Sustainable Livelihoods 2020-2040: The Future of Work in Te Hiku

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Code Innovation Ltd.

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1. Executive Summary

This report is written to support a variety of conversations about "future proofing" the communities served by the Te Hiku Iwi Development Trust. Fast-paced developments in business and technology are contributing to both progress and volatility around the world. Many of these developments are slow to arrive in rural areas and may impact rural areas adversely or unevenly. With careful planning, it is possible to identify which trends can be leveraged in line with the values of Te Hiku and how to position communities to enjoy co-creating their own futures.

However, it is not possible to future proof the communities served by Te Hiku while pursuing business as usual. The path to a resilient and thriving Te Tai Tokerau involves embracing two pathways that, because of their differences, create a broader and more stable social and economic foundation.

The first pathway is fostering a culture of safe and constant economic experimentation. As long as failure in business remains a likely outcome, interest in business will remain limited to risk takers (and those with the financial privilege to take risks). To make business and economic experiments safe and attractive for everyone requires structures, frameworks and support. But it also requires a paradigm shift away from prioritizing standard businesses that aspire to permanence.

The way to engage more people in business is via short-term business ventures: such as pop-ups, events and seasonal efforts. Cultivating the capacity to seize upon trends and quick opportunities is valuable, and best when separated from the demand that long-term ventures be built at the same time. People can sharpen their ideas and develop their business skills by running a market stall for one week, a food truck for one night, or a shopfront for one month. A more regular calendar of business experiments can overlap with creative and artistic events that stimulate interest in the local economy.

This culture of experimentation applies to all recommendations in this paper and not just to businesses. Social programs, currency experiments and changes to how we educate rangatahi can all be explored in short, time-bound ways. This promotes a culture of learning and is more inclusive by design: people can engage meaningfully without making significant commitments. This also helps to move away from a culture that expects perfectionism or that fears the vulnerability of failing (and learning and adapting) in the public eye.

An organization like Te Hiku Iwi Development Trust can serve as an Anchor Institution, doing the heavy lifting to create the safe space of learning and experimentation for the community. An Anchor Institution can focus on the regulatory issues, the policy issues, the facilities management and other back house functions of business in order to let citizens exercise their creativity and learn by doing. As interest in business grows, community members can be transitioned into cooperatives or helped to take over the greater complexities of independent business management. But the experimental culture and ecosystem is the goal in itself.

The second pathway to a thriving and resilient Te Tai Tokerau embraces the opposite attitude towards time: building for long-term, multi-generational resilience and thriving. This pathway has two strong components, one is the identification and endorsement of principles and frameworks

that guide the community in its dealings with business and government alike. When every new opportunity is debated on all sides and subject to pressure from all sides, it becomes difficult to mount a sufficient defense of the environment and vulnerable communities, let alone future generations. When principles constrain investments and partnership parameters, institutions like Te Hiku can make their "non-negotiables" crystal clear. This helps to attract partners with aligned values and prevent deals that use near-term benefits as a mechanism to distract from long-term harms.

As others have recommended (see below), it is similarly helpful to embrace a tool like the Doughnut Economics Framework. This framework challenges organizations to invest only in projects that improve social indicators, while respecting environmental limits. This framework is supported by an increasing number of digital dashboards that can help communities to visualize their progress on important measurements. Transparency of measurement and accountability foster citizen engagement and citizen science.

The second component of the permanence-seeking pathway is looking for ways to build multi-generational structures: like trusts, public goods (digital or otherwise) and cooperatives. These structures exist alongside of (and beneath) competitive markets and provide stability when other systems are in flux. Ecosystems embedded within trusts are immune from selling pressure during economic downturns; at such times, citizens working in cooperatives are protected from unemployment. A community that works with transparent and public digital infrastructure (marketplaces, logistical software, hardware platforms and more) can retain data sovereignty and pool its investments when times are tough.

With a commitment to these two different pathways, this report explores strategies for transforming many of the industries in Te Tai Tokerau. We consider: sustainable and ecological tourism; the intersection of regenerative agriculture, aquaculture and forestry; employment opportunities in the field of digital sensors and related digital dashboards; trends in elder care and remote work; and why experiments with digital currency could lead to greater financial literacy and financial resilience.

By looking to create inclusive, reliable, shock-resistant institutions that enable agile, playful, constant experimentation, Te Hiku can help to bring both vitality and resilience to the economies and the communities that it serves.

2. Background and Methodology

This report builds on the work of two other reports submitted to Te Hiku. The first is the Taumata Rangatira Presentation from the Joint Work Program (July, 2020), which shows that communities supported by Te Hiku take a decade or more to recover to their baseline level of economic wellbeing after each significant economic shock to the region. COVID-19 has delivered the latest significant shock. If we follow the recovery strategies of earlier decades, history tells us that recovery will be slow and incomplete.

The second report that informs our work is the Te Hiku Recovery Framework, COVID-19, also published in July of 2020. This report outlines demographic challenges and proposes that Te Hiku work within the Doughnut Economics framework as a way of encouraging long-term planning. We are in broad agreement with the focus of The Recovery Framework and the authors' advice to use the Doughnut Framework. The Doughnut Framework is a powerful tool because of how it links precise measurements of environmental wellbeing (such as nitrogen loading of water ways and biodiversity metrics) with detailed measurements of social wellbeing (such as health, education and shelter outcomes). It is especially helpful for establishing a common language with potential partners, government and foundations.

This Sustainable Livelihoods 2020-2040: Future of Work in Te Hiku introduces strategies for generating livelihoods in the community that are economically, socially and environmentally desirable. These livelihoods are chosen for their "future proof" qualities. These livelihoods offer ways to benefit from short-term trends, while moving towards expanded sovereignty and profitable skillfulness in the community. The main thematic areas of this report are as follows:

- Best practices for building a digital economy;
- How to create and support a startup ecosystem;
- Innovations to evolve Farming, Fishing & Forestry;
- Other potential growth industries like Tourism and Housing;
- Innovations for generating liquidity and economic stimulus.

Methodology

To inform the thematic areas of this report, we conducted two forms of research: a desk review of relevant reports and digital materials and more than three dozen interviews spanning both Aotearoa and global organizations. Global research helped to identify significant trends that Te Hiku can leverage in their programming. Research within Aotearoa focused on potential partnerships, resources and other tailwinds. The acknowledgments at the end of the report include a list of key respondents along with their organization and position within it.

3. Thematic Areas

Best Practices for Building a Digital Economy

Section 1 will look at best practices drawn from four areas: first, systems-level strategy for the social sector; second, the international development industry; third, the digital cooperative sector; and fourth, a brief look at STEM learning possibilities. The private sector's most notable approach for building a digital economy is to kindle new businesses. That pathway is explored in section 2.

A) Anchor Institutions

The Democracy Collaborative in the United States has helped to introduce the concept of "Anchor Institutions." These are organizations that are tied to a specific place, that have an important ongoing presence in that place, and that can play a defining role in creating and reinforcing local economic ties. Anchor institutions help generate increased community participation and ownership (or stewardship) of key resources. They also help create and sustain social entrepreneurship and vulnerable populations by adopting robust social procurement strategies. Universities and hospitals can serve as anchor institutions, but so can development trusts, such as Te Hiku.

Anchor Institutions play a key role in future proofing their communities by identifying the ways to make social and environmental more likely to succeed for everyone. Anchor Institutions create enabling environments in terms of policy, in terms of mentoring and support and in terms of building partnerships and collaboration. There is also exciting research that shows the compounding positive effects that are possible when anchor institutions form alliances with one another. For further guidance on anchor institutions, see the resources at: Democracy Collaborative.

B) The Digital Development Principles

Humanitarian aid and international development organizations distribute hundreds of billions of dollars each year towards challenges like hunger, poverty and illiteracy. In the last fifteen years, many of these organizations have changed their strategy to prioritize digital technologies. This change involved a steep learning curve for the sector. Early years were full of costly failures, resulting in abandoned and ineffective software and confused or demotivated beneficiaries. Fortunately, this sector made the decision, early on, to share openly about their failures and to learn collectively. This enables people from every country and background to look for the patterns that help digital initiatives to succeed or to fail.

This open collaboration resulted in the Digital Development Principles (https://digitalprinciples.org/) which are useful for two reasons. First, the Digital Principles help to shape social procurement in the arena of technology. Organizations "endorse" the Digital Principles publicly, creating transparency around their expectations for fair play in technical endeavors. Endorsing the principles means that an organization invests in technology projects only when they are harmonious with the Digital Principles.

Requiring adherence to the Digital Principles can be a powerful tool when negotiating with technology providers. For instance, technology providers often seek to retain different types of control: control over a closed-door design process; control over the data they gather; control over their code and hardware specifications; and (most notably) control over their ability to turn a freely offered

Fig. 1: Digital Development Principles

Digital Principles	Details	Potential Relevancy
1. Design with the user.	User-centered design starts with getting to know the people you are designing for through conversations, observation and co-creation. It prioritizes including users who might be excluded: like women and girls or people with disabilities.	Look for technology providers who interested in co-design rather than sales. A good provider knows that you community can teach as well as learn.
2. Understand the existing ecosystem.	Well-designed initiatives and digital tools consider the particular structures and needs that exist in each area and community	Consider the cost benefit analysis for a small business investing in digital tools and check your assumptions.
3. Design for scale.	Achieving scale requires adoption beyond an initiatives pilot population and often necessitates securing funding or partners that take the initiative to new communities or regions.	This would not have to be a priority for Te Hiku, though it may be an avenue for long-term growth and sustainability.
4. Build for sustainability.	Building sustainable programs, platforms and digital tools is essential to maintain user and stakeholder support, as well as to maximize long-term impact.	Who will own and operate, maintain and develop the digital tools on into the future? What is their connection to the community?

Fig. 1: Digital Development Principles (continued)

5. Be data driven.	When an initiative is data driven, quality information is available to the right people when they need it, and they are using those data to take action.	Ask the hard questions, from the beginning: what numbers would represent success or failure and how can we ensure their validity?
6. Use open standards, open data, open source, and open innovation.	An open approach to digital development can help to increase collaboration in the digital development community and avoid duplicating work that has already been done.	If you skip this step, you can be IP or data “rinsed” by business people who offer convenience in place of sovereignty.
7. Reuse and improve.	Reusing and improving is about taking the work of the global development community further than any organization or program can do alone.	Teaming up with other technology communities who share their work can save money and increase long-term sustainability
8. Address privacy and security.	Addressing privacy and security in digital development involves careful consideration of which data are collected and how data are acquired, used, stored and shared.	The temptation to surveil and control often leads towards racist and unequal applications of power.
9. Be collaborative.	Being collaborative means sharing information, insights, strategies and resources across projects, organizations and sectors, leading to increased efficiency and impact.	Technology offers an ideal arena in which to pool resources and set aside ego or more narrow institutional goals.

service into a paid one. The Digital Principles help impact-driven organizations to push back against these encroachments upon sovereignty. In line with social procurement practices, they also advantage smaller and newer companies that prioritize impact and that take the time to work in collaboration with a community. They are educational and democratizing in nature and are listed in Figure 1:

The second key benefit of the Digital Principles is that following them increases the chances of spreading technological literacy in communities. The Digital Principles start from the conviction that communities are capable of co-designing and maintaining the technologies that they use and also capable of owning and stewarding their data. Instead of trading away learning opportunities and privacy for convenience, organizations that follow the Principles move more slowly, but involve their members more deeply in understanding the different assets and opportunities in play when technology is widely adopted. This aligns with Aotearoa's leading edge thinking about the evolution of data sovereignty in a Te Ao Māori context.

C) Platform Cooperatives

For many in Aotearoa, the idea of joining a cooperative, might be synonymous with providing milk to Fontera, or affiliating with other large, well-established coops. While cooperatives of this variety continue to grow and profit around the world, there is also a newer, tech-savvy community of innovators changing what it means to create and belong to cooperatives. We'll explore digital innovation in the cooperative arena more deeply in the next section with a focus on start-ups. Here, we offer a brief introduction of the larger trend related to digital tools for cooperatives.

In the last five years, pockets within the global cooperative ecosystem have invented and refined digital tools for supporting their operations and expanding their reach. It is common to speak of large technology companies like Google, or Facebook or Amazon as Digital Platform companies, because their technologies serve as platforms (the terrain) where business or transactions take place. When cooperatives build software to support their own businesses and transaction needs, they are building "Platform Cooperatives." In 2015 there were fewer than 10 platform cooperatives. Now there are more than 400—and these are spread across more than 50 countries. Platform cooperatives put powerful technologies into the hands of workers who were previously easy to exploit or replace.

One such initiative is Fairbnb, a competitor to Airbnb launched by several major cities in Europe, including Amsterdam and Venice. These cities noticed that Airbnb was capturing a significant amount of their tourism revenue (and data) and that it was not building the technological capacity of their citizens. These cities also understood that the technology beneath Airbnb is no longer difficult to create. So they cooperated together to build their own digital platform that offers accommodation. They took advantage of this opportunity to make the rules of the platform more helpful to their communities: the fees are re-invested into neighborhood improvements (instead of sent to Silicon Valley); the usage data is available to cities for their own planning; and each individual can only offer one accommodation on the platform (so it helps individuals instead of being captured by large property companies).

Platform cooperatives have now been formed by delivery personnel, office cleaners, small farmers, temporary office workers, journalists, artists and tourism experience providers, to name just a few. And, critically, many of these platform cooperative teams are looking to share their skills, expertise and technology with other workers and communities around the world. Airbnb isn't going to share their source code or operational knowledge with the FNDC; but Fairbnb might.

Platform cooperatives notably improve transparency of business while offering ways to revitalize member engagement. (Members who are uninterested in attending long meetings can use digital tools to vote, for example). Digital tools are also, perhaps obviously, helpful for

connecting with consumers—especially when long rural distances make travel costly and inconvenient. The innovations in digital cooperatives are also enabling coops (for the very first time) to raise venture or crowd equity funding and to franchise. This means you can expect to see platform cooperatives continuing to grow at an exponential rate.

D) STEM Education Options

Many decision makers who see the expanding reach and influence of digital technology often suspect that it would be beneficial for rangatahi to be trained in science, technology, engineering and math. This has given rise to numerous "learn to code" initiatives that push the rudiments of software programming down even towards very young learners. Two common approaches are sub-optimal and to be avoided: teaching everyone the same narrow technological skill set and assuming that motivated learners can independently navigate the "teach yourself" type resources that are widely available on the Internet.

There are many more optimal approaches, but we'll point to just two that are most readily available for Te Hiku. The first is setting up incentives and support for self-motivated learners. Working with existing digital hubs to help identify, attract and support learners who commit to clear technical goals is a low hanging fruit.

The second is to imagine what mix of technical skills would be most helpful within the Te Hiku community and then to partner with an entity like Enspiral Development Academy to create some bespoke educational programs that prepare exactly the sort of expertise that is needed. For instance, Te Hiku could support capacity development in hardware development and maintenance for artificial intelligence supported agricultural sensor kits (see below). While young people who learn to code Python (for example) are competing against coders from all around the world (often in countries with much lower wages), young people who are working with technology in the orchards of Te Tai Tokerau are only competing with local orchard managers who do not have technology skills.

Technology work, in particular, often has flexible hours and remote working options, which can be particularly well-suited for women doing unpaid care work in the home who are looking for upwardly-mobile, nontraditional work-from-home opportunities. Women in technology are a rapidly growing group and in-demand for the collaborative social skills, management capabilities, and creative problem-solving they bring to a team. In addition, technology work can also be a fit for people with disabilities who are working from home, and whose mental health status or physical disability makes it difficult for them to work in a traditional office environment. Technology jobs that can be done remotely enable people who are not otherwise accessing the workforce to bring their livelihoods home. Not all technology jobs offer this benefit, but many do; and women and people with disabilities could have additional incentives to apply.

4. How to Create and Support a Startup Ecosystem

In the last twenty years, massive attention and investment have been poured into creating accelerators, digital hubs, incubators and startup weekends. These proliferated with the support of governments, academia and civil society. In many cases, these initiatives hoped that hubs, accelerators and incubators would be able to sustain themselves by drawing revenue from the businesses they launched. This was based on a hope that local people would create high growth businesses. But these goals have proven difficult to achieve.

This is partly why organizations that were previously committed to creating startups via innovation hubs have frequently changed approach and wound down their networks (both, UNDP and UNICEF retreated from this approach across several dozen countries). After closely analyzing accelerators and innovation hubs on several continents, UNICEF discovered the one factor most likely to make them succeed was when they were directly overseen by a person who had been very successful in a Fortune 500 company. In contrast, as UNICEF's Regional Innovation Director for East and Southern Africa reported, "Western accelerators run by folks who had never built successful companies were actually stunting the innovation ecosystem."

There are two additional challenges to creating a startup ecosystem: the high rate of business failure and the cultural misfit between some communities and standard modes of doing of business. Here in Aotearoa, microbusinesses (those with fewer than 5 employees) have only a 37% chance of staying in business for two years—and those figures precede the impacts of COVID-19. Compared to other countries this is a better survival rate, but it still means a strong majority of failures. And business failures are not abstract events. They can lead to demotivation in the community and worsened financial hardship for families. Fortunately, there are strategies for increasing the success rate for startups, which we will explore below.

First, we must also acknowledge that the lifestyle sacrifices required of many entrepreneurs are not always attractive to young people or to those who have elected to live in Te Tai Tokerau for the slower pace of life. Needing to market oneself or one's products, risking public failure and being supported by only a small team, or nobody at all, may be unattractive on face value. Working long hours for uncertain reward is a tough sell even in areas where entrepreneurship is popular.

For people that care deeply about quality of life, it's important to offer templates of doing business that will not prove joyless and all-consuming. For people with few resources and a need to protect against the reputational damage caused by public failure, it's important to offer templates for doing business that are low risk. We'll explore two such templates for business creation that Te Hiku is well situated to support. These could prove inviting both to rangatahi and to adults in the community: pop-up businesses and cooperatives.

A) Pop-Up Businesses

A pop-up business is an impermanent form of business that has a known end point, at which the business will be deliberately closed. Pop-up businesses are increasing in frequency and popularity all around the world, and showing particular promise in the food, beverage, tourism and entertainment industries. They have a number of key advantages.

i. Advantages of Pop-Up Businesses

The first advantage of pop-up businesses is that they have a drastically reduced likelihood of failure. They are not designed to last for years and years. It is more common for them to exist for a week or less. The entire life cycle of the business is planned out before work and activities are conducted and the business unfolds more like a campaign or an event than an economic commitment. This lower likelihood of failure makes pop-up businesses more attractive for people concerned with the reputation cost of failure. And that concern with failure is higher (and arguably more valid) in smaller and rural areas where failure is easier to notice and remember.

The second advantage is that businesses that only exist briefly can leverage scarcity marketing. In a town like Kaitaia where restaurants struggle on quiet nights, a pop-up can stand out. Opening for one-night only concentrates demand into a short window and makes profitability more likely. Because of the likelihood of concentrating customers, it is easier to seek support, partnerships and sponsorships from other businesses that are comfortable being associated with the temporary phenomenon. These same sponsors or partners would typically have greater reservations and longer processes for teaming up with a permanent business.

Third, the short duration of pop-up businesses decreases the likelihood of conflict amongst the entrepreneurs or business partners. There is less time to develop competing visions of the business or for politics and relationship stress to erode the rapport of the team. People can participate in business opportunities when their relationships are strong and end the business on a high note. The same entrepreneurs can create another pop-up the very next week. But they don't have to drag their original business ideas around with them for month after month, year after year

Fourth, pop-up businesses can pick and choose optimal windows for operation over the course of the year. Holidays and the summer seasons bring bursts of economic activity. Pop-up businesses can capitalize on these rhythms without accumulating losses during slower times. This also enables repeat visitors (seasonal or otherwise) an avenue for sharing their talents and resources with the community.

This touches on the final advantage of pop-up businesses: they are ideal for iterative learning processes and experimentation. People can learn from a series of pop-up restaurants that Kaitaia diners are more excited about homemade ice cream than tacos or dumplings. And they can learn that without the sunk costs and wasted momentum of configuring an entire industrial kitchen, developing a brand and making a digital presence for a single choice. While the preceding examples pertained to restaurants the approach also applies to market stalls, retail shop fronts, touristic experiences and event production.

i. Methods for Creating and Supporting a Pop-up Business Ecosystem

It's key to lower the costs associated with pop-up business experiments, especially for rangatahi. To do this, Te Hiku could organize some of the infrastructure, including connectivity, that keeps pop-up costs low. As Te Hiku has learned in other contexts: the cost (in time and money) of setting up EFTPOS infrastructure can be too burdensome for small or occasional businesses to manage. Investing in the ability to stand-up WIFI, EFTPOS or QR code support for pop-up businesses will open opportunities for more technically savvy experiences and a way to connect with a wider variety of customers.

For some businesses, the biggest costs that Te Hiku could cover would be the preparation of adequate facilities. A test kitchen and sample retail space could be created and made available for different workshops and experiments. (These could leverage an existing community or commercial space during off hours or layer in with something like the digital hub.) The basic materials for a market stall could be made available to qualifying teams, or a food-truck or a store front on Commerce Ave. These different investments can be made gradually, only after testing the appetite of the community for pop-up experiences.

It's also key to provide mentoring and support to teams that want to attempt pop-up businesses. There are many individuals and organizations in the community who are sufficiently qualified to facilitate preparatory workshops with teams

interested in making use of pop-up business facilities. It's also a smaller and more reasonable ask than requesting community members to commit to supporting a business for months or years.

Proper pop-up businesses are not a way to dodge compliance with food and safety or regulations or tax code. To make pop-up businesses safe for new entrepreneurs and for the community, an organization, like Te Hiku, would need to take responsibility for teaching and verifying the necessary compliances. There is a spectrum of responsibility that Te Hiku could take, from simply providing training and education, to facilitating or offering mentorship and coaches, to actually sponsoring activities under its own organizational umbrella and compliances.

To ensure that the public doesn't miss out on pop-up experiences, it can be tactical to set a rhythm to this sort of business activity. For example, programming could aim for a weekly cadence: every Thursday nights there could be a pop-up restaurant experience, Saturday mornings there could always be one pop-up stall at the market and the last Friday of every month there could be a pop-up food truck parked outside a unique event that also features a pop-up retail space or pop-up gallery. These give rangatahi and others the opportunity to step, briefly, into the role of restauranteur, merchant, event coordinator or entertainer, without the enormous pressure of needing to cement that identity and succeed reliably for years.

For each piece of pop-up business infrastructure that Te Hiku helps to sponsor, there can be competitions to determine which teams from the community can make use of the infrastructure each week or month. They can vote on and support one another's ideas during and after the relevant trainings. For instance, there could be try outs during the middle of the week to see which team has the best idea for the market stall, or recipe testing events or kitchen speed testing to see which teams are ready for the challenge of producing food items on time and at scale.

A Word on Policy

People on the benefit are keenly aware of what sort of employment or profit loses their coverage. They are also keenly aware of how time consuming it can be to re-enroll in the benefit after leaving it to experiment with different work. To encourage entrepreneurship, there needs to be a more flexible and immediate process for re-enrolling on the benefit when it is only interrupted by pop-up or temporary work. To the extent that Te Hiku engages in policy recommendations, this would be a powerful lever.

B) Cooperative Businesses

The second avenue of business creation that Te Hiku can support is the establishment and operation of group or collective based entrepreneurship. If such collectives or groups experience success and become committed to their path, they might form cooperatives. But there is value in group or collective based businesses even if they never reach that point. As with pop-up businesses, group-based businesses offer people the opportunity to engage in business in a limited or part-time capacity, while giving them the flexibility to back out or abandon the business without major losses of capital or reputation.

Worldwide, cooperatives are significantly less likely to go out of business than traditional corporations. Their survival rate in Spain, for example, is at least seven times higher than conventional businesses. Cooperatives have a further advantage during economic recessions or stagnant periods: they can adjust the level of available work to ensure that every member has some work and draws some income, whereas traditional businesses are more likely to fire vulnerable workers.

After Te Hiku identifies the industries or livelihood areas that they would like to see growing over the next two decades, they can create a group learning and support structure at the base of each industry. This would serve as a safe space for training workers and building sovereignty.

When it is not possible to form a cooperative of expert workers who already know an industry, Te Hiku can create these group learning and support structures and mentor and oversee them on behalf of rangatahi and those who are hoping to make a career transition. Ensuring that women are represented at the table from the beginning will ensure that growth is inclusive from the start.

These may become formal cooperatives slowly, quickly or not at all. For example, there might be a tourism industry learning and support group that learns together by identifying opportunities for income-generating activities and experimenting with them, as with pop-up experiences.

Creating this group learning and support layer makes it safer for people to get hands-on business skills without first mastering the financial and tax code literacy that solo entrepreneurs must know. Meanwhile, Te Hiku can ensure regulatory compliance through one centralized entity for many members of the community, while gradually training interested members in managing those responsibilities. Generally, the cooperative shoulders or removes the major obstacles that prevent people from engaging productively in the economy and allows them to start collaborating in an environment that is both optimized for learning and in which it is safe to fail. Within a group environment, it's easier to experiment as an incubation space emerges for shared learning and best practices.

The Tolaga Bay Innovation organization has pioneered this group-based learning approach within majority Māori communities. Using regular meetings as a way for new entrepreneurs to practice marketing their ideas to one another and to receive support on key financial and business skills. The existence of these organizations also helps to attract support and investment from the community, as late career specialists (or retirees) with expertise can offer their services and resources to a recognized, enduring organization. This can cut down on nepotism or disengagement.

In the US, the Main Street Phoenix Coop has pioneered a noteworthy and related strategy: serving as a Holding Company that can buy distressed businesses and transition them to employee ownership. This coop grew stronger as businesses in the area began to fail from the impacts of COVID-19. In a normal situation, only the bank is growing as businesses fail: using their lending position to accumulate assets from distressed business people. This leads to the type of empty storefronts that are already too familiar in Kaitaia.

The Main Street Phoenix Coop works in service to the stability and prosperity of the community. Before businesses would begin bankruptcy or closure proceedings, they negotiate a sale that keeps the jobs and the business alive in the community. The Main Street Phoenix Coop also provides backhouse business services to these businesses; because the workers may not start with the same managerial familiarity that the owners had. This is a way to future-proof small businesses that are already beloved (or at least appreciated enough) by the community.

Te Tai Tokerau is known for a focus on farming, forestry and fishing. In their current state, these industries are not conducting business within the safe operating space of the Doughnut Economics model. They are pushing through the ecological ceiling, damaging biodiversity, threatening fresh water supplies, and contributing to nitrogen loading and chemical pollutants—amongst other issues. The quality of the jobs that they currently offer could be a lot higher. Their current perspective is decidedly not multi-generational. How could they be transformed?

Each industry could easily be the subject of its own detailed report, especially because innovations in all three areas are proliferating, in terms of new technologies, new business models and new strategies. The themes in earlier sections are relevant to all three industries, especially the subject of cooperatives using their own digital platforms to connect with markets and improve operational efficiency. In this section, however, we'll focus on data gathering, dashboards and the deliberate interoperation of industries.

A) Digital Sensors, Internet of Things and Data Science

It's still common to think of environmental sensors as costly to install, difficult to maintain and productive of complicated streams of information. For smaller businesses, such technology might seem distracting or out of reach. But the prices of sensors, micro-computers and related artificial intelligence have been plunging. At the same time, the quality and capability of these technologies have risen astronomically—putting into the hands of small businesses a level of monitoring capacity that was only available to huge companies just a few years ago.

This trend will continue to accelerate, driving adoption of sensing devices and dashboards. It would be strategic for the community served by Te Hiku to engage productively with these technologies at this early stage. There is an opportunity to cultivate specialist ability in the district around the assembly, installation and maintenance of digital sensors. For instance, a portion of the Kaitaia Digital Hub (or other community space) could be devoted to hands-on learning about the Internet of Things (IoT) devices and open source hardware, like Raspberry Pi computers (which are cheap, small and easy-to-assemble computers that can be used for almost any commercial application). Such a hub could intersect well with any citizen science initiatives. It would also be supportive of Ngati Kuri's existing leadership in biodiversity monitoring and protection.

Taking an active role in cultivating this specific form of digital expertise also makes it easier to advocate for data sovereignty. Sensors, without thoughtful consideration to data and privacy, can be used to intrude upon the privacy and sovereignty of a community or an individual. When a community is empowered to assemble, maintain and even innovate with their hardware layer, they are in a stronger position to influence the software layer that operates through those sensors. Consider, for instance, that NRC is planning to install sentinel bores to monitor avocado orchards. They are not currently planning to open that data to the general public or to citizen scientists. But if the community was closely tracking this issue, they could better demand access to that data—and even data streaming directly from all major horticulturists in the area.

5. Digital and Other Innovations that Help to Evolve Existing Industries

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A) Digital Sensors, Internet of Things and Data Science

It's still common to think of environmental sensors as costly to install, difficult to maintain and productive of complicated streams of information. For smaller businesses, such technology might seem distracting or out of reach. But the prices of sensors, micro-computers and related artificial intelligence have been plunging. At the same time, the quality and capability of these technologies have risen astronomically—putting into the hands of small businesses a level of monitoring capacity that was only available to huge companies just a few years ago.

This trend will continue to accelerate, driving adoption of sensing devices and dashboards. It would be strategic for the community served by Te Hiku to engage productively with these technologies at this early stage. There is an opportunity to cultivate specialist ability in the district around the assembly, installation and maintenance of digital sensors. For instance, a portion of the Kaitaia Digital Hub (or other community space) could be devoted to hands-on learning about the Internet of Things (IoT) devices and open source hardware, like Raspberry Pi computers (which are cheap, small and easy-to-assemble computers that can be used for almost any commercial application). Such a hub could intersect well with any citizen science initiatives. It would also be supportive of Ngati Kuri's existing leadership in biodiversity monitoring and protection.

Taking an active role in cultivating this specific form of digital expertise also makes it easier to advocate for data sovereignty. Sensors, without thoughtful consideration to data and privacy, can be used to intrude upon the privacy and sovereignty of a community or an individual. When a community is empowered to assemble, maintain and even innovate with their hardware layer, they are in a stronger position to influence the software layer that operates through those sensors. Consider, for instance, that NRC is planning to install sentinel bores to monitor avocado orchards. They are not currently planning to open that data to the general public or to citizen scientists. But if the community was closely tracking this issue, they could better demand access to that data—and even data streaming directly from all major horticulturists in the area.

i. Agriculture

Appropriate sensing devices and monitoring services can be marketed and sold directly to orchards and other farms. A group (perhaps a cooperative) of technology literate people able to install, repair and upgrade these sensors could offer valuable cost savings to farmers of every description. Agriculture sensors are gaining popularity for their ability to spot problems (insect pests, plant disease and more) in the shortest time possible. This

enables treatments to be administered early, before crops or animals are badly impacted. This saves on the cost of raw materials (like pesticides or medicine) and helps to prevent losses. Sensors can also help to guide watering and irrigation. These types of sensors are the backbone of precision agriculture, which is a growth industry worldwide.

Digital dashboards are the counterpart to these sensors. Increasingly, map-based dashboards can be accessible on simple mobile devices, tablets or computers. They enable farmers to track and visualize the health and prosperity of their farms in a digital way. This can often lead to new insights and it can support long-term planning. It constitutes an initial area where technical workers can provide support.

These technologies are being particularly embraced by Aotearoa's regenerative agriculture industry. That sector has long relied on more anecdotal or observational data to support their claims of improved farm resilience, water retention or crop health. The technologies to substantiate those claims are now being developed and deployed around the country. The scientific community already has the ear of government (MPI, for example) in this regard and it is likely that policy will align with data from these new initiatives to generate further tailwinds for regenerative agriculture.

An additional reason to start cultivating this expertise is that the next wave of sensing technologies to become commercially or even personally available is hyperspectral imaging: this means a camera that can detect more than a hundred different wavelengths of light at a time. Hyperspectral cameras have the ability to detect individual elements or chemicals and can play an incredibly powerful role in tracking pollutants, nutrients, plant diseases and more. As these cameras arrive, they'll be optimized for use on drones (airborne, terrestrial and aquatic) and they'll enable much more wholistic approaches to farming and ecosystem management.

Finally, with regard to agriculture, Te Tai Tokerau is the first part of Aotearoa to begin experiencing the warming temperatures that climate change will deliver to the rest of the country. Te Tai Tokerau can play a lead role in identifying and cultivating species that are adapted to warmer weather and more volatile swings between drought and downpour. Climate Experts frequently advise orchardists to plant trees that are rated to 2 USDA hardiness zones warmer than one's current climate. There is an opportunity to position Te Tai Tokerau as a leading outpost in the climate adapted horticultural strategies that will become increasingly relevant to the whole of Aotearoa.

ii. Conservation and Environmental Management

The second major monetization opportunity of sensors relates to the stewardship of the natural environment: measuring and tracking biodiversity indicators, attending to the micro-fluctuations within waterways and delicate ecosystems. Part of this opportunity is focused on ecosystem regeneration and regenerative agricultural practices—both of which require sensitive environmental measurements to prove their success to donors and supporters. Part of this opportunity focuses on conservation or the monitoring and protection of vulnerable ecosystems. There is not better layer of protection than an informed community. Trusting industry alone, or isolated government employees, creates unnecessary risks when the issues are matters of environmental health (and ultimately, life or death).

At recent environmental court hearings about water consents for avocado orchards on the peninsula, it became apparent that contingency plans for ensuring the long-term safety of ecosystems and fresh water on the peninsula are dangerously limited in their scope and thinking. They mandate infrequent measurements of a small number of variables, taken far from each other over large and disparate areas. These plans do not demonstrate multi-generational stewardship over the future of the peninsula and they show no willingness or ability to engage with state-of-the-art monitoring technologies. "Sentinel bores" are the only newer technology mentioned—bores that sit within the wetlands and stream information to NRC. All other terrestrial or aquatic sensors are completely ignored. There's no mention of constant monitoring of biodiversity levels (whether birds, insects or the macroinvertebrate community); nor is there mention of constant water quality metrics that could detect the spread of contaminants from tantalized poles or chemical treatments. Air and soil quality are similarly ignored.

There is a big opportunity to demand monitoring requirements aligned with iwi values, which then support jobs within the monitoring sensing industry. A community that cultivates awareness of the sensing options and expertise in their use can better advocate for itself and its environment. Then it can partner with industry in creating safe and sustainable plans instead of landing in an adversarial or disengaged position. Additionally, the jobs that are possible within this sensor industry are better stepping stones towards personal and professional growth than seasonal picking jobs or non-specialized manual labor.

iii. Marine & Aquatic Applications

The same resources that are being developed for stationary monitoring in fields and orchards are being adapted for aquatic, marine and airborne platforms. Such technologies are currently more expensive (as they involve more robotics or investment in water protection); but they are also plunging in cost, increasing in capacity and enjoying rapid adoption. In short order, the same sensing and monitoring expertise that could ensure optimal and sustainable orcharding could be applied to our waterways, harbors and upcoming kai moana hatcheries (whether for seaweeds, fisheries or shellfish).

There has, for example, been some progress in Aotearoa created novel measurements of ecological health that everyone in a community could understand, such as “Safe to swim or Not safe to swim” water ways. Puhoi Stour have helped to build a coalition of scientists and companies that are able to work with communities to combine many different water quality measurements into some overall metrics that describe the potential uses of different water bodies.

iv. Tourism

We’ll examine tourism more closely in a later section, but it’s worth mentioning here that sensing platforms create the opportunity to document where biodiversity hotspots are thriving and in good health. Being able to monitor and protect (or regenerate) areas of biodiversity opens the possibility of creating new tourist experiences around natural Taonga. Some communities hesitate in the current environment of tourism because opening access to beautiful areas can result in overloading. But a carefully sensed and monitored biodiversity hotspot could be stewarded in a way that keeps visits within limits decided upon by the community and correlated to objective measurements of ecosystem health. The community can, for example, monitor the impact of visitors on popular hiking trials.

Globally, tourists have also shown interest in the chance to participate in citizen science and ecological regeneration activities. Giving them opportunities to sponsor or remain digitally connected to, for example, native trees that they plant, could foster longer-term connection to Te Tai Tokerau, encouraging return visits.

v. Community Benefit

Building expertise in IoT sensors and open data dashboards has the potential to center the community served by Te Hiku, giving them a chance to show leadership, even at a national level, on the close stewardship of vulnerable environmental resources. Te Tai Tokerau could become a center of excellence on these matters.. Investing in this sort of digital architecture also creates something that science teachers at schools in Te Tai Tokerau can connect with in their lesson plans. It can give rangatahi awareness of a new livelihood possibility, something that could advance them professionally, close to home, in an industry perceived as modern.

vi. Partnerships and Investment

Leveraging technology in this way is currently a high probability way to attract significant financial support both from foundations and also government investment bodies. There are several organizations in Aotearoa working to create map-based digital dashboards that track important environmental (and social) data with as much frequency as possible There is an opportunity to create relationships with these organizations so that data from the community can be present and visible within public systems. There are also, potentially, ways for the community to monetize the provision of data to either governments or industry bodies (although the data economy is just now emerging and not yet easy to map).

There is substantial money and partnership support sitting on the sidelines waiting to

support farmers in a transition towards regenerative and organic practices. More than any other industry with an existing footprint in Te Tai Tokerau, regenerative and organic farming can draw on significant investment and support. Calm The Farm is an Aotearoa based outfit that helps with data-informed farm management plans. They line up very low interest loans, impact investors, mentors and technological support for farmers (of any variety) planning to transition towards regenerative agriculture. They are aware of the costs and challenges during transition years and have coaching and resources on hand to support farmers. The Hirschberg Institute is a South Island based center of excellence in Organic Farming that stands ready to connect organic farmers with buyers around the world and to support them with marketing and communication assistance. Quorum Sense is an Aotearoa-based digital community full of expert practitioners, ready to coach farmers as well. By establishing ties with these supporting organizations, Te Hiku can help connect farm managers with support that de-risks the necessary changes.

B) Values-Centric Branding

If Te Hiku takes the lead in measuring the environmental sustainability of different producers on the peninsula, there is an opportunity to create a brand or a certification, or a seal of approval, that communicates the endorsement of the Te Hiku community. Such a mark can be integrated into tourism efforts, digital currency efforts, the cooperative ecosystem and efforts to support the region socially. Social branding is an innovation in its own right and something than enables and supports other beneficial actions. It can be linked with quality control services and access to distribution channels.

Social branding can play a key role in helping to foster more business experimentation for early-stage ideas and ventures. In the same way that registering a business and committing to a long-term business building process is laborious, creating and marketing a brand is hard work. For many people, it does not come naturally and it is not an aspect of business that they cherish. If Te Hiku is interested in supporting experimentation in many small businesses, they could create and perform vital quality assurance around an umbrella brand that could be leveraged by pop-up businesses and startups alike. The brand could foreground the values and multi-generational vision of Te Hiku, thereby helping to steer the innovation ecosystem towards more sustainable business practices. This is another avenue by which Te Hiku could serve as an Anchor Institution.

As the climate warms and farmers and whānau are forced to experiment with plants that are more drought and heat tolerant, there is an opportunity to explore tropical products from Aotearoa. This is a huge potential addition to the overseas brand of Aotearoa, broadening what's available to include things like mangoes or dragon fruit that are more readily associated with equatorial regions. A brand with some existing marketing channels (even if it's just the market stall and the retail shore front, at first) allows people in the Te Hiku community to experiment with professionalizing their growth of new, boutique, exotic foods and botanicals.

C) New Interoperability Between Industries

The future of forestry, fishing and farming (inclusive of horticulture) is far more intertwined than it has been in the recent past. This is particularly true as we learn to make more fruitful and sustainable use of our coastlines. With good reason, aquaculture initiatives are being prepared for the peninsula. It's easy, however, to get focused on a single species: the value of toheroa, for example, or the value of mussel spat. A single-species focus increases the vulnerability of these industries to reckless behavior, as everyone around the table is looking for profit in the same area.

Lessons from aquaculture innovators around the world point to a holistic approach.. First, aquaculture, whenever possible, should look to identify and utilize value of several species at once—ideally both plant and animal. Second, aquaculture can receive powerful support from land-based farmers when (by)products are identified that help with soil regeneration (or, in Aotearoa, methane-reduction interventions for cattle).

As commercial forests on the peninsula near their final cycle, many regard the land beneath them to be depleted and of little value. Perhaps a transition to grazing is all that comes to mind. There is an opportunity however, to encourage experimentation specifically in the rapid use and

rehabilitation of hectares depleted by pine forestry. Te Hiku could encourage experimentation by way of contests, offering some seed capital and a free lease on small parcels of forestry-degraded land to see what creative ideas growers (or tourism operators) could come up with. Mineral rich seaweeds or seaweed teas can be leveraged to bring these depleted forestry blocks back into richness more quickly.

D) Developing Laboratory Expertise

At this stage, it's not possible to predict what sort of laboratory services will be most relevant to industries in Te Tai Tokerau in the coming decades. However, it would be prudent to keep track of what laboratory tests are being done outside of the region on behalf of its industries and for what costs. For example, the following costs may add up: monitoring water quality samples, testing the levels of different nutrients in certain crops or doing soil analysis. It would be prudent to anticipate a medium-term investment in laboratory capabilities, after sufficient mapping of the ecosystem has been undertaken. Having this in mind and earmarking some future funds or investment will help nudge the ecosystem towards sharper planning and more sovereignty.

6. Other Potential Growth Industries: Tourism and Housing

A) Tourism

With COVID-19 ravaging the world, tourism may seem like a distant memory or wishful thinking. But there's little doubt that visitors will continue to find their way to the Far North in years to come. The question is: how can the people of the peninsula add to the economic value of these visitors and capture more of that value, whether the visitors come from elsewhere in Aotearoa or from countries around the world. Now is a perfect time to create a new vision and make meaningful investments towards a more inclusive and regenerative future for the tourism industry.

i. Pay to Access

Northland Inc just sponsored Meneth Consulting to conduct Destination Management research throughout the Northlands with the aim of providing recommendations about the future of tourism in our region. Based on our attendance at one of these workshops and a subsequent conversation with the lead consultant, we are confident they will recommend increased support for communities that wish to create pay-to-access tourism experiences. This goes hand-in-hand with limiting the strain on ecosystems and stewarding the ecosystems to a world-class standard. To get restricting access right, operationally, the technologies are a huge support. And to get restricting access right, socially, the cooperative business models, in particular, are a big help.

ii. Youth

However, one stakeholder group was conspicuously under-represented in the tourism workshops (based on the consultant's own admission). Rangatahi are not currently in the picture. Youth owned and operated tourist experiences are not yet visibly present in the area. At the same time, youth-driven and youth-focused experiences can be attractive to visitors and both educational and profitable for the youth.

ii. Cooperatives

There are overlaps once again with platform cooperatives. In Europe, new platform cooperatives have emerged to impact every corner of the industry.. New worker-owned and worker managed digital tools now support fleets of (electric) rental cars; they create a direct marketplace of guided touristic experiences and they offer accommodation. In many cases, the architects of these platforms are willing to share their code or at least their lessons learned.

iv. Augmented Reality and Digital Story-Telling

There is another, technology-centric avenue to enrich touristic experiences that is becoming more accessible and globally popular: the combination of IoT devices, QR codes and audio or augmented reality story-telling. By way of example, a group could carefully record a significant historical or mythological story about a given natural area: perhaps a specific bay, or a spot up on the Te-Paki sand dunes. They could then install a small post with a QR code at that location, which, when scanned by a mobile phone offers a tourist the ability to listen to that story in the appropriate setting. These can be available for free, by subscription or paid for one-by-one. These sorts of experiments are already under way; the role of an Anchor Institution is to look for ways of knitting them together in a way that makes technological maintenance easiest over time and, ideally, that maximizes the number of people (and generations) that can participate and benefit.

Audio recordings are the low hanging fruit, but animated augmented reality (AR) through a mobile app could draw on local talent to bring history to life. Te Hiku could also partner with an organization that teaches visual story-telling in augmented reality, for example animating the arrival of Kupe's waka in Te Kohanga through an app similar to Pokémon Go. This would involve teaching people, especially rangatahi, some commercially

valuable skills in 3D design and animation. It also serves as a profitable opportunity for both artistic, creative and technical people. These digital experiences can be seeded throughout the environment and advertised to visitors. In the case of augmented reality experiences, the visitors would hold up their phones and watch as historical or mythical events unfolded, digitally overlaid upon the real world. Skills developed in this arena are highly sought after in Aotearoa's fast-growing film and digital media industries.

v. Dark Sky Sanctuary Status

It is likely that all or most of the Aupouri Peninsula could qualify for Dark Sky Sanctuary (DSS) status. This is a status that recognizes an exceptionally low level of ground-based light pollution and it means that starry nights are clear and beautiful enough to attract visitors for their own sake. The Great Barrier Island has been awarded this designation and Martinborough Dark Sky Society was awarded Provincial Growth Fund support to explore their own plans for a Dark Sky Sanctuary. Nearby Hokianga is exploring the possibility and networking multiple areas together could make the entire region more attractive to visitors. There are at least three key advantages come from pursuing such a designation:

First, tourists need to stay overnight to enjoy a DSS. They cannot stay in Paihia and easily take a bus in and out of the area. Finding ways to keep visitors on the peninsula overnight can drive growth to the hospitality sector. Second, there are many ways to add value to the tourist experience of a DSS. For example, a community group could invest in a cutting edge telescope and offer guided viewings from a place of historical importance. This leads to more opportunities for jobs in tourism that overlap with scientific expertise or cultural knowledge—since stories about wayfinding and celestial navigation could be easily included. Ngāi Tahu have demonstrated the economic value of combining cultural narrative with celestial observations. Third, creating a DSS gives the community much more influence over the future built environment. It creates legal leverage that the community can use to ensure that future hotels or other dwellings are highly sensitive to the light that they admit, which requires more thoughtful architecture and planning.

vi. Biodiversity Corridors

The organization known as Reconnecting Northland is doing pioneering work to help knit together pockets of biodiversity in the Northland region. Because these efforts help to support native flora and fauna, they also attract visitors, both local and foreign. At present, areas north of the Mangamukas are not included amongst these linked up ecosystems. Yet, the Aopouri peninsula lends itself, geographically, to a corridor-based approach and boasts globally unique ecosystems, like the kaimaumau wetlands. The sooner that a vision is established for identifying, measuring, protecting and interlinking native ecosystems, the easier they become to protect and the sooner the marketing and story-telling can begin to attract visitors and opportunity. When an organization, like Reconnecting Northland, has already proven adept at attracting PDG moneys, it is tactical to get on their project pipeline.

B) Housing

Two other groups are likely to be increasingly relevant to the future of Te Tai Tokerau: retirees with government pensions and remote professionals s, who love the lifestyle in Te Tai Tokerau and can do their work online. Both of these require housing solutions. Housing in Te Tai Tokerau is already fraught with challenges: low quality dwellings, low connectivity, high rental costs, and erratic zoning decisions that make town planning and expansion difficult, to name a few. Numerous homeowners decide to rent their homes profitably to tourists for scattered weeks and weekends instead of adding to the housing supply for housing insecure residents of Te Tai Tokerau. If we add the profitable business of renting living space to retirees and remote workers, we risk worsening the social and economic divisions that are already present.

The traditional approach to housing development packs as many dwellings into the available physical space as council will allow and floats them to the market for as much as possible before moving on to the next development. This sort of approach misses the opportunity to use housing to design healthier and more inclusive communities. It also creates developments that are less attractive for exactly the type of long-staying potential residents who would help to build new industries: remote workers and retirees.

Both remote workers and elderly people need connection and look for community when deciding where to place themselves. In Aotearoa there are some noteworthy experiments in designing integrated communities. These have the potential to weave together sustainable and affordable dwellings, community services, hands-on education and entrepreneurial opportunities like attracting and drawing revenue from remote workers or retirees. The planning and investment processes to get such initiatives off the ground are considerable. But there are playbooks to follow from Earth Song in Auckland and the newer Mohua Village (still in early stages) in Golden Bay. Waingakau Village in Hawke's Bay and the Kotare project could offer additional points of reference.

i. Elder Care

The warm weather of Te Tai Tokerau is attractive to cold-sensitive seniors. But for those with more serious health conditions, the available medical facilities are insufficient. There may still be a niche for retirement villages or assisted living facilities targeted to the more healthy and mobile elderly customer. For this demographic, access to nature, gardening and community all improve quality of life and could be offered year round in Te Tai Tokerau. There are significant employment opportunities in elder care that can serve as stepping stones towards more advanced jobs in health care and social services. A values-centric and community-aligned assisted living facility offering employment for rangatahi and meaningful interactions to the elderly residents could prove an attractive proposition.

If the facility is run as a social business, the possibility also exists to charge a premium to customers who are not (and have not been) resident to the Far North, so that their rates subsidize the provision of services to elderly people within the Te Hiku community who would otherwise be isolated or under-supported by family.

ii. Remote Workers

One approach to stimulating an economy is to attract knowledge workers to your location who have the freedom to base themselves anywhere that they find the lifestyle attractive and the digital connectivity sufficient. There can be cultural tensions around the idea of serving this class of worker, especially against a backdrop of limited affordable housing. Such remote workers could be attracted by rental prices that are still higher than locals are willing to pay, resulting in further upward pressure on monthly rental costs. Economic and cultural sensitivities must be considered and navigated before embarking on this trajectory.

But if the community is in favour of the idea, it typically starts with identification of a beautiful physical location that has (or can be provided with) high speed Internet connectivity. A co-working or gathering space can be identified or built within easy walking or biking distance to rental housing. Regular shuttle bus services to town for grocery shopping would complete the basic list of offerings. This whole undertaking could be invested in and operated by a community organization for profit and for social benefit. Initially, the target market can be people who want to find a way of staying in the Far North longer. It could quickly be expanded to other nationalities who are looking for a certain lifestyle as the backdrop for their work. Strong connections with and buy-in from the iwi represented by Te Hiku would be a powerful attractant to many of the "digital nomads" who exist within this new ecosystem. Notably, in the US, the Center for Rural Innovation has found making affordable housing in the vicinity of its innovation hubs to be of high importance.

7. Innovations for Generating Liquidity and Economic Stimulus

Poverty was at problematic levels in Te Tai Tokerau before COVID-19. In other locations where poverty is endemic and where the economy is stagnant or declining, communities and local governments have experimented with creating new forms of currency. The idea of printing and distributing hyper local currencies has been popular with Transition Towns for several decades and is familiar to many in Te Tai Tokerau.

The advantage to having multiple currencies in use is similar to the advantage of planting multiple crop species: resilience in the case of shocks. The economics shocks that impact the global economy roughly every decade have shown a marked tendency to concentrate wealth and ownership of assets. Businesses and families that are not prepared have to sell their assets to businesses and families who have a cash reserve. One of the only ways to begin opting out of this adverse macro-economic environment is to create means of exchange (and stores of value) that are designed to enrich the local economy.

While shocks to the global economy (like COVID-19) can constrict the supply of dollars, or even cause dollars to lose value, local, digital currencies designed for and by communities are more likely to be counter-cyclical: increasing in use and value when the larger market suffers. This is being demonstrated currently in Italy, South Africa and Kenya, to name just a few.

Similar to the pop-up businesses, currency experiments can be attempted in short-term, experimental ways before committing to a larger roll out. It can be good to think of them as an applied learning experience that helps to broaden the community's awareness of economic vulnerabilities and opportunities. There is a financial literacy advantage to giving a community the chance to experience the difference between a currency with a negative interest rate and a positive one, a currency that arrives automatically or expires automatically, or a currency that specifically rewards activities considered virtuous or desirable.

Customized currencies also deserve a fresh look because digital innovations have lowered the cost, decreased the risks and amplified the benefits of such experiments. With digital currencies, groups can avoid the expense of printing, storing and distributing physical notes. They can also benefit from levels of transparency and security that make corruption or theft much less possible. The same transparency makes it easy to map how currencies are circulating and to reach out to individuals and businesses who are not spending or transacting as anticipated. The interest rate on digital currencies can be programmed to make them circulate.

Perhaps most interestingly, recent initiatives have programmed rewards (or incentives) into the system. For example, new currency can be rewarded to community members who complete valuable trainings (in CPR, food safety, or conflict resolution). In South Africa, a digital currency called Zlato incorporated mobile-based learning to train users how to gather and submit information that was helpful to local businesses or organizations. This same system was used to reward community members who for good public health behaviors related to COVID-19, showing the flexibility of the incentive system

There are now several multiple technologies that can facilitate this sort of experiment. It's important to note that a critical step is working alongside businesses to ensure they will be willing to accept some of this local currency for their goods or services. In South Africa, Shoprite, a major supermarket, accepts Zlato as part of their Corporate Social Responsibility and also their customer acquisition strategy. Because they only accept Zlato for certain staple foods, they find that most Zlato customers still spend fiat currency when they visit. Other businesses offer discounted prices to those spending. An alternate approach is working with government to ensure that taxes can be paid via the currency.

This sort of model can be used at a regional level and marketed to tourists. It can reward tourists for behaviors the community desires, like planting trees, cleaning beaches or taking water quality measurements as citizen scientists. The currency can also drive them to spend within community businesses or to attend events and festivals where the currency is accepted or promoted.

It takes time, investment and sustained community engagement to succeed with initiatives of this variety. And where many of the analog community currencies have failed, they have often generated, at the same time, subsequent waves of innovation within the community. At the very least, exploring such opportunities builds financial literacy, builds technological literacy and knits together productive layers of the community in future planning.

8. A Word on Connectivity

In conversation with Vodafone, it became apparent just how cost-prohibitive it will be to erect enough towers on the peninsula to reach ubiquitous coverage. Unless they are forced by regulation or heavily subsidized, it seems unlikely that a major ground-based Mobile Network Operator will provide widespread coverage anytime soon. This creates an opening for strong demands in the interim. A few strategies worth considering:

- It is increasingly common to refer to connectivity as a "public good" and to suggest that lack of access to connectivity creates "information poverty." This terminology is in use, globally, thanks to the Giga Initiative, sponsored by UNICEF.

- Identify locations (such as Maraes, or parks and beaches) that should be blanketed with super fast connectivity and permitted unlimited data.

- Because 5G requires more towers than 4G, companies may use this as an excuse not to invest. 4G is very adequate for most technology users; perhaps as MNOs replace 4G with 5G towers elsewhere in the country, they can relocate the 4G towers to the North.

- families will struggle to have their households connected, MNOs could permit family members to create unlimited wifi hotspots for one another using their own mobile devices and data signals.

- In line with the digital principles, demand that if any public funds are used to pay for the towers, that the resulting connectivity is either free or significantly subsidized. If, for example, Vodafone seeks to use PGF money to build their towers, there should be extra provisions for community members to experience discounted connectivity, since PGF money is meant to benefit citizens not off-set customer acquisition costs for enormous corporations.

- It was rural electricity cooperatives that brought electricity to most of rural USA. Electricity companies didn't see the value in paying to connect small populations; but the cooperatives did and remain in an advantaged position now centuries later. This might be a relevant playbook for iwi. Conversations are already happening between Skylink (a satellite-provided Internet company) and changemakers within Aotearoa about this sort of possibility.

9. Conclusion

Te Hiku is well situated to expand its role as an Anchor Institution by developing important skills in the community and by establishing enduring protections over both the community and the natural world. This involves a mixture of embracing brief, temporary and creative experiments and making generational commitments of protection and oversight.

There is immediate benefit in creating a safe and enjoyable environment for community members to explore and experiment with business activities. Te Hiku can establish various sandboxes within which community members can learn about how their products and services interface with local markets. This takes financial and business literacy out of the classroom and puts it within temporary market stalls, shopfronts, food trucks or commercial kitchens.

Multiple smaller initiatives could be wrapped around this environment, such as mentoring and backhouse business support, the development and leveraging of a shared Te Hiku brand; and marketing around a calendar of events that captures the community's attention.

By observing where the community shows the most interest and vitality, Te Hiku can determine where to invest in more permanent forms of support, such as the creation of cooperatives that build and sustain expertise within different industries. Te Hiku can also identify what forms of digital infrastructure would bring the greatest advantage to the community. Perhaps it makes sense to invest in open digital infrastructure for the supply chains that link food growers to customers or markets. Perhaps it makes sense for Te Hiku to invest in the hardware and software that enables monitoring ecosystem or horticultural health.

In the background, Te Hiku can assess and adopt frameworks that help to steer investments and industry towards an attractive future for the community. This may involve commitment to the Doughnut Economics Framework, the Digital Development Principles or certain community-determined metrics like "safe to swim" waterways. These principles and experiments can all be set within a generational effort to stitch together thriving and biodiverse natural ecosystems.

By looking to create inclusive, reliable, shock-resistant institutions that enable agile, playful, constant experimentation, Te Hiku can help to bring both vitality and resilience to the economies and the communities that it serves.

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11. Background on Code Innovation

Code Innovation is a US and Aotearoa based strategic consulting company with expertise in digital technology, economic development, equitable and inclusive design practices and environmental stewardship. Code consults with and designs programs for governments, non-profits, established companies and startups. Code's technology work has received funding from UNICEF, the Bill & Melinda Gates Foundation and the UK's Department for Foreign Development along with a variety of Foundations and charities. Code merges practitioner experience from fragile countries and vulnerable communities with insider knowledge of exponential tech trends in order to help clients mitigate likely risks while benefiting from tailwinds and opportunities that the mainstream often fails to see.