Te Mata o te Tai – The Edge of the Tide

Rising capacity in information technology of Maori in Aotearoa

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Waiata hei mihi mo koutou

Tirotiro ra, te mata o te tai	Observe the edge of the rising tide
Hura ana e, Whati ana e	Its flowing, its swelling
Tirotiro mai, nga morehu nei e	Observe also these survivors
Tupu ake tatou	We rise
Ka ora tonu e-i	We still survive

Abstract

We can extract relevant lessons in the information technology era from our colonial past. One such lesson is to understand how information technologies might further impact on our knowledge. While there are many recent information technology projects they are often ad hoc and in “pilot” or “trial” mode, reducing any chance of sustainability or ‘proof of concept’. However, experience has taught us some of the pitfalls, management and effectiveness of information technology, and our capacity to understand, select and critique is increasing. Thus, the edge of the tide creeps slowly forward.

Drive for survival

After food, shelter and reproduction, there is culture. For whatever reason, we strive for cultural survival - in the face of physical threat, we fight; in the face of colonisation, we redefine, reclaim; in the face of information technology, we position ourselves so that we and everyone else can know we are distinct - and that is survival also.[1]

We need to have a *presence* and to be remembered – not just by others, but by ourselves. Predictions that Maori would disappear early last century (Hiroa 1949 p409, p537, Walker 1996b p176) due to colonisation would have transpired except that we have strove to reclaim and maintain knowledge about ourselves and then ensured its dissemination back. Information technology is a tool that will help us 'remember'.

Defining information technology our way

Definitions of information technology need not be limited to those found in information technology journals. Potentially, any means of storing, analysing and disseminating information can be included - even our minds. By ignoring the jargon and focusing on this idea, it is clear that Maori concepts such as "matauranga" and "hinengaro" can encapsulate (and enhance) what we believe about information technology and offer a wider context. Matauranga refers to education and intuitive intelligence, and is linked to the divine. Hinengaro is the mind, the thinking, knowing, perceiving, remembering, recognising,

feeling, abstracting, generalising, sensing, responding and reacting (Pere 1991, p32). In this light, Maori knowledge informs us about why Maori might be highly motivated to take up information technology and why concepts of information technology, as its industry sees it, are not only accessible to Maori but even simplistic.

Predictions about information technology

In 1991, Mander's book, stirringly titled 'In the Absence of the Sacred', states that the eventual adoption of information technology by indigenous peoples is a *fait accompli* but warns of the probable breakdown of unique cultures, and the hard sell tactics of the exploitive western world. This expresses the vulnerability that information technology represents for Maori, in areas of further colonisation, legally unprotected ownership of knowledge and information, unsupported views about collective guardianship of data, and a high risk of compromising the integrity of knowledge and its distribution.

Yet, the speed of information technology developments leaves little time to reflect. Toffler's renowned 'Future Shock' in the 1970's, discusses the acceleration of change and our future critical need to adapt. Information technology brings new choices almost daily. What impact does the Internet have on us with its ability to hurl information all over the world, communicate at split second speeds, and enable faster decisions? To exercise 'choice', as Toffler and Mander both advise, requires the ability to comprehend what is being offered and to predict the impacts to the best or our abilities. The learning curve for Maori must be steep and swift.

Toffler points out that if a nation (or in our case indigenous peoples) is poor, it tends to welcome any technical innovation that promises to improve economic output or material welfare without argument. He states that this is brutally unsophisticated (Toffler 1970, p383). However, are Maori as passive as that? On one hand, we are the 'poor' recipients of whatever technology arrives, but on the other, I believe we are becoming increasingly sophisticated in our decisions about information technology.

Impacts of early 'information technology'

The English missionary-scholars arrived in Aotearoa in the early 1800's with their technology, the pen and paper (Kamira 2000b). Pakeha (the non-indigenous settler population[2]) historians and anthropologists were prolific publishers. These types of information technology encountered by Maori were the first of a series that separates knowledge from its spirituality. It was the beginning of a systematic process by which Maori knowledge was discarded, modified or validated to suit an English international strategy for colonisation – an attempt to conquer both geography *and* knowledge systems (Kamira 2000b) - an attempt to forget.

It is now well known that some of the early English writings were deliberately altered. Maori were 'defined' and history and knowledge reproduced (Smith 1992, p34). When the process of unravelling all of this began with Maori scholars and others such as Hiroa (1949, p526), Mikaere (1994), and Smith (1992) the extent of the alterations became clear.

There is also evidence that some material given by Maori to Pakeha authors was hoax information, given as a way of getting back at an exploitive relationship (Walker 1996b, p174). Even where Maori were the writers, payments that were offered in return for their writings prompted them to produce sheer volume to earn monetary reward, but did not guarantee accuracy (Walker 1996b, p174). Also the Maori Land Court, a system introduced in 1865 to further alienate land from Maori, created copious written records of genealogies, places of spiritual significance and historical events. However, these records also require close scrutiny because Maori were forced to *counter* claim against each other and therefore some of the evidence is understandably contradictory (Kamira 2000b). Hiroa, Kamira, Mikaere, Smith, Yates-Smith and Walker also note that Christianity brought about deliberate alterations to belief systems.

Further, legislation also contributed to the gradual breakdown of knowledge. For example, Walker (1996a, p264) and Smith (1992, p33) explain that the Native schools system introduced in 1867 was driven by assimilation. The Maori language was banned and its use by children was punishable. What is more, the curriculum was deliberately downgraded and inferior (Walker 1996a, p265) - and delivered *en masse* to new generations of Maori children.

Aside from these integrity issues access to some of that knowledge has been and continues to be restricted as universities, libraries, museums and Government departments claim that they 'own' the knowledge (or at least the paper it is written on), and that to return it to the

source would be to risk its loss forever as they believe irresponsible Maori might lose or hide it[3] (Kamira 2000b).

The oral traditions that held and passed on knowledge have dwindled and are now a rare privilege. So it is an irony that whether or not these written records (paper, digital, film, etc) are accurate, dubious or accessible, in some cases they are all that remains of certain knowledge about ourselves. Some believe that the dissemination of this knowledge is more critical now than ever before because the only way for it to remain inherent in the Maori culture is by 'saturation' wide and far.

Is information technology a colonisation tool?

Colonisation was initially a crude process involving plunder of land, resources and the enslavement or deaths of the colonised. For indigenous peoples that live in 'advanced capitalist societies' there is growing sophistication in the extraction and exploitation of knowledge (Smith & Jenkins 1997, p17).

If the coloniser has control of information technology, and is in a position to validate, discard or modify knowledge, then information technology becomes a tool for further colonisation.

Yet, the face of the coloniser is not so easily seen these days. The control of information technology is strewn amongst many groups, including companies, governments and others who have access to technology resources, skills and 'gateways'. They are the international

corporations, the Silicon Valley tycoons, the computer 'whizzes' sitting in their networked bedrooms in countries far from here hiding behind aliases …

There is a threat again to have our stories and histories reproduced by others who have no stake in its integrity or survival. Without the benefit of hindsight, this is not so easily seen. However, history leaves us with relevant lessons (Kamira 2001).

Chronological summary of information technology and events

The following chronological summary is far from complete but gives an overview of some key events. Land, language loss and population are key threads alongside information technology developments. Undoubtedly, the enormous loss of land and the undermining of Maori social and cultural systems resulted in mass dislocation, isolation and separation from ancestral knowledge. Also, language is deeply encoded with meaning that cannot be translated[4], so it is integral to holding the integrity of knowledge. The loss of language that we have experienced is on the brink of turning and it is likely information technology is having, and will continue to have, a significant impact on language resurgence. Finally, the Maori population decline and then subsequent growth is a factor that impacts positively on our ability to mobilise and increase our political power

1835 up to WWII

The Declaration of Independence 1835 is signed by the United Tribes, to maintain sovereign power and authority over their territories. Shortly after, the Treaty of Waitangi 1840

between the English Crown and various tribes is almost immediately breached as the land wars of the 1860s 'deal' aggressively with Maori resistance. Meanwhile, the Native Schools Act (1867) institutionalises the systematic removal of Maori knowledge. By the end of the wars and subsequent land confiscations, Maori have 17% of their original lands.

In the 1890s, the Maori population is predicted to die out and has reached its lowest point at 42,000. The levels of life expectancy had declined to 24 years for women and 28 years for men (NZ Statistics).

Introduced diseases wipe out thousands, peaking in 1918 with the influenza epidemic that destroys a "generation of village leaders" (Simpson 1979, p243).

After the turn of the 20th century, the population decline had been checked and the growth slowly gains strength so that Maori continue, each decade after World War I, in a quite remarkable demographic recovery (NZ Statistics). By the 1930s, in an uncanny turnaround, the Maori population has risen to over 80,000. After World War II only 6% of land remains in Maori hands (Asher & Naulls, 1987).

Meanwhile, the Tohunga Suppression Act (1907) criminalises people who hold on a range of specialist knowledge, and effectively illegalises traditional expertise in spirituality, medicinal knowledge, the arts, environmental expertise and more, and invalidates vast amounts of knowledge that has never been fully recovered.

Across the globe, the telegraph had already been invented, and the telephone and radio, the first "wireless" technology, appears in the late 1800s. In 1905, the first wireless

distress signal is received using Morse code (JHSPH 2002). The steam powered Analytical Engine, based on the weaving loom, uses punch cards and its first application is for the US Census. By 1940, the first all-electronic computer is developed and extends the Boolean (true or false) concept to electronic circuits (on or off) (LaMorte & Lilly, 1999).

Post WWII to 1960s

The Maori population is almost 170,000 but the Hunn Report (1961) exposes the socio-economic status of Maori and shows that time has consolidated their low status, performance and capacity in health, education, housing, employment, crime, abuse, etc.

Internationally, Governments that are seeking strategic military advantage, fund the first generation computers that are characterised by the transistor and operating instructions that are made-to-order for a specific task. Developments include weapons and aircraft design, code breakers, ballistic charts, and atomic energy laboratories (LaMorte & Lilly 1999). Also, the Military configures wireless signals to transmit data with complex encryption, making unauthorised access to network traffic almost impossible (Hopkins 2002). Second generation computers allow abbreviated programming codes to replace difficult binary codes. Throughout the early 1960's, there are a commercially successful second generation computers in business, universities, and government. This gives rise to new types of careers (programmers, analysts, and computer systems experts) and the entire software industry begins (LaMorte & Lilly, 1999).

Late 1960s to 1970s

The ‘death’ of the Maori language is predicted to arrive before the end of the century, and placed precariously on the endangered list (Kemara 2002). A tiny 4.5% of the land remains in Maori hands (Asher & Naulls, 1987) and the upsurge of Maori activism coincides with international movements. The era is remembered by the 1975 land march on parliament, Bastion Point, Raglan and the regular protests at Waitangi (Te Ahu Poata-Smith 1996).

In 1975, the Waitangi Tribunal is formed to make recommendations on treaty claims. Less than 20% can speak the Maori language (Nicolson 1997) and it is predicted that it will not survive to the end of century.

Third generation computers introduce integrated circuits (1958) and combine three electronic components onto a small silicon disc made from quartz – the chip. Later, scientists fit even more components on a single chip and computers become smaller (LaMorte & Lilly 1999).

Fourth generation computers in the 1970s bring in the Intel chip that takes the integrated circuit a step further by locating all the components of a computer (central processing unit, memory, input and output controls) on a minuscule chip (LaMorte & Lilly 1999).

In the mid-1970's, computer manufacturers seek to bring computers to general consumers (LaMorte & Lilly 1999).

The first wireless local area network (LAN) comes together in 1971 when networking technologies meet radio communications at the University of Hawaii (JHSPH 2002).

1980s

The resurgence and reclamation movements[5] of the 1980s are triggered by an increase in Maori consciousness (Te Ahu Poata-Smith 1996) and the careful removal of layers of invented and misinterpreted histories has begun. The first Te Kohanga Reo opens in 1982, providing total immersion Maori language pre-school programmes, and the first software is translated into Maori.

Meanwhile, in 1985 the Wai 11 claim to the Waitangi Tribunal says the Crown[6] failed to protect the language under Article II of the Treaty. Claimants want the language to be made official enabling its use in Parliament, courts, etc (Waitangi Tribunal 2002). The tribunal recognises the potential of broadcasting to support its development.

In 1988, the Government makes the state broadcaster a State Owned Enterprise as a precursor to privatisation. Subsequent court action forces the Crown to make limited concessions for Maori broadcasting. At the same time, the Government introduces the Radiocommunications Act Bill to turn the radio spectrum into a tradable resource.

The Waitangi Tribunal says, “broadcasting media, radio and television, play a key role in the maintenance or loss, development or stagnation of language and culture … The virtual absence of Maori language from radio and television has been a potent factor in the decline in the number of fluent speakers of Maori over the last forty years…“ (Waitangi Tribunal 2002).

In 1987, the Maori Language Act makes the language official and Te Taura Whiri I te Reo Maori (Maori Language Commission) is established.

The end of the decade sees a combined second claim (Wai 26 & 150) seeking Maori interest in the radio spectrum. However, the Government implements only parts of the Tribunal's recommendation, ignoring the Maori radio spectrum claims, and setting the scene for the next decade of failed attempts to start a Maori TV channel.

In 1981, IBM introduces its personal computer (PC) for use in the home, office and schools. Small personal computers can now be networked to form electronic co-ops. A global web of computer circuitry, the Internet, links computers worldwide (LaMorte & Lilly 1999).

In the 1980's, the Federal Communications Commission in the USA proposes the 802.11 as the IEEE standard for wireless networks (JHSPH 2002).

1990s

The International Year of the World's Indigenous Peoples (1993) increases the dialogue amongst international indigenous peoples including Maori. The United Nations Draft Declaration for the Rights of Indigenous Peoples and the Mataatua Declaration place indigenous issues clearly on the worldwide agenda.

The mid-1990s sees an upsurge of protest with the symbolic chainsawing of the tree on *One Tree Hill*, the beheading of statue of John Ballance at Moutoa Gardens, the smashing of the Americas yachting cup, the explosion of anger at the 1995 Treaty of Waitangi "celebrations", and a large number of land occupations.

The Ministry of Maori Development kicks off their indigenous year project, NZ Online, an electronic network for exchanging information with up to 100 Maori organisations. Te Mangai Paho – the Maori Broadcasting Funding Agency is established. In 1995, He Taonga Te Reo, A Celebration of the Maori Language year puts Maori language issues alongside technology potential. Meanwhile, Te Taura Whiri I te Reo Maori (Maori Language Commission) coins new words for science and mathematics, and technology jargon is also being developed.

This decade sees Maori organisations begin to deliver entry level computer skills training to unemployed and youth through the Government funded training programmes. Ngati Pikiao, a tribal group, gets online with *Pikiao OnLine*, and the NAMMSAT (*National Maori Mathematicians, Scientists and Technologists)* group is established to help improve Maori participation and achievement in science, mathematics and technology. Te Hiringa I te Mahara (1999) a two year technological professional development programme for Maori high school teachers, equips them with computer and communications technologies, training and support.

The NZ Maori Internet Society forms in 1997 to promote Maori on the Internet and has authority over 'iwi.nz' second level domain name, a tribal domain, and introduces 'maori.nz'. The Maori Information Technology and Telecommunications Council is established in 1999 following a national hui held by Te Wananga o Raukawa, an indigenous university.

In 1999, ten years after the original claim to radio spectrum, a new Waitangi Tribunal claim (Wai 776) is lodged seeking Government recognition of Maori ownership rights to the radio

spectrum in the 2 GHz band. The spectrum is essential for wireless services, and Maori ownership will ensure their participation in the sector. A Tribunal majority rules in favour of claimants, but the Government rejects its recommendation, and the claimants are forced to pursue action through the Courts.

2000

The year 2000 is rife with information technology projects including Stockholm Challenge Award finalist, Computers in Homes, for children with the greatest social, economic and health needs (DIA 2001). The Hepatitis B Information Framework develops its intellectual property framework enabling it to protect collective privacy and data ownership that, while not supported by legislation, takes into account cultural views of social organisation and knowledge (Kamira 2000c). The first Flaxroots Technology conference highlights a number of community projects like wairoadotcom, and the Manukau Urban Maori Authority with its computer “hub” in South Auckland, 'Cyber Tek', to increase Maori employment options by giving them computer skills (DIA 2001).

Te Wairere Wahine, the Society for Professional Maori Women in Information Technology, is formed to support Maori women who work in information technology or who wish to become information technology professionals.

The Government sets up the Maori Spectrum Trust and allocates (NZ) five million dollars and the right to purchase a block of 2 GHz spectrum. Negotiations between the Trust and potential partners to set up a third mobile phone network in New Zealand begin.

The growing popularity of wireless communications has caught the attention of corporate, manufacturing, and academic settings (JHSPH 2002).

2001

The Maori population is almost 600,000 and NZ Statistics 2001 census figures show that about 1 in 4 Maori speak the Maori language, an increase of 5% since the 1970s (note the measuring methodologies are different). The link between information technology and language revitalisation is clearly a priority.

However, trends show that Maori are under-represented in occupations where digital technology is of primary importance. Increasing numbers of Maori students are learning information technology skills but are concentrated in introductory courses (TPK 2001, Infometrics 2001). Yet information technology activity is high and ICT projects have become difficult to track. No agency is responsible for monitoring successes and failures, and funding is scattered.

Maori organisation, Te Runanga O Te Whanau and Pacific Islands Matati E Fa Trust, undertake a joint venture with Cisco Systems in their Cyberwaka project - that trains Maori students in rural areas in Cisco-standard network installation qualifications.

Intellectual and cultural property issues are raised internationally when Lego, a Danish company, uses Pacific languages and themes for their Bionicle toys and Internet game. Lego initially agree to set a code of conduct for the use of traditional knowledge in the manufacture of toys.

The Korowai Groups are formed late in 2001, and comprise three member groups (1) Te Wairere Wahine - society for professional Maori women in information technology, (2) NZ Maori Internet Society, (3) Maori IT and Telecommunications Council. Collaborative work begins on a Maori information and communication technology strategy.

2002

This year sees a small but positive shift towards more proactive activities. The Korowai groups begin advocating the development of a Maori Information and Communication Technology Strategy across government sectors to improve coordination of funding and resources, sustainability and benefit.

The Straw Poll voting for the Maori.nz domain, results in an unprecedented 91.7% support for its creation, with over 1600 members voting online.

New Zealand's 2nd Flaxroots Technology conference on community networking conference attracts about 400 attendees from communities and tribal groups with a high proportion of Maori participants both as members of audience and presenters. Video-conferencing includes two other cities.

Tribal university Te Wananga O Raukawa (TWoR) offers the first tertiary level information technology and Maori related degree. Also, its Marae[7] Based Studies (MBS) programme gives 500 students and staff access to computers, Internet, training and support. In 2000, TWoR is awarded the top crown entity award for innovation in the public sector. In 2002, 700 students are expected to participate.

Defining the fifth generation of computers is difficult because the field is in its infancy. The fifth generation computer has artificial intelligence, can hold conversations with human operators, and learn from its own experiences (LaMorte & Lilly 1999).

The number of failed attempts since the 1980s to establish a Maori television channel is accumulating.

Central themes contributing to increasing skill capacity

There is no real proof that information technology can have positive and long term impacts on the socio-economic status of people. However, Maori will not be in a position to find out unless they move from a passive role to mastery. We will only achieve informed decision-making if we increase our skill capacity to all levels. The historical perspective of colonisation and information technology projects reveals themes that are assisting to increase the skill capacity amongst Maori.

Political

The Hunn report in 1961 highlighted the failings of the Crown to meet any of its Treaty obligations, forcing a response from Government to take at least minimal action to contend with Maori needs. Subsequently, the establishment of the Waitangi Tribunal to hear treaty claims was bound to reap some benefits for Maori despite its 'recommend-only' status. In particular, claims relating to knowledge highlighted its value and on the periphery – claim or

no claim - information technology activities that support the resurgence of our knowledge are increasing.

The introduction of information technologies including electronic networks, interest groups, discussion forums, and the World Wide Web, has significantly increased our ability to communicate internationally with other indigenous peoples. This has resulted in Maori being more equipped to represent themselves (and they usually insist) in international forums and to publicly 'voice' grievances. This increased ability to communicate internationally has highlighted to the Government the potential for international embarrassment.

The emphasis on the Treaty since the 1970s sent a ripple across Government sectors to 'deal' with Maori mainly through weak policies, and while dissatisfaction remains amongst Maori, the 'door is ajar' and some gains have resulted. For example, the resulting funding and scholarships infrastructure has enabled Maori communities and individuals to pursue academic and technology projects that attempt to address the knowledge loss and enable dissemination that is required to keep us 'glued' together as a culture.

In terms of political and policy areas in Government, the rising population statistics show we are a quarter of the population and growing. In 1996, the population is 15% but in 2051 it is projected to be around 21% or almost one million (NZ Statistics). Our political 'clout' is increasing.

Ability to learn the tools of the coloniser

Apirana Ngata, a scholar and the first Maori graduate in 1894, wrote in his granddaughter's autograph book (Huta 2002):

E tipu e rea mo nga ra o tou ao	Grow up o tender youth in days of your life;
To ringa ki nga rakau a te pakeha	Your hands grasp hold of the tools of the Pakeha,
Hei oranga mo to tinana	For your material well being;
To ngakau ki nga taonga a o tipuna Maori	Your heart to the treasures of your Maori ancestors,
Hei tikitiki mo tou mahunga	As a plume for your head;
To Wairua ki te Atua	Your spirit to God,
Nana nei nga mea katoa	The creator of all things.

The quote captures the desire and the ability of Maori to acquire knowledge of other cultures which is an important strategy for the uptake of information technology. Survival strategies such as these have increased our understanding of our Treaty partner. Tame iti articulates this implying that the inability to move between cultures is a disadvantage, "We know where you come from… and I speak your language. I know your habits. You don't know me. Maybe you need to know about that." (Inside NZ 2002).

Technology projects have been haphazard and often do not continue because of limited funding and lack of planning for sustainability. This unsustainability and lack of cohesion or coordination has the disadvantage of increased likelihood of repeated mistakes and lost successes. Even so, information technology projects have been numerous and Maori have learned from these even when those projects have failed to produce results.

Understanding intellectual and cultural property

Maori have had a long and deep-seated aversion to the commodification of their knowledge (Walker 1996b, p174). This is understandable when we consider that our ancestor Tanenuiarangi retrieved the baskets of knowledge from a celestial abode (Barlow 1991, p156) while coping with many dangers along the way, and that the dissemination of knowledge is a matter of great ritual and responsibility.

Our early awareness of intellectual and cultural property issues worldwide was significantly due to the work of Aroha Mead (1997) who worked both nationally and internationally in communities, the Maori Congress, the United Nations and more.

Yet, Government databases still collect abundant data about Maori. The data is analysed and published, and Maori are again subjected to statistical research findings that continue to reinforce the most negative stereotypes. It is not surprising that the Internet can symbolise a disadvantage for a culture that is so busy curbing further decline, and whose experience of information technology that is in the control of others, is the repeated reinforced perception of failure. Technology still happens 'at' Maori.

Intellectual property laws focus on commercial ownership and are immensely inadequate as a way to protect indigenous knowledge. This awareness leads Maori to other solutions. The concept of kaitiakitanga is from traditional Maori concepts about stewardship, guardianship and an inter-generational responsibility to protect and sustain knowledge, land and other resources.

Kaitiakitanga seeks to enable the following:

1. Maori as first beneficiaries of information systems
2. Collective ownership, use and access of data
3. Collective privacy as a valid form of control for grouped data

Entrepreneurial aptitude

Maori recently topped the world in entrepreneurship, according to a GEM survey, with 24% of Maori either trying to start a business or owners of a business (Frederick and Carswell 2001). It is clear that the report downplays the significance of the percentages saying that Maori are "every bit" as entrepreneurial as European New Zealanders, despite their figures only reaching 16%, and the international average at less than 10% (Frederick and Carswell 2001, p38-39, Reynolds, Camp, Bygrave, Autio, Hay 2001, p4).

Technology access is mentioned throughout the document as significant. Yet, the impact and use of information technology on Maori businesses was not elaborated. Even so, it is likely that access to information technology is having an effect, and future research on information technology transfer amongst Maori, the emergence of Maori IT groups, numerous Maori websites and increased access to electronic communication may add further understanding.

The GEM statistics could also be attributed to specific cultural features that align with information technology. For example, entrepreneurs generally have more extensive communication networks than non-entrepreneurs (Frederick and Carswell 2001). This is an

advantage to Maori since they live in a culture that disseminates knowledge through networks (Frederick and Carswell 2001). This cultural parallel is also clearly well-matched to information technology.

This entrepreneurial aptitude, that appears to be compatible with Maori, encourages us to enter information technology fields, or businesses and development that can maximise information technology to our advantage.

Conclusion

Maori continue to feature disproportionately in almost all of the negative statistics including unemployment, education, health, housing, domestic abuse, crime, and of course limited technological capacity (Hunn 1961, Infometrics 2001, Te Ahu Poata-Smith 1996, TPK 2001). It is clear that Maori remain at the top of the negative statistics as their 'price' for colonisation.

The disparity between Maori and non-Maori is often referred to as the "gap" or the "divide". However, decades of knowing about *gaps* and *divides* have not improved the situation. I believe the solutions are dependent on our success in continuing the reconstruction of our knowledge, and that we can harness information technology to assist. This is because information technology enables us to cover more ground, faster, and reach more people than ever possible.

While there is no proof that information technology can help turn the tide on our socio-economic status despite the worldwide hype, there is optimism. However, Maori will need to participate in *decisions* about the technology. They will need to influence policies and laws that support concepts of traditional protection, ownership, access and use that go beyond limited intellectual property laws. This is only possible if they have the necessary level of skill, the infrastructure, and an environment that enables it.

It is also clear that if a culture is cohesive and has strong leadership, even with few resources, success in information technology projects is possible with or without government funds by stocktaking resources and skills, and pooling them. The lesson is in the strength of the culture and communities - not the technology itself.

It is also important to remember that while information technology could potentially have a similar impact on our knowledge to that of early colonisation; it did not completely destroy our culture. In many cases, the 'written word', as an example, has preserved it.

It is clear that information technology can contribute to the survival of our knowledge as long as our cultural contexts are maintained. It can support our languages, images, concepts, histories, politics and development. It can sustain our choice to define and redefine, and to grow and change. Now that information technology is here, the process of reclamation has just begun.

Naku na, Robyn Kamira

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Tena koe mo tenei whakaahua ataahua e whakapaipai ana i te korerorero nei.

[1] See Kamira 2001. Originally in an email to a colleague and included in the EarthWatch article.

[2] Definition borrowed from Smith (1999) p6.

[3] While not explicitly stated in this paper, interviews and meetings with both Maori Land Court and Museum staff revealed some apprehension and eventual rejection to return ancestral knowledge to Maori families and tribal groups, because of the belief that Maori would either lose the books, or limit access to them to the New Zealand "public".

[4] For example, see Smith 1999, p 46.

[5] A number of programmes reclaim language, spiritual belief systems and cultural protocols. For example the Te Kohanga Reo (the language nest) programme for pre-school children led the way fro further education in the Maori language that now spans right through to university level.

[6] Note 'Crown' and Government' are used alternatively

[7] Marae is a traditional place for gathering, discussions, events, etc.