers. CODE will develop a world-leading interactive media and gaming curriculum by working with the University of Otago, Otago Polytech and international incubator programmes to help gaming startups scale.

CODE also proposes to leverage the internationally renowned Otago Medical School and redeveloped Dunedin Hospital to apply interactive design to MedTech and wellness applications. Dunedin can take advantage of its strong international ties with leading gaming and medical hubs in its sister city Edinburgh, Scotland.

Dunedin has a long history of innovation in interactive media. Animation Research Limited is a global pioneer in real time sports graphics, including its famous America's Cup Virtual Spectator imagery. Meanwhile, Runaway Play, part of Natural History New Zealand, came from a heritage in serious games to establish a niche in games inspired by nature.

Work-for-hire Guns Lead to Creative Depths

New Zealand game developers have been creative and savvy in growing sustainable businesses.

James Tan and Sam Evans founded Digital Confectioners in Christchurch in 2007. They leveraged their experience as developers-for-hire to create a business that today is debt-free, has steady revenue streams and owns some increasingly valuable IP.

In the early years, James and Sam contracted on Unreal Engine, one of the world's leading game development engines made by Epic Games. They quickly earned a reputation that led to consulting on AAA game projects with companies such as Microsoft.

Digital Confectioners accrued skills, reputation and resources working on these contracts before launching into original IP development. Working with developer Alex Quick, the studio published its first original product in 2014 with *Depth*, a tense underwater experience in which players are pitted against each other, either as a treasure hunting diver or a man-eating shark.

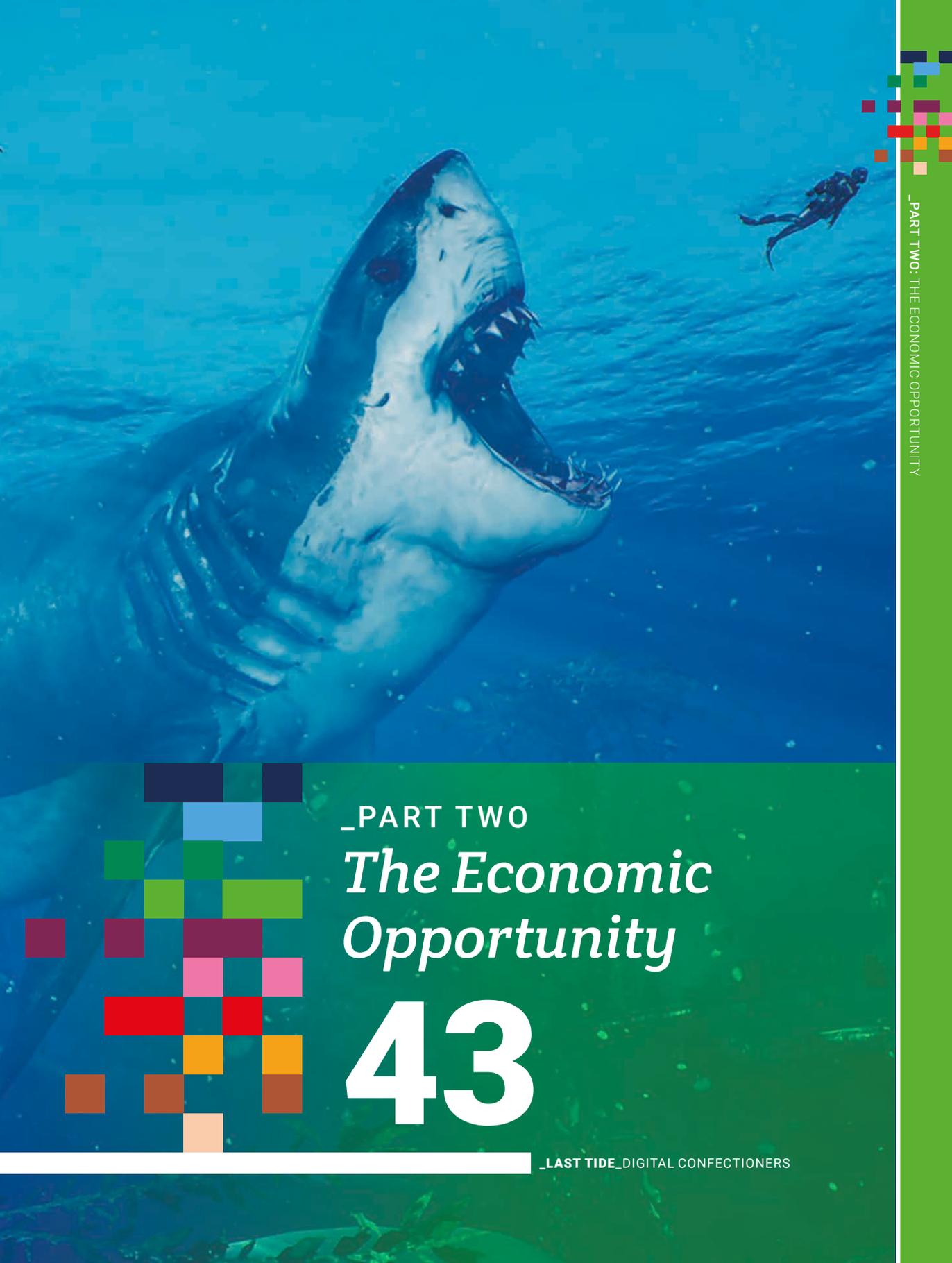
The timing was perfect as the game appealed to a PC market hungry for experiences which could be streamed

online or played with friends. To date, the game has sold 1.3 million copies.

James and Sam adopted the 'games as a service' model in which a game is offered as an endless service which players can invest time in, making the game profitable over a longer period. In recent years this model has become common, but in 2014 *Depth* was one of the earliest games to adopt it. It has subsequently sold 1.15 million units of add-on content.

Recently, Digital Confectionaries released *Last Tide*, an evolution of *Depth* but for the 100 person Battle Royale genre, popularised by games such as *Fortnite*. James says they closely track popular trends, and when the team's creative ambitions meld with what's hot, they develop in that direction. This allows them to create a product that's fuelled by passion and timed for commercial success.





_PART TWO

The Economic Opportunity

43

Taking our Creative Industries Global

Our creative industries are already highly digital in the way they create, market, distribute and earn⁴². In particular, digital business models offer new ways to monetise global audiences, removing our reliance on a small domestic audience and limited funding sources.

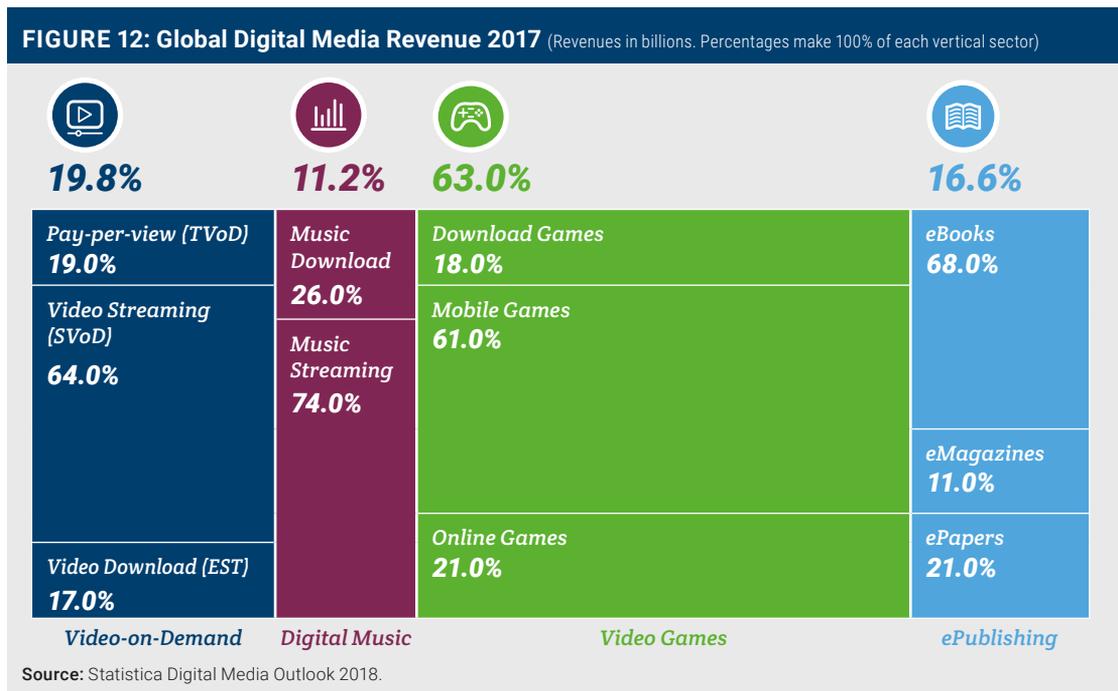
However, going global presents new business challenges such as discoverability in a crowded market, price erosion, reliance on platforms, piracy and the complexity of managing multiple platforms and rights deals.

Selling digital services in addition to content has become a large portion of media revenues.

Increasingly, consumers are choosing to pay for experiences⁴⁴ and services, such as streaming content rather than downloading it, or purchasing customisable characters, emotes, equipment and abilities in interactive games.

Of the media who have embraced digital, interactive games make up the majority of revenues⁴⁵.

It is estimated that digital now accounts for 80 percent of games revenue, 64 percent of recorded music, 53 percent of video (excluding cinema) and 25 percent of all book publishing⁴⁶.



⁴² Copyright and the Creative Sector. Ministry of Business, Innovation and Employment, 2016.

⁴³ Have the cultural and creative sectors found the formula for development in the digital age? A report prepared for the Forum d'Avignon. Kurt Salmon, December 2015.

⁴⁴ The Experience Economy. Pine, J. and Gilmore, J., Harvard Business School Press, 1999.

⁴⁵ Digital Media Outlook. Statistica, 2018.

⁴⁶ Have the cultural and creative sectors found the formula for development in the digital age? A report prepared for the Forum d'Avignon. Kurt Salmon, December 2015.



Interactive Media Export Opportunity



Growing our Global Market Share

New Zealand currently has a small, but growing, share of the world's largest and fastest-growing media industry. However, the pipeline of new creative IPs that will grow our market share is uncertain.

The global Total Addressable Market of USD\$178.2 billion in 2021 represents a Total Serviceable Market that New Zealand firms can realistically target worth a potential NZD\$258.4 billion annually⁴⁷.

New Zealand developers' share of the Total Addressable Market increased from 0.02 percent in FY2012 to 0.08 percent in FY2018⁴⁸. A 0.1 percent market share increase would generate an additional \$258 million in exports.

The global interactive media and gaming market is a highly accessible opportunity for New Zealand firms. Even in countries with some market access restrictions and potential quotas, such as China, New Zealand developers have strategic partnerships. Established New Zealand

0.1% | additional market share would generate \$258m exports

studios currently have publisher and platform relationships in all key market segments (mobile, PC, console, mixed reality as shown in Figure 4).

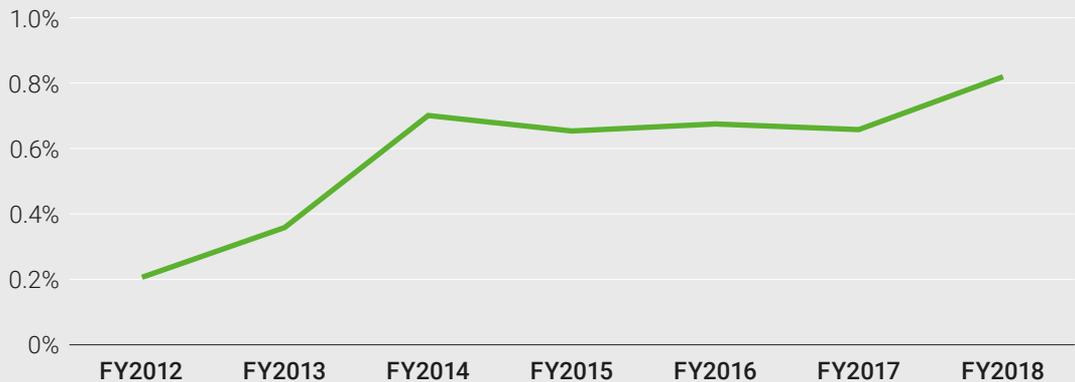
With highly-substitutable creative products⁴⁹ competition is the key factor affecting the market share that New Zealand developers can capture (known as the Serviceable Obtainable Market). However, the established New Zealand studios have demonstrated that they are competitive internationally and have benefitted overall from the last decade's digital disruption.

⁴⁷ (Figure 2) Total Revenues from Newzoo Global Games Market Report, June 2019. Assuming exchange rate of NZD\$1 = USD\$1.45.

⁴⁸ Calculated as percentage of Total Revenues from NZ Game Developers Survey 2018, using financial year ends of 31 March (Figure 6), out of Total Revenues for Newzoo Global Games Market Report June 2019 which uses 31 December year ends (Figure 2), assuming an NZD\$1 = USD\$1.45 exchange rate.

⁴⁹ Creative Industries: Contracts between Art and Commerce. Caves, Richard E. Harvard University Press, 2000.

FIGURE 13: New Zealand Interactive Game Developers Global Market Share



Source: NZ Game Developers Survey 2018 and Newzoo Global Games Market Report, June 2019.

Growing a Billion Dollar Export Industry

New Zealand’s interactive games sector has had an impressive 39 percent compound annual growth rate (CAGR) over the last six years (see Figure 6).

It is clear that New Zealand’s interactive media industry will continue to grow – the question is by how much and whether its potential is realised. The returns from any one successful creative product can be highly-scalable, with an individual hit having a huge impact on industry earnings.

In a digital economy, the scalable nature of creative IP and a global market means high growth rates are possible. For example, in FY2014 New Zealand developer’s revenues more than doubled (210 percent growth) from \$36.3 million in FY2013 to \$76.3 million⁵⁰. The past six years tracked by the NZ Game Developers Industry Survey demonstrate a growth phase for the

industry, characterised by the launch of new IPs each year and also the sustained growth of franchises like NinjaKiwi’s Bloons Tower Defence and Grinding Gear Games’ Path of Exile.

The concern of participants interviewed for this study is that the New Zealand games industry is maturing and that the pipeline of emerging studios is weak.

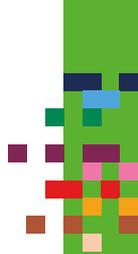
This study modelled two scenarios for the potential revenues of the New Zealand industry:

- **High-growth scenario** where significant new IPs continue to be developed and launched. This assumes that the 39 percent compound annual growth rate of the last six years⁵¹ continues for the next six.
- **Maturing scenario** where existing established studios retain their global market share, which would grow at the projected global average CAGR of nine percent⁵².

⁵⁰ New Zealand Game Developers Industry Survey, 2014.

⁵¹ New Zealand Game Developers Industry Survey, 2018.

⁵² Newzoo Global Games Market Report, June 2019.



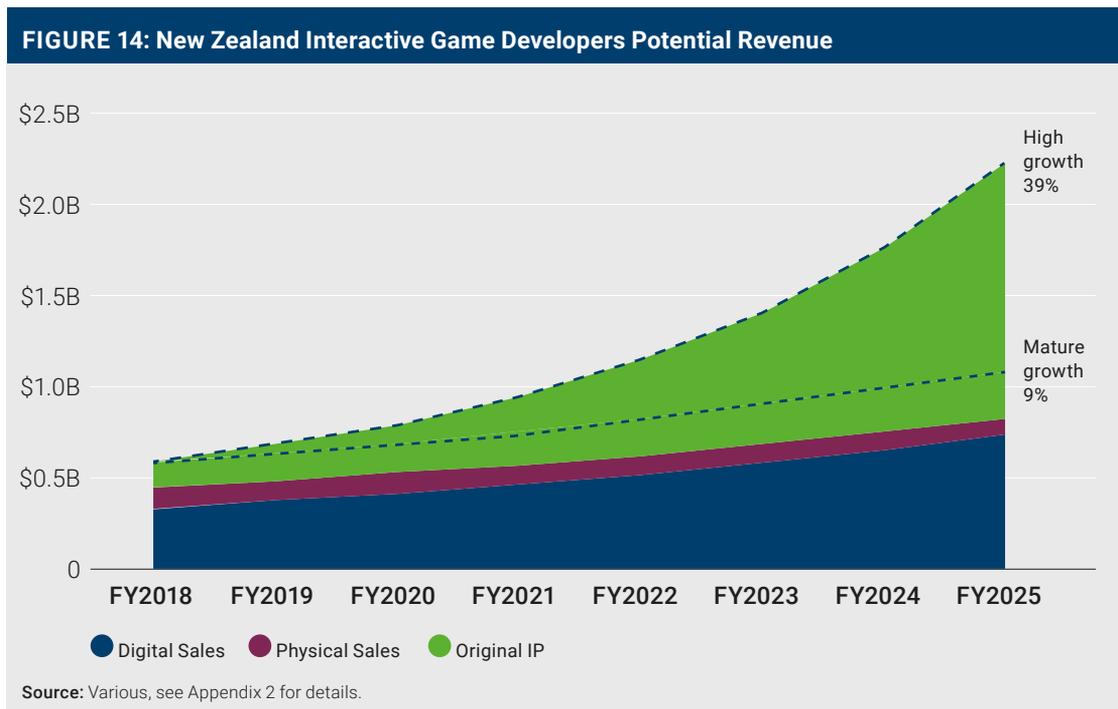
Domestic spending on interactive media, a more mature and predictable market, is assumed to continue with retail sales declining four percent annually⁵³ while digital sales grow 12 percent per annum⁵⁴. See Appendix 2 for more details.

If the high growth rate of 39 percent CAGR continued, New Zealand’s interactive media earnings would be worth \$1.01 billion in FY2024, on top of domestic spending of \$751.6 million.

If the industry matures (an assumed nine percent CAGR), IP earnings would be worth only \$235 million in FY2024.

In comparison, film post production, such as editing and visual effects contracts, was worth \$764 million to New Zealand in 2018⁵⁵ yet globally the games industry now earns considerably more than film and video.

In the 2018 NZ Game Developers Industry Survey, eight of the top ten employers expected greater than ten percent revenue growth for the next year, suggesting that growth will continue in the immediate future.



⁵³ NPD Group NZ Retail Tracker, 2017.
⁵⁴ Telsyte Digital Market Monitor NZ, 2017.
⁵⁵ Screen Industry Survey 2017/2018. Statistics NZ, 2019.
⁵⁶ NZ Game Developers Industry Survey, 2018.



CASE STUDY

PikPok Moves up the Value Chain

New Zealand's oldest video game studio has gone from strength to strength throughout its 22 year history.

Originally called Sidhe Interactive, the studio now known as PikPok began life contracting for international publishers. Despite an impressive client list including Warner Bros, Electronic Arts, and Activision, these work-for-hire projects typically have fixed margins, tight deadlines and clients on the other side of the world.

Following the Global Financial Crisis of 2008 many large publishers cancelled development plans. However, PikPok had been an early adopter of emerging digital distribution models on console and PC, and later the Apple and Google mobile app stores. As these new channels matured, PikPok reinvented itself as a self-publisher of its own IP and eventually as a publisher of other creators' products.

Managing a portfolio of games allows PikPok to manage risk and cross promote to their audience.

As well as retaining a larger share of profits in New Zealand, self-publishing offered PikPok autonomy to create content on their own terms. Today, PikPok typically invests between one to two million dollars, and up to two years developing a mobile game app before bringing it to market.

PikPok products have more than 350 million downloads and have been distributed to over 200 countries in up to 24 different languages. The sequel to one of their most popular games, *Into the Dead*, received six million downloads in its first week with total downloads for the franchise over now 108 million. Their 2009 arcade game *Shatter* was named one of the best games for the Sony PlayStation 3 by the world leader in games media, IGN.

The studio has also received 12 Apple Editor's Choice Awards and has even been nominated for a BAFTA.



Creating Jobs for Kiwis

Employment by interactive games studios has grown steadily at ten percent CAGR over the last six years⁵⁶.

If growth continues at this rate, New Zealand's interactive entertainment sector would employ 974 full time equivalent positions by FY2024. If the industry matures and existing studios seek to maintain existing market share, employment would be assumed to level off.

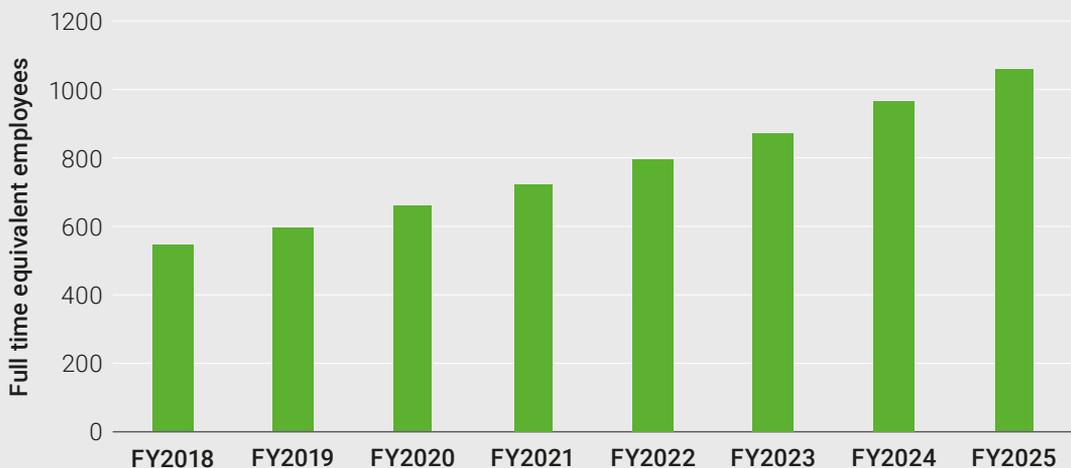
However, immediate employer intentions are much stronger than these projections. The 2018 NZ Game Developers Industry Survey found studios expected to hire 150 new full time employees during 2018/2019⁵⁷ alone.

New jobs expected this year

150

Earnings per employee could also be used to estimate employment. The average earnings per employee for an established New Zealand studio is \$303,370 (although it can be much higher at studios with hit games). At this ratio, a \$1.01 billion industry would support 3,330 full time jobs. In comparison, when the Finnish industry earned a similar €800 million (NZD\$1.28 billion) in 2013 it employed 2,150 people⁵⁸.

FIGURE 15: Potential Employment in NZ Interactive Game Studios



Source: NZ Game Developers Industry Survey 2018.

⁵⁷ NZ Game Developers Industry Survey, 2018.

⁵⁸ The Finish Games Industry Report 2018. NeoGames Finland, 2019.

The Mixed Reality Revolution

Recent years have seen an explosion in the availability of virtual reality (VR) and augmented reality (AR) devices for entertainment, education and training. Collectively, these are known as mixed reality (MR) or sometimes cross reality (XR).

Growth has been driven by reasonable-cost consumer VR hardware that plugs into existing PCs and consoles as well as dedicated AR support in smartphones (such as Apple's ARKit and Android's ARCore).

Over 150 million dedicated VR hardware devices will have been sold by 2022⁵⁹.

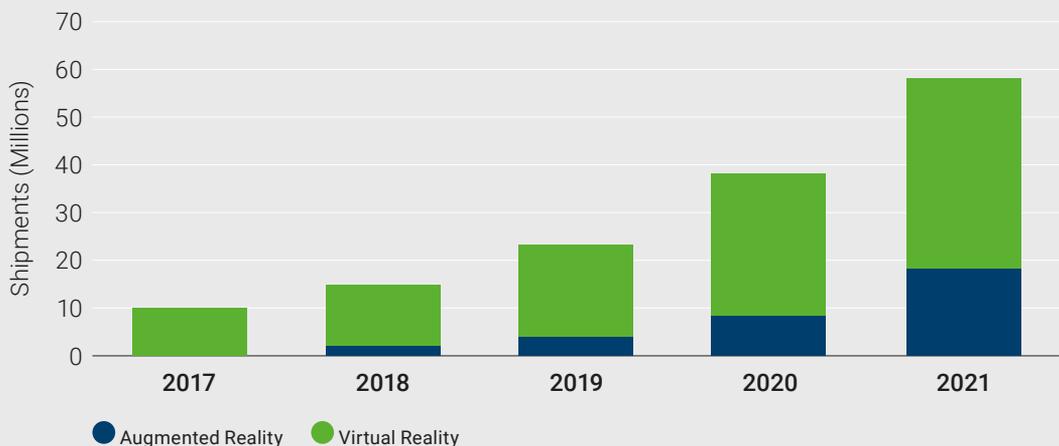
Smartphone-based AR is even more affordable and convenient, with one quarter of all smartphones in use today (over one billion devices) having specialist AR capabilities⁶⁰.

Worldwide spending on AR and VR hardware and services was worth USD\$27 billion in 2018, with 72 percent compound annual growth predicted from 2017 to 2022⁶¹.

While entertainment drove early adoption of VR and AR, marketing, education and corporate training are now the fastest-growing use cases. Commercial uses make up 60 percent of all AR/VR spending and this is expected to increase to 85 percent by 2021⁶².

A variety of industries are adopting VR/AR for training, sales and operations. Proven use cases

FIGURE 16: Global VR and AR Headset Shipments



Source: Worldwide Semiannual Augmented and Virtual Reality Spending Guide. IDC, 2018.

⁵⁹ Worldwide Quarterly Augmented and Virtual Reality Headset Tracker. IDC, 2018.

⁶⁰ The New Reality for Mobile Gaming: The VR/AR Opportunity. Newzoo, 2018.

⁶¹ Worldwide Quarterly Augmented and Virtual Reality Headset Tracker. IDC, 2018.

⁶² Virtual & Augmented Reality: Understanding the race for the next computing platform. Goldman Sachs, 2016.

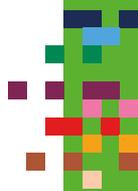
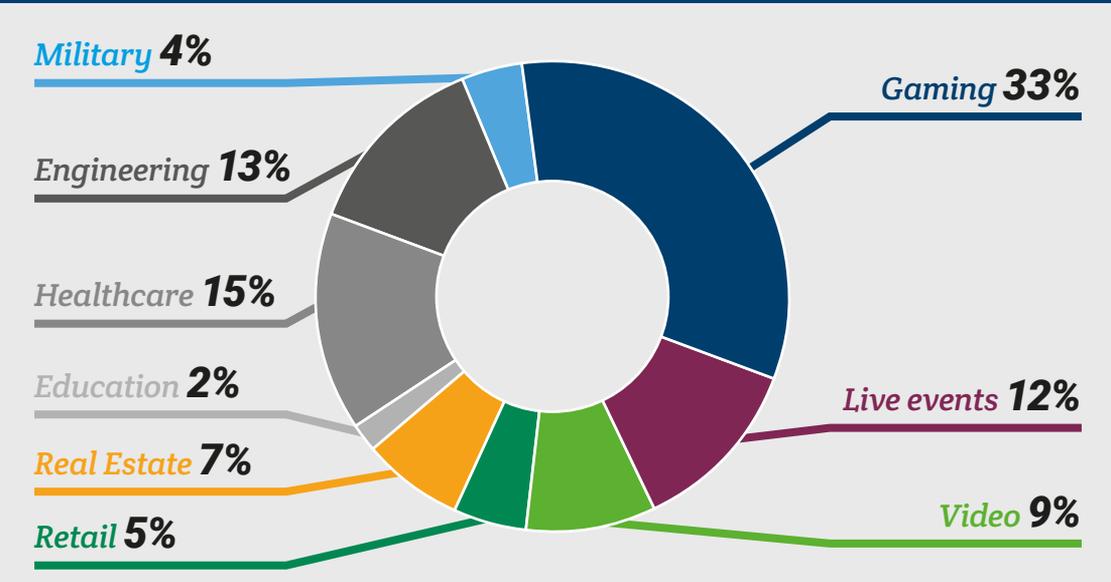


FIGURE 17: Spending on AR/VR Software Use Cases



Source: Virtual & Augmented Reality: Understanding the race for the next computing platform. Goldman Sachs, 2016.

include architectural design, virtual test drives, virtual property tours, public infrastructure maintenance, smart cities management, business process visualisation, remote surgery, virtual retail fitting rooms, simulating hazardous environments safely and personalising products before shipping.

New Zealand mixed reality developers and studios work across this wide range of sectors. According to a survey of New Zealand VR/AR Association members⁶³, while entertainment was the most popular sector (with 43 respondents), members had also developed projects for marketing (41) and education (37). Architectural (28), storytelling (31) and training (31).

35% | of New Zealanders have used training games at work

According to the Digital NZ Report 2018, 35 percent of New Zealanders have used training games at work, and 24 percent have used games to learn health and safety rules⁶⁴.

⁶³ Virtual gets real: The explosion of cross reality in New Zealand. NZ VR AR Association, 2017.
⁶⁴ Digital NZ Report 2018. Bond University and IGEA, 2018.



CASE STUDY

Virtual Reality for Airplane Maintenance

A training software by New Zealand-based VR company StaplesVR shows how professionals who operate in high risk environments can train in VR without the associated real life risks.

The costs of flight delays and the potential safety risks for new engineers were a catalyst for Jetstar to engage StaplesVR to create a

true-to-scale training platform to enhance existing training processes and operations.

The programme is a step by step preparation for Jetstar's two most common planes, the A320 and B787 aircraft, prior to take off. Engineers are provided with necessary experience prior to stepping onto the tarmac, dramatically reducing the potential for error.

As a result, the programme has reduced costs, removed risks and reduced staff delays. StaplesVR retains the rights to the IP and plan to localise and sell the software internationally.



EdTech Export Opportunities

The Government's International Education Strategy 2018-2030 aims to diversify our international education earnings, including by delivering education products offshore and online.

The total global education technology or EdTech market is forecast to grow 17 percent per annum to USD\$252 billion by 2020⁶⁵.

Game-based learning is one of the faster growing segments, with 20.2 percent annual growth, and revenues expected to reach USD\$8.1 billion by 2022, up from USD\$3.2 billion in 2017⁶⁶.

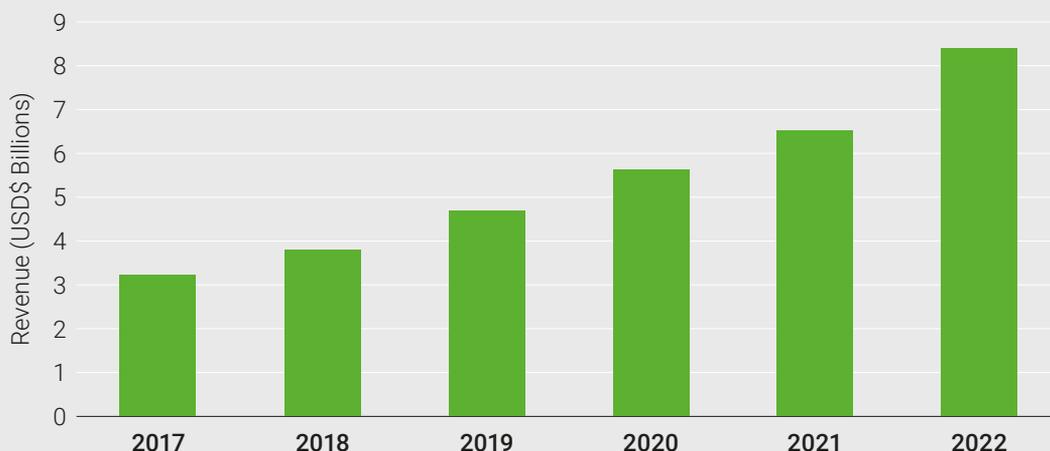
Additionally, the global mixed reality learning market is expected to be worth USD\$9.9

billion by 2023⁶⁷, with studies suggesting that VR is more engaging and effective than video and textbooks in the classroom⁶⁸.

Educational games for preschool, special needs, language learning, STEM education and workplace simulations are currently high growth segments. Consumers and parents are just as likely to be customers as schools, tertiary education and businesses.

Local edtech startups suggest that the decentralised, fragmented nature of New Zealand schools slows uptake. This creates a challenge when exporting to international clients as they place value on products that are endorsed by local educators or Government.

FIGURE 18: Global Game-based Learning Revenues



Source: The 2017-2022 Global Game-based Learning Market. Metaari, 2017.

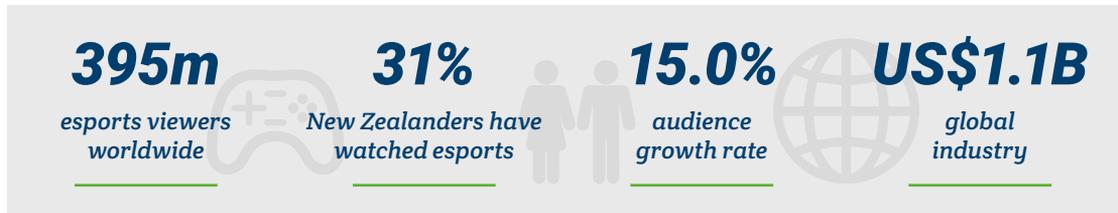
⁶⁵ Global EdTech Industry Report. EdTechXGlobal and IBIS Capital, 2016.

⁶⁶ Global Game-based Learning Market 2017-2022. Metaari, 2017.

⁶⁷ Worldwide Mixed Reality Learning Market 2018-2023. Metaari, 2018.

⁶⁸ Learning in virtual reality: Effects on performance, emotion and engagement. Allcoat, D., & von Mühlhelen, A. 2018.

esports Gaining Ground



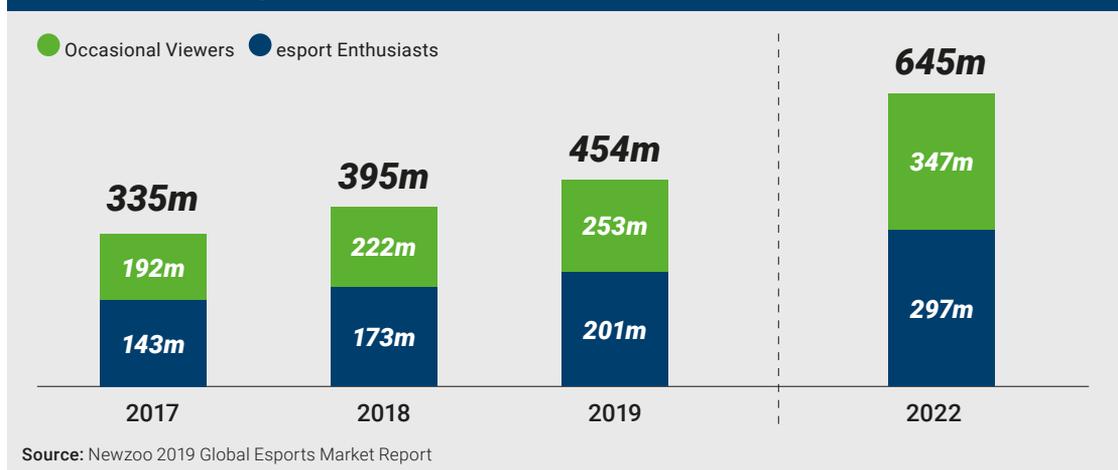
Esport or electronic sport is the competitive form of video gaming. It covers everything from simulations of real life sports such as motor racing or basketball, to abstract skill challenges only made possible by interactive design.

Over 173 million viewers watched esports regularly (esports enthusiasts) during 2018, along with 222 million occasional viewers. This total audience is predicted to reach 645 million viewers in 2022⁶⁹.

Internet video streaming has popularised esports. The largest platform in the world, Twitch, had an average viewership of 1.25 million people in January 2019, putting it on par with traditional broadcasting viewership. Esports events have also been broadcast on traditional television networks such as ESPN, FOX Sports, Sky Sports and Māori Television.

Thirty one percent of New Zealanders have watched esports⁷⁰. Of those, 53 percent watch to learn strategies to improve their own gameplay and seven percent follow a team.

FIGURE 19: Global esports Audiences



⁶⁹ Newzoo Global esports Market Report, 2019.

⁷⁰ Digital NZ Report 2018. Bond University and IGEA, 2018.



With 98 percent of New Zealand families having access to a video game device, esports can be considered more accessible for many than sports fields. In particular, esports have been embraced by the disabled community with accessibility technologies such as Microsoft's Adaptive Controller making entry into esports more open than ever.

The esports industry structures and develops its players along similar lines to other high performance sports programmes. Fitness, nutrition and access to high performance coaching are the keys to success.

A study of esports athletes by German Sports University in Cologne concluded that they are exposed to physical strains similar to those of traditional athletes⁷¹. They found that the amount of cortisol produced is similar to that of a race car driver and pulse rates of up to 160 to 180 beats per minute are comparable to long distance runners. Comparisons have also been made with established sports such as shooting and biathlon which require concentration and reaction times, as well as team sports requiring tactical strategy.

Publishers of the leading esports titles invest heavily in tournament prize pools. The International, the largest DOTA2 tournament in the world, featured a prize fund of over USD\$25 million in 2018 and Epic Games has a \$100 million prize pool for Fortnite's 2018/2019 season.

The esports market is expected to be worth USD\$1.1 billion in 2021, with 42 percent of that revenue coming from sponsorship deals. However, media rights (currently 23 percent of revenues) is the fastest-growing segment as both digital and TV media companies compete for esports content⁷².

Many sport franchises have expanded into esports to protect or extend their audiences. For example, the National Basketball Association has developed its own esports league for the equivalent video game NBA 2k, including owning some team franchises directly. Locally, the Vodafone Warriors and the New Zealand Breakers have established esports teams.

Growing New Zealand esports

The New Zealand Esports Federation (NZESF), a not for profit initiative established in 2016, is the voice of esports in New Zealand and exists to support and grow competitive gaming. The NZESF has developed the national High School League for secondary school students to represent their school in organised esports and compete for school pride. Currently, matches are streamed every Monday online on Twitch.

Internationally, national sports authorities in 27 countries now recognise esports as an official sport. Efforts are also underway to see esports represented as a demonstration sport at the 2024 Olympics in Paris, France.

An official New Zealand representative team would be a significant milestone for the development of esports in New Zealand, unlocking commercial sponsorship and funding for structured career pathways.

While New Zealand is unlikely to bid for large stadium esports events, niche and online opportunities exist. International invitational or qualifying tournaments hosted in New Zealand can be streamed online, promoting the country to global audiences larger than traditional sporting broadcasts.

⁷¹ Stress im eSport – Ein Einblick in Training und Wettkampf. Rudolf, K., Grieben, C., Achtzehn, S., & Froböse, I. 2016.

⁷² Newzoo Global esports Market Report, 2019

Māori Developers Sharing Māori Stories

The world is hungry for stories about Māori culture and Māori developers are eager to share them.

In 2016, Rio Hemopo-Hunuki and Kristy Mayes started Koi Digital with the goals of presenting Māori and Polynesian stories in gaming medium and engaging Māori and Polynesian developers. With seed funding from Te Puni Kokiri's Ka Hao Digital and the NZ Film Commission's Interactive Development Fund, Koi Digital is developing *Titans of Aotearoa*, an ambitious project to bring the history, culture and legends of the Māori people to life for gamers around the world.

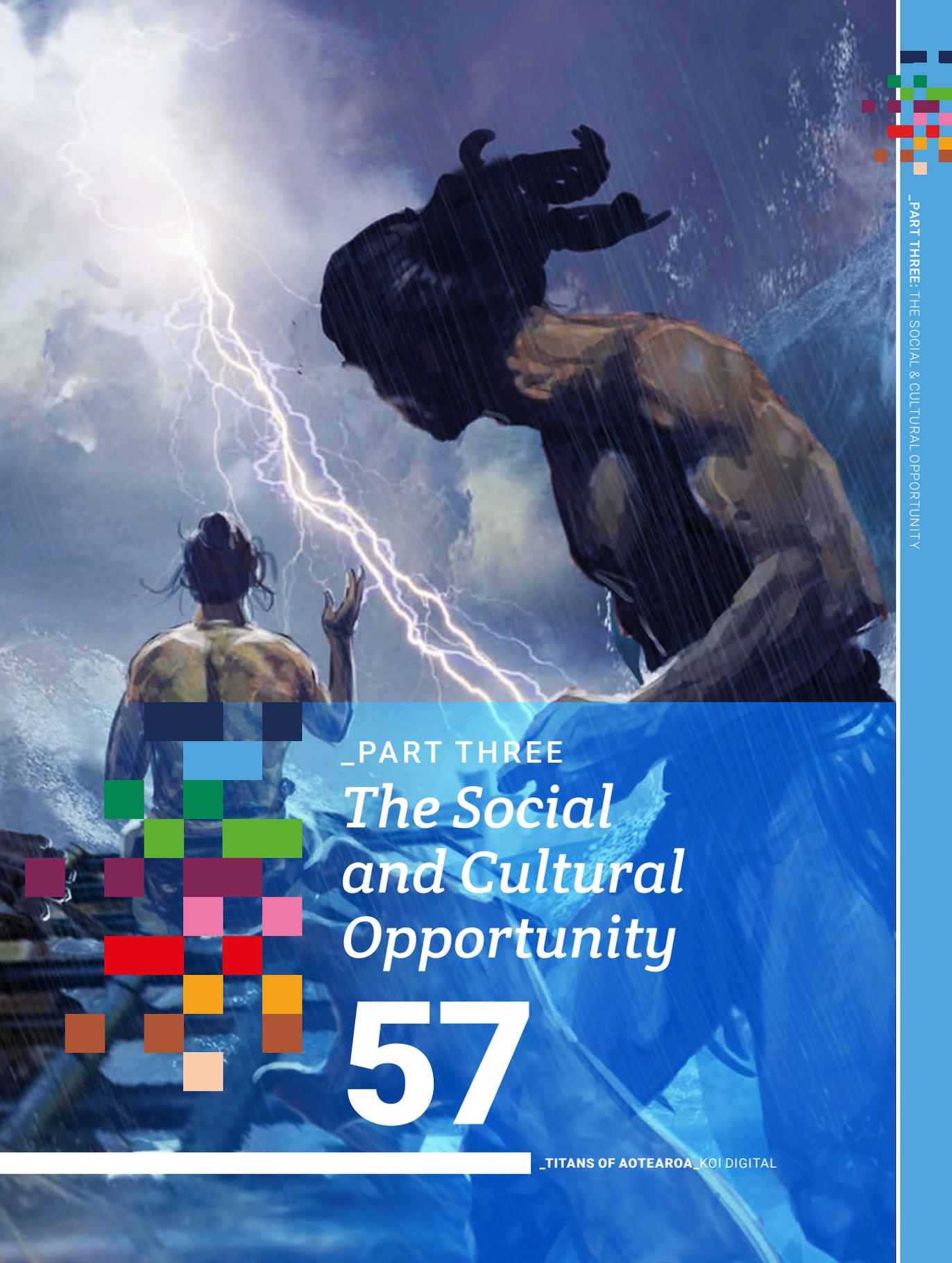
The initial funding has allowed limited creation of concept animations, trailers and pitch materials, although Koi Digital is in discussion with international publishers about pursuing cooperative development. Rio says a large-scale project of this kind could be transformative in educating millions of people about the trials and successes of the Māori people from pre-migration to Aotearoa and into the future.

A similar concept *Never Alone* (also known as *Kisima Inqitchuna*), which was developed by Alaska's Cook Inlet Tribal Council and told the legends of Alaskan natives and Native Indians, was critically acclaimed by the global games industry on its debut in 2015.

However, Koi Digital don't just want to present Māori culture but they also want for game development to be an authentic expression of Māori storytelling, with a significant proportion of the studio to be Māori and Polynesian.

To help achieve this, Koi Digital is actively fostering the technical skills of young Māori. One initiative is the Koi Digital Hub which integrates the *tikanga* (customs) of the *marae* with the modern world. This creates a space in which Māori people can learn digital skills for the modern workplace.





_PART THREE
*The Social
and Cultural
Opportunity*

57



Celebrate our Identity Through Interactive Media

Interactivity offers many innovative ways to express New Zealand stories and culture, and a diverse range of New Zealanders consume interactive media everyday. However, current Government arts, culture and screen funding is organised into traditional categories that need to be modernised to include interactive media.

Interactive Culture, Identity and Creativity

Interactive storytelling and art brings together the work of visual artists, musicians, composers, writers, animators, choreographers and other creatives in innovative ways.

As highlighted on page 29, a diverse cross-sector of New Zealanders access interactive media everyday. The average age of a game player is 34 years, 47 percent of game players are female and 98 percent of households have a device capable of playing interactive media. New Zealanders spent \$452.3 million on interactive media and games in 2017⁷³, compared with \$208 million⁷⁴ at movie box office in 2018 and \$107.9 million on recorded music in 2018⁷⁵.

In addition to featuring New Zealand content, music, locations or characters, projects can use interactive design principles to convey New Zealand themes or experiences. For example, Guardian Maia's gameplay choices (see page 17) value the concept of kaitiakitanga (guardianship). Interactive art exhibition Half Blood explores colonisation by offering the player the ability to play from both Māori and Pakeha perspectives.

New Zealand interactive creativity and art has been recognised globally (see page 63), and a

new generation of creative technologist artists are graduating from our secondary schools and universities with skills that combine coding and content creation and the desire to tell local stories.

The Rise of Indie Creators

Digital technologies have empowered individual creators and small teams to craft and distribute their own interactive content. The result has been an explosion in the creativity and diversity of interactive storytelling.

Like other creative industries, the term indie can refer to both artistic freedom and innovation, and also to the business model of independently self-publishing via digital distribution platforms.

The tools to create interactive games are accessible anyone with an internet connection. Students can now use the same tools as professionals, such as free versions of Unity and Unreal Engine. Creative practitioners such as artists, musicians, animators and sound engineers can now collaborate with game developers and programmers using these tools. For every technical role employed in New Zealand's video games industry, 1.4 creative jobs are generated⁷⁶.

With the introduction of the Digital Technologies strand (including coding and game development)

⁷³ NPD Group retail tracker data 2017 and Telsyte Digital Market Monitor 2017. See Appendix 2 for more details.

⁷⁴ Screen Industry Survey 2017/2018. Statistics NZ, 2019.

⁷⁵ NZ Recorded music revenues top \$100 million in 2018. Recorded Music NZ, 2019.



in the New Zealand Curriculum, our students are growing up with these creative opportunities. Students can learn game creation from free tools such as MIT's Scratch before progressing to industry-standard tools. In 2017, over 150 student teams from around the country made games for the NZ Transport Agency's Future Transport Competition⁷⁷.

The increased diversity of game creators has increased the variety, innovation and originality of interactive projects. Alternative aesthetics, explorations of challenging themes, characters from underrepresented groups and innovative non-standard interaction mechanics have found a home in indie gaming communities. Currently, 21 percent of professional game developers employed in New Zealand identify as female or non-binary⁷⁸ and there is a growing community of Māori developers.

While indie games attract smaller audiences than heavily marketed global franchises, they still represent a sizeable market globally. Their innovative experiences, originality and risk-taking lead to breakout hits. Minecraft, one of the most popular games in history, began as an indie game made by a Swedish developer before being sold to Microsoft for USD\$2.5 billion⁷⁹.

Support for Interactive Art and Culture

Like other cultural sectors, New Zealand's small domestic market makes commercial funding for local interactive content uneconomic outside of advertising, training and education.

Table 2 summarises current Government arts and culture funding programmes and their applicability to interactive media that tells New Zealand stories.



⁷⁶ See Figure 7.

⁷⁷ NZ Transport Authority, 2017. <https://education.nzta.govt.nz/competition/>

⁷⁸ NZ Game Developers Industry Survey, 2018.

⁷⁹ Minecraft to join Microsoft. Microsoft, 2014. <https://news.microsoft.com/2014/09/15/minecraft-to-join-microsoft/>

TABLE 2: Existing Government Arts and Culture Programmes

<i>Programme and Purpose</i>	<i>Applicability to Interactive Media</i>
<p>NZ Screen Production Grant – New Zealand Productions⁸⁰ Build the sustainability, scale and critical mass of the domestic industry, and support the development of New Zealand creatives. Provide cultural benefits to New Zealand by supporting the creation of New Zealand content and stories.</p>	<p>Video games are excluded as an eligible format.</p>
<p>NZ Film Commission Interactive Development Fund⁸¹ The Interactive Development Fund pilot enables the development of interactive content that is focused on strong and original New Zealand stories. Funding is provided to develop the concept, including creative material such as story and design, that may form the basis of a playable prototype that is suitable to access the appropriate marketplace to seek project financing.</p>	<p>The pilot fund provides up to \$50,000 of early-stage funding for VR, AR, interactive and gaming projects telling New Zealand stories with a scripted narrative focus. This amount is less than equivalent development funds in other countries (see Appendix 3).</p>
<p>NZ On Air – NZ Media Fund⁸² Create New Zealand content that is valued and enjoyed by many New Zealand audiences.</p>	<p>A single cross-platform NZ Media Fund covers content for television, radio, music and online media. Contestable content applications must have a commissioning platform that reaches New Zealand audiences.</p>
<p>Creative NZ⁸³ Encourage, promote and support the arts in New Zealand for the benefit of all New Zealanders.</p>	<p>Creative New Zealand does not fund game design.</p>
<p>Sport NZ Invest in organisations to help them reach their community sport and high performance outcomes.</p>	<p>Sport NZ has not funded any development programmes for esports.</p>
<p>Source: NZ Screen Production Grant, NZ Film Commission, NZ on Air, Creative NZ, Sport NZ.</p>	

⁸⁰ New Zealand Screen Production Grant Criteria for New Zealand Productions. The New Zealand Screen Production Grant, July 2017.

⁸¹ Interactive Development Fund (Pilot Programme) - Guidelines for Applicants. NZ Film Commission, May 2017.

⁸² NZ On Air Funding Strategy, December 2016.

⁸³ Statement of Intent 2016 – 2021. Creative New Zealand, 2016.



Interactive media and video games are explicitly excluded from flagship Government programmes such as Creative NZ funding and the NZ Screen Production Grant, but can access support from NZ On Air and the NZ Film Commission in limited circumstances.

In other creative industries, such as screen and music, the support model of using local cultural funding to develop skills, capability and IP before exporting is well acknowledged. The barrier to local funding means that interactive creators have had to target international audiences from day one. While this has encouraged the sector's commercial export success, it has resulted in a lack of local interactive content and talent development.

In 2016 the NZ Film Commission launched the Interactive Development Fund which provides \$300,000 annually to develop interactive projects with New Zealand content. They have also provided some market activity and talent development support to the NZ Game Developers Association. The Commission reports that the quality of Interactive Development Fund applicants has improved each year, and a handful of projects have received a second round of funding to enable them to further their development process. However, the Commission recognises there is a gap as there is no next step production funding available for local interactive projects.

NZ On Air's New Zealand Media Fund is designed for a cross-platform converged media landscape. While NZ On Air increasingly funds digital content, only a small portion is highly interactive. To ensure that publicly-funded content reaches New Zealand audiences, NZ On Air requires that projects

have a commissioning platform or broadcast partner that reaches New Zealand audiences.

Ironically, the global nature of digital platforms means that New Zealand-made interactive content reaches larger global audiences than those at home.

Recently, two local digital platforms have arrived that can support interactive content.

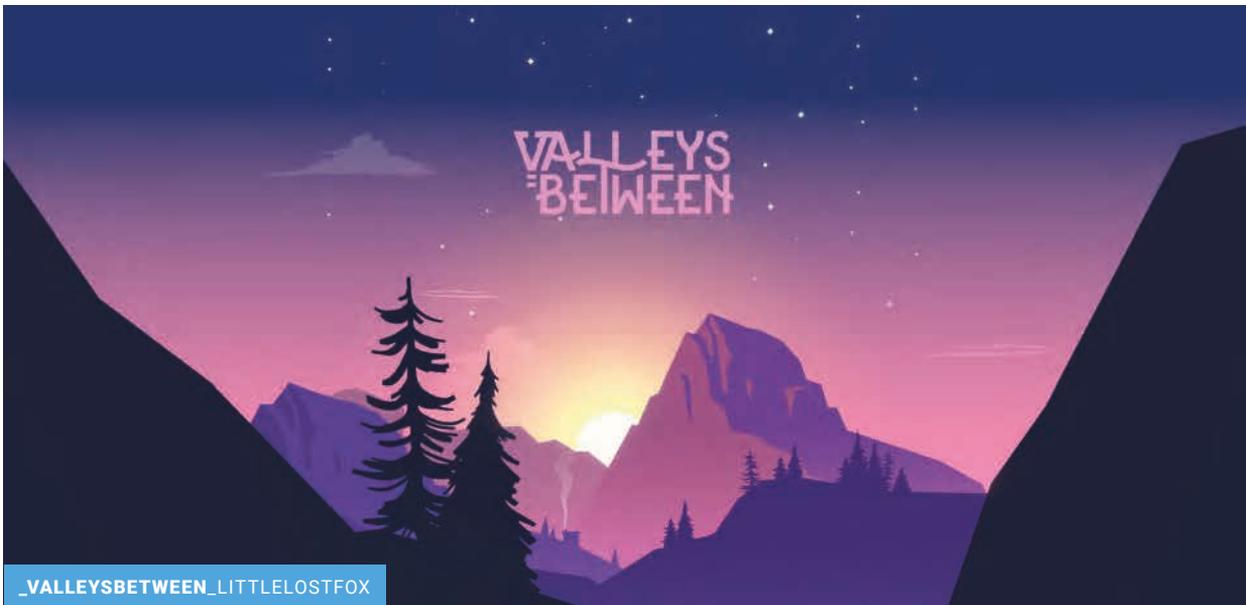
The NZ On Air and RNZ Joint Innovation Fund is supporting several public broadcasting and journalism projects that will allow audiences to explore topics in more depth interactively.

In 2018 NZ On Air and TVNZ launched HEIHEI, a safe, ad-free children's media platform featuring local content including games. NZ On Air audience research⁸⁴ found that gaming was New Zealand children's most popular online activity (76 percent) which is marginally higher than watching YouTube (75 percent). Twelve out of 22 of children who chose to use HEIHEI rather than other media said they chose HEIHEI because of the games⁸⁵. In 2019, NZ On Air will fund \$960,000 towards children's games and interactive media. However, considering the strong audience demand, this is a significantly underrepresented portion of the total \$11.8 million allocated for HEIHEI content to date.

⁸⁴ Children's Media Use Study 2015. NZ On Air, 2015.

⁸⁵ HEIHEI November user research with focus on games. NZ On Air, 2018.

Call to Action	Who
<i>Remove the exclusion of game design from Creative New Zealand funding criteria so that interactive projects for artistic, experimental or expressive purposes can be supported</i>	Creative NZ
<i>Establish interactive media as a distinct artform category eligible for Creative New Zealand grants</i>	Creative NZ
<i>Increase the funding allocated to interactive children's media projects to match high audience demand</i>	NZ On Air
<i>Make interactive media and video games an eligible format for domestic productions in the New Zealand Screen Production Grant to encourage large-scale New Zealand-themed interactive productions</i>	Ministry for Culture and Heritage
<i>Update the Films, Videos, and Publications Classification Act to classify digital apps and games in a scalable way</i>	Office of Film and Literature Classification



International Creative Acclaim

PikPok's Super Monsters Ate My Condo and Dinosaur Polo Club's Mini Metro were both nominated for UK Games BAFTAs.

Mini Metro was a finalist in three categories of the Independent Games Festival (IGF) 2016, and the winner for Excellence in Audio.

Valleys Between by Wellington studio Little Lost Fox won Best Feel Good Game at the International Mobile Gaming Awards 2019.

Auckland-born indie game designer Michael Brough has been a finalist for the IGF's Nuovo Innovation Award three times, and a finalist for Excellence in Design twice.

Being selected by Apple, one of the world's best design-led companies, is an impressive design accolade. Over 20 New Zealand game apps have been featured globally by Apple including Furistas Cat Cafe, Flutter, The Blockheads, Bloons Tower Defence and Flick Kick Rugby.

Board game Endeavor was a finalist for the As d'Or (Golden Ace) nomination at the Cannes Festival International des Jeux.

Interactive Art

Shatter by Wellington studio Sidhe/PikPok was shortlisted for The Smithsonian Institute's landmark Art of Video Games exhibition

New York's Museum of Modern Art exhibited New Zealand game designer Pippin Barr's art game of the acclaimed art installation The Artist is Present in 2013

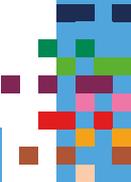
Wellington Museum hosts the Level Up exhibition showcasing the finalists of The Pavs, NZ's games awards, each year.

Auckland Art Gallery hosted the Wavelength interactive art exhibition during 2015.

Te Papa hosted the international exhibition Game Masters as its major summer 2013 exhibition.

Urban regeneration project GapFiller installed a giant outdoor arcade game, Super Secret Arcade, to reinvigorate post-quake Christchurch public spaces.

Arcade: Art of NZ Video Games was curated by The Dowse gallery and toured regional museums from 2013 to 2015.



Telling New Zealand Stories

Auckland War Memorial Museum recreated the rugged landscape of 1915 Gallipoli in Minecraft with students from Alfriston College.

Orchestra Wellington and interactive company MIXT created the world's first virtual conductor experience for Wellington's 2018 CubaDupa Festival.

Artist Johnson Witehira's interactive exhibition Half-Blood explored the colonisation of Aotearoa New Zealand by allowing the audience to explore from both Māori and Pakeha perspectives.

The Waikato Raupatu River Trust developed a game app River Rush to teach rangatahi (youth) about the role of the river in local communities' lives.



CASE STUDY

How Story Structure got Framed

Interactivity affords new ways to tell stories and create meaning.

Award-winning indie game Framed innovates with the structure and order of the story itself, not just choices of character, dialogue or camera perspectives.

Telling a classic detective story, Framed features handcrafted art and animation and an original live jazz soundtrack. Trapped in an author's work of fiction, the player must rearrange comic book panels on each page to change the outcome of the story.

Created by game designer Joshua Boggs and the team at Loveshack, Framed was praised for its original storytelling and rewarding puzzles. On each page players can move and sometimes rotate panels to create new pathways, impacting the world around them, such as double-crossing other characters.

In a novel plot twist reminiscent of non-linear films, in the final chapter the player can reorder the act structure of the narrative they have just

participated in. This calls into question the nature of truth in the story and who the hero really is.

Framed's narrative is partly scripted and partly a structured interactive system working together. Joshua describes the role of game designer coordinating these combinations of story possibilities, visual art, animation and soundtrack as similar to that of a director on a film production.

Framed received over 30 awards from indie games festivals around the world, including being a finalist for the prestigious Independent Games Festival 2015's Excellence in Design Award. The sequel, Framed 2, was featured by both the Apple AppStore and Google Play store as one of the best games of 2017.

Entering international festivals was one of Loveshack's marketing strategies to appeal to taste makers and discerning gamers interested in innovative indie games. Joshua has since returned to his native New Zealand to found new studio Mayday.



Realise the Education and Wellbeing Benefits

Interactive design and game-based learning is a powerful evidence-based tool to deliver educational content, simulations and behaviour change programmes. The creative industries are often a source of interactive design expertise that can be applied to education and wellbeing.

Game-based Learning

Interactive media, simulations and serious games have many proven educational, prosocial, behaviour change and wellness applications.

The term game-based learning has been coined to cover a range of learning tools and strategies including educational games, board and card games, simulations, gamified lessons and student created games.

In educational media, interaction is a powerful enabler of personalised and self-directed learning. Software can match the lesson content to the progress, preferences, learning styles and relevant needs of an individual learner. The educational publishing industry has long used storytelling and creativity to share memorable lessons in relevant ways.

Several decades of empirical research studies have found that simulations, educational games and gamification can lead to a variety of educational outcomes. It has also shown that they can be more effective, engaging and accessible than non-game alternatives. This includes several systematic literature reviews and meta-analyses that assess evidence across many studies^{86,87}.

In addition to better retention of knowledge outcomes and understanding of processes, educational games have also been demonstrated to develop higher order thinking skills such as strategic thinking, interpretative analysis, problem solving, planning and adapting to rapid change⁸⁸.

A simplistic view of educational games is that they work because they are fun and attractive to students who in turn pay more attention. As complex interactive systems, educational games excel as experiential learning tools. They can feature a range of learning principles as shown in Table 3.



_GAMEDEVCLUB_GAMEFROOT

⁸⁶ Gameplay engagement and learning in game-based learning: A systematic review. Abdul Jabbar, A., & Felicia, P. 2015.

⁸⁷ Digital games, design, and learning: A systematic review and meta-analysis. Clark, D., Tanner-Smith, E., & Killingsworth, S. Menlo Park, CA: SRI International, 2014.

⁸⁸ The Potential of Digital Games for Empowerment and Social Inclusion: Evidence and Opportunity for Policy. Joint Research Centre of the European Commission, 2013.

Young Ocean Explorers Brings the Sea to School

Some of New Zealand's most successful media creators are preparing for a transmedia future, where entertainment is interactive and cross-platform.

Digital disruption presents exciting new ways for audiences to interact with traditional entertainment, particularly through the incorporation of game mechanics and techniques. Imagine, for instance, watching a nature documentary and having the option to click on a sea creature that interests you to learn more. This increasingly transmedia future is what Greenstone Pictures, one of New Zealand's most successful content creators, is preparing for.

Greenstone Pictures has been applying gamification in partnership with Young Ocean Explorers, an education platform for students and teachers to interact with a catalogue of constantly expanding interactive content about the ocean, its ecology and conservation. In the 11 months since its 2017 launch, it had 168,000 engaged visitors, and 18 months later it now contains 114 videos, 78 quizzes and 28 polls.

As well as being a cultural fit with Greenstone's belief in the importance of local kids' content, one of the strategic reasons for creating this portal was to develop new skills in

interactive media and build relationships with experts in gamification and transmedia techniques. This has enabled Greenstone to be more agile as the entertainment landscape becomes more interactive.

The project also provided a testbed for the studio to better understand how audiences engage with this type of storytelling. The ability to test and iterate is one of the key benefits of digital content, Greenstone CEO Rachel Antony says.

"In broadcast, what you deliver is locked and the audience usually only engage with your content once. With Young Ocean Explorers, they're returning often and discovering new things," Rachel says.

Thirteen thousand hours of data from the first 11 months allowed Greenstone and Young Ocean Explorers to understand how audiences engage with interactive content, including the most common drop-off points. For example, they found there was a 64 percent completion rate for activities on the site. This level of meaningful engagement helped secure further support from NZ on Air to create additional content. Likewise, it assisted Young Ocean Explorers in attracting philanthropic support to further develop the platform's functionality.



TABLE 3: Benefits of Educational Games

Identity	Players build a sense of identity throughout the video game, either through direct input or an on-screen character they inherit.
Interaction	Communication occurs between the player and the game.
Production	Gamers help produce the story through some form of interaction, such as solving a puzzle or completing a level.
Risk Taking	Failing in a game holds few consequences in comparison to real life, empowering players to take risks.
Customised	Games usually offer a level of customisation so that users can play – and succeed – at their competency level.
Agency	Players have control over the gaming environment.
Well-Ordered Problems	The gaming environment contains problems that naturally lead into one another, allowing a player's mastery to grow and evolve.
Challenge and Consideration	Games offer a problem that challenges students' assumed expertise.
Just in Time or On Demand	Players receive information as they need it, not before, which teaches them patience and perseverance and improves critical-thinking abilities.
Situated Meanings	Students learn new vocabulary words by experiencing them within game situations.
Pleasantly Frustrating	The game should frustrate the student enough to challenge them but be easy enough that they believe and can overcome the problem(s) faced.
System Thinking	Games make players think in a bigger picture, not just individual actions taken, helping them see how the pieces fit or can be fitted together.
Explore, Think Laterally, Rethink Goals	Games force players to expand their situational knowledge and consider courses of action other than linear ones.
Smart Tools and Distributed Knowledge	In-game tools help students understand the world. Through using them, they gain confidence to share their knowledge with others.
Cross-Functional Teams	In multiplayer environments, players have different skills, forcing them to rely on each other—a needed soft skill for students.
Performance before Competence	Competency occurs through taking action in the game, reversing the typical model in which students are required to learn before being allowed to act.

Source: Good Video Games and Good Learning: Collected Essays on Video Games, Learning and Literacy. James Paul Gee, 2017.



CASE STUDY

Digital Butterflies bring Auckland Museum Alive

More than 13,000 meticulously digitised butterflies wowed Auckland Museum visitors.

Auckland Museum commissioned a fully interactive and customisable digital experience to add an extra dimension to an exhibition of Ray Shannon's collection of over 13,000 butterflies.

Interactive technology has allowed curators to take the Secret World of Butterflies exhibition to the next level, supplementing the experience of seeing the butterfly in real life by seeing them, as if alive, digitally.

The Museum worked with creative experience agency Method to bring the butterflies to life, releasing them from the confines of the specimen cases into a dynamic 3D experience that goes well beyond passively viewing specimens under glass.

Central to the exhibition is a lush, digital garden in a forested environment with foliage true to the environments of butterflies. Visitors design their own butterfly on a tablet and release it into the garden.

Using tablets and smartphones, visitors extend their knowledge by getting hands on with science, biology, and real-world information. Visitors can zoom into Monarch butterflies to identify anatomy, crawl through a large scale caterpillar, take a butterfly selfie and even become the body of a butterfly using an anatomy digital touch screen.

"The museum aims to engage every schoolchild and become a vibrant place for learning, enabling young people in particular to realise their potential," said Museum Director Dr David Gaimster.



Boosting our Game-based Learning Capability

Educational technology (EdTech) containing game-based learning or gamification techniques is increasingly common in New Zealand classrooms, but integration with the curriculum and teacher professional development is required to unlock their full educational impact.

Fifty-nine percent of New Zealand children report having used educational games⁸⁹. Gamification adds a layer of motivational challenge to existing lessons and exercises, whereas game-based learning provides improved outcomes by simulating systems and processes to allow for experiential learning.

Increasing access to digital devices and ultrafast broadband have helped adoption. While there is strong interest in the immersive properties of virtual reality to transport learners to inaccessible, dangerous or impossible locations and events, the cost of VR headsets has limited their uptake to date, especially for classroom groups.

Educators have long understood the value of play and experimentation in learning. A New Zealand Centre for Educational Research study⁹⁰ found that there is a mix of enthusiasm and uncertainty in the education sector about where games 'fit' into learning. Some strong communities of practice for game-based learning exist, such as the Gameful Praxis

59%

of New Zealand children have used educational games at school

network in Wellington and Auckland, but more professional development can be done to build teachers' confidence and capabilities to integrate game-based learning into their lesson plans.

The most popular educational games are those that have proven easy for teachers to integrate into lesson plans or homework, with subscription costs often passed on to parents.

Educational games that reflect Aotearoa New Zealand and its unique cultural, historical, social, and natural environments are rare. The small domestic market, high production budgets and cost of marketing to individual schools has made local interactive content rare. The Ministry of Education funds learning resources for specialist areas, such as Māori and Pasifika or new curriculum areas. It has funded ebooks and digital stories but not highly-interactive games or simulations. Instead, private educational publishers produce the majority of learning resources.

Call to Action	Who
Provide Professional Development and Learning in game-based learning for primary and secondary teachers.	Ministry of Education

⁸⁹ Digital NZ Report 2018. Bond University and IGEA, 2018.

⁹⁰ Games, gamification and game design for learning: Innovative practice and possibilities in New Zealand schools. Bolstad, R. & McDowall, S. Wellington: NZCER, 2019.

Cultural institutions such as galleries, libraries and museums have partnered with gaming companies to engage students with science, technology, engineering, arts and mathematics (STEAM) subjects. For example, Te Papa partnered with GNS Science, the Earthquake Commission and Minecraft specialists Geddes Brothers to create ShakerMod that teaches earthquake preparedness. Auckland's Museum of Transport and Technology operates a digital games club.

Where New Zealand related educational games do exist, the majority have been funded by corporates, industry associations or Government

agencies with public education goals. Examples include Genesis Energy's EnviroCity, Dairy NZ's Rosie's World, the Kiwibank sponsored financial literacy app Banquer and the Commission for Financial Capability's Debt Empire game.

The majority of educational games are targeted at primary school age students. In secondary schools, teaching coding skills via game programming is growing in popularity, but there is a lack of sophisticated interactive learning objects such as simulations, especially those with local content.

<i>Call to Action</i>	<i>Who</i>
Make projects with education and wellbeing purposes eligible for the proposed New Zealand Interactive Innovation Fund.	Ministry of Business Innovation and Employment

CASE STUDY

Game Dev Club Supports Teachers

Making games to learn our Digital Technologies Curriculum.

The new Digital Technologies and Hangarau Matihiko curriculum has landed in New Zealand schools and with it the expectation that teachers will be able to deliver the new subjects to students by 2020.

One challenge is that the new curriculum asks teachers to teach computer programming, when most teachers don't know how to code themselves.

To support teachers, Wellington studio Gamefroot developed an online platform for kids to code video games and launched Game

Dev Club, an after school programme that takes young people and their teachers through the game development process. Gamefroot's software also has over 500,000 users globally.

At Game Dev Club students learn to code, problem solve and explore STEM subjects. The team at Gamefroot use their own gaming industry knowledge combined with relevant, educational, local content to create digital experiences that have a real impact on young learners.

Several similar coding clubs have sprung up around the country in after-school programmes and museums and libraries such as MOTAT.

Gamifying Rehabilitation

Kiwi Studio takes physiotherapy routines digital.

Interactive design turns what can be a mundane and repetitive activity into something dynamic and entertaining, such as encouraging physiotherapy patients to adhere to their rehabilitation programme.

Wellington studio Swibo has developed Tilt - a balance board with an embedded smartphone holder that projects the movements of the balance board onto a game screen using the phone's internal gyroscope sensors.

By gamifying therapy, Tilt motivates patients to exercise through challenges, immediate feedback and visual storytelling. Studies have shown gamification to have a measurable increase in adherence and completion rates of rehabilitation programmes. Tilt also provides

useful data for physiotherapists and sports trainers who can track the user's improvements and provide tailored training as time goes on.

Swibo developed Tilt as a solution to the fatigue experienced during rehabilitation exercises but has already applied the technology beyond physio to include high performance athletes, the elderly and people with a disability. The idea came about during a Victoria University Entrepreneur Bootcamp and was commercialised with the assistance of VicLink.



Health and Social Change

Applying the engaging and persuasive powers of interactive games to purposes beyond entertainment is known as serious games⁹¹.

Modern audiences familiar with digital games and apps are increasingly open to using them and agree that serious games can have a range of benefits (see Figure 20).

The global serious game market was worth USD\$3.5 billion in 2017 and is expected to grow 18.2 percent annually to reach USD\$15.6 billion by 2026⁹².

Gamification is the application of game design elements (such as motivational rewards) to non-game activities⁹³ which often aims to change attitudes and behaviours. A serious game often combines the real-time interaction of a simulation with motivational structures to create its experience.

Serious games are being adopted in health, education, defence, emergency management, sociology, engineering, urban planning, research, training and service delivery.

⁹¹ Serious Games: Improving Public Policy Through Game-based Learning and Simulation. Sawyer, B., & Rejeski, D. Woodrow Wilson International Center for Scholars, 2002.

⁹² Serious Game Global Market Outlook 2017-2026. Statistics MRC, 2018.

⁹³ Gamification: Toward a definition. Deterding, S., Dixon, D., Khaled, R., & Nacke, L. Paper presented at CHI 2011 gamification workshop.

FIGURE 20: New Zealanders Attitudes Towards Serious Games

Improve thinking skills

85%

Improve dexterity

76%

Improve emotional wellbeing

74%

Reduce anxiety

66%

Motivate fitness

66%

Help manage pain

52%

Source: Digital NZ 2018, Bond University and IGEA, 2018.

Collaboration is key to serious games having a meaningful social impact. Projects require a channel or partner (often a Non-Governmental Organisation) to reach audiences, researchers to provide best practices and evaluation, and user centred designers and skilled interactive designers to ensure the experience engages and motivates.

In New Zealand, serious games have been developed by researchers and students in several universities, but few have been commercialised or publicly launched. University funds are available for prototypes but further innovation funding, including through contestable research grants, is rare. It is proposed that the Otago Centre of Digital Excellence (CODE) establish a Games for Health Innovation Hub as an extension of its game and interactive design programme. It is common for user engagement techniques pioneered in entertainment games to then be transferred to serious games.

There is particular uptake in serious games as e-therapies, for training purposes and as ways to explore social issues. Research has shown

that interactive apps can increase patients' adherence to programmes, educate them about safety and conditions, ensure social support and help manage pain. The US Food and Drug Administration (FDA) has developed guidelines for digital medicines, and the first ever purely digital medicine⁹⁴ – an app for children with ADHD called AKL-T01 – has been submitted for FDA approval.

Playing to their strengths in experiential learning and systems thinking, games can be 'empathy engines'⁹⁵ suitable for exploring social topics. Digital gaming has been used to address digital inclusion in areas such as positive aging, supporting the disengaged, engaging disabled communities, addressing discrimination and civic participation⁹⁶.

⁹⁴ Digital Health Innovation Plan 2018. US Food and Drug Administration, 2018.

⁹⁵ Empathy Engines: Design Games That Are Personal, Political, and Profound. Sampat, E. 2017.

⁹⁶ The Potential of Digital Games for Empowerment and Social Inclusion: Evidence and Opportunity for Policy. Joint Research Centre of the European Commission, 2013.



Call to Action	Who
Make projects with education and wellbeing purposes eligible for the proposed New Zealand Interactive Innovation Fund	Ministry of Business, Innovation and Employment
Establish a Games for Health Innovation Hub as part of the Otago Centre of Digital Excellence (CODE) via the Provincial Growth Fund	Ministry of Business, Innovation and Employment, Enterprise Dunedin, Southern District Health Board

New Zealand Serious Games

The SPARX positive mental health game has been made available as a free e-therapy through the Prime Minister's Youth Mental Health Project.

MovinCog by The University of Auckland's Brain Dynamics Lab and InGame combines exercise and computer games to build cognitive skills in children with ADHD and other learning difficulties.

Robin by Media Design School students explores chronic fatigue syndrome and was critically acclaimed by international gaming media.

Talk Town teaches social skills to children with hearing loss and won the Social Enterprise category of BNZ Startup Alley 2018.

Magical Parks augmented reality app encourages children to run around council parks for an average of 1.5km each time they play.

SafeHouse, a home safety game commissioned by the ACC, encouraged 32 percent of players to do something about hazards around their own home.

The Ripple VR experience by New Zealand Breast Cancer Foundation and Mixt helps reduce anxiety, fear and depression, and is undergoing clinical trials.

The Commission for Financial Capability's mobile game Debt Empire teaches financial literacy.

Hollywood to Holograms

Weta Workshop is devoted to building imaginary worlds. Whether through traditional artisan crafts or mixed reality futures, the Academy Award winners are known for pushing the limits of what is possible.

There is no better example of this than their work on Dr. Grordbort's Invaders – the flagship launch game title for spatial computing company Magic Leap.

Weta Workshop's leap into the games industry began with their long-standing relationship with Rony Abovitz and his Florida-based spatial computing company Magic Leap, makers of the Magic Leap One, a lightweight, wearable spatial computer that seamlessly blends the digital and physical worlds. Fascinated by the retro sci-fi universe of Dr. Grordbort, the brainchild of Weta Workshop creative director Greg Broadmore, Rony proposed using Magic Leap's spatial computing platform to bring its characters into the real world. It was a perfect fit.

Dr. Grordbort's Invaders is a mixed reality experience in which life-sized robots invade the player's home

through portholes that appear in their walls, floor, and ceiling. This trailblazing technology lets players move freely around the room, inspecting allies and enemies up close while defending Earth with an assortment of retro sci-fi rayguns.

Now, with its first game under its belt, Weta Workshop's Interactive division is gearing up to push the capabilities of Magic Leap One to its limits and to research new ways of working on the platform. The company's partnership with Magic Leap gives the world-leading creative facility unfettered access to cutting-edge technology, unlike anything the world has seen before.

Key to the division's success is its family-oriented culture that holds creativity, inclusivity, and individuality as core values. Crew members – a diverse mix of Magic Leap and Weta Workshop talent – are encouraged to strike a work-life balance. They come from all over the world to work at the renowned Wellington studio.

The ground-breaking partnership is already bearing fruit. In the first few months since release Dr. Grordbort's Invaders has been nominated for both Visual Effects Society and D.I.C.E awards.



_PART FOUR
*Growing our
Interactive
Capability and
Sector*

75

Opportunities and Challenges

The vision for New Zealand’s interactive media sector is to produce and export high value, weightless, creative IP and services sustainably. It is believed that the first generation of established studios’ successes can be leveraged with Government backing to create a billion dollar export industry by FY2024.

While the largest industry sector and economic opportunity is exporting interactive entertainment and games, this report’s recommendations to build New Zealand’s capacity for interactive design are intended to support education, business, wellbeing and cultural goals as well.

As shown in Part Two, New Zealand currently has a small but growing share of the world’s largest and fastest-growing media industry. Our established studios are now ten years old on average and there is concern that the pipeline of new creative IPs that will grow our market share is uncertain and unsupported.

The industry’s goal of earning \$1.01 billion annually by FY2024 and maintaining its high growth rate of 39 percent CAGR is only likely with a dedicated industry development programme, like those that have been successful in Finland and Canada and are being adopted by a growing number of countries around the world.

Part Four of this report examines many of the success factors and constraints facing the sector (summarised in Table 4) and details recommendations to realise the growth potential.



TABLE 4: Strengths, Opportunities and Constraints for NZ’s Interactive Media Sector

Strengths	Opportunities	Constraints
<ul style="list-style-type: none"> Established generation of successful studios. Specialist tertiary education. Digital Technologies strand of NZ Curriculum. 	<ul style="list-style-type: none"> Large and accessible Total Addressable Market. Interest from private investors. Interest from global publishers. Healthy industry collaboration. 	<ul style="list-style-type: none"> Skills shortage for senior employees. Lack of early-stage development funding and support. Excluded from current Government support programmes. Small domestic market.



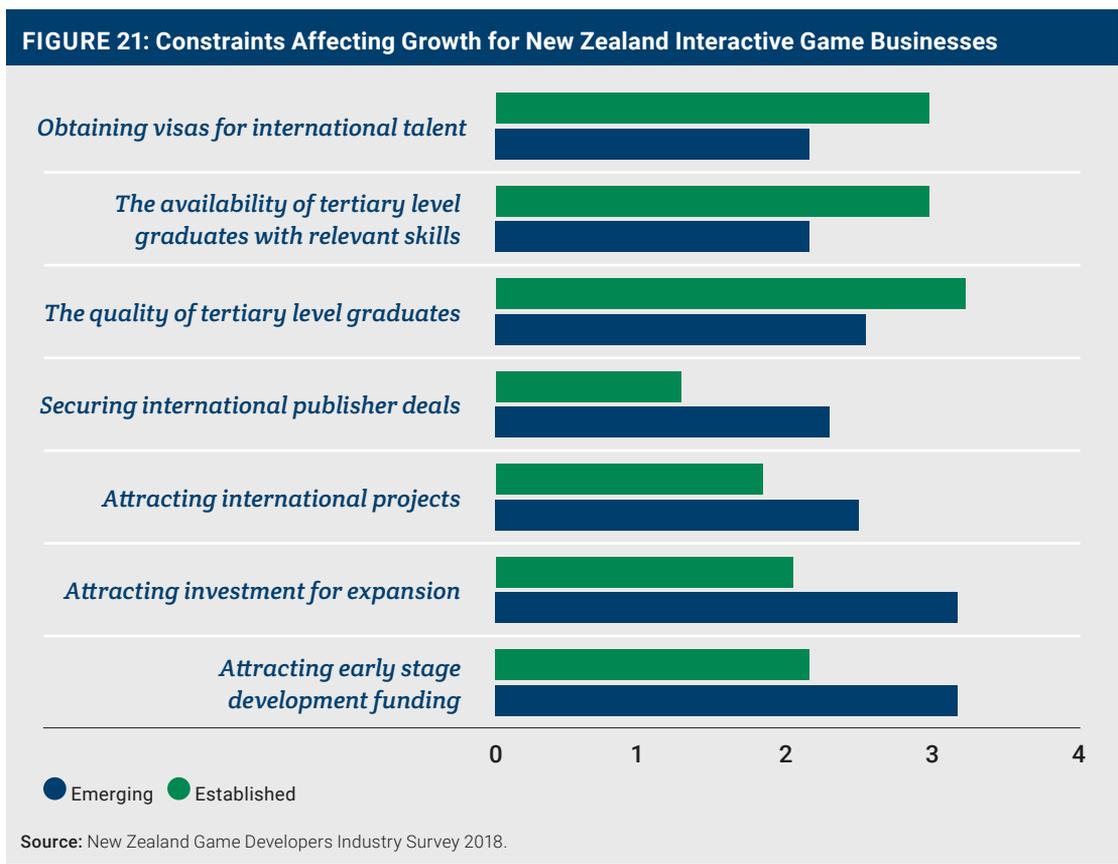
In addition to the social and cultural recommendations in Part Three, the Interactive Aotearoa study identified several actions for industry and Government to improve New Zealand’s capability in interactive design and the economic impact of its interactive media sector:

- Forge a coordinated interactive media industry plan
- Address the investment gap
- Grow the creative tech talent pool
- Improve data and policy insights

These recommendations are similar to those that have shown economic returns in Finland and Canada, while considering the strengths of the New Zealand ecosystem. For instance, exporting original IP has proven the most profitable and sustainable business model but it requires more upfront investment and dedicated coordination is needed to support firms at both early and late stages of business growth.

Industry Needs

For established studios, skills and talent issues are a key concern. For emerging studios, a lack





of funding sources and investment pathways prevent them from launching market ready products⁹⁷. Virtual reality developers also have needs for hardware, physical lab space and rental equipment in addition to early stage investment⁹⁸.

Success Factors Behind the Established Studios

The successful established studios have several common characteristics: interactive design talent, creative talent, business experience, and seed funds from a founder's previous business. Several founders came from previous ICT businesses (for example, Grinding Gear Games) or more recently the screen industry (for example, Weta Workshop and Staples VR). Several grew their game development experience before embracing self-publishing (for example, PikPok and NinjaKiwi).

Another common characteristic is that, on average, the established studios were founded in 2009. They were early adopters of digital

distribution and self-publishing when the market was less crowded and budgets for a Minimal Viable Product were smaller. Today PikPok, for instance, typically budgets a million dollars pre-launch for a mobile game (see page 48).

While there is an increased amount of competition today, much of it is low quality. For example, 90 percent of all apps are undiscoverable or do not rank on app store charts⁹⁹.

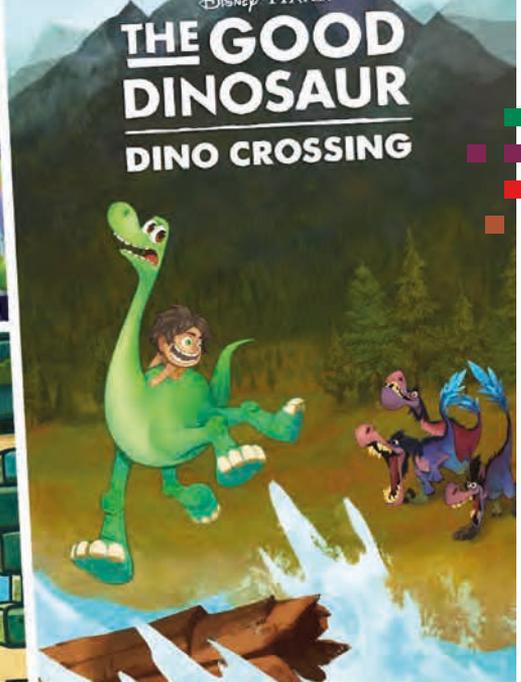
The challenge for New Zealand's interactive sector, and for a return on any Government support, is for any new creative IPs and businesses to have a competitive advantage¹⁰⁰ to meaningfully compete internationally. The recommendations in this study aim to create a structured development process that supports design innovation and originality to develop creative IPs that compete globally and attract further investment.

⁹⁷ New Zealand Game Developers Industry Survey, 2018.

⁹⁸ Virtual gets real: The explosion of cross reality in New Zealand. NZ VR AR Association, 2017.

⁹⁹ The App Store in 2016: App zombies, lists and ranks. Adjust Inc, 2016.

¹⁰⁰ The Competitive Advantage: Creating and Sustaining Superior Performance. Porter, M. E.. NY: Free Press, 1985.



CASE STUDY

Partnering with Entertainment Giants

New Zealand game developers are building world leading relationships with the biggest brands in the industry.

For the past decade CerebralFix has quietly been building an impressive resume of clients, projects and franchises that include the biggest entertainers in the world.

Formed in 2009 by Benjamin Dellaca, CerebralFix has not focused on making its own content and has instead thrived in the contract work environment, becoming a household name for development within Disney, Universal, Pixar and Dreamworks.

The Christchurch-based studio is home to 50 dedicated game makers that own or support the delivery of up to 30 games a year. Over the years these games have ranged from marketing for upcoming shows or movies, for example Disney Pixar's The Good Dinosaur or Dreamworks' Madagascar 3, to safe online

multiplayer environments like Club Penguin and Club Penguin Island. The games CerebralFix has found itself involved in are enjoyed by millions of players every day all over the world, with no recognition or highlight of their involvement.

The studio's year on year success is a testament to the strong relationships they have with these entertainment giants. There is an exciting future ahead as they make the move towards producing their own games by leveraging the relationships and entertainment properties of their clients to bring new and exciting experiences to the world.

Alongside their mostly game development properties, CerebralFix has also partnered with Christchurch company Virtual Medical Coaching and Skilitics to develop VR training and simulation products, one of which is a radiography simulation which is used as part of the curriculum at the nearby Ara Institute of Canterbury.

Recommendations

Forge a coordinated interactive media industry plan.

Multiple industry groups, local government and central Government agencies currently work separately with the interactive media sector. Establishing a coordinated industry development organisation, the proposed New Zealand Interactive Commission, would ensure efforts are aligned and increase export, job and intellectual property (IP) creation. Similar to our other creative industries economic development bodies, it would be responsible for coordinating many of the recommendations in this report.

Existing Capability Building Initiatives

To thrive, an interactive business needs several types of business capability: general business skills, specific industry knowledge and ongoing professional development.

A healthy calendar of industry development events exists, led by the New Zealand Game Developers Association (NZGDA) and New Zealand Virtual Reality and Augmented Reality Association (NZVRARA). However, these associations are run by volunteers and do not employ professional staff or receive industry development funding.

With 450 to 500 attendees each year, the New Zealand Game Developers Conference is one of the largest creative sector professional conferences in the country. It includes streams on VR, AR, educational, Māori and simulation games. Public Meetups operate in Auckland, Hamilton, Tauranga, Wellington, Christchurch and Dunedin, with industry and international speakers. The week-long New Zealand Games Festival including the Play By Play conference happens in Wellington annually. Two 48-hour game jams, the Global Game Jam and KiwiJam, are held nationwide.

Industry specific knowledge such as audience insights, analytics trends or publisher terms is harder for New Zealand creators to access given our distance from industry hubs such as San Francisco, Shanghai, Tokyo or London. Often these valuable industry insights are treated as trade secrets and only privileged studios gain access.

Due to the success of the established studios, business advisors such as lawyers, accountants and investment advisors with experience in the interactive industry now exist. Business issues that particularly affect interactive media studios include the capitalisation of creative IP as an asset during development, data privacy, child online safety, IP protection and foreign investment.

Existing Government Programmes

The Government has several programmes aimed at growing specific creative industries, innovation, intellectual property and exports (see Table 5). However, interactive media productions are largely ineligible for support or the programmes are not fit-for-purpose.

Export programmes from New Zealand Trade and Enterprise focus on established firms, not early stage firms that go global from day one. Research and development programmes focus on tech stretch, not design-led forms of IP creation. These constraints apply to interactive design for education, wellbeing, social causes as well as creative industries. Screen industry programmes which fund content are structured as silos and exclude interactive media. Arts and culture programmes which could be leveraged to develop talent domestically are also restricted (see Table 2 in Part Three).

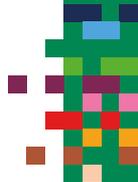


TABLE 5: Existing Government Economic Development Programmes

<i>Programme and Purpose</i>	<i>Applicability to Interactive Media</i>
<p>NZ Screen Production Grant¹⁰¹ - International Productions (including Post, Digital and Visual Effects or PDV) Provide economic and industry development benefits to New Zealand by incentivising screen production (and the resulting production expenditure in New Zealand) that would not have otherwise been made here.</p>	<p>Video games are excluded as an eligible format. Transmedia content, such as the app or game of a film, can potentially be included as qualifying expenditure under some circumstances but this has been rare.</p>
<p>Callaghan Innovation Project Grants¹⁰² Accelerate the commercialisation of innovation by New Zealand businesses. Increase New Zealand businesses' investment in research and development to support long-term economic growth.</p>	<p>As discussed on page 85, these grants focus on technical or scientific knowledge not creative IP invention. They may be accessible for research leading to production efficiencies.</p>
<p>Callaghan Innovation Founder Incubators¹⁰³ Accelerate the commercialisation of innovation by New Zealand businesses. Support startups to overcome barriers to their success and grow the number of experienced entrepreneurs.</p>	<p>Two educational game startups have been accepted into Government funded incubator programmes since 2013. These short programmes do not allow sufficient time for content creation or audience testing of a minimum viable product (MVP) and focus on business-to-business markets.</p>
<p>NZ Venture Investment Fund Accelerate the development of New Zealand's early-stage capital markets. Co-invest with private investors and develop other markets.</p>	<p>Only two game startups have received matching investment funding from NZ Venture Investment Fund and their local angel investor networks, both prior to 2015.</p>
<p>NZ Trade and Enterprise Focus and Coalition customers Work with businesses looking to go global to build their capability, boost their global reach, connect to other businesses and invest in their growth.</p>	<p>Early-stage original IP exporters, or groups of them, are not eligible for these programmes or do not have matching funds to access them. Few nontariff trade barriers exist requiring NZTE or MFAT services.</p>

¹⁰¹ New Zealand Screen Production Grant Criteria for International Productions. NZ Film Commission, 1 July 2017.

¹⁰² Direction to Callaghan Innovation—Criteria for Assessing Proposals for Funding Project and Student Grant Funding. 3 October 2018.

¹⁰³ Callaghan Innovation Statement of Intent, June 2019.



_FURISTASCATCAFE_RUNAWAYPLAY

An Aligned Interactive Industry Development Plan

Our interactive sector has many potential partners willing to collaborate. A coordinated pathway that considers the life stages of a business would unlock the potential of New Zealand's interactive sector.

An example of the pathway in action:

- Industry works with tertiary education to improve creative tech graduates' work readiness
- The proposed NZ Interactive Innovation Fund supports creation of prototypes and Minimum Viable Products
- The proposed Interactive Commission or other industry development programmes supports businesses with structured mentoring, talent development and capability building
- Local investors partner with industry experts in a New Zealand Games Fund to invest in Minimal Viable Products

- Investors and NZTE Better By Capital attract further international investors for expansion capital or exits.

A structured pathway would unlock various parties' ability to contribute. The established studios can share industry knowledge and publisher and platform relationships. Investors are interested in providing business capability advice if they are confident of a pipeline of promising early stage companies.

Similar plans have been developed by New Zealand Music Commission, New Zealand Film Commission and the Government has proposed a Creative Sector Industry Transformation Plan.

Similarly, a coordinated plan would help Government agencies better align their services with industry, particularly to support new creative IP that is competitive and has the potential to scale.

An Interactive Industry Development Plan





Establish the New Zealand Interactive Commission

The industry development plan and the recommended New Zealand Interactive Innovation Fund (see page 89) require resources and an organisation to deliver it.

In addition to coordinating an industry plan and fund, the proposed Commission's activities could include:

- scholarships and talent development grants
- diversity initiatives
- developing an interactive sector export plan
- talent development programmes
- marketing and launch assistance
- coordinating with other Government agencies
- advising Government on interactive media policy issues such as cultural funding, education, classification, regulation and intellectual property
- coordinating regional CODE activities with national activities.

Established studios and industry bodies, such as the NZVRARA and NZGDA, are able to contribute industry expertise and connections but would need to partner with Government to resource an industry development programme.

Currently, no Government agency has a remit to monitor or support the interactive or creative tech sectors.

This follows the current sector-based model of Government support for the creative industries.

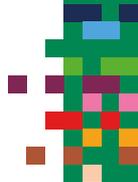
The Interactive Commission could be modelled on the New Zealand Music Commission, an industry-led private trust with Government funding, or the New Zealand Film Commission, an agency with both economic development and cultural goals. New Zealand's exports of interactive media original IP will soon exceed local music and film exports, yet the sector is still young.

Expanding the New Zealand Film Commission's remit to cover interactive media would also require significant new resourcing or restructuring. While an integrated screen industry has much in common, growing original IP and work-for-hire post production contracts have different industry dynamics. Skills, partners and distribution platforms also differ. Following a 2017 report¹⁰⁴ the Film Commission has focused on providing grants for individuals to attend events and supported NZ Game Developers Association activities such as mentoring and startup programmes.

In the United Kingdom a not-for-profit community interest company UK Games and Talent CIC was established in 2015 with Government funding to operate the UK Games Fund and UK Games Talent programme.

¹⁰⁴ NZFC Support for Interactive Digital Media. Tim Thorpe Consulting Limited for NZ Film Commission. August 2017

Call to Action	Who
Establish and fund a dedicated industry development organisation (such as a NZ Interactive Commission) to run an industry development programme to grow talent, employment and exports, and administer the proposed New Zealand Interactive Innovation Fund	Ministry of Business, Innovation and Employment, Ministry for Culture and Heritage, NZ Game Developers Association, NZ VR AR Association
Develop an interactive sector export plan and export coalition programme Showcase New Zealand interactive productions at leading international events such as VR Developers Conference, Game Developers Conference, PAX Australia, WePlay Game Expo China Coordinate a joint New Zealand presence at SXSW, a leading international festival for music, film and interactive media	NZ Interactive Commission, NZ Trade and Enterprise, Ministry of Business, Innovation and Employment, NZ Film Commission, NZ Music Commission, NZ Game Developers Association, NZ VR AR Association, Auckland Tourism Events and Economic Development, Wellington Regional Economic Development Agency, Otago Centre of Digital Excellence
Establish the Otago Centre of Digital Excellence (CODE) via the Provincial Growth Fund to better align the supply of talent and scale the video games industry in the Otago region Coordinate regional CODE activities with national NZ Interactive Commission activities	Ministry of Business, Innovation and Employment, Enterprise Dunedin



Address the Investment Gap

While export earnings and a \$258 billion addressable global market make interactive media attractive to investors and publishers, there is a gap in early-stage startup or development funding to foster investment-ready projects. The hybrid nature of creative tech and interactive media means that these businesses are excluded from existing support programmes for both the hi-tech and cultural sectors. Therefore a dedicated support programme, similar to those that exist for New Zealand's other creative industries and in other countries, is recommended. Education and social enterprise startups that combine content creation with software code would also benefit.

Research, Development and Innovation in Interactive Media

Design-led innovation is a key value creator in a digital economy.

Interactive media is widely acknowledged for innovation and being an early adopter of new technologies, but in practice it is unable to access technology research and development (R&D) support programmes. Where it is available, it is often for production processes, not the invention of new creative IP, education or wellbeing solutions.

Innovation and competitiveness in creative products arises from the combination of:

- novelty (it is original with some product differentiation),
- product-market fit (it appeals to the tastes of a sufficient audience or niche) and
- complex execution (its whole is greater than the sum of its parts which each require quality execution and craft)¹⁰⁵.

There are still many possibilities for novel experiences, and for storytelling and interactive systems to be invented given the young age

of the medium, new interfaces such as mixed reality and diversifying audiences and creators.

The intangible nature of creative IP poses some unique considerations for early-stage creative research and development. The infinite potential variety of creative works means that they are differentiated by perceived quality and uniqueness, not scarcity or function. The very act of differentiating a creative product, establishing novelty and originality, creates its value in the eyes of audiences. Market positioning is a key capability for developing original IP.

However, product market fit can be difficult to establish. Consumers' reaction to a creative product cannot be judged until the product has actually been created to some degree, such as via a prototype. This differs from business to business products, where a market need can be validated before a prototype even exists.

Tech Stretch Does Not Cover Creative Invention

The interactive sector uses a variety of structured development processes adapted from both the technology and creative sectors, such as

¹⁰⁵ Adapted from Creative Industries: Contracts between Art and Commerce. Caves, Richard E. Harvard University Press, 2000.



experimenting, prototyping, phase-gate processes, agile development and audience testing.

Creative IP asset development is a form of research and development similar to that in other sectors¹⁰⁶, but in practice it is excluded from Government research and development programmes that focus on 'tech stretch'. Research and Development Tax Credits apply to activities that "reduce technological and scientific uncertainty"¹⁰⁷ and Callaghan Innovation's Project Grants address projects that gain "new scientific or technical knowledge and understanding"¹⁰⁸.

Technology stretch is often an enabler of creative products but not the sole value creator. It may assist with production efficiency, but does not invent original and novel experiences

or more effective user engagement, behaviour change or educational outcomes. For example, artificial intelligence (AI) for personalised learning can recommend the most suitable learning content, but does not design ways to deliver the content more effectively.

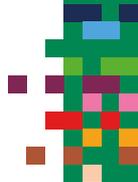
Where New Zealand creative businesses have been able to access Callaghan Innovation Grants in the past it has been to develop more efficient production tools not to invent the creative IP itself. This means that R&D assistance has primarily been accessed by established studios and not startups. In addition, it is the novelty and product-market fit of creative IP that generate scalable returns and high margins rather than production efficiencies.

¹⁰⁶ Policy Briefing: Defining R&D for the creative industries. Nesta, 2017.

¹⁰⁷ <https://www.mbie.govt.nz/info-services/science-innovation/funding-info-opportunities/rd-tax-incentive>

¹⁰⁸ 2018 Ministerial Direction - Criteria for Assessing Proposals for Growth Grant Funding <https://gazette.govt.nz/notice/id/2018-go4863>

¹⁰⁹ National Business Review, 31 May 2018. www.nbr.co.nz/article/behind-scenes-grinding-gear-games-diy-success-story-ck-215989



The Foreign Investment Opportunity

New Zealand digital creatives and game developers face a funding gap. Global publishers and investors are actively seeking New Zealand investments, but the local industry does not have a pipeline of ‘investment ready’ studios.

In 2018, the world's largest games company, Tencent, purchased New Zealand's largest games studio, West Auckland based Grinding Gear Games, for an undisclosed sum in excess of \$100m¹⁰⁹. It was one of the largest tech exits in recent New Zealand history, and one of only three international sales of New Zealand technology companies valued over \$100m during 2018¹¹⁰.

Tencent has also taken a foundation investment in Dunedin based Rocketwerkz. Wellington studio A44 had their original game Ashen published on Xbox and PC in 2018 by Annapurna Interactive, a division of Academy Award winning Annapurna Pictures.

Notably, these international firms invested in New Zealand-developed original IP rather than low cost production of their own franchises.

International Investment Opportunity

The interactive media industry increasingly operates globally and there is an opportunity to attract further investment to New Zealand.

Globally, a record USD\$25 billion of games investment deals were transacted in the first nine months of 2018¹¹¹. USD\$3.8 billion was directly invested in games companies

US\$25B

of games investment deals were transacted in the first nine months of 2018

(50 percent higher than all of 2017), with gaming mergers and acquisitions worth USD\$20.1 billion and stock market initial public offerings (IPOs) valued at USD\$1.1 billion.

Potential international investors can be specialist games publishers (like Tencent and Annapurna Interactive), film and media companies, platforms seeking exclusivity (like Microsoft or Xbox) or specialist investment funds. They can invest in medium-stage companies and serve as buyers for maturing businesses.

¹¹⁰ Decision summaries. Overseas Investment Office, 2018. www.linz.govt.nz/overseas-investment/decision-summaries-statistics

¹¹¹ Digi-Capital Games Report, Q4 2018. <https://www.digi-capital.com/reports/#global-games-investment-review>

Lack of Creative Tech Investment Locally

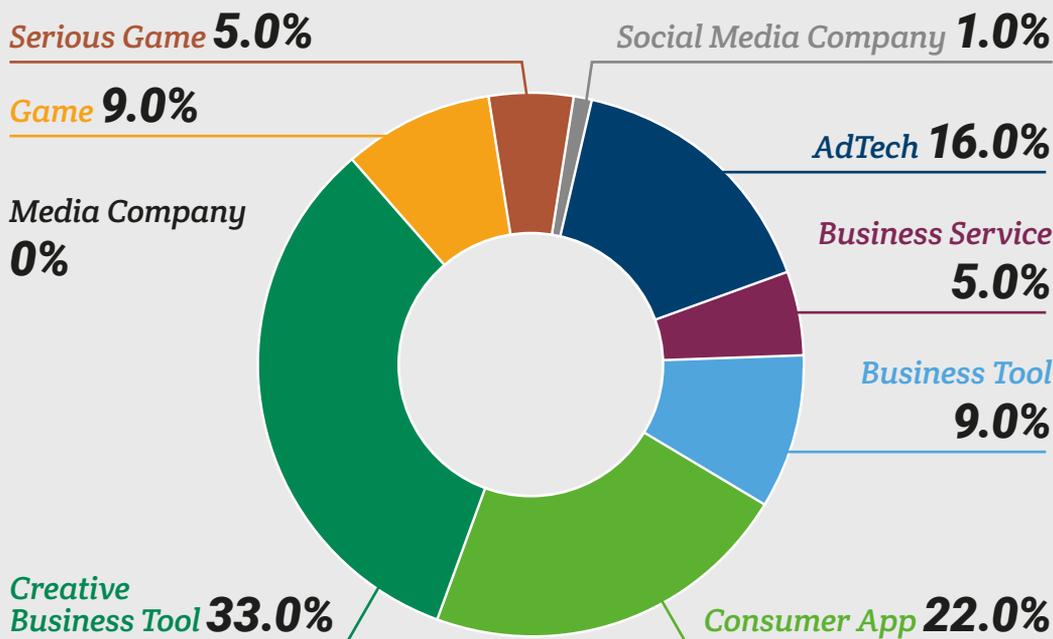
New Zealand investors have missed out on the returns from the industry's recent successes and there is an opportunity for local investors and Government to partner with experienced industry studios and international publishers.

There is an acknowledged market gap for risk capital to support high growth New Zealand firms¹¹², which is particularly pronounced for creative tech businesses. Even then, most investments have been in software tools or business-to-business products, not creative IP.

Between 2005-2018 the New Zealand Venture Investment Fund (NZVIF) and its affiliated angel and venture capital investor partners (the majority of New Zealand's ecosystem) invested in 35 local creative technology firms. Thirty percent of those investments were in tools for general business, such as advertising or creating business content. Another 33 percent were tools to help creative businesses make content more efficiently, such as video or audio production tools.

Only nine percent of investments were in developing creative IP and they were for investment in two children's games from 2012-2015.

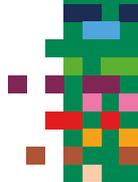
FIGURE 22: NZVIF Angel and VC Creative Tech Investments



Source: NZVIF Data of all affiliated NZ Angel and VC investments in Content and Creative Businesses 2005-2018.

¹¹² Statement of Performance Expectations 2016-2017. New Zealand Venture Investment Fund.

¹¹³ Interviews with New Zealand Venture Investment Fund, Flying Kiwi Angels, Zino Ventures, NZ Venture Capital Association, 2019.



<i>Call to Action</i>	<i>Who</i>
Launch a New Zealand Games Investment Fund for mid-stage firms seeking expansion capital	NZ Interactive Commission, NZ Game Developers Association, private investors, NZ Venture Investment Fund
Establish a business mentoring programme for interactive media startups	NZ Interactive Commission, NZ Game Developers Association, NZ Film Commission
Grow the current Kiwi Game Starter startup challenge to create investment-ready interactive businesses	NZ Interactive Commission, NZ Game Developers Association, NZ Venture Investment Fund

Partnering for Better Investment Decisions

Creative IP investments are attractive as they target global audiences and ambitions from day one. If successful, they can scale quickly and have the potential to become cashflow positive comparatively quickly.

While local angel and VC investors acknowledge that the risk profile of creative IP is similar to other early stage startups, they have less expertise in evaluating and selecting entertainment startups¹¹³.

To access industry expertise, angel networks can partner with successful New Zealand studio founders who have enjoyed the first generation of exits and successes. They can contribute expertise and connections as well as angel investment. The result could in time become a private sector New Zealand Games Fund.

The Government-operated NZVIF could be one participant. Internationally, the equivalent Business Development Bank of Canada has a mandate to ‘aggressively support video game startups in Canada.’

However, angel investors still seek a prototype or beta to evaluate, ideally with some evidence of product market fit and are

reluctant to provide seed or development funding. The proposed NZ Interactive Innovation Fund would address this gap.

Establishing the New Zealand Interactive Innovation Fund

The Interactive Aotearoa study recommends that the Government address the investment gap and current exclusions with a dedicated fund. It would fund production of original, innovative interactive projects for education, wellbeing, social change or creative purposes.

The fund would grow New Zealand’s capability in interactive design, game design and creative technology across a range of applications and sectors. Innovation in interactive design would target projects that are sophisticated, original or novel, serve a defined audience or need, have a suitable channel to reach audiences, contain creative content and are technically complex (see page 85).

The programme should provide two tiers of funding:

- early stage prototype development
- production funding to develop a ‘beta’ product

Any beta would be designed to test the market with a beta launch or to attract further investment.

Examples of eligible projects include transmedia stories, interactive documentary, educational software, virtual reality stories, 'games for change', as well as entertainment video games.

Only a scoped interactive media project, not business operations, would be funded. Projects without significant creative content, such as platforms or gamified behaviour change apps, would not be eligible, nor would cultural projects funded by Government cultural programmes (See Part Three).

The pipeline of potential applications would come from tertiary education incubators, university research projects, New Zealand Film Commission Interactive Development Fund prototypes and emerging interactive studios. A current industry development gap is that such Government and education initiatives have no next stage funding to apply for.

In order to effectively grow New Zealand's interactive exports, any new IPs need to be competitive. Under investment runs the risks that a project is not a valid beta test. Minimal viable products need to be right-sized: sufficient to test audience demand without being wasteful. Mentoring and professional development should be aligned with investments.

Internationally, over 30 similar funds exist and this number is expected to increase. The Governments of Ireland, Spain, Israel, Philippines, Vietnam and Australia have also investigated establishing interactive programmes.

Appendix 3 details 30 international schemes which a New Zealand fund could learn from. They include a mix of grants and no interest loans to support startups, and tax rebates suitable for larger productions. The majority have economic development goals.

Grants available for early stage projects in European nations such as France and Finland range from €200,000 to €250,000 (over NZD\$400,000). Rebates or loans for larger productions can be much higher. Screen Australia's previous Games Enterprise and Games Production programme had AUD\$1 million and AUD\$500,000 tiers.

For production funding of commercial projects, the fund could provide interest-free repayable loans or retain a revenue share. Several interactive funds in Canadian provinces aim to reinvest returns to grow a self-sustaining fund with decreasing Government contributions over time. Screen Victoria reports that recoupment rates from their interactive projects are higher than for film.

<i>Call to Action</i>	<i>Who</i>
Establish a contestable New Zealand Interactive Innovation Fund to fund production of original, innovative interactive projects for education, wellbeing or commercial creative IP purposes	NZ Interactive Commission, Ministry of Business, Innovation and Employment

Government and Industry Partnership in Finland

Finland, a country of 5.5 million (compared to New Zealand's 4.6 million), is an example of Government support generating significant economic growth.

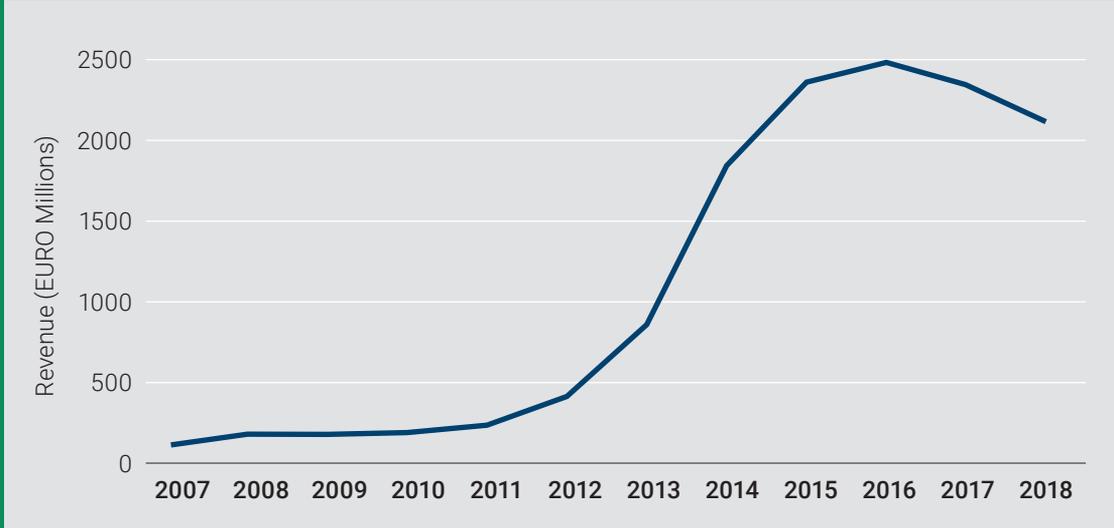
Finland has over 220 game studios employing 3,200 game, VR and AR developers¹¹⁴ who earned €2.1 billion (NZD\$3.35 billion) in 2018.¹¹⁵

Much of this can be attributed to the Finnish powerhouses of Supercell (Clash of Clans, Boom Beach, Clash Royale) and Rovio (Angry Birds), as well as a healthy ecosystem of medium sized developers accounting for hundreds of millions in revenues.

The Finnish Funding Agency for Innovation and Technology (TEKES), has contributed approximately €100 million to the sector since 1995, with a particular emphasis from 2012 to 2015 during which time it contributed €30 million and attracted €90 million in private funding. This period coincided with the biggest jump in Finland's growth.

In addition to TEKES efforts, there is dedicated support at all levels of Government for the game sector, including incubators, accelerators and office space in some cities. Government schemes support all levels: grants for demos MVPs or customer research, loans for creative media R&D and grants and loans for rapid growth.

FIGURE 23: Finnish Game Developer Revenues



Source: Finnish Game Industry Report 2018.

¹¹⁴ The Game Industry of Finland Report. Neogames, 2016.
¹¹⁵ The Finnish Games Industry in 2017 update. Neogames, 2017.

Attracting Large International Productions

Unlike our film industry, New Zealand is not competitive in the international market for large interactive productions.

Currently only 4.1 percent of local interactive games revenue comes from international contracts¹¹⁶. While original IP exporting is the most profitable business model, targeting international productions would bring scale, international connections and would diversify against market shifts.

Video games are not an eligible format for the New Zealand Screen Production Grant, whose purpose is to provide economic and industry development benefits by incentivising screen production expenditure in New Zealand that would not have otherwise been made here¹¹⁷.

Interactive productions are included alongside film and television screen rebates in over 25 countries, which global media clients consider when deciding where to locate productions just as they do in the film and television sectors.

The 30 interactive screen incentive programmes listed in Appendix 3 are similar in purpose and

operation to the New Zealand Screen Production Grant, both to attract foreign production spending and to support New Zealand content. Many operate similarly by providing a rebate on qualifying production expenditure spent in New Zealand, once production is completed.

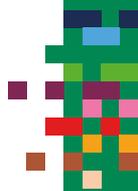
Productions have moved to countries with competitive incentives. In 1997, Montreal in Canada introduced tax rebates on 37.5 percent of labour costs and is now the fifth largest video game development centre in the world, with 230 development studios employing more than 10,000 people. See page 30 for other case studies.

Possible spillover benefits from our successful film industry are not being realised. The sector’s export clients – global media companies and film studios – all have multimedia and gaming divisions. Many seek to commercialise their franchises over as many media as possible in a transmedia strategy. However, few notable multimedia productions have been included as part of NZ Screen Production Grant projects undertaken here, even though including an interactive project as “additional multimedia content” is allowed. Clarifying the criteria so

<i>Call to Action</i>	<i>Who</i>
<p>Make interactive media and video games an eligible format for the New Zealand Screen Production Grant (NZSPG) International fund</p> <p>Make producing a major transmedia video game alongside a NZSPG grant film production a Significant Economic Benefit that would make the production eligible for the additional 5 percent uplift</p>	<p>Ministry of Business, Innovation and Employment</p>

¹¹⁶ New Zealand Game Developers Industry Survey, 2018.

¹¹⁷ New Zealand Screen Production Grant Criteria for International Productions. Ministry of Business, Innovation and Employment, 1 July 2017.



that producing a major transmedia video game alongside a NZSPG film production would make the production eligible for the Grant's additional five percent uplift would encourage cooperation between film and interactive productions.

Exploratory discussions about producing Avatar or Lord of the Rings related games locally have not progressed due to the lack of relevant screen rebates¹¹⁸.

Between 2015 and 2018, the NZGDA received four unsolicited international enquiries,

however these were ineligible for the New Zealand Screen Production Grant or other support from Government agencies.

In addition to incentives, New Zealand is an attractive location for international productions. New Zealand has been identified as the lowest cost English speaking location to develop games¹¹⁹. It also has an international reputation for visual effects excellence, a quality education system, a time zone convenient to Asia and America and a high ease of doing business.



¹¹⁸ Confidential interviews with two established New Zealand game studios.

¹¹⁹ Getting the right mix: Game Development and Call Centre Comparative Cost Report. Prepared by Deloitte for NZTE, 2011.



An Icon for Diversity in Mobile Apps

New Zealand poised to be a world leader in diversity in the game development industry.

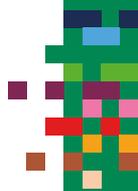
The world is looking to New Zealand developers as an example of gender diversity in game development, due to the efforts of Dunedin game studio Runaway Play. Their company is celebrated for engaging games, a commitment to making products inspired by nature and for starting the international movement, Girls Behind The Games.

In 2018, the studio was proud to realise that their team of 27 was nearing gender parity. To celebrate this achievement and inspire other women to enter the interactive industry, Runaway Play created a website and social media campaign #GirlsBehindTheGames for International Women's Day 2018. Prime Minister Jacinda Ardern also recorded a video message for the campaign.

The campaign quickly gathered momentum, with many of the world's biggest game development studios, including Bioware, Guerilla Games and Riot Games, highlighting the women working at their companies. Runaway Play Director Zoe Hobson says having near-gender parity offers the studio many commercial and creative strengths. The studio's focus on inclusivity fosters a company culture in which people feel safe being open and honest with each other, says Zoe.

This company culture has allowed the studio to stay agile and it became an independent developer in 2016. It has since proven successful, with their first independent release, Flutter Starlight, providing a 300 percent return on investment in one year.

Their latest release, Furista's Cat Cafe, reached a million downloads just weeks after launch and was also featured worldwide as Apple's App of the Day.



Grow the Creative Tech Talent Pool

In addition to employing hundreds of creative jobs and hi-tech jobs, the interactive media sector requires specialist 'creative technologists' who have both creative and coding skills. The tertiary education sector has worked well with industry to produce graduates with these skills, but skilled migrants continued to be needed to fill senior roles.

Specialist Creative Technology Skills

The fast-growing interactive media industries such as VR, AR, gaming, simulation and EdTech require graduates skilled in both technical and creative fields. Crucially, they require an understanding of how these fields interrelate.

The specialist fields of interactive design and game design create new user experiences. This integrated design capability is key when inventing new creative IP, or new EdTech and wellbeing solutions, where user interaction is the value creator.

Building on our Strengths in Film and Tech

There are spillover benefits from past investment in New Zealand's film and television sectors. Skilled 3D computer graphic artists and animators move between film and video game productions. There is an existing ecosystem of 2D and 3D computer graphics and animation training providers, but the majority focus on film and television techniques, and graduates need to be retrained to work with real time graphics.

Several interactive fiction writers learnt the skill of dialogue and character development in local television productions before adapting to non-linear stories.

Many software qualifications include multimedia, but there is an ongoing shortage of software development graduates¹²⁰. Likewise, many

TABLE 6: Interactive Tertiary Qualifications

In addition to software development, computer science, design and animation qualifications, several specialist Bachelors and Masters programmes (NZQA Level 7 and above) are offered in New Zealand which also have evidence of industry engagement:

ACG Yoobee School of Design

Diploma of Game Art and Development

AUT University

- Bachelor of Creative Technologies
 - Digital Design, Game and Play Design
- Master of English and New Media

Massey University

- Bachelor of Creative Media Production

Media Design School

- Bachelor of Software Engineering
 - Game Programming
- Bachelor of Creative Technologies
 - Game Art

Victoria University of Wellington

- Computer Graphic
- Media Design

University of Canterbury

- Human Interface Technology
- Bachelor of Product Design
 - Applied Immersive Game Design

Southern Institute of Technology

- Game Art, Game Design, Animation

¹²⁰ NZ Digital Skills Survey. NZ Digital Skills Forum, October 2017.

creative courses touch on programming, but do not specialise in it to an extent sufficient for the demands of industry workplaces where people work in multidisciplinary teams.

Specialist Tertiary Education Investments

Academics in video games, simulation and creative technologies research and teach at all New Zealand universities. This includes in computer science, software engineering, media studies, creative industries, design, medical, marketing and creative technologies departments.

In recent years, several universities and private training institutes have responded to industry needs and developed qualifications specialising in interactive media and game design (see Table 6). Over 150 students graduate from these specialist courses each year.

In 2013, Victoria University of Wellington launched its Computer Graphics programme in conjunction with the film and gaming industry, supported by a \$500,000 Ministry of Science and Innovation grant. Massey University has invested around

\$20 million in new Wellington facilities for its School of Music and Creative Media Production.

The Otago Centre of Digital Excellence (CODE) Provincial Growth Fund project proposed for the University of Otago, Otago Polytechnic and the Otago region, will provide dedicated training in game design and cross-disciplinary workplace simulation, including healthcare and serious games.

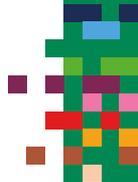
Quality of Graduates

While the industry is currently satisfied with the number of graduates, for established studios the quality of graduates and the relevance of their skills are the top two business challenges. The New Zealand Game Developers Association plans to work with industry and educators to bridge these skill gaps.

Internships, mentoring programmes and contestable NZ Interactive Innovation Fund grants for smaller projects run by the proposed NZ Interactive Commission are potential initiatives to address this.

Call to Action	Who
Establish an industry and tertiary education working group to report on skills and competencies employers expect from work-ready graduates	NZ Game Developers Association, Tertiary education providers, interactive studios

¹²⁰ NZ Digital Skills Survey. NZ Digital Skills Forum, October 2017.



Diversity

Similar to the ICT industry, gender diversity is a concern in the interactive sector with only 21 percent of professional game developers identifying as female or non-binary.

Diversity is a strategic priority for both the NZGDA and NZVRARA, and would be for the Interactive Commission.

Existing industry initiatives include scholarships, Girls in Games workshops, Women and Non-Binary in Games groups and events, but sustained effort is required to improve representation, recruitment and retention of women and non-binary developers. With support from industry, the New Zealand Film Commission and Callaghan Innovation, over 20 scholarships are provided for under-represented developers to attend the Game Developers Conference in San Francisco each year. The Game Developers Association is also a member of Diversity Works, which shares employment best practices.

Call to Action	Who
Encourage industry diversity through scholarships to the international Game Developers Conference/VR Developers Conference, promoting employment best practices, Working Lunch mentoring programme	NZ Interactive Commission, NZ Game Developers Association, Diversity Works, Working Lunch
Include a focus on student career pathways, diversity, wellbeing and export growth at the annual NZ Game Developers Conference	NZ Game Developers Association
Promote interactive careers through Techweek, nationwide Meetups, Global Game Jam and KiwiJam events	NZ Interactive Commission, NZ Game Developers Association, NZ VR AR Association, NZ Tech, Auckland Tourism Events and Economic Development, Wellington Regional Economic Development Agency



Senior Skills Shortage

A skills shortage of senior staff with experience in both technical and creative roles is constraining the industry's growth. During its initial rapid growth, New Zealand's games industry essentially hired all experienced creatives locally and imported several key people.

Sixty-six percent¹²¹ of established game studios and 44 percent of mixed reality studios¹²² felt that skills shortages were constraining the growth of their businesses. Many experienced developers are recruited from offshore with seven established studios employing 84 staff on work supported visas, which is 15 percent of the entire games industry.

These skills shortages also affect the VR, AR, AdTech and EdTech sectors too.

The only graduate role shortages were for the specialised positions of game designer and

producer. Audio, writing and illustration are disciplines where studios report an oversupply of applications for jobs, but most applicants do not have any industry specialisation or experience.

The shortage of senior talent has formed an employment bottleneck as senior staff are required to lead internal teams and effectively develop graduate career pathways. It may also discourage senior talent in secure jobs from forming their own entrepreneurial studios.

Recruiting and relocating senior staff from overseas is both time consuming and expensive. Some interactive studios have become accredited employers with Immigration NZ to streamline this process. While the role of Multimedia Designer is listed as an Essential Skill in Demand (ESID), the definition is out of date. Validating international qualifications and industry experience can sometimes be challenging.

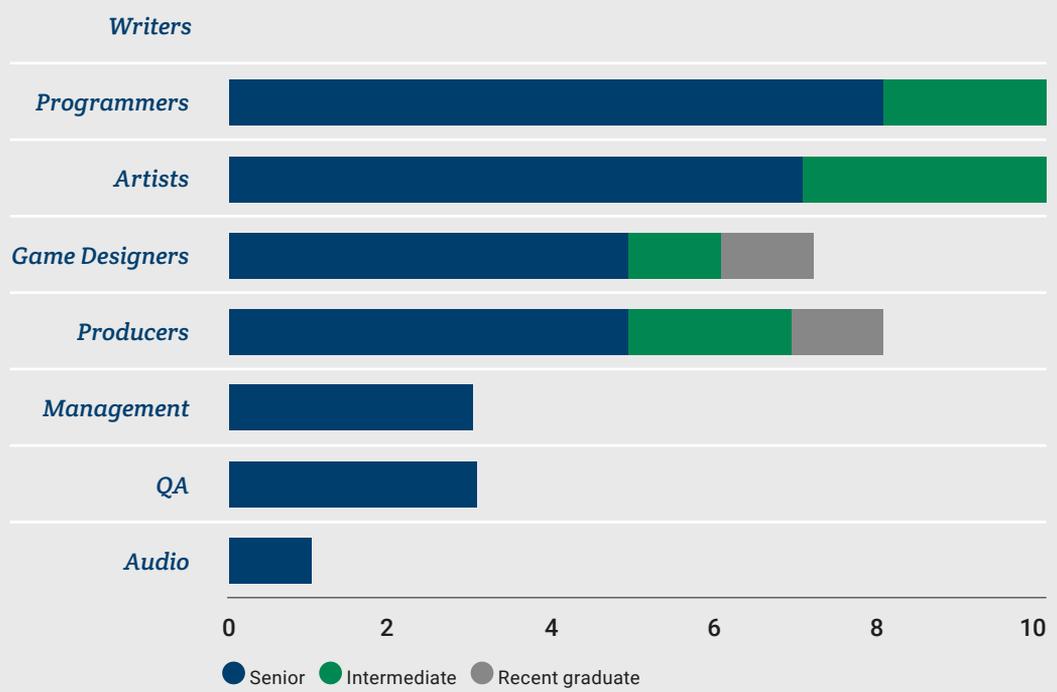
<i>Call to Action</i>	<i>Who</i>
Hold an international recruitment campaign to attract senior staff to New Zealand	NZ Interactive Commission, NZ Game Developers Association, NZ VR AR Association

¹²¹ New Zealand Game Developers Industry Survey, 2018.

¹²² Virtual gets real: The explosion of cross reality in New Zealand. NZ VR AR Association, 2017.



FIGURE 24: Skills Shortages Reported by New Zealand Game Studios



Source: NZ Game Developers Industry Survey 2018.

Improve data and policy insights

As one of New Zealand's largest creative sectors, interactive media should be included in all Government media, creative industries and cultural policy-making.

Currently, no Government agency has a clear remit to monitor or support the interactive and creative tech sectors or to develop policy expertise in it. This has led to missed opportunities to learn from the interactive sector's early adoption of digital business models and apply them to other creative industries.

A joint Government and industry Screen Sector Strategy underway in 2019 will be the first time interactive media and mixed reality have been included in a screen sector policy programme. However, interactive media is still a distinct industry segment in its own right that would benefit from dedicated support and the removal of exclusions.

Overall economic and employment data for New Zealand’s creative industries, of which interactive media is a significant part, is difficult to gather. WeCreate, a coalition of creative industries including games and VRAR, has developed a joint Action Plan with Government which recommends improved data collection and analysis to better value New Zealand’s entire creative sector¹²³. For example, the New Zealand Game Developers Industry Survey is one of the few creative industry surveys which identifies export revenues.

Previous NZ On Air and NZ Film Commission audience research has considered digital media but rarely interactive media. The annual Statistics NZ Screen Industry Survey does not include interactive media, nor does the current Government policy work on employment in the screen industry, despite the high growth of interactive media.

Despite their popularity, particularly amongst young people, video games do not require

content classification. The Films, Videos and Publications Classification Act 1993 considers games a type of film and only those likely to be restricted have to be submitted for review. With thousands of digital games released every year regulators would quickly become overwhelmed trying to classify all content manually. In practice, the global platforms self regulate and review content when creators submit their games. Internationally, some ratings authorities have coordinated to streamline their content ratings and those of digital game storefronts.

<i>Call to Action</i>	<i>Who</i>
Include interactive media, mixed reality and games in any screen industry policy work and audience research	Ministry of Business, Innovation and Employment, Ministry for Culture and Heritage, Statistics NZ, NZ On Air, NZ Film Commission
Interactive media to participate in the joint Government and industry Screen Sector Strategy	NZ Game Developers Association, Screen Sector 2030
Develop fit for purpose mapping and valuation of the creative sector including interactive media	Statistics NZ, Ministry of Business, Innovation and Employment, WeCreate
Update the Films, Videos and Publications Classification Act to classify digital apps and games in a scalable way	Office of Film and Literature Classification

¹²³ WeCreate Action Plan: Let’s make NZ creativity count together. WeCreate, 2018.

Appendices

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Appendix 1: Research Partners



New Zealand Game Developers Association

The New Zealand Game Developers Association (NZGDA) is an incorporated not-for-profit industry association founded in 2001. It represents New Zealand creators of interactive content and promotes the business, craft and art of creating interactive content, including educational and serious games as well as those for entertainment.

The Association is a member of the New Zealand Tech Alliance and WeCreate.

The Association led qualitative interviews and workshops, consulted with international interactive industry associations, researched comparable international programmes and was lead author of this report.



NZTech

NZTech is the voice of the New Zealand technology sector. NZTech represents over 280 organisations across the technology landscape in New Zealand, from startups and local tech firms to multinationals, and from ICT to high tech manufacturing.

NZTech's goal is to stimulate an environment where technology provides important productivity and economic benefits for New Zealand.

NZTech provided analysis, peer review and design for this study and report.



Sapere Research Group

Sapere Research Group is one of the largest expert services firms in Australasia. Sapere provides independent expert testimony, strategic advisory services, data analytics and other advice to Australasia's private sector corporate clients, major law firms, Government agencies, and regulatory bodies.

Sapere undertook a literature review and peer reviewed the NZ Game Developers Industry Survey research.



Tim Thorpe Consulting

Tim Thorpe Consulting is a Wellington-based strategic research and policy consultancy specialising in creative and cultural sectors such as screen production, music, video games and museums.

They have worked for a range of Government and private sector clients including Screen Producers of New Zealand (SPADA), NZ On Air, NZ Film Commission, Libertine Pictures, National Military Heritage Charitable Trust, Recorded Music New Zealand and the NZ Game Developers Association.

Tim Thorpe Consulting conducted the NZ Game Developers Industry Survey from 2012 to 2018.



WeCreate

WeCreate is the alliance of New Zealand's creative industry organisations. WeCreate was formed in 2014 to unite the New Zealand creative industries, to be a central point of communication for Government, and to become a catalyst for growth via an industry-led, Government-partnered Action Plan.

WeCreate's Action Plan proposal and working groups have contributed to this study, and WeCreate provided peer review and advice for this report.

Appendix 2: Research Methodologies

Digital New Zealand Study

Digital New Zealand is a study of 807 New Zealand households and 2288 individuals of all ages in those households. Participants were drawn randomly from the Nielsen Your Voice Panel in March 2017 with research and analysis undertaken by Bond University on behalf of the Interactive Games and Entertainment Association. The margin of error is ± 3.4 percent for households and ± 2.1 percent for individuals.

New Zealand Game Developers Industry Survey

Since 2012, researchers Tim Thorpe Consulting Limited have conducted an independent survey of New Zealand game developers, including VR and AR studios producing entertainment. The survey questions are based upon the Statistics New Zealand Screen Industry Survey. Figures are for each financial year ending 31 March.

The response rates of larger studios, who represent the majority of sector revenues, have been consistent over this time.

An independent review by Sapere Economic Research found that the survey is a fair representation of historic industry growth.

Newzoo Global Games Market Report

This report is an annual tracker by specialist games and esports analysts Newzoo. Newzoo tracks 1.5 billion devices, 700 million app users, four million apps, esports events and public companies. They also perform primary consumer research in 28 countries, interviewing more than 70,000 consumers each year. Market forecasts and tracking data is validated by industry partners and clients. This report cites Newzoo's June 2019 report.

Potential growth of NZ interactive Media Revenues (Figure 14)

This graph models a 39 percent CAGR high-growth scenario and a nine percent CAGR maturing scenario.

The base FY2018 figures for NZ developer revenues are from the NZ Game Developers Industry Survey for FY2018. This includes revenue from original IP and contract work-for-hire business models. Although contract work may have different growth rates, it makes up only nine percent of revenues and is declining as a proportion of all revenues, and has not been calculated separately. The \$1.7 million of NZ-made content sold domestically has been excluded to avoid double counting with domestic sales.

The base figures and growth rates for domestic consumption are NPD Group retail tracker data for physical sales and the Telsyte Digital Market Monitor for digital sales, courtesy of Interactive Games Entertainment Association. This data is for the period ending 31 December 2017 whereas the NZ Game Developers Industry Survey uses a 31 March 2018 year end.

Domestic growth rates assume that 2017 NPD and Telsyte trends would continue: retail sales down four percent and digital sales up 12 percent per annum. These projections are comparable to Newzoo's projected global industry CAGR of nine percent from 2018-2022.

Interactive Aotearoa Study Interviews

To compliment the external research used to undertake this study, 50 independent interviews were completed with industry stakeholders to gather a range of qualitative data and insights. The following people and organisations were interviewed or provided insights during this research study:



Terry Allen, New Zealand Trade and Enterprise

Rachel Antony, Greenstone Pictures

Victoria Blood, New Zealand Music Commission and WeCreate

Rachel Bolstad, New Zealand Centre for Educational Research

Tim Bourne, CerebralFix

Derek Bradley, A44 Games

Michael Brook, Auckland Tourism Event & Economic Development

Paula Browning, Copyright Licensing New Zealand and WeCreate

Rudi Bublitz, Flying Kiwi Angels

Brian Cole, University of Waikato

Dale Corlett, New Zealand Film Commission

Robert Curry, Dinosaur Polo Club

Ron Curry, Interactive Games Entertainment Association

Richard Dunsheath, New Zealand Trade and Enterprise

Melissa Firth, NZ Tech Industry Association

Chris Ford, Enterprise Dunedin

Pam Ford, Auckland Tourism Event & Economic Development

Cassandra Gary, New Zealand Game Developers Association

Dean Hall, Rocketwerkz

Rachel Hatch, New Zealand Virtual Reality Augmented Reality Association

Stephen Hillier, Media Design School

Zoe Hobson, Runaway Play

Pete Hodgson, Callaghan Innovation

Alex Humphries, Jaffa Jam

Dr Karolina Stasiak, Faculty of Medical and Health Sciences, University of Auckland

Ben Kenobi, AUT University

Raelene Knowles, Interactive Games Entertainment Association

Ben Lenihan, New Zealand esports Federation

Fraser Liggett, Enterprise Dunedin

Rohan MacMahon, MacMahon and Associates

Simon McCallum, Victoria University of Wellington

Vhari McWha, Sapere Research

Amie Mills, New Zealand On Air

Graeme Muller, NZ Tech Industry Association

Maru Nihoniho, OMNZ, Metia Interactive

Rene Olmos, Whanganui and Partners

David Pannett, Creative New Zealand

Tim Ponting, Renegade PR

Sam Ramlu, Method

Annabel Robertson, Education New Zealand

Richard Sandford, ChristchurchNZ

Aliasha Staples, Staples VR

Tim Thorpe, Tim Thorpe Consulting

Aaron Tregaskis, New Zealand Venture Investment Fund

Dorien Vermass, Wellington Regional Economic Development Agency

Michael Vermeulen, A44 Games

Patrick Wagner, Weta Workshop

David Wang, Zino Ventures

Chris Wilson, Grinding Gear Games

Mario Wynands, PikPok

Appendix 3: International Programmes

This study identified 30 international Government programmes dedicated to supporting the growth of interactive media and video games industries. They include a mix of grants and low or no interest loans to support startups and MVPs, and tax rebates suitable for larger productions.

The majority have economic development goals. A minority (indicated on the table) require a local cultural content test.

TABLE 8: International interactive media and games programmes

Country – State	Name of Programme	Amount	Type	Local Content
AUSTRALIA – VICTORIA	Assigned Production Investment	Up to \$150,000 AUD (sometimes more)	Loan	
AUSTRALIA – VICTORIA	Assigned Production Investment	Up to \$30,000 AUD	Loan	
CANADA – ALBERTA	Alberta Media Fund (Interactive Digital Media)	Up to \$200,000	Grant	
CANADA – BRITISH COLUMBIA	British Columbia Interactive Digital Media Tax Credit	17.5% of eligible salary and wages	Tax Credit	
CANADA – MANITOBA	Manitoba Interactive Digital Media Tax Credit	40% of eligible project costs (labour, marketing and distribution) or 35% of eligible labour	Tax Credit	
CANADA – NEWFOUNDLAND & LABRADOR	Newfoundland and Labrador Interactive Digital Media Tax Credit	40% of eligible labour - \$2 million/year for associated group (and \$40,000/eligible employee per year)	Grant	
CANADA – NOVA SCOTIA	Nova Scotia Digital Media Tax Credit	50% of eligible labour (+10% for qualifying expenditures in regions outside metro Halifax). 25% of expenditures (+5% for qualifying expenditures in regions outside metro Halifax). Up to \$100,000 for marketing and distribution.	Tax Credit	
CANADA – ONTARIO	Ontario Interactive Digital Media Tax Credit (OIDMTC)	40% of eligible labour. Up to \$100,000 for marketing and distribution. Or: "Specified products" (fee-for-service products): 35% of eligible Ontario labour directly attributable to interactive digital media products (no maximum). Or: Large game companies: 35% of eligible Ontario labour directly attributable to the development of eligible digital games (no maximum).	Tax Credit	
CANADA – PRINCE EDWARD ISLAND	Prince Edward Island Innovation and Development Labour Rebate	One year of eligible labour expenditures for new full-time positions.	Grant	



Country – State	Name of Programme	Amount	Type	Local Content
CANADA – QUEBEC	Quebec Production of Multimedia Titles Tax Credit	26.25% or 30% of qualified labour (+7.5% if a French language version is produced)	Grant	
DENMARK – NATIONAL	Spilordningen – "Play Scheme" – Development	Up to DKN 100,000 or 60% of project costs for a development prototype	Grant	
DENMARK – NATIONAL	Spilordningen – "Play Scheme" – Production	Up to 50% of production costs	Grant	Cultural
EUROPEAN UNION	Creative Europe - Support for Development of European Video Games 2019	€10,000 - €150,000 up to 50% of eligible production costs	Grant	Cultural and Creative
FINLAND	BusinessFinland Tempo Program for International Growth	Up to €50,000 up to 75% of production costs	Grant	
FINLAND	BusinessFinland Funding Services for Startup Companies – Young Innovative Company Funding	Up to €250,000 Grant or €750,000 Loan	Grant & Loan	
FRANCE	Crédit d'impôt jeu vidéo – "Video Game Tax Credit"	30% of production costs, up to €6 million per year	Tax Credit	
FRANCE	Fonds d'Aide au Jeu Vidéo (FAJV) "Support Fund for Video Games" Aide à la création de propriétés intellectuelles – "Support for the creation of IP"	50% of production costs, up to €200,000	Grant	Cultural
FRANCE	Fonds d'Aide au Jeu Vidéo (FAJV) "Support Fund for Video Games" Aide à la pré-production de jeu vidéo – "Support for video game pre-production"	35% of pre-production expenditure. 50% as a grant and 50% as a repayable loan.	Grant & Loan	Cultural
GERMANY	German Games Fund	For budgets up to €1.5m, 50% of eligible costs up to €600,000 For budgets up to €4.0m, 44% of eligible costs up to €1.4m For budgets up to €8.0m, 25% of eligible costs up to €1.8m	Grant	Cultural
SINGAPORE	Intercom Media Development Agency – Production Assistance	Up to 40% of production costs	Grant	
SINGAPORE	Intercom Media Development Agency – Development Assistance	Up to 40% of pre-production and prototyping costs	Grant	
SPAIN – CATALONIA	Ayudas a proyectos del ámbito de los videojuegos – "Support for projects in the field of video games"	Up to €280,000 loan	Loan	

<i>Country – State</i>	<i>Name of Programme</i>	<i>Amount</i>	<i>Type</i>	<i>Local Content</i>
SPAIN – NATIONAL	Programa de Impulso al Sector del Videojuego – "Program to Promote the Video Game Sector"	Up to 80% of production costs, up to €150,000	Grant	
UK – ENGLAND	Creative England investment	Low interest loans from £50,000 – 250,000	Loan	
UK – NATIONAL	Video Games Tax Relief	20% of production costs	Tax Credit	Cultural
UK – NATIONAL	UK Games Fund	Up to £25,000	Grant	
UK – NATIONAL	UK Research and Innovation - Audience for the future Industrial Strategy Challenge Fund	Single company grants from £100,000 to £250,000. Collaborative company grants from £250,000 to £1 million.	Grant	
UK – NORTHERN IRELAND	Northern Ireland Screen Project Development Fund	90% of project costs up to £10,000, 75% of project costs up to £20,000, 50% of project costs up to £100,000	Loan	
UK – NORTHERN IRELAND	Northern Ireland Screen Project Production Fund	Up to £500,000 or 25% of the overall production costs.	Loan	
UK – YORKSHIRE	Yorkshire Content Fund	Up to £500,000 matching investment per project	Investment	
UNITED STATES OF AMERICA	20 State-level Film and Media Funds	Various from 15-35% of eligible costs	Tax Credit	



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