Manatū Taonga
Ministry for Culture & Heritage

ANNEXES

Culture in the Digital Age
Long-term Insights Briefing 2025

Te Ahurea i te Ao Matihiko
He Whakamāramatanga mō ngā Tirohanga Wā Roa 2025

Contents
Ngā wāhanga o roto

Annex 1: Methodology

This annex outlines the process Manatū Taonga Ministry for Culture and Heritage ("the Ministry") has undertaken to develop *Culture in the Digital Age: Long-term Insights Briefing 2025* ("LTIB 2025").

Methodology

As per guidance from the Department of the Prime Minister and Cabinet (DPMC; 2024), the Long-term Insights briefing (LTIB) process has eight steps (see below). This section outlines the methodology applied for the first five steps of this process, which occurred July 2024 and August 2025. While these steps are presented in a linear fashion below, in practice these steps overlapped.

Figure 1: Steps of the LTIB process as set out in DPMC guidance.

July 2024

- **1: Gather information about the future**
- **2: Consider topic and potential for joint Briefings**
- **3: Engagement on proposed topic**
- **4: Develop draft Briefing content**
- **5: Engagement on draft Briefing**
- **6: Present final Briefing to the House**
- **7: Select committee examination**
- **8: Conduct review activity**

December 2025

Gather information about the future

Evidence review

To gather relevant intelligence and insights, the Ministry engaged in a range of research activities including:

- reviewing national and international research on the use of digital technologies in the cultural and creative industries; arts, culture and heritage; media; and sport and recreation
- reviewing evidence on key drivers of change and emerging trends in technology, with a focus on their application to the cultural system
- analysing and synthesising the evidence to identify key themes
- speaking with subject matter experts to identify emerging trends.

Futures thinking activities

A range of techniques can be used to support futures thinking (DPMC, 2025). Following guidance from futures strategists, after conducting research on drivers and trends, the following techniques were undertaken:

- Horizon scanning—systematically looking for early signs of change that could disrupt the cultural system
- Three horizons—considering how dominant a way of working is and how that may change over time
- Future scenarios—considering how key drivers and trends are likely to impact the cultural system and could create different futures, and how different futures would impact diverse personas
- Wind tunnelling—testing potential policy options against different future scenarios.

Consider topic and potential for joint Briefings

The Ministry engaged with the following agencies who were interested in exploring digital technology for their LTIB and/ or who hold responsibilities relating to digital technology:

- Department of Internal Affairs Te Tari Taiwhenua
- Ministry for Business, Innovation and Employment Hīkina Whakatutuki
- Ministry for Pacific Peoples Te Manatū mō ngā Iwi ō te Moana-nui-ā-Kiwa
- Ministry for Women Manatū Wāhine.

Following engagement, it was determined it would not be appropriate or feasible to undertake a joint LTIB.

Engagement on proposed topic

Topic consultation was held from 16 September to 7 October. The Ministry received a total of 49 submissions, including survey responses and written and verbal submissions. Respondents represented individuals and organisations in the arts, culture, heritage, media and broadcasting and sport sectors, as well as across government. Following consultation, the proposed LTIB topic wording and scope for the LTIB were revised. Given the topic consultation document was provided in English via the Ministry's website (in HTML and PDF versions), this may have limited some people's ability to engage with the consultation process.

Summary of topic consultation submissions

Develop draft Briefing content

Content development workshops and subject matter expert engagement

The Ministry conducted two internal and eight external workshops with stakeholders from across the cultural system and government, and further engaged with digital technology subject matter experts. These workshops provided a forum to test the draft futures scenarios and gather New Zealand and cultural system perspectives to augment those obtained from the evidence review. These discussions also helped to shape the themes for the briefing and further identify future risks and opportunities, which informed the development of policy options.

Policy analysis process

The policy analysis process included the following steps:

1. Define scope—Define and clearly articulate the boundaries of the policy analysis based on identifying specific issues to be explored within the briefing.
2. Review evidence—Review the evidence collected during the Gather phase, including written materials, grey literature and information gathered from other sources such as meetings and workshops.
3. Identify trends, risks and opportunities—Analyse current trends and anticipated future developments in relation to each of the identified focus areas and draw out key insights.
4. Apply analytical frameworks—Identify the analytical frameworks that will be used to underpin policy analysis and their relevance (see below). Make the underlying assumptions and rationale for the chosen frameworks clear.
5. Incorporate Te Tiriti analysis—Given the implications of digital technology for te ao Māori is a cross-cutting theme of this LTIB, the analysis considered how the risks, opportunities and policy options could affect Māori and uphold the Te Tiriti o Waitangi the Treaty of Waitangi.
6. Develop policy options—Formulate multiple policy options to address the identified trends, risks and opportunities, so that a range of potential policy levers and options are articulated for key issues explored in the briefing.
7. Evaluate policy options—Assess the strengths and weaknesses of each policy option in relation to the identified criteria and alignment with the strategic framework.
8. Outline limitations—Discuss potential limitations or uncertainties in the data, information and analysis, and state the implications of these limitations or constraints.

Strategic framework for policy analysis

DPMC (2024) identified several best practice examples from the first LTIB cycle that applied a strategic framework to policy analysis. These include the Ministry of Transport's 2022 LTIB, which used the Transport Outcomes Framework as its strategic lens, and the Treasury's 2021 combined LTIB and Long-term Fiscal Position, which used the Living Standards Framework and He Ara Waiora as frameworks for considering the wider wellbeing implications and distributional impacts of fiscal objectives and the means of achieving them.

To apply a strategic framework for the policy analysis in this LTIB, the Ministry has drawn on the OECD AI Principles (n.d.) and the Ministry's strategic outcomes and priorities for the cultural system (2024). This section provides the rationale for using these, along with the evaluation criteria used to assess the policy options presented in LTIB 2025.

Rationale for using OECD AI Principles

This section identifies different attributes of the OECD AI Principles and explains how they are useful for analysing potential policy options.

Internationally recognised, future-proof framework

- The OECD AI Principles are widely accepted by governments, industry and civil society, providing a globally aligned approach.
- They offer a future-oriented foundation that accommodates rapid technological change while ensuring AI remains beneficial to society.

Values-based, human-centric approach

- The principles prioritise human wellbeing, fairness and inclusivity, ensuring that AI-driven policies in culture and sport align with ethical and social values.
- This may help prevent AI systems from displacing creative and cultural jobs or exacerbating digital divides.

Broadly aligns with New Zealand's legal context and Te Tiriti obligations

- New Zealand's constitutional and legal environment, including the Te Tiriti o Waitangi the Treaty of Waitangi, Bill of Rights Act and Privacy Act, already emphasises equity, transparency and accountability—core tenets of the OECD AI Framework.
- The focus on inclusivity and sustainability supports Māori data sovereignty and could help ensure AI respects traditional knowledge systems.

Comprehensive and multi-dimensional lens

- The OECD framework covers a broad range of AI and digital policy considerations including safety, transparency and accountability, which helps balance innovation with regulation.
- This makes it adaptable for different sectors, including arts, media, heritage and sports.

Balances innovation with risk management

- Encourages responsible AI use while avoiding overly restrictive policies that might hinder technological progress.
- Supports a risk-based approach, ensuring policies address potential harm (e.g., misinformation, surveillance risks) without stifling creativity in culture and sports.

Encourages trust and public confidence in AI

- Ensuring transparency, explainability and accountability in AI systems builds trust in digital storytelling, media and sports applications.
- This helps mitigate risks like deepfakes in journalism, bias in AI-driven sports analytics and privacy violations in biometric tracking.

Supports global trade and investment in AI and digital technologies for culture and sport

- Aligning with the principles would help ensure New Zealand's AI and digital policies are interoperable with global standards, potentially making it easier to attract investment in cultural and sports technologies.
- This promotes cross-border partnerships in AI-driven storytelling, immersive media and sports technology innovation.

Rationale for using the Ministry's strategic outcomes and priorities

This section highlights attributes of the Ministry's strategic outcomes and priorities and shows how they are useful for analysing potential policy options.

Grounded in the unique social, cultural and constitutional context of New Zealand

- Unlike generic international frameworks, the Ministry's strategic outcomes and priorities are tailored to New Zealand's distinct cultural and legal environment, including obligations under Te Tiriti o Waitangi the Treaty of Waitangi.
- They reflect New Zealand's diverse cultural heritage, ensuring AI and digital policies support and enhance local storytelling, identity and participation.

Outcomes focused

- The strategic outcomes and priorities go beyond abstract principles, offering a clear vision for what success looks like in the cultural and creative sectors.
- This ensures AI and emerging technologies serve public good outcomes, rather than just commercial or technological progress.

Alignment with broader government priorities and responsibilities

- It is important to ensure that Māori, Pacific and diverse communities benefit from digital advancements.
- The strategic outcomes and priorities aim to support the long-term resilience of cultural institutions and infrastructure.
- They also focus on strengthening community engagement and participation in cultural life, driving tangible social, cultural and economic benefits.

Cross-sector approach to cultural policy

- The strategic outcomes and priorities integrate multiple domains, including arts, heritage, sports, media and community engagement. This helps to ensure AI and digital policies support the entire cultural ecosystem.
- It also helps to identify synergies and trade-offs when considering the impacts of digital technology across different areas, for example creative industries, media and sports technology, and digital heritage preservation.

A guide for policy implementation and evaluation

- The strategic outcomes and priorities provide a benchmark for measuring success, helping ensure AI and digital policies and investments lead to meaningful improvements in cultural participation, resilience and sustainability.
- This could support the design of targeted funding mechanisms, regulations and partnerships to strengthen New Zealand's cultural and sporting systems in the digital age.

Policy evaluation criteria

The potential policy options were assessed to identify strengths and weaknesses based on the following criteria:

1. Effectiveness and strategic alignment
   - Does it support New Zealand's cultural system goals?
   - Does it align with the OECD AI Principles?
   - Does it uphold obligations under Te Tiriti o Waitangi the Treaty of Waitangi?
   - Does it uphold New Zealand's commitments under relevant United Nations conventions?
   - Are there international precedents or similar policy examples in other jurisdictions?
2. Impact and equity
   - Who benefits? (e.g., Māori, Pacific peoples, creatives, high performance sports, private interests?)
   - Does it reduce inequities or risk widening them?
   - Does it address environmental, cultural and social sustainability?
3. Feasibility and cost
   - What are the upfront versus longer-term costs?
   - Are there regulatory, technological or social barriers to adoption?
   - Does it require government funding and/or can it leverage private investment?
4. Risk and trade-offs
   - Does it create unintended consequences?
   - Does it require balancing privacy, transparency or innovation?
   - Does it introduce compliance burdens on industry or communities?

Engagement on draft Briefing

Public consultation was held on the draft Briefing from 4 June to 6 July 2025. An online public information session was held on 6 June with NZSL interpretation, with a recording of the webinar made available on the Ministry's website. An information sheet about the LTIB was provided in English in e-Braile and Easy Read, however as the full draft LTIB was made available in HTML and PDF versions (also in English), some people may have been limited in their ability to engage with the briefing.

In total, 16 submissions were received (12 written, 4 verbal). Submissions were analysed thematically to identify key feedback and guide revisions for the final document. Overall, submissions were supportive of the LTIB, and noted its breadth, depth and robustness. The submissions also noted the wide range of complex ethical, legal, cultural and governance challenges explored, and reiterated the importance of highlighting issues relating to data sovereignty, digital literacy and education, equity and accessibility, and the impacts of climate change.

Within the submissions, there were a range of contradictory views which are emblematic of broader competing opinions and priorities across the cultural system and society more broadly. These related particularly to the highlighting of risks versus opportunities, the temporal framing of the briefing, and prioritising commercial/financial versus civic/cultural aims and responsibilities.

Additional suggestions were made to strengthen the content of the briefing, in most cases by providing additional nuance, context or examples. Where appropriate, these suggestions have been incorporated into the final LTIB. This includes, for example, adding:

- a statement around the use of AI in preparing this LTIB
- clarifications of terminology and methodological limitations
- nuance to discussion relating to the impact of AI on the workforce, content scraping and algorithms, digital replicas, Big Tech, the 'digital detox' movement, education and climate change
- further evidence, including international conventions, legislation and recent legal cases
- additional detail to clarify policy analysis.

During the process of reviewing the policy options against the feedback, one option presented in the draft briefing was removed (Option 17: Human-made content' labels could help consumers to differentiate between human- created, AI-assisted and fully AI-generated content), based on feedback that this option would not be viable given complexities in distinguishing at what point something is no longer 'human-made', and the interactive nature of using generative AI in practice.

Limitations of the data, information and policy analysis

Limited robust evidence on distribution of technological impacts

Limitations

- AI's role in cultural heritage, media, sports and digital storytelling is still new and evolving, meaning there is a lack of empirical studies on its effects over time.
- While economic modelling and forecasts exist, real-world evidence on the impacts of emerging technologies on job creation, creative diversity and cultural expression remains speculative or anecdotal.
- Digital technology disrupts industries at different speeds. While some creative jobs have been heavily affected (e.g., digital artists and musicians), other cultural and creative applications (e.g., AI-generated literature) remain niche.

Implications for future policy design

- Policy assumptions may not fully account for long-term consequences—some technology applications may be overestimated or hyped, while others may be underestimated.
- The analysis relies on current research, future projections, expert and stakeholder views and experiences, and international comparisons, which may not fully reflect New Zealand's unique cultural and regulatory context.
- Gaps in real-world data mean that some policy options would likely need to be tested through pilots before full-scale implementation.

Fast-moving nature of new and emerging technologies

Limitations

- AI, blockchain, Web3 and immersive digital technologies are evolving rapidly, making static policy analysis quickly outdated.
- AI and digital technology regulations worldwide are still developing—what is considered "best practice" today may change dramatically within months or years.
- Many governments and international bodies (e.g., the European Union, UNESCO World Intellectual Property Organisation and the OECD) are still debating AI and digital technology governance models, meaning that the global regulatory environment is in flux.

Implications for future policy design

- Some policy options may need frequent updates to remain relevant. Policymakers should build in mechanisms for regular review.
- Uncertainty in international AI governance means New Zealand's alignment with global AI laws could shift depending on how leading economies, including the United States and China, regulate AI.
- Adoption rates for digital technologies in creative, cultural and sports sectors are unpredictable—some applications (e.g., AI-assisted refereeing) may be widely adopted, while others (e.g., AI-generated theatre performances) may remain niche.

High-level nature of the policy evaluation

Limitations

- The policy evaluation is broad and strategic, rather than a detailed regulatory impact assessment or cost-benefit analysis.
- Many policy options are conceptual and have not undergone detailed feasibility studies.
- Sector-specific considerations (e.g., the impact of emerging technologies on Māori broadcasting or on community sports funding) are not explored in depth.

Implications for future policy design

- Some policy options would require further feasibility assessments (e.g., piloting AI-assisted training programmes in schools or polytechnics before nationwide rollout).
- The policy analysis does not quantify costs and benefits, meaning budgetary and economic trade-offs remain unclear.
- Policymakers will need additional sector-specific engagement (e.g., consulting sports bodies, cultural institutions, Māori digital leaders) to refine and tailor policy interventions.

Uncertainty in international comparisons

Limitations

- The international examples used in the analysis reflect recent policy trends, but some are still in experimental or pilot stages, or are subject to change due to changes in political context.
- AI and emerging technology policies in the European Union, United States and Asia-Pacific are highly context-dependent—what works in one jurisdiction may not translate directly to New Zealand due to differences in legal, cultural and economic factors.
- Some international digital technology regulations remain proposed rather than enacted, making it difficult to predict their full impact or effectiveness.

Implications for future policy design

- New Zealand specific trials or engagement may be needed before adopting certain international approaches.
- Ongoing monitoring of AI and digital technology policy developments globally is essential to ensure New Zealand remains aligned with best practice.
- Some international policies may not be directly applicable due to New Zealand's unique obligations under Te Tiriti o Waitangi the Treaty of Waitangi.

Regulatory trade-offs not fully explored

Limitations

- Some policies (e.g., explainability audits for AI-powered journalism, virtual reality storytelling and automated sports decision-making) may increase transparency but also impose compliance burdens on creative industries.
- Stricter AI and emerging technology regulations could slow down innovation, while a light-touch approach could lead to ethical risks and bias.
- The analysis does not fully quantify regulatory trade-offs (e.g., balancing technological innovation vs. consumer protection).

Implications for future policy design

- Policymakers may need to conduct cost-benefit analyses to weigh the economic, cultural and legal impacts of new and emerging technology regulations.
- More stakeholder engagement with technology developers, cultural leaders, legal experts and regulators is needed to refine policy trade-offs.
- Some governance models may need phased implementation, balancing short-term innovation with long-term accountability.

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Annex 2:
Trends and drivers

This annex provides additional detail on the trends in digital technology and key drivers of change highlighted in Manatū Taonga Ministry for Culture and Heritage's *Culture in the Digital Age: Long-term Insights Briefing 2025* ("LTIB 2025").

New Zealand's digital cultural landscape

Over the last two decades, how New Zealanders engage with and through digital technologies has changed. Globally, internet access doubled between 2013 and 2023 (Turcu et al., 2023), and over 90 percent of New Zealanders have been online for more than 10 years, with internet access in New Zealand growing exponentially from only 5 percent in 1995 to 96 percent in 2022 (World Bank Group, 2025). Likewise, the 45 percent of adult New Zealanders connecting to the internet at home via fibre in 2018 grew to 69 percent by 2023 (Matika, 2023).

Increased connectivity and access to digital technology has led to shifts in people's attitudes, preferences and behaviours. People currently spend more time using digital media like streaming platforms and social media than traditional media such as linear television (NZ On Air, 2023). The majority of New Zealanders spend two to four hours online every day outside of work—nearly half spend most of their time on social media alongside emailing and streaming, while far fewer use the internet for news or education (Matika, 2023). People are also using digital technology to engage in cultural activities in new ways, with digitisation, online streaming and virtual service delivery offering further opportunities for participation. In a 2023 survey of New Zealanders' engagement in the arts, 40 percent of respondents reported using digital technology for arts activities, with digital engagement higher among disabled people, Pacific peoples, younger people, Māori and women (Creative New Zealand, 2023).

Trends in digital technology

With the increasing proliferation of and engagement with digital technology, there is a range of technologies that are effecting change and have the potential to reshape how New Zealanders create, share and protect their stories. This section discusses key technological trends that have been identified by subject matter experts[1] as being highly relevant when contemplating the future of the cultural system.

Generative AI

Generative AI (GenAI) is a "broad term that is used for any AI system whose primary function is to generate content" (Toner, 2023, para. 4). This contrasts with other AI systems that serve other functions, such as classifying and grouping data, or choosing actions. GenAI encompasses a range of tools including image generators, large language models, code generation tools and audio generation tools. According to one study, in 2024 57 percent of all internet content was at least partly generated or translated by AI (Thompson et al., 2024). Some experts anticipate that this

1 Parts of this section include input from members of the AI Forum of New Zealand which was received during stakeholder engagement activities.

figure will grow to as much as 90 percent of internet content within a few years (Nicoletti & Bass, 2023). It is projected that AI could potentially surpass human intelligence by 2045 (Corbyn, 2024).

GenAI can also be used to "super-charge" other forms of technology and AI, for example speeding up testing or running 'what if' scenarios and reducing the need to design a specific interface in order to create or change a digital product based on user criteria. New opportunities will also emerge through technological convergence, where the merging of previously distinct technologies may lead to new functionalities and capabilities, for example with AI and robotics.

Developments in GenAI have unlimited application across New Zealand's cultural system, assisting in the creation and automation of artistic works, creative and media content; language transcription, translation and preservation; and sports analysis. This may help to increase productivity and efficiency, freeing up time for creative activities. For example, creative toolsets now allow creatives to storyboard and create realistic impressions of what a final photo or film may become before they go on location, removing unnecessary delays and costs from productions, and allowing that time and budget to be used to create a better product.

A range of AI tools can also be used to support increased access to and participation in cultural experiences, especially for disabled people, such as better automated captioning (Hafizov, 2024). In New Zealand, these tools are rapidly evolving and growing in capability, for example New Zealand start-up Kara Technologies Ltd.'s (2025) new applied AI technology to provide NZSL interpretation by digital humans is currently nearing release.

It is important to note, however, that these tools may provide improved or enhanced accessibility, but do not wholly replace ensuring information and cultural experiences are accessible from the outset. Stakeholder engagement is important to ensure tools are fit for purpose and effective. For example, during public consultation for this LTIB, one respondent shared a problem that had emerged when a document reader app had recently updated their voices to AI-enhanced voices, seemingly to make the voices sound more human. In doing so, the enhanced voices then replicated the human tendency to drop syllables when speaking, but in illogical places, which made the reading inaccurate and unclear.

Robotic process automation and agentic AI

Robotic process automation (RPA), also known as software robotics, uses intelligent automation tools or 'bots' to perform repetitive enterprise and administration tasks on behalf of human workers, such as extracting data and completing forms (IBM, 2021). RPA can significantly improve productivity beyond human capabilities, reducing the risks of human error and speeding up processing times, for example in data entry, and improving business results. However, ethical concerns have arisen in the implementation of RPA regarding impacts on job displacement, data privacy and security, and transparency and accountability (Andersen, 2024).

RPA is being used to automate the documentation and cataloguing of art collections and cultural artefacts. For instance, museums and galleries can use RPA to streamline the process of recording details about new acquisitions, updating inventory records and managing loan agreements. This not only saves time but also reduces the risk of human error, ensuring that records are accurate and up to date (Oh et al., 2025).

In the media sector, some news organisations use RPA to automate the more mechanical tasks involved in the creation of news articles, social media posts and video content. This allows journalists to focus on more complex tasks, such as investigative reporting, while RPA handles routine content production and distribution (Clearmatic, 2024).

RPA is also being used to automate the collection and analysis of sports data. For example, sports organisations can use RPA to gather data from various sources, analyse player performance and generate detailed reports. This helps coaches and analysts make informed decisions and enhances the overall efficiency of sports management (Siegel & Morris, 2020).

Recently, major RPA providers have started to move towards agentic AI, a further step in the evolution of AI. Agentic AI or AI agents are reshaping how humans and AI interact and collaborate. Where AI assistants are reactive, performing programmed tasks, agentic AI is empowered to act proactively and make decisions on behalf of their user. AI agents can realise particular goals or objectives and carry out complex sequences of activities independently (Purdy, 2024).

New tools for building agents have emerged with increasing capability, including the launch of OpenAI's Operator in January 2025 (OpenAI, 2025). Further platforms like Vertex AI Agent Builder and Copilot Studio provide low-code or no-code options for building agents, particularly within specific ecosystems like Google Cloud and Microsoft 365, removing the need for a programmer to build an agent. Agentic AI technologies are already being used to restore and conserve artworks, as well as in the preservation of cultural heritage sites and archaeological and historical research (Pasikowska-Schnass & Lim, 2023).

Web3 decentralised platforms

As a concept, Web3 refers to the next evolutionary stage of the internet, which aims to reshape the current Web2.0 architecture into a more autonomous or user-empowered digital experience. Where Web2.0 provided read-write capabilities, allowing users to interact and share information with an online community, Web3 offers read-write-execute capabilities, enabling intelligent and decentralised web experiences. In terms of the technology itself, Web3 includes a range of emerging technologies for blockchain technology, including fungible tokens (cryptocurrencies), nonfungible tokens (NFTs), decentralised autonomous organisations (DAOs) and metaverses (Murray et al., 2023).

Artists are using blockchain technology to create and sell NFTs, which are unique digital assets that represent ownership of a specific piece of art. This provides artists with a new revenue stream while ensuring the authenticity and provenance of digital artworks. Platforms like OpenSea enable artists to sell their NFT art directly to collectors, bypassing traditional galleries and auction houses (Ford, 2025). In New Zealand's heritage sector, projects such as Digitaonga (n.d.) are using blockchain to enable new methods of repatriation and preservation of taonga.

In the sports sector, Web3 platforms are being used to enhance fan engagement through tokenisation. For example, Socios.com allows fans to purchase tokens that give them voting rights on certain club decisions, creating a more interactive and participatory experience, while monetising engagement to generate revenue. This model is being adopted by various sports teams around the world, including football clubs and electronic sports (esports) organisations.

Web3 platforms offer increased privacy and data sovereignty compared to current digital infrastructure by empowering locally controlled data storage and management (Lai et al., 2023). With applications across heritage, media and the wider cultural system, harnessing blockchain's ability to bring together decentralised data for specific purposes is one of the key ways that data sovereignty and data ownership issues can be addressed, as it allows data to stay where it originates and to be shared by permission. For example, platforms like Mirror.xyz allow writers and content creators to publish their work on a decentralised network, where they can retain full ownership and control over their content. This can reduce reliance on traditional media outlets and provide creators with more direct access to their audience (Vick, 2023).

Extended reality and immersive technology

Extended reality (XR) technology—including augmented reality (AR), mixed reality (MR) and virtual reality (VR)—are creating new ways to interact with and through digital content, impacting social connection, cultural participation, education and remote work. However, high costs, complex usability and the need for staff training have limited their adoption across the cultural system to date. New training offered by companies in New Zealand such as StaplesVR for people in the entertainment industry may help address these challenges.

Virtual spaces enable new social and economic opportunities. In a report on the future of extended reality (KPMG, 2022), technology experts predicted that by 2030, XR will have reshaped human interactions, with some people spending "more physical conscious time in the metaverse than the real world", and higher education delivered on "a virtual campus with digitised assets such as museums as a service" (p. 4).

The research above further predicted that "the flatscreen, keyboard and a mouse will disappear and be replaced by wafer-like glasses and contact lenses for spatial collaboration across multi-disciplines" (KPMG, 2022, p. 4). This immersive technology offers further opportunities to alter and shape participation in cultural experiences, for example attending a virtual concert, exhibition or heritage site (Anwar et al., 2025; Komianos et al., 2024; Verhulst et al., 2021).

Wearable and implantable devices

Wearable devices such as fitness trackers, VR headsets, wearable cameras, GPS trackers and an array of smart devices are already creating new possibilities to understand, monitor and enhance physical or biological performance. Implantable devices such as neurotechnology or brain-computer interfaces are taking the next step in integrating technology with the human body, offering further promise. Recently, new milestones have been reached towards blending AI with human cognition. By 2032, brain-computer interfaces are projected to have a market value of US$3.26 billion, with the potential to drastically alter the global economy (StartUS Insights, 2024). These technologies—especially when combined with AI—hold applications across the cultural system, both in terms of enhancing the performance of artists and athletes as well as for communities, such as disabled people, who may face challenges participating in cultural activities.

Enhanced connectivity—5G, 6G and Edge computing

Enhanced connectivity through advanced network technologies and internet-enabled devices will enable new services and business models; 6G, the sixth generation of fast-speed wireless networks, is expected to be commercially available in the early 2030s (Ericsson, 2025).

Edge computing brings enterprise applications closer to data sources, enabling faster and local processing of real-time data, and improving bandwidth availability (IBM, 2023). It can also help to increase privacy and data sovereignty, allowing data processing to be done without sharing data offshore, and support data processing in remote locations.

In the cultural system, this holds applications for example in screen production, when filming in difficult or remote locations, such as under sea ice. In the future, enhanced connectivity could enable hyper-realistic remote participation in cultural and sporting events and further enable large amounts of data—including arts and cultural content—to be created, shared and consumed.

Quantum computing

Quantum computing is expected to further boost computing power, accelerating the adoption of emerging technologies, and further advancing cybersecurity and encryption. While IBM, Google and D-Wave have been running quantum processors for some time, recent advancements such as Microsoft's Majorana 1 chip unveiled in February 2025 signal progress towards making the technology commercially available. Microsoft anticipates this technology will "realise quantum computers capable of solving meaningful, industrial-scale problems in years, not decades" (Bolgar, 2025, para. 1).

In heritage conservation, quantum sensors and imaging techniques are already in use, providing enhanced understanding of the molecular structure of historical artefacts, and enabling more accurate restoration processes. This ensures that cultural heritage is preserved with minimal damage, enhancing long-term conservation efforts (Allen Yarnell Center for Student Success, n.d.).

In the future, quantum computing could open new frontiers in digital art creation. Artists could leverage quantum algorithms to generate complex and data-heavy visual media that were previously impossible with classical computing (Miranda, 2022), and create highly interactive and dynamic experiences. Quantum computing could also be applied in sports analytics to optimise performance and strategy. By processing and analysing large datasets more efficiently, quantum algorithms could provide deeper insights into player performance, game strategies and injury prevention.

Digital twins

Digital twin technology, where data is used to create virtual replicas of a physical object, system or process, enables predictive maintenance, real-time monitoring and performance optimisation. This has applications in sport and recreation (Hliš et al., 2024) as well the protection and monitoring of cultural heritage (Niccolucci et al., 2022). Digital twins are also transforming media production by enabling virtual sets and environments, for example with virtual 3D modelling technology such as photogrammetry, which enables filmmakers and content creators to work together on and around a potential shooting location, without having to be at a physical site together in person (Accenture, 2025).

Key drivers of change

In futures thinking, the term 'drivers' refers to factors or forces that will create change. Looking ahead to 2040, there are many possible drivers that may influence the future. This section discusses eight broad drivers that are highly likely to affect New Zealanders' future stories and their relationship with digital technology.

Shifting demographics towards a more diverse and aged population

According to Stats NZ's (2022b) national population projections, New Zealand's population growth is expected to slow as the population ages and the gap between the number of births and deaths narrows. There is a roughly 25 percent chance the population will stop growing in the 2050s and start to decline by the 2060s. In 2024, New Zealand's population was almost 5.27 million. By 2033, the total population is projected to reach between 5.28 and 5.85 million, and by 2073, it could be as high as 7.86 million.

New Zealand's population on average is expected to age, with the proportion of the population aged 65+ increasing to between 21 to 25 percent by 2048, and 24 to 32 percent by 2073. Migration remains a volatile and uncertain factor, and while it is the only population component directly controllable by the government, high migration rates will not offset the ageing population (Stats NZ, 2022b).

New Zealand will become more ethnically diverse, with higher populations of Māori, Asian and Pacific peoples. According to Stats NZ's (2022a) ethnic population projections, if current growth rates continue, the Māori population is expected to reach one million by 2030, and by 2043:

- 21 percent of all New Zealanders and 32 percent of children (under age 14) will identify as Māori
- 24 percent of all New Zealanders and 27 percent of children (under age 14) will identify as Asian
- 11 percent of all New Zealanders and 18 percent of children (under age 14) will identify as Pacific.

A greater number of New Zealanders will also hold linguistic, cultural and physical connections to other home nations and diasporic communities.

Increasing geopolitical instability and economic shocks

Heightened geopolitical tensions can disrupt international trade, weaken domestic demand and lead to market volatility (Reserve Bank of New Zealand, 2024). Historically, large, disruptive economic shocks have occurred at least once every decade (Easton, 2023). This means that by 2040, it is reasonable to expect one to two more significant economic shocks.

The need to respond nationally to significant economic shocks will place greater demands on government on top of existing challenges, leading to the prioritisation of investment in critical services and infrastructure. For example, New Zealand is currently facing infrastructure challenges, with up to $185 billion of investment needed for water infrastructure alone over the next 30 years (Department of Internal Affairs, 2023). The Treasury (2021) projects that by 2061, if expenditure and revenue follow historical trends, net debt will be unsustainable.

More frequent and intense weather events

New Zealand will experience severe weather events with increasing frequency and intensity. Earth Sciences New Zealand (formerly NIWA) projects that by 2040, temperatures will increase by between 0.7°C and 1.0°C nationally. By 2090, this increase is between 0.7°C and 3.0°C (NIWA, n.d.).

Very extreme precipitation events, reoccurring every 2 years or greater, will increase per degree of warming by five percent for five-day duration events and 14 percent for one-hour duration events (NIWA, n.d.).

Projections indicate extreme weather events could expose 700,000 people and 411,516 buildings to river flooding alone, and up to 10,000 houses could be uninsurable by 2050 (Mercier, 2024). Māori cultural sites, including burial sites and plantations or food sources, are particularly at risk—80 percent of the almost 800 marae in New Zealand are built on low-lying coastal land or flood-prone rivers. Within this, 191 marae are situated within one kilometre of the coastline, which may experience a 30-centimeter sea level rise in only 10 to 20 years (Kowhai, 2022).

Weather events are increasingly linked to how people use digital technology. This works both ways. Unforeseen events can lead to greater adoption and use of digital technology and digital innovation. For example:

- Social media plays a critical role in providing emergency response, information dissemination and community support after extreme events (Flew et al., 2014).
- The COVID-19 pandemic accelerated the adoption of digital technology such as broadband internet, social media, cloud computing and networking tools to enable flexible working arrangements and help people to maintain social connections (Green et al., 2020).
- Digital tools (e.g., GPS tracking, drones, satellite imaginary) are being used to help understand and reduce the impact of climate change (Ministry for the Environment, n.d.).

At the same time, the increasing demands of digital technology on energy and natural resources may further impact climate change. As the UN Environment Programme (2024) has recently highlighted, data centres housing large-scale AI deployments, including those operated by cloud service providers, take a heavy toll on the environment. For example:

- Making a 2kg computer requires 800kg of raw materials.
- The microchips that power AI require rare earth elements, which are often mined in environmentally destructive ways.
- Data centres produce electronic waste, which often contains hazardous substances.
- A request made by ChatGPT consumes 10 times the electricity of a Google search.

In countries such as Ireland, a technology hub, AI data centres could account for almost 35 percent of the country's energy use by 2026.

AI and digital infrastructure are also increasingly vulnerable to the impacts of climate change, presenting risks to both the technology itself and the broader societal benefits it offers. While AI and other digital tools have the potential to help address climate change, AI infrastructure and the data it relies on are susceptible to disruptions from extreme weather events and other climate-related hazards. Some communities, including those that are geographically isolated, may be especially impacted by extreme weather events, affecting digital and physical connectivity. More broadly, it is likely that climate-induced human migration will increase, including among Pacific Island nations, increasing the importance of New Zealand's role as a holder of wider Pacific knowledge, history and culture.

Increasing challenges to social cohesion and declining trust in institutions

Declining social cohesion and trust is a threat to democracy and democratic institutions. As explained in a recent report by the Helen Clark Foundation (2025): "the opposite of social cohesion is polarisation. Social cohesion can be understood as the glue that holds our communities and society at large together. Without social cohesion, societies become increasingly unstable – from politics to business to civil society to day-to-day life in our communities. This is a pattern increasingly seen around the world, and New Zealand is not immune" (p. 6).

Social cohesion in New Zealand communities is still relatively high, however there are significant threats on the horizon. While many New Zealanders have a strong sense of belonging and social connection, this has been declining since 2016 (Stats NZ, 2024). Recent research has found that other indicators such as loneliness, financial insecurity and food insecurity are increasing, while trust and safety in local communities are decreasing (The Helen Clark Foundation, 2025). More New Zealanders trust central government (63 percent) than the OECD average (51 percent), however trust in key institutions (Parliament, media, health system, education system, court system, police) is at its lowest since 2014 (Stats NZ, 2024). When compared internationally, New Zealand's social cohesion is 8 percentage points lower than Australia (49 percent vs. 56 percent), with New Zealand lagging on every dimension: social and political participation, sense of belonging, sense of worth, social inclusion and justice, and acceptance and rejection (The Helen Clark Foundation, 2025).

A key factor in declining trust in institutions, including government and media, is the rise of mis- and disinformation, ranked by the World Economic Forum (2024) as among the top global risks for the next decade. It is increasingly difficult for people to tell what is true or not. In New Zealand, the number of people who are extremely or very concerned about misinformation has increased significantly from 48 percent in 2019 to 65 percent in 2023 (Matika, 2023).

The volume, reach and effectiveness of misinformation is increasing with AI, which has made it easier to create and amplify malicious content. Such synthetic content includes deepfake videos, cloned voices and websites that look like legitimate news outlets; content that challenges the credibility of digital narratives. The impacts of AI-driven misinformation include disruption of electoral process, civil unrest and confrontation, increased polarisation and distrust of media and government (Torkington, 2024). With social media and large media companies pulling back from fact-checking, there is an increased risk that more New Zealanders will become susceptible to mis- and disinformation and that social cohesion, trust and confidence in institutions will be further eroded. The mitigation of mis- and disinformation and its effects is also likely to create additional resource and social burdens on government, businesses and the public.

Widening digital divide

There are continued disparities in people's access to digital technology. Digital disparities are reproducing and reflecting existing inequalities in society (DiMaggio & Garip, 2012). Digital disparities include lacking material access to digital tools as well as people's skills or technological competence, usage, motivations and attitudes (van Deursen & van Dijk, 2015).

Digital inequity has traditionally impacted population groups such as disabled people, Māori, Pacific peoples, people in social housing, older adults, the unemployed and underemployed, and remote communities (New Zealand Government, 2021; Ministry for Pacific Peoples, 2023). In New Zealand, people who are a part of several of these groups face even greater challenges with digital inclusion (Grimes & White, 2019). For example, the introduction of fibre has provided opportunities for faster internet connections, benefiting activities such as remote work and telehealth services. However,

a broadband digital divide has emerged, as people in rural areas, older adults and disabled people are less likely to have access to fibre at home (Pacheco & Burgess, 2024).

AI is further widening the digital divide and inequity more broadly. With the recent advent of GenAI, the gap between who can and cannot understand, develop or manage AI technologies is widening (Hendawy, 2024). While AI has the potential to generate policy interventions to address difficult societal problems, it may also exacerbate existing digital inequalities particularly in relation to workplaces and productivity, education and healthcare, where benefits (and costs) are likely to be unevenly distributed across businesses, economic sectors and population groups, as well as under-resourced and marginalised communities (Capraro et al., 2024). A recent survey in New Zealand found 90 percent of businesses and their staff expect to be using GenAI tools within the next five years, and workers who fully harness AI will likely experience salary increases of 30 percent on average (Pelletier, 2024).

Rapid expansion of 'Big Tech'

Large technology or 'Big Tech' companies are dominating markets across societal domains. This expansion is not limited to the traditional 'Big Five' (i.e., Alphabet, Apple, Meta, Amazon and Microsoft) or the United States, but is a global phenomenon also taking place in Europe, South America, Africa and Asia (Khanal et al., 2025; Saura García, 2024; Stevens et al., 2024).

There are concerns about the concentration of influence in the hands of large technological companies, as they often control the key resources for innovation, research and development (e.g., talent, data and computing power). Big Tech also controls the market in several ways, including access to the market, pricing, the distribution of revenues generated and ownership of consumer data. Governments are reliant on technology companies' digital infrastructure for data storage and operations, the majority of which—especially in New Zealand's case—is offshore. Additionally, Big Tech firms hold significant political influence and are becoming pivotal actors across different stages of the policy cycle (Andhov, 2025).

Global and national regulatory mechanisms have yet to resolve how to manage or mitigate the influence of Big Tech. The expansion and influence of Big Tech has led to increasing regulatory scrutiny and policy action to address issues including data privacy and security risks, and monopolising digital media platforms. For example, several countries have imposed and upheld national bans of the social media platform TikTok, with varying reasons including its role in disrupting social harmony, circulating inappropriate content and posing national security concerns ("Click here: The Tiktok Ban", 2025).

Increasing cybersecurity risks

New Zealand is facing increasingly complex cybersecurity threats. Cybersecurity, defined as "any technologies, practices and policies for preventing cyberattacks or mitigating their impact" (Jonker et al., 2025, para. 1), has been a critical concern among governments, businesses and communities since the inception of digital technologies. Despite protective measures, the landscape of cyber-attacks continues to constantly evolve and become more complex, with increasing threats from both criminals and other countries (National Cyber Security Centre, 2024). This is due to several factors including the growth and increasing capability of emerging technologies such as GenAI, shifting political tensions, the lack of national and international regulation and enforcement mechanisms, increasing cybercrime sophistication, supply chain interdependencies and the cyber skills gap (World Economic Forum, 2025). In 2020, it was estimated that within New Zealand, the costs of cyber-attacks could be more than $100 million a year on average for the financial sector alone (Reserve Bank of New Zealand, 2020).

As cybercrime escalates, new approaches are needed to ensure New Zealand is cyber resilient. New cybersecurity tools are emerging to protect critical infrastructure and data, such as zero-trust security (Government Communications Security Bureau, 2025) and quantum cryptography (Scheider & Smalley, 2023). However, in New Zealand, recent research has found businesses overestimate their cybersecurity and resilience, while many employees lack the skills and awareness to mitigate cybersecurity risks (Datacom, 2025). This is in keeping with global trends (World Economic Forum, 2025). More broadly, countries vary greatly in their capacity to be 'cyber resilient' in the face of cyber-attacks—only 25 percent of people in Oceania are confident that the country in which their organisation is based is well prepared to respond to major cyber incidents targeting critical infrastructure, compared to 37 percent for Europe and 45 percent for North America (Datacom, 2025).

Accelerating pace of digital innovation

Technology is developing at a faster rate than ever before, making it increasingly hard for policy and legislation to stay current, and for data and digital assets to be kept up to date. As Our World in Data's long-term timeline of technological development illustrates (Roser, 2023), the pace of technological change experienced within this and the next generation may far outpace previous historical eras, with increasingly sophisticated AI being a significant driver in how quickly innovation may occur in future. Other emerging trends, such as augmented and virtual reality, robotics, advanced network technologies and quantum computing may further increase the speed of change. The focus on rapid technological development is being reflected in global investment, with spending on information technology projected to rise significantly worldwide in 2024/25 and beyond (Gartner, 2025).

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Annex 3:
Four future scenarios

This annex provides the future scenarios created as part of the strategic foresight process to develop Manatū Taonga the Ministry for Culture and Heritage's *Culture in the Digital Age: Long-Term Insights Briefing 2025* ("LTIB 2025"). These scenarios follow The Four Futures analytical framework developed by scholar Jim Dator and adapted by futurist John Smart.

The Four Futures model sees the future not as a passive target that will be reached at some point in time, but as a series of possible scenarios representing four ways in which societies and systems grow, evolve and respond to threats, shocks and opportunities. No scenario is considered an inherently good or bad future, a best-case or a worst-case scenario. Or, as Jim Dator puts it, "in the long run, all four generic forms have equal probabilities of happening, and thus all need to be considered in equal measure and sincerity" (Dator, 2009, p. 7).

The model proposes that the main images (depictions, stories, scenarios) of societal futures can be classified into four recurring groups: Continuation, Collapse, Constraint and Transformation:

Continuation—Broadly, this refers to the continuation of the status quo; the future is simply whatever is happening now, extended and perhaps amplified. This scenario envisions a future where the current trajectory of societal and economic development continues, with ongoing growth and technological progress.

Collapse (and New Beginning or Creation)—This future represents an inverse to the Continuation scenario and can be described as a movement from a higher stage of development to a lower one. This scenario depicts a catastrophic event, such as a global crisis or financial disaster, that disrupts life as we know it.

Constraint (also sometimes called Limits or Disciplined Society)—This future focuses on adapting to growing internal or external constraints, potentially through new ways of working, resource management or government regulations. Once a constraint has been reached, what does the new equilibrium look like? How are goods and services distributed? What are the impacts, trade-offs and implications? Who are the winners and losers?

Transformation—This future represents rapid, super-exponential growth, usually through some technologically enabled means. This could be, for example, a new industrial revolution, artificial intelligence (AI), genetic engineering, time travel or spacefaring technology.

The following scenarios creatively imagine different futures that could unfold when considering the topic of LTIB 2025. The AI-generated images included in the scenarios were developed using Microsoft Copilot with "New Zealand society in 2040" and the scenario text as a prompt. These images—at once surprising, intriguing and problematic—aim to stimulate thinking, inviting readers to consider the future role of AI in shaping how New Zealand and its future communities will be represented.

These scenarios are challenging to evaluate due to overlapping variables and future uncertainties. Because they are illustrative in nature, they do not explore cross-scenario dynamics such as potential shifts between scenarios or the impact of high-impact and unexpected events ("wild cards" and "black swans"). Further development of these scenarios could consider additional

factors such as a deeper consideration of interdependencies, transferable conditions across scenarios, stakeholder responses and disruptive possibilities. For example, rapid innovation can coexist with decentralised communities or radical technological change, and rather than stifling innovation, regulation can play a critical role in enabling the safe and widespread adoption of new technologies, systems and ways of working.

Further analysis of options and policy responses can use these futures scenarios as a method to:

- stress test policies and interventions to see how they measure up against a set of possible future conditions and see if policies need to be modified to succeed under a range of conditions and futures (also called 'wind tunneling')
- develop a strategic and structured set of steps to deliver a desired goal or future ('roadmapping')
- work backwards to build a timeline from a preferred present to the future, identifying key decisions and inflection points, testing feasibility of approaches and engaging long-term thinking and planning to overcome "present bias" ('backcasting').

References

Dator, J. (2009). Alternative futures at the Manoa School. *Journal of Futures Studies 14*(2), 1–18. https://jfsdigital.org/articles-and-essays/2009-2/vol-14-no-2-november/articles/futuristsalternative-futures-at-the-manoa-school/

Scenario 1:
Aotearoa New Zealand Unfiltered

Continuation scenario: A booming but largely unregulated digital creative economy, leading to unprecedented storytelling opportunities and increasing misinformation challenges.

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By 2040, digital storytelling in New Zealand is thriving, driven by AI-assisted content creation and immersive virtual reality platforms. With Māori making up a larger share of the population, te reo Māori and tikanga Māori are increasingly embedded in digital storytelling. However, a lack of robust content moderation means misinformation and deepfake narratives flourish. Copyright laws and frameworks to protect intellectual property rights have become too difficult to enforce leading to a lack of revenue, funding and investment for creatives and cultural products. The decline of fact-checking, combined with an increase in cyber-crime, erodes trust in digital content. AI-generated athletes and deepfake performances blur the lines between real and virtual competition in sports and the performing arts, leading to controversy over the legitimacy of records and talent. Tech giants dominate digital platforms, shaping public discourse and global geopolitics, and monetising user-generated stories. Free access to digital stories is limited and increasingly hard to come by.

Despite this, new opportunities emerge: AI tools widely translate and help preserve indigenous languages and provide accessibility features for cultural experiences. Blockchain helps to verify "what's real" and decentralised platforms allow content creators to bypass corporate gatekeepers. Personalised sports broadcasting allows fans to insert themselves into All Blacks games or experience events from an athlete's point of view through neural playback. Digital sovereignty becomes a major issue as Māori leaders and cultural and creative practitioners push for greater control over data and storytelling platforms. There is also a growing Disconnect movement that emphasises human creation and connection in the face of rapidly developing "noisy" digital technologies, leading to 'unplugged' alternative communities.

Scenario 1: Aotearoa New Zealand Unfiltered

Key Events Leading to 2040

2026: The AI Media Boom

- A major New Zealand media company replaces 50 percent of its journalists with AI-generated news and storytelling tools.
- Deepfake Māori and Pacific historical reenactments cause outrage, leading to the first major debate on AI ethics in cultural storytelling.

2028: The Rise of Decentralised Content Platforms

- New Zealand launches its first fully decentralised storytelling platform, allowing artists to bypass traditional publishers.
- Māori content creators adopt blockchain-powered sovereignty tools to assert digital ownership over cultural narratives.

2031: The Fact-Checking Collapse

- Leading media organisations close fact-checking divisions due to cost-cutting, increasing the spread of misinformation.
- An AI-generated false news story about a climate refugee crisis in New Zealand goes viral, affecting national elections.

2035: The Algorithmic Divide

- New Zealand's digital media is controlled by two major international AI-driven platforms, leaving small, independent storytellers struggling to be heard.
- Virtual influencers, indistinguishable from humans, dominate the entertainment industry, leading to debates on what constitutes "authentic" storytelling.
- New Zealand's top-earning athlete is no longer a rugby player but an AI-enhanced esports competitor with a neural interface.

2040: "Aotearoa New Zealand Unfiltered" Becomes Reality

- AI tools create personalised historical narratives, meaning every individual can experience tailored versions of New Zealand's past, further eroding a shared national identity.
- A government inquiry reveals that over 95 percent of digital content consumed by New Zealanders in 2040 is AI-generated, prompting urgent regulatory discussions.
- A New Zealand AI-coached and genetically optimised "perfect athlete" wins Olympic gold in track and field, sparking a global debate over human versus AI-assisted sports performance.

Scenario 2:
Hyperlocal Renaissance

Collapse and creation scenario: Infrastructure failures, cyber-attacks and environmental crises make digital storytelling unreliable, forcing a return to localised and traditional knowledge sharing.

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A series of cascading crises—including cyber-attacks on infrastructure, extreme weather events and democratic erosion—have led to a fragmented and fragile digital landscape in New Zealand by 2040. The collapse of global technology companies has left digital storytelling platforms outdated and unreliable, while misinformation and state-sponsored disinformation campaigns manipulate public perception. With limited access to reliable online spaces, many New Zealanders turn back to localised, community-based storytelling and brick-and-mortar learning. Oral traditions, print media, cultural institutions and in-person gatherings become more trusted sources of information. However, with frequent infrastructure failures and an overburdened energy grid, preserving and sharing stories digitally becomes a challenge. A return to handheld digital music recorders allows for musicians to quickly record and physically share their music, but with limited reach. Creatives form organisations with like-minded people to share, create and protect their works; organisations like the National Writers Circle emerge to collectively collate, curate and publish works and maintain outdated printing machines.

The decline of digital entertainment also leads to a resurgence of in-person, local sports as a primary form of recreation. Māori and community-led sports flourish as people return to traditional activities like waka ama and ki-o-rahi, which require fewer resources than professional leagues. For Māori and other indigenous communities, the decline of centralised technology platforms means a resurgence in traditional knowledge-sharing practices and but also risks further marginalisation from the global digital conversation and diasporic communities, particularly as international travel becomes more costly and restrictive. At the same time, the influx of Pacific and international climate refugees has heightened the need for safe spaces to preserve cultural knowledge and artefacts. In partnership with the community, New Zealand's institutions serve as safe havens for wider Pacific knowledge, culture and history.

Scenario 2: Hyperlocal Renaissance

Key Events Leading to 2040

2027: The Great Cyber Blackout

- A nationwide cyber-attack cripples digital infrastructure, wiping out years of archived cultural content.
- Heritage organisations scramble to retrieve lost digital collections, sparking renewed interest in physical archives.

2030: The AI Disillusionment Crisis

- New Zealanders experience mass digital fatigue as AI-generated content becomes repetitive, shallow and prone to bias.
- A surge in demand for authentic, human-made cultural experiences leads to a revival of oral storytelling traditions, led by Māori and Pacific communities.
- Sports sponsorship collapses as global economic crises force corporations to withdraw from sports investments.

2033: The Fall of Streaming

- Extreme weather events destroy critical undersea internet cables, cutting New Zealand off from global content platforms for months, with wider damage necessitating the relocation of thousands of climate refugees from across the Pacific to New Zealand and Australia.
- The streaming industry collapses as power shortages make large-scale digital content distribution unsustainable.
- With digital infrastructure failing, international sports and live performance events are getting too costly to run, and local, community-run tournaments become the dominant form of competition. Kapa haka, waka ama and other 'low tech' activities proliferate, gaining new audiences.

2037: The Last Digital Archive Breach

- A major cyber-attack permanently erases New Zealand's largest digital heritage database, reinforcing the need for physical cultural preservation.
- The government mandates print and analogue backups of all essential cultural materials. A 'culture war' erupts as different groups compete for limited physical storage space.

2040: "Hyperlocal Renaissance" Becomes Reality

- New Zealanders primarily rely on local libraries, museums and community elders for storytelling, history and cultural education.
- The final professional rugby match is held in New Zealand as centralised leagues dissolve; the focus shifts to local inter-iwi and inter-community competitions, ensuring that sports survive as a cultural practice rather than a commercial industry.
- Traditional Māori and Pacific navigation techniques, arts and storytelling are fully revitalised, playing a central role in national identity.

Scenario 3:
Digital Guardianship

Constraint scenario: Strict government oversight ensures cultural protection and misinformation control but raises concerns over censorship and creative freedom.

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By 2040, the New Zealand government has taken an active role in regulating digital content, enforcing strict measures to ensure online safety, authenticity and cultural integrity. All digital stories must pass through national fact-checking bodies, and AI-driven monitoring systems flag potential misinformation. New Zealand implements a world-leading digital governance model and enacts new data sovereignty laws, grounded in Te Tiriti o Waitangi the Treaty of Waitangi, providing a pathway to decolonise the ownership of Māori cultural intellectual property. A government-owned and curated digital platform provides verified news and public information, and preserves New Zealand's national data, history, cultural memory and assets, including digital taonga, in partnership with sovereign Māori-owned platforms. Māori sports heritage is legally protected, with government oversight ensuring haka and other cultural traditions are not misused by commercial entities. Biometric security measures and quantum encryption safeguard digital archives against cyber threats. New Zealand cultural works have achieved protected global status through trade agreements and international treaties and help to build the brand and reputation of New Zealand and its creative industries. Government-certified AI referees in rugby, cricket and football eliminate human error but spark debate over whether sports should retain an element of human judgement.

However, while these protections help maintain cultural authenticity and social cohesion, they also limit free expression. There are concerns about transparency and freedom of expression and this has an unintended chilling effect on the freedom of individuals, creatives and media operators over what they can publish in the digital space. Some digital creators feel restricted by overregulation, and underground networks emerge to share alternative narratives. Grey-market digital zines emerge where creatives can share works and ideas free of government filters. The tension between digital safety and creative freedom remains an ongoing debate.

Scenario 3: Digital Guardianship

Key Events Leading to 2040

2027: The Founding of the National Digital Ethics Council

- The New Zealand Government establishes a Digital Kaitiakitanga Council to regulate AI-generated content, ensuring it aligns with national values and Te Tiriti o Waitangi the Treaty of Waitangi obligations.

2029: The Introduction of AI Storytelling Licenses

- Creators must apply for government approval before distributing AI-generated historical content.
- AI-generated misinformation is criminalised, with severe penalties for companies that distribute false narratives or generate deepfakes.

2032: The Launch of "Truth by Design"

- New Zealand mandates AI-powered truth verification initiative "Truth by Design" for all online stories and media, making it one of the most digitally regulated countries in the world.
- Artists and journalists face creative restrictions, as AI tools block any content deemed "culturally or politically sensitive".
- A new law bans deepfake sports content, requiring all AI-generated sports media to be clearly labelled.

2035: The Great Digital Protest

- A New Zealand influencer is convicted for spreading AI-generated false cricket highlights, marking the first-ever legal case of sports misinformation.
- A group of artists, historians and activists resist strict digital controls, arguing that government oversight is limiting creative expression.
- Māori and Pacific leaders demand greater community control over AI-driven storytelling rather than state governance.

2040: "Digital Guardianship" Becomes Reality

- All digital stories are tagged with a trust score based on AI-powered fact-checking and cultural oversight.
- While misinformation is eliminated, many lament the loss of creative spontaneity and alternative perspectives in storytelling.

Scenario 4:
A New Digital World

Transformation scenario: Radical new technologies reshape storytelling, erasing traditional boundaries between memory, identity and virtual experience.

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By 2040, radical technological advancements have reshaped storytelling in ways previously unimaginable. Neural interfaces allow direct brain-to-digital storytelling, enabling New Zealanders to share experiences and memories as immersive sensory data. Technologies are open by design so that collectives, nations and individuals are able to tailor and customise software, hardware and their frameworks based on their own needs and context. Holographic archives preserve cultural narratives and data in interactive 3D spaces, and AI curators help personalise storytelling experiences. AI-driven sports psychologists and personalised biomechanical coaches replace human trainers, leading to concerns about athletes losing cultural and personal agency in their training. Enhanced athletes, performers and artists become the norm—genetic modifications and AI-optimised training are used to push human limits beyond anything seen before, and for live events holographic players and performers add a new dimension, allowing events to be simultaneously experienced physically and virtually.

New Zealand's digital landscape has shared governance with Māori and the wider public, reflecting a blend of diverse knowledge systems and cutting-edge technology. Storytelling platforms are decentralised and community-owned, ensuring that digital heritage is protected while still allowing for creative innovation. While concerns about surveillance, transparency, accountability and ethical AI persist, New Zealanders embrace the fusion of tradition and technology, using digital storytelling not just as a tool for entertainment, but as a means of deepening cultural connections, fostering democratic resilience and safeguarding historical truths against manipulation.

Scenario 4: A New Digital World

Key Events Leading to 2040

2026: The Emergence of Neural Storytelling

- Researchers develop memory-sharing technology, allowing people to experience stories through others' lived experiences.
- Iwi express concerns over the ethical implications of storing and sharing whakapapa through these digital interfaces.

2029: The Creative AI Surge

- More than 90 percent of New Zealand's new films, books and music are AI-assisted, with human input limited to curation and direction.

2032: The Haka Deepfake Debate

- Museums begin replacing physical exhibits with fully interactive, AI-driven historical reconstructions, allowing visitors to "witness" major historical events in immersive environments.
- A nationwide controversy arises when AI-generated haka performances are criticised for misrepresenting tikanga.

2036: The Shift to XR

- People now work primarily in extended reality (XR), and "experience" news, sports, film and history through neural downloads, allowing full emotional and sensory immersion in past, current and imagined events.
- The government struggles with regulating whose memories are shared, as private companies profit from selling virtual "lived experiences".

2040: "A New Digital World" Becomes Reality

- The boundary between human memory and AI-generated experience blurs, raising fundamental questions about what is "real" history.
- Community groups push for sovereign control over Māori and Pacific digital memory banks, ensuring traditional knowledge is not rewritten or commodified by AI corporations.
- Traditionalists call for a separation between enhanced and non-enhanced sports competitions, leading to the creation of two parallel sports categories: "Pure Human" and "Enhanced".