

26 November, 2014

FUTURE NZ



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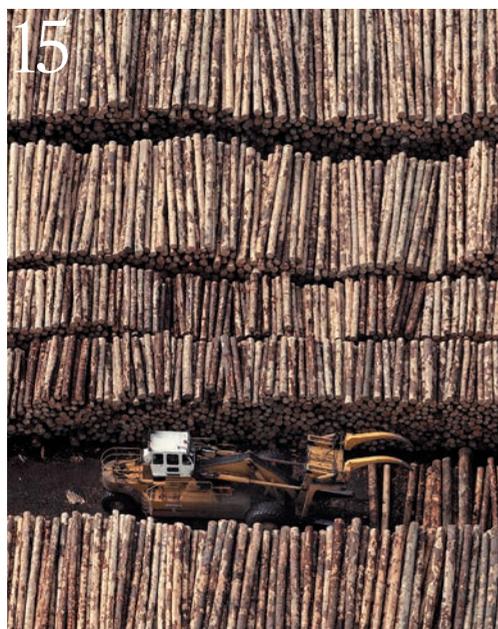
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Who will win and why?

Shayne Currie
NZ Herald editor



The faces on the cover of this insightful magazine speak to the nature of the new New Zealand.

We are growing, diversifying and ageing. We are browner and older, more urban, less connected to our agricultural roots. Proud of our past but less certain of our future, we are struggling to transform our old economy and worrying about how to educate our children. We are dealing with a pace of change unprecedented in our young nation's history. It's exciting - and nerve-racking, in equal measures. What we need are some of the country's smartest brains to lead the discussion.

This annual partnership between *The New Zealand Herald* and Massey University sets out to do what all good journalism should. It challenges and explains, translating big ideas and issues into how they affect our everyday lives.

The *Herald's* business editor Liam Dann sets out the mandate for transforming our economy and five of Massey's big business thinkers offer ideas on the

This annual partnership between *The New Zealand Herald* and Massey University sets out to do what all good journalism should. It challenges and explains, translating big ideas and issues into how they affect our everyday lives.

best ways to do so. There is a plea for our taxpayer health dollars to be spent not on more drugs and procedures, but on fixing the underlying issues which create them, and for schools to teach our kids to code and garden.

It's not all big picture though: next year's Rugby World Cup offers the perfect opportunity to understand how the All Blacks have made themselves the most mentally tough and resilient rugby team in the world. Science expert Peter Griffin offers a glimpse into the technology we'll be using in the years to come and the University's own Vice-Chancellor explains why Mick Jagger is the answer to baby boomer business.

We are thrilled to offer our readers the depth and breadth of thinking contained within these pages.

Shaping our future

Steve Maharey
Vice-Chancellor of Massey University



We cannot predict the future with any precision – or it would not be the future. We can, however, seek to identify the major trends that will shape our world and look at how best to respond to them.

It is this ability to understand change and respond appropriately that Massey University has taken on as a central responsibility through our teaching, research and connections with wider society. This is no small task. New Zealand and the world face challenges and opportunities that will require an enormous amount from each of us if we are to build a better future.

That's why we have been so keen to partner with the *New Zealand Herald* on this annual publication - it encourages New Zealanders to get familiar with the changes taking place around them and to think about what it means for their families, communities and businesses.

The seed for Future NZ was sown in 2012 when Massey invited Daniel Franklin, the executive editor of *The Economist*, to speak at our first 'new New Zealand' forum. He discussed his book *Megachange* - in it writers from *The Economist* explored what the world might look like in 2050.

The chapters covered religion, war, the role of the state, science, technology, health, business, globalisation and much more. But the most heavily discussed topic was population. Demographers predict that the world's population will rise from its current seven billion to nine billion by 2050. This is important not only because of the sheer number of people that will inhabit the earth, but also because we are going to have to prepare for the consequences.

While New Zealand's population seems small by global standards, we are still part of a global megatrend that we need to understand and respond to. Our population will grow, but it appears most of that growth – 60 per cent, in fact – will take place in Auckland. We are also a country that is becoming dramatically more diverse and with a very different age profile.

During the year Distinguished Professor Paul Spoonley and his colleagues have been studying our population. There are important implications – especially for labour supply, the allocation of resources and the provision of services in the increasingly diverse country that we are becoming. That's why demographic transformation is the focus of this year's publication.

You will be able to read Professor Spoonley's thought-provoking insights in these pages. We also intend to share our thinking with businesses, communities, policymakers and government through this year's "new New Zealand" forums, which will take place around the country in coming days.

As you read the ideas presented by Massey and *NZ Herald* experts in this magazine, take the time to consider the sort of future you want for this country. As Professor Bruce Glavovic so rightly points out in his climate change piece, there are important decisions to be made, and they need to be made together.



For more Future New Zealand content including articles on the battle for our land; housing; Conservation's volunteers and university funding go to <http://futurenz.massey.ac.nz> and nzherald.co.nz/go/futurenz

FUTURE FACE OF NEW ZEALAND

Welcome to the new New Zealand

New Zealand's population is ageing, diversifying and urbanising. We look at what's required to keep up

Paul Spoonley

Distinguished Professor and Pro Vice Chancellor of Massey University's College of Humanities & Social Sciences



New Zealand is in the middle of a demographic transformation that will profoundly change the way we live and work, as well as our sense of cultural identity. Our population is becoming dramatically more diverse, with more regional differences and a very different age profile.

There are already 600,000 New Zealanders over the age of 65 and this will double in size by 2031. Our fertility is destined to drop below replacement level in coming decades. And population growth and decline is playing out in very different ways in New Zealand's cities and regions, which will have significant implications for service provision and economic vitality.

Since emerging from the shadow of the Global Financial Crisis a year ago, our immigration flows have changed significantly. The latest figures show that immigration to New Zealand has reached an historic high, with the two largest groups of arrivals coming from China and India, rather than the UK and Europe.

These trends are transforming our world. The implications are substantial, especially for labour supply, the allocation of resources and the provision of services in the increasingly diverse country that is 21st century New Zealand.

THE ARRIVAL OF SUPERDIVERSITY

At the height of the Global Financial Crisis, 53,800 people left New Zealand for Australia in a single year, while those arriving dropped to just 83,000. But 103,000 permanent and long-term residents have come to our shores in the last 12 months – a figure we have never seen before.

This trend is putting New Zealand into new territory. It looks like we will start 2015 with a net immigration gain (the number of arrivals less departures) of 45,000 people for the year – another historic high.

And it's not just the number of immigrants that's changing. The composition of these flows signals a shift in the countries we are exchanging goods and people with. Of the net immigration gain in 2013, 75 per cent came from China, India and the UK (in that order) with another 20 per cent arriving from the Philippines and Germany. This shift began after 2000 but has become more pronounced in the last four to five years.

The 2013 census confirmed that more than a quarter of New Zealanders were born in another country. The Auckland figure was 40 per cent – or more than 500,000 people.

In coming years, the European/Pakeha population will decline as a percentage of the total

population. Maori will continue to grow in size but remain about the same percentage, while Pasifika communities will become a slightly larger part of the New Zealand community.

But it is the Asian population that will grow the most. Already one-quarter of Aucklanders identify with an Asian ethnicity. These communities are growing three or four times faster than any other. By the mid-2020s, the Asian population of New Zealand will overtake the Maori population in size.

New Zealand's past reflects its colonial connections with the UK, but the future offers very different possibilities. Immigration and trade now connect New Zealand to Asia in much more explicit ways and New Zealand is beginning to embrace its location in the Asia-Pacific region. With the exception of some high profile land sales to Chinese investors, this geo-political realignment has been positively viewed.

Since 2000, public opinion polls show that the attitudes of New Zealanders towards Asian immigration has trended positively. We know that contact is important in creating this view and more and more non-Asian New Zealanders now have contact with these new communities, especially in our education system. Social cohesion, or the lack of it, is not the issue it is in other countries – so far.

AUCKLAND VERSUS THE REST

Auckland is expected to provide 60 per cent of New Zealand's population growth in the next two decades and many of the jobs will be created there. And the Auckland story provides a stark contrast with some other regions.

The number of people not in education, employment or training (NEETs) is lowest in Auckland, Canterbury and Otago and highest in Northland, Hawke's Bay, the East Coast and the Bay of Plenty. NEETs are most likely to involve Maori, young mothers and those who leave school without qualifications.

Auckland is also home to 60 per cent of New Zealand's immigrants and has a significant net migration gain – along with Canterbury and Otago – while all other regions experienced a net migration loss between 2006 and 2013.

These differences are reflected in the fact that Auckland has the highest annual average household income, and almost a third of households earn \$100,000 or more. In a region like Hawkes Bay, the average annual household income is \$74,300 and only 15.7 per cent earn more than \$100,000.

By 2031, the country should reach five million, with two million of those residents living in Auckland. Christchurch will retain its position as the second largest city, and as a result of the rebuild it should become more ethnically diverse. But forecasting the city's future population is more difficult because of the unusual nature of the disaster and what to expect.



Zealand

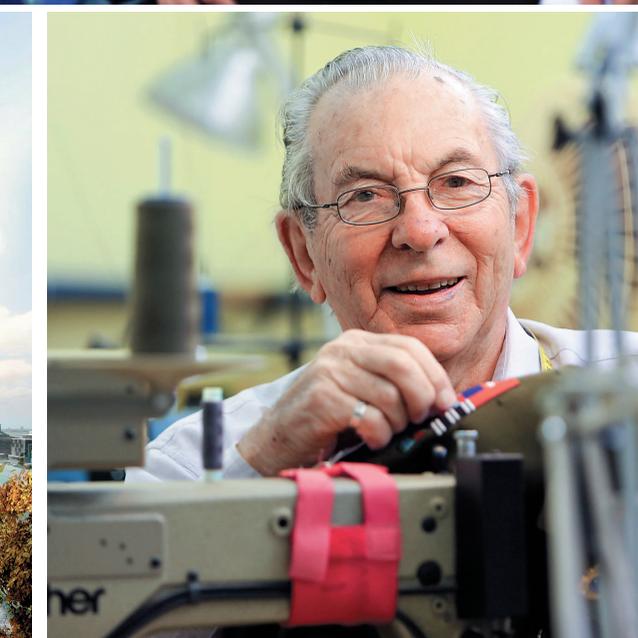


Manurewa High School principal Salvatore Gargiulo says Auckland's future is in his school. The South Auckland school has 1900 students representing more than 40 nationalities: roughly 50 per cent Pasifika, 25 per cent Maori, and 25 per cent a mixture of European/Pakeha and Asian.

But the statistics mask the ethnic mash-ups that characterise this generation. "We have Samoans with Chinese grandparents, kids with Indian and Tongan parents."

And at Polyfest, students choose the dances they like, not necessarily the ones that match the ethnicity box they tick.

They'll bring an exciting richness to New Zealand culture, he says, "though you've got to remember that Maori language and culture makes us different from all other countries, and Maori is our first language."



Twenty-one per cent of over-65-year-olds continue to work, often well into their 70s.

Far left: Auckland is expected to have a population of two million by 2031.

I've seen the future, and the future is brown

Rawiri Taonui

Head of Te Putahi-a-Toi, Massey University's School of Maori Art, Education and Knowledge



global scale, with the large-scale migration of people from Asia, Africa and Latin America to Western Europe and North America – where 100 million workers are required to bolster the workforces of ageing white populations.

Pakeha and nationalistic Maori argue that the Asian population will surpass Maori as the “second-largest ethnicity” by the mid-2020s and they, with a rising Pasifika demographic, may threaten Maori rights under the Treaty of Waitangi. Maori should not be concerned.

Both the Asian and Pasifika census categories are made up of a wide range of quite different peoples who are far more internally diverse than Maori. Chinese and Indians are a third each of the Asian group and Samoans 50 per cent of Pasifika. Maori will remain the second largest ethnicity after Europeans for the foreseeable future, followed in order by Chinese, Indians and Samoans.

The key dynamic of the rising Maori, Asian and Pasifika population is a super cultural diversity where brownness will replace the current European dominance.

Europeans have been the dominant culture for 158 years – ever since the Pakeha population surpassed Maori in 1858. Within two generations we will see the end of Prime Minister William Massey's stated “natural affinity” of New Zealand to “European race and colour” and “a deep-seated sentiment” to be “a White New Zealand”.

Long-term population projections are notoriously variable. But it is reasonable to suggest that by 2050 the combined Maori, Asian, Pasifika and other non-Western African, Latin American and Middle Eastern groups (currently 46,000) will equal that of Pakeha – around three million or more for both groups.

And, although prominent commentary argues we will have an ageing and less fertile population, the fact is that by 2050 the brown population will be relatively younger than the European population by some margin. Within that dynamic, the brown 50 per cent will dominate the workforce, voting age group and the ranks of school leavers and tertiary graduates.

We are already witnessing that change. Nearly one-third of our current Parliament comprises Maori, Asian or Pasifika MPs. Maori lead three Parliamentary parties, there are 26 MPs of Maori descent, and the ruling National Party emerged from the last election as the most culturally diverse with nine MPs of Maori descent. Gone are the days of Ben Couch facing four Maori Labour MPs from the Maori seats.

This same dynamic is being repeated on a

Demographers make much of the fact that one in six Maori already lives in Australia, with many others residing in Britain, North America and Asia. But the key future drivers are much wider. By 2050, our young brown populations, in combination with a Pakeha demographic relatively younger than North America and Europe, will drive an economy that will be among the fastest growing in the Western world.

In this equation Maori will add two capital advantages in finance and culture. The BERL (Business and Economic Research Limited) Maori Economy report estimated Maori capital at \$37 billion in 2010, and growing. Projecting out from there, it's not hard to see Maori potentially possessing New Zealand's largest source of domestic capital.

Maori have survived European, Pasifika, Asian and other immigrant arrivals without losing identity; this means they have the cultural capital to engage with a new international brown community. According to the HSBC World in 2050 report, 24 of the fastest-growing and 55 of the top 70 economies in terms of size will be brown economies from Africa, Asia, the Middle East and the Americas.

The political implications for New Zealand are wide ranging. Maori, Asian and Pasifika will dominate one or more of the major parties. This may be in different political-cultural groups, rather than together – a reflection of regional and class disparities as much as cultural difference. Currently National has the largest Maori and Asian caucuses while Labour has the largest Pasifika – nothing will be exclusively brown or white. Within two generations, we will have had our first Maori Prime Minister and probably one of Asian descent too.



There are risks. Contemporary discourse predicts a Maori shift from grievance to development mode. However, we must keep human rights to the fore in case a significant Maori majority emerges – one without the language, the benefits the new Maori middle class enjoy outside of new corporate and iwi structures. A majority poor and rightly angry.

Even so, we might no longer need the Maori seats. In truth, we may very well require special Pakeha seats. Pakeha might be entitled to more, but I suggest we begin with four seats to make sure we get this special exercise in guaranteed representation right. Once we all get used to these new arrangements, perhaps after 100 years, we can increase the number to reflect their proportion of the population.

Yes, future equality will be wonderful.

FUTURE FACE OF NEW ZEALAND

WHERE ARE THE JOBS – OR THE WORKERS?

The distribution of skills and the nature of labour supply is changing significantly as our demography changes. These trends have substantial implications for business in New Zealand. Do our employers fully understand what this means for their future labour supply, client base or markets? And skills are at a premium – we discovered this in the 2000-2008 period and it is an issue we are encountering once again.

This is a challenge for many regions where the labour market is thin. There are a limited number of companies that employ more than 100 people and there are limited options for skilled, highly qualified workers and limited local R&D activity. The lifestyle is attractive, but where are the jobs?

In the “human capital century”, Auckland has a number of advantages that means it is likely to grow to be home to about 40 per cent of the country’s population. Many other regions will see population decline, especially given constrained job markets and ageing populations.

This is not to say that they will not be important contributors to the national economy, especially as primary producers. But their challenge will be to attract immigrants, to retain workers and firms and to grow educational and employment options.

WHERE HAVE ALL THE BABIES GONE?

The birth rate needed to replace a population is 2.1 births per woman. New Zealand currently hovers around this magic number but in the last year, immigration has contributed more to New Zealand’s population growth than fertility.

An ageing population is one side of the equation; the other is declining fertility levels. Both lead to a population imbalance and a narrowing of the dependency ratio. This is the number of dependents (children, those in education and superannuitants) versus the taxpaying, working population.

At the moment, for every 100 people working, there are 52 dependents, but that is dropping significantly. In a little more than a decade, the ratio will be 100:64, with many regions seeing a ratio of 80 dependents for every 100 workers. Again, this is new territory.

And the fertility rate is different for different groups in New Zealand. Maori and Pasifika women tend to have more births at a younger age and spaced closer together than European/Pakeha. Asians are somewhere between the two.

The effect of these very different fertility rates can be seen in the median ages for ethnic groups – 41 for Europeans and 30.6 for Asians, compared to 24 for Maori and 22 for Pasifika in 2013. At the moment the ageing of New Zealand is dominated by Pakeha while, increasingly, the younger cohorts include a greater percentage of Maori and Pasifika. The ethnic diversity of our school age population is an indicator of the future ethnic composition of the population.



THE GREYING OF AOTEAROA

The number of New Zealanders aged over 65 doubled between 1980 and 2013, and it will double again to about 1.1 million by 2031.

The most significant factor is the arrival of the baby boomers (who were born between 1946 and 1965), with about 50,000 reaching 65 each year. But this demographic fact is further underlined by growing longevity. A child born in 2014 has an average life expectancy of 94 if they are female and 91 if they are male.

There are significant regional differences. Some areas – including Thames-Coromandel, Kapiti Coast, Horowhenua and Timaru – are already experiencing population decline as deaths outnumber births. Many more regions and towns will join them in the next decade.

What does this mean for how we consider ageing and the supply of services? The 2013 census confirmed the fact that the “retirement age” of 65 is somewhat arbitrary. New Zealanders are healthier and more active than ever before, with 21 per cent of the over-65-year-olds continuing to work, often well into their 70s.

Those working over the age of 80 are expected to triple as people need to continue in paid work for financial reasons, but also because they are a skilled, experienced part of the workforce that wants to continue working.

The equally important question is how we are going to provide for an ageing population? The baby boom after World War II required a substantial investment in education, but then resulted in a “demographic dividend” as the baby boomers became economically active.

As they age, this demographic bulge becomes a challenge, especially in paying for health services and retirement income.

WHAT THE NEXT GENERATION THINKS

The recently-completed Nga Tangata Oho Mairangi study, led by teams from Massey and Waikato Universities, examined how demographic changes are being experienced at a regional level.

Researchers spoke to households, employers and groups of Year 13 students in five different regions about their attitudes to diversity. It seems New Zealand’s young people are leading the way in terms of accepting that New Zealand is now a multicultural nation.

The interviews did reveal considerable differences around what diversity means, depending on region or even location within a city. For example, South Auckland students saw diversity as primarily involving Maori and Pasifika but, on the North Shore, it tended to be about more recent immigrants, ranging from South Africans to various Asian communities.

But it was obvious that all the students, regardless of where they lived, saw diversity as part of their lives in a contemporary New Zealand. This did not mean they were always positive about it. Some said they thought Maori got preferential treatment, others noted that ethnic groups often stayed apart at school and there was some resistance to being known by their ethnic group.

But these concerns were relatively minor. On the whole, younger New Zealanders were generally positive about the diversity they encountered in their schools and communities. They were often empathetic to the challenges faced by recent immigrants and were critical of racism. They noted that while their attitudes were positive, their parents’ and grandparents’ attitudes were not always as positive.

The study suggests this is a cross-over generation who are introduced at an early age to diversity in their schools and see this as an inevitable part of a future New Zealand.

Vidya Walavalkar, her husband Jeet and 8-year-old son (above) have recently come to live in New Zealand. They were doing well in their careers in India – Vidya worked in student services, Jeet in banking and finance – but wanted better work-life balance.

“As far as earning is concerned, India is a very good country, but you end up slogging long hours, even weekends. We’re definitely right back at the beginning of our jobs, but we do get weekends off and we get to spend time with our son,” says Vidya, 35.

New Zealand also offers a better balance between academic and extracurricular activities for students. So far, she hasn’t encountered any racism, and was touched by lessons about Diwali at her son’s school. “I do appreciate the fact that Indians do have a good reputation here – you’re not looked down upon.”

Educated Indian immigrants have much to offer, she says. “The gruelling long hours you put into studies in India pay later, and this country can benefit from that. We’ve got good IT brains, entrepreneurial brains that could do good for this country.”

AT LEFT: Anne Costello, 74, and her husband, Phil, also a retired teacher, are examples of older New Zealanders moving to the regions. The couple bought their Hahei house in Coromandel in 1963 as a retirement home. “It’s a beautiful place to live, a good community.” They’re not worried that the nearest hospital is a two-hour drive away – there’s an emergency helicopter and community-based healthcare. Anne says many retirees do a lot of volunteer work, which can help plug the gaps left by a dwindling working-age population.



For more content including stories on housing in Auckland and Christchurch go to <http://futurenz.massey.ac.nz> and nzherald.co.nz/go/futurenz

Immigration increase brings religious diversity



Peter Lineham
Professor of
History at
Massey University

Before the fall of the World Trade Centre and the events connected with it, people tended to dismiss religion as a spent force. In New Zealand religious affiliation had been on a downward spiral for 50 years. But today no one is so sure, and religion can be viewed as a troubling angle of identity in New Zealand.

While mainstream Christianity is down in the figures, religions with stronger identities are on the rise. The 2013 census shows that Islam is now the religion of more than one per cent of the population, Hinduism the religion of two per cent, and the more fundamentalist types of Christianity are also growing.

Pakeha New Zealanders, on the whole, seem less interested, but new migrants are more likely to be attached to a religion. Methodism has lost huge ground among ordinary New Zealanders, but in many parts of Auckland it is now predominantly supported by Tongans and Samoans.

There are parts of Auckland where there are more Filipino Catholics than Pakeha. Koreans, whether or not they are religious, tend to go to a Korean church on Sunday. Indians will be at the Hindu or Sikh temple, Indonesians and Pakistanis at the mosque, and many South East Asians at ethnic Buddhist temples. The new New Zealand is made up of a vast variety of beliefs and religious practices.

Some New Zealanders will see this as a problem and fear that we are now at risk from all that variety. But if you visited a temple or a Korean, Catholic or Tongan church, I think you would be amazed. These people are very devout, and their religion helps them to recall their homeland, but it also helps them to find their identity in New Zealand.

Week by week the new migrants wrestle, as



Immigrants, whether Buddhist, Methodist or fundamental Christian, find refuge in their faith while adapting to their new home.

they worship, with how to guide and help their young people to find their way in their new country and how they help their elders survive in a strange land. Some outsiders fear that these foreign places of worship are potential recruiting grounds for jihadists and dissidents – but, most of the time, they are places where migrants learn

how to live in a new place.

Our immigration policy has made us a part of global society. That has its risks, of course. But there would be far greater risks if there were no places where new migrants and old New Zealanders can wrestle with all the issues of living and believing.

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BRANDING

Exploring New Zealand's brand



The debate over a new flag for New Zealand should also spark a reawakening of our search for national identity, writes Massey University Business School deputy head Malcolm Wright

In 2015 New Zealand will hold a nationwide debate and referendum about our country's logo – the flag. This will be a pivotal moment for Brand New Zealand. Whatever design might be chosen, this will be a chance to have a nationwide discussion about how we view ourselves and what face we present to the rest of the world. Just as any brand should reflect the culture of the organisation supporting it, our flag should reflect the values and stories that underpin our shared sense of identity.

New Zealand has a rich historical narrative but it is curious that we have assumed only a small part of this into our common understanding of who we are. Our shared stories bind us together – sacrifice in war, sporting prowess, pride in our environment, and the distinctive bicultural nature of our founding document, overlaid with the multiculturalism of another 175 years of immigration. Some of these shared stories are under threat – are we really clean and green? How visible will our bicultural foundation continue to be with ongoing immigration? So of course we must clean up our rivers, should celebrate our diversity and ought to live by the Treaty of Waitangi. But I think we must go well beyond simply respecting and strengthening these familiar narratives.

New Zealand was founded on some of the world's most extraordinary acts of exploration – the voyages of the great Polynesian and European navigators. All who followed them here took great risks in leaving behind their familiar life for the new land of Aotearoa. Many were determined to reverse the injustice and failure they perceived in their own societies. This tradition of exploration and the willingness to take a leap in the dark has continued in other ways. New Zealanders have always pushed back the frontiers of human achievement – as mountain climbers, sailors, scientists, engineers, suffragists and filmmakers. We often achieve something remarkable because we simply don't stop to think that it should not be possible.

Alongside this history lie remarkable tales of entrepreneurship. These range from the unsavoury – the whalers and sealers of Kororareka, or the Maori who hired European ships to pillage the Chatham Islands – to the inspirational, the gold miners who came to New Zealand from Guangdong, California and Australia, the Maori who traded by schooner around the Pacific from the mid-19th century, the artisans who came to build a 'better Britain,' and the modern business people who have transformed traditional industries as diverse as film, bookkeeping and adventure tourism. Our history also includes stories of social entrepreneurship – votes for women, the welfare state, marriage equality, and the first transsexual MP – voted in by a conservative electorate. We remain one of the best places in the world to do business and one of the most inclusive societies. But we don't take kindly to being told what to do, whether by an aristocracy, a foreign government or



Pinning our colours to the flagstaff

Malcolm Mulholland, Māori and Pasifika research advisor at Massey University, is New Zealand's leading flag historian. He gives his personal view on the best design for a new New Zealand flag

The ultimate aim of a flag is to invoke patriotism. Chests should inflate, the throat should gulp, and the heart should pound. For some, our flag fails that test.

Designed by a British Naval Lieutenant and approved by a career British diplomat, our flag represents the United Kingdom and the Southern Cross. It is often confused with Australia's and reinforces the view New Zealand is the "Britain of the South Pacific."

Though there is a sense of inevitability about the eventual need to change our flag, next year's referendum provides an opportunity for an intergenerational debate and perhaps consensus.

The silver fern design is by far the most popular alternative because it has been emblazoned on almost all national sporting uniforms and is now part of our national

consciousness. The fern is based on our indigenous flora and appropriately signals regeneration. As the whakatauki (proverb) states 'Mate atu he tetekura, ara mai he tetekura' – 'When one plant frond dies, another plant frond rises to take its place'.

Colour is also important. Some have expressed concern over the use of the colour black, given its association with mourning and the symbols of some terrorist organisations. Perhaps the most popular colour associated with New Zealand is green; another could be blue. We pride ourselves on being 'clean and green' and are surrounded by the ocean.

A flag with the silver fern design on a blue or green background has a better chance of invoking a sense of patriotism amongst the broad, multicultural mix of people who now make up the New Zealand public.

<http://futurenz.massey.ac.nz> and nzherald.co.nz/go/futurenz

a German internet entrepreneur. We like our heroes to be humble and stand with us rather than above us.

These are our vital stories, yet we seem in danger of forgetting them in the search for prosperity. I hope a debate over our identity in 2015 will encourage our creative community to rediscover these narratives, as Eleanor Catton did with *The Luminaries*. We need literature and a visual oeuvre that celebrates our sense of who we have been, and of whom we might become. The flag is part of this, but should be the tip of a broader narrative. If

there was a mental image that captured all this for me it would be a waka filled with a diverse community, travelling with courage towards an uncertain future.

I hope the referendum kindles broader debate about our sense of self, or we may slip quietly towards prosperity, going straight from gawky adolescence to a bland, comfortable middle age. I would rather we lived a little longer as an ambitious, idealistic youth. Let us be explorers. Let us be entrepreneurs. Let us be inclusive but humble. Let that be our brand.

What Gallipoli means *a century on*



Glyn Harper
Professor of
War Studies at
Massey University

When the sun rises over the Gallipoli Peninsula on April 25, 2015, around 10,000 people from Australia and New Zealand will be there to greet it. They will have been waiting all night for this moment.

These are the lucky ones who were selected by ballot and will have paid thousands to get there. Many others missed out. About 42,582 Australians applied for the 8000 tickets in New Zealand, more than 10,000 people applied for just 2000 places.

Meanwhile, back home, hundreds of thousands of people will rise before dawn to attend Anzac Day services. What motivates so many to do this, and what makes this day so special?

The Gallipoli campaign of 1915 holds a peculiar fascination. Gallipoli has assumed a cultural significance out of all proportion to its military reality. It was a serious defeat for the Allies, a costly failure with no significant outcome on the war. It was a military endeavour marked with muddle and command incompetence. It is unusual for nations to associate one of their most defining moments with a military campaign with all these failings.

Professor Sir Hew Strachan, the Chichele Professor of the History of War at Oxford University and a world authority on World War I, has written that the national identity of three



Thousands turn out for Anzac Day commemorations. Gallipoli has a special resonance for New Zealand.

nations – Australia, New Zealand and Turkey – is woven around the Gallipoli experience. New Zealand soldiers believed it was on Gallipoli they started to discover themselves as New Zealanders.

Gallipoli has cast a very long shadow. The Somme battle of 1916, still New Zealand's most costly military encounter, will not receive anything like the attention Gallipoli has attracted.

It is doubtful whether any one event can create such an elusive and changing entity as a country's national identity; where it begins and ends is impossible to say as the process is so complex. But what happened at Gallipoli 100 years ago cannot be ignored, nor can it be separated from Australian, New Zealand and Turkish national

histories or cultural identities. So important has this campaign become to each nation's heritage that most New Zealanders and Australians have developed a sense of place about Gallipoli without ever having been there.

Gallipoli has become something bigger and better than just its military reality. It has been transformed into a type of victory, albeit not a military one. It is a victory for comradeship, endurance and a determination to succeed against all the odds, values that still resonate. Ultimately, Gallipoli is a victory of the human spirit over death, suffering and the futility of war. It is an imagined one but is more powerful and enduring than the real thing.



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HEALTH

Five ideas for the new

A rise in chronic disease and an ageing population mean challenges for the health industry



Paul McDonald

Professor and Pro
Vice-Chancellor of Massey
University's College of Health.

Our new Minister of Health, Dr Jonathan Coleman, has inherited a portfolio which has averaged expenditure increases of 4.2 per cent per year for the past decade. There will be pressure to continue increasing funding, offset by reductions in education, social programmes, culture, environmental protection, and public housing. This would be a mistake.

Over the next few years more Kiwis will develop chronic diseases such as diabetes, dementia and respiratory disease. The cost of caring for individuals in their last few months of life will continue to grow as long as we focus on adding years to life instead of adding life and dignity to years. It's

financially unsustainable.

Left unchanged, spending increases will be driven by greater use of pharmaceuticals, diagnostic, and information technology. Technology companies will make fortunes selling computer apps to monitor behaviour in the mistaken belief that information and feedback are enough to alter complex conditions.

Pharmaceutical companies will push drugs for more people at an earlier age by inferring they reduce the risk of chronic conditions. They will point to studies showing their drugs are more effective and cost efficient than doing nothing or using another medical treatment. But they will fail to compare



Health Minister

themselves with public health interventions.

Big Pharma, and the nations that host them, will use international trade agreements, like the Trans-Pacific Partnership, to increase their profits by dismantling Pharmac (which protects New Zealand consumers and taxpayers from even higher pharmaceutical costs). Trade agreements will be used to block public health efforts to reduce the consumption of tobacco, alcohol and unhealthy food.

Minister Coleman's former colleagues in family medicine will lobby for more primary and acute care. The National Party has already announced an intention to extend free GP visits to children under the age of 13, and extend elective surgeries. But, is this the best investment? Here are five pragmatic alternatives for dealing with future health challenges at a sustainable cost.

1 COMBAT POVERTY

Get serious about reducing poverty and increasing social connectivity. A 2013 study from Toronto, Canada found that reducing poverty and improving social cohesion were twice as likely to reduce disability and chronic disease as increasing access to health care. Making investments in low-income families by increasing after tax incomes and increasing access to affordable education, child care, housing, food and transportation will produce more health at less cost than increasing access to medical treatment, drugs, or technology.

2 INVEST IN PUBLIC HEALTH INTERVENTIONS

Put more emphasis on disease prevention and health promotion. However, be aware that many preventive and screening activities delivered through primary and acute care will actually cost us more money. In contrast, public health interventions such as price regulation, advertising restrictions, and health labelling improve health while reducing health care costs. For example, 15 per cent of Kiwis and one in five 15-to-17-year-olds put their health at risk because of their alcohol consumption. Nearly 30 per cent of women drink alcohol during pregnancy, potentially harming their growing babies. As indicated by the New Zealand Law Commission's report on alcohol, excise taxes, restrictions on advertising and health warnings are highly effective and cost efficient ways to reduce alcohol-related hazards.

3 SUPPORT HEALTHY AGEING

Let's ensure our seniors remain healthy and independent for as long as possible by increasing funding for healthy ageing. This means rethinking the design of houses, transportation, food and recreation. It means increasing



As the rate of diabetes and other chronic diseases continues to rise, caring for one's own health is vital.

funding for assisted and long-term care to eliminate chemical restraint, boredom, and isolation. Money spent on professionally-qualified staff, nutrition, and recreation will be offset by lower drug costs and unintended medical complications.

4 REFRAME END-OF-LIFE CARE

Let's also get serious about dignified end-of-life care. We need to make it easy and affordable for everyone to have a living will and end of life care plan. This isn't about euthanasia or assisted suicide – it's about ensuring people have a voice in the type and extent of care they receive in their last days, often when they cannot speak for themselves. We also need to do more to promote and fund hospices. These remarkable resources help people and their loved ones to face death with dignity. Most people die in expensive hospital settings while less than 10 per cent use the community or residential resources at a hospice – and this needs to change.

5 FUND BETTER RESEARCH AND TRAINING

Better-trained, innovative and competent nurses, social workers, programme evaluators and specialists in public health, environmental health, occupational health, health analytics and more will not only help manage costs, but increase our society's resilience, adaptability and productivity. Medicine isn't the only profession that can, and must, improve practice through evidence and evaluation. Research funding must come from both industry and government to ensure we put health and public interest before wealthy shareholder profits.



BABY BOOMERS

The 'don't stop' attitude

Baby boomers are unlikely to be content in retirement ghettos but our ageing population needs new options – fast



Chris Stephens

Professor at Massey University



Fiona Alpass

Professor at Massey University

Co-leaders of Massey University's 'Independence, Contributions and Connections' longitudinal study on ageing in New Zealand.

In just 15 years' time, 22 per cent of New Zealanders will be over the age of 65. With nearly a quarter of our population as senior citizens, how retired and ageing Kiwis live is a key planning issue.

The current government policy of "ageing-in-place" encourages people to remain in their homes and communities, but our existing infrastructure has not been designed for an older population. In practical terms, this can mean encouraging older people to remain in socially isolating situations.

For those who can afford it, constructed communities like retirement villages can provide a more socially supportive environment, but they can also segregate older people from the rest of the community. A focus on building more affordable retirement villages, which need large areas of land, could actually create a relatively large ghettoed population.

What we need are ways for people to "age in place" within integrated communities – housing situations and neighbourhoods that enable older people to participate in, and engage with, the whole of society. The development of appropriate housing will be a critical aspect of our ability to provide community support for the very old.

Traditional home ownership models may not work into the 21st century. The baby boomers have a high rate of home ownership, but home ownership is on the decline and not all older people can own a house. Staying in unsuitably large homes can also lead to loneliness, which is a major cause of poor health in older people.

In the latest phase of Massey University's longitudinal study on ageing, nearly half the baby boomers surveyed said they could see themselves moving from their current house in the future. This is reinforced by Statistics New Zealand figures, which show the number of one-person households has been growing steadily. Based on current indi-

But new housing options are already emerging. Baby boomers are returning to flatting, often as a hedge against age-related physical restrictions and loneliness.

cations, 80 per cent of the growth in one-person households will occur among those over 55, with the number of women aged over 65 living alone projected to increase from 100,000 in 2001 to 150,000 in 2021.

But new housing options are already emerging. Baby boomers are returning to flatting, often as a hedge against age-related physical restrictions and loneliness.

Because of the difficulties in setting up living arrangements in later life, organisations in the United States are developing systems to support shared living arrangements. The Golden Girls Network hosts a database that members can use to find compatible housemates, while the National Shared Housing Resource Center offers regional information about supported home-sharing options across the country.

There have been some small-scale developments in New Zealand too. Earlier this year the Bays Community Housing Trust opened a five-bedroom house for single women over 65 who do not own their own property and have limited assets. The aim is to provide affordable housing for women and combat loneliness – the trust is currently developing a similar house for men.

Purpose-built shared housing is also becoming popular in the US and Europe. These arrangements combine communal living areas with private rooms. In New Zealand, the Abbeyfield housing model is a forerunner of this kind of arrangement. These houses are organised by volunteer societies and the house is staffed by a housekeeper who cooks the main meals. There is a communal lounge, dining room, kitchen and laundry and sometimes a guest room.

The Intergenerational Living Society, supported by Age Concern in New Zealand, plans to include all generations in this kind of model. In purpose-built community housing, modelled on many examples in Germany and other parts of Europe, groups of people of all different ages will live together in an apartment complex, terraced houses or individual houses. Each individual or family has their own apartment or house, complemented by community rooms. Residents provide mutual support, such as help with driving, shopping, paperwork, childcare, and support in illness and emergencies.

The Humanitas Apartments for Life for older people in the Netherlands are organised on similar principles. Residents are encouraged to live as they have always chosen, including engaging with their extended family. The apartments include restaurants, shops and other services, and invite the wider community to participate in the social life of the community.

How older people are able to live and participate in society is important for their wellbeing, and that of society. The 11th Science Challenge recently announced by the Government is based on "building better, homes, towns and cities". This is an important opportunity for the housing industry, researchers, and policymakers to pool their expertise to develop workable solutions for demographic change.

Move like JAGGER

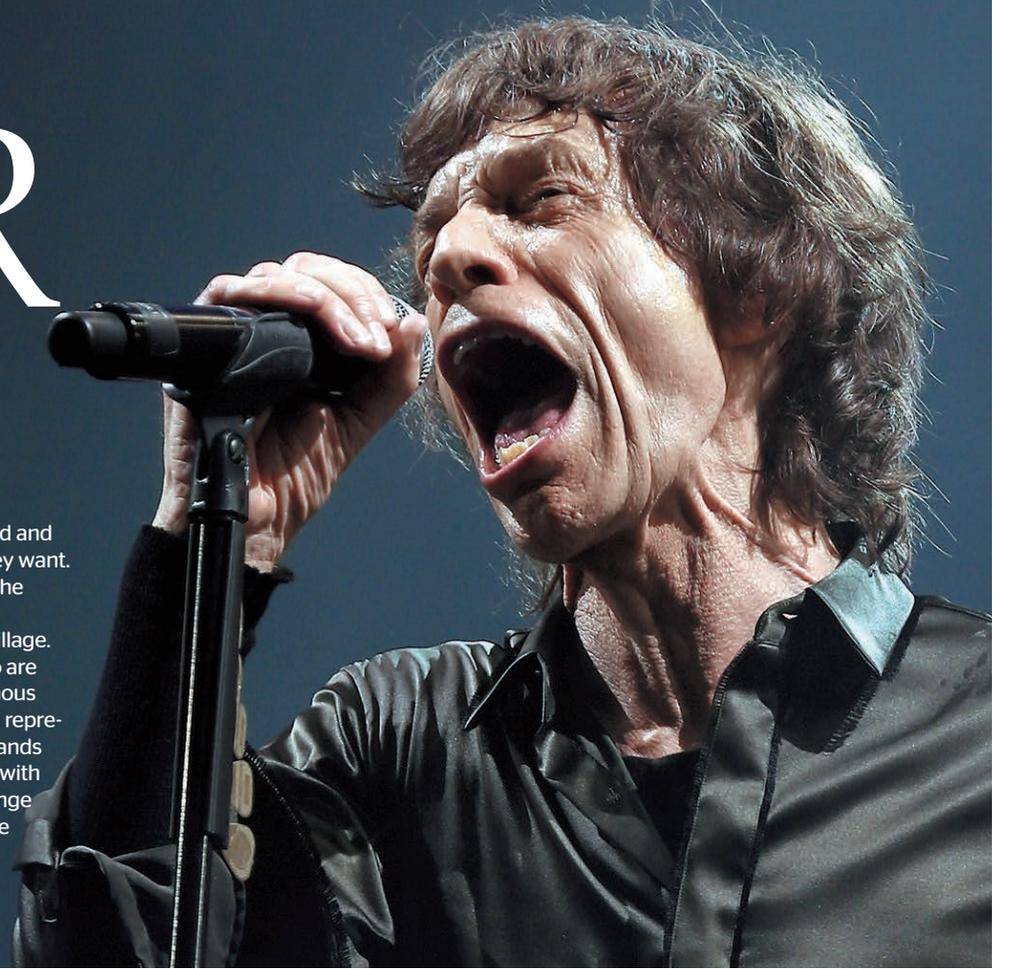
Steve Maharey
Vice-Chancellor
of Massey University



Mick Jagger, lead singer of the Rolling Stones, is part of the baby boomer generation, born between 1946 and 1964. Like Jagger, they enjoyed the fruits of the welfare state and went on to build their lives during long periods of economic growth that allowed them to live well and accumulate assets.

And like Jagger, they have no intention of stopping - which is a challenge and an opportunity for anyone who intends to provide services for them as they move into the next phase of life. Just don't call it retirement. Previous generations may have accepted whatever they were given, but not baby boomers. They don't have to. There are a lot of

them, they have money to spend and they are used to getting what they want. What they want is to live life to the full. The response to this can be seen in every advertisement for a retirement village. They depict healthy, active, people who are in charge of their lives. This is an enormous shift in the way older people have been represented. It is a positive change that demands new approaches from those who work with older people. Those who make the change are not only doing what is right, they are also positioning their business for success. If this sounds hard, here is an easy test. Imagine that Mick Jagger is the client and the rest will be easy.



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BUSINESS

The changing face of business

It's time to wake up and embrace an ever-developing technological future for the good of our children's world, writes Liam Dann



Liam Dann

Business Editor of the New Zealand Herald

Now, while New Zealand's economy is in good shape, is the time to get serious about transforming it.

It is not enough to simply enjoy the golden weather and survive the storms if we want to grow real wealth across the social spectrum in this country.

Commodities and agricultural exports continue to serve us well but an over-reliance on any one sector creates risks. Time and time again we've seen economic progress towards a wealthier, more equitable country cut short by a commodity slump or a global economic crisis.

And then there is the problem of creating jobs for the next generation of highly urbanised New Zealanders.

No one can predict what jobs our children will be doing in the future because the business landscape is changing too fast.

Many of the jobs and the companies that will create them don't exist yet.

But the trends are clear. We need to equip

young people for a different working world to the one we grew up in.

We need to put technological literacy at the heart of our education policies and we need to encourage an increasingly entrepreneurial spirit in whatever area of study our young people choose to follow.

In doing that we need to keep encouraging the creativity and lateral thinking that marks out the most successful New Zealanders and has taken them to the top of the world in so many fields.

If we get that mix right then they will be equipped to do the jobs of the future and more importantly – to create them.

There is no question that we need to transform our economy. We need to keep growing our tech sector in all its variations – from food science to cloud computing. We need to build on the fantastic platform that generations of innovators, entrepreneurs and exporters have laid for this country.

Now, while the going is good, is the time to the make plans to keep it that way.



A log loader at work in a sea of logs at the Port of Tauranga.

Export risk and diversification

More New Zealand goods are going to China than ever before – but is that really good for our economy?



Sasha Molchanov

Associate Professor from Massey's School of Economics and Finance.

Last year China became New Zealand's top importer, taking 20.18 per cent of our exports, overtaking Australia, which is now on 19.14 per cent and the United States, our third top importer on 8.53 per cent. Others who rank high on our export list include Japan and Britain. New Zealand currently exports about 30 per cent of its output, and the Government has set a target for this number to reach 40 per cent by 2025.

While it is not surprising that our export composition is changing – China is now the world's second largest economy – there are two issues of concern.

First, China, unlike New Zealand's traditional export partners, has a very high political risk score – 54 out of 100 compared with Australia on 13, the

US on 18 and New Zealand's 11. Russia had a score of 49 in 2006, and Egypt had a score of 50 as recently as 2009.

Political risk can mean restrictions on foreign ownership, restrictions on how much money you can transfer out of the country, or politically motivated exchange rate controls.

The other area of concern is how quickly our Chinese exports have grown. It was our number 27 export destination in 1990 and since 2008, exports have almost quadrupled from 5.93 per cent to more than 20 per cent now.

We are not the only country exposed – Australia currently exports more than 35 per cent of its output to China and Japan's share of Chinese exports is also higher than ours. But neither of these countries has experienced such a high rate of export growth to a

single, politically-risky destination.

Our current level of export-related political risk is acceptable, but it is important we don't become too reliant on the continued

growth of the Chinese economy, which has recently shown signs of slowing. A downturn in China increases political risk if there are job losses, while also negatively impacting the economies of Australia and the United States – the second and third-largest importers of New Zealand goods.

Any risk, including export-related political risk, should be addressed through diversification – the old adage “don't put all your eggs in one basket”. New Zealand is a small economy that can be adversely affected by external shocks so it's crucial we maintain a diversified base of export destinations.



How Kiwi musicians can succeed globally
<http://futurenz.massey.ac.nz>



Christchurch-based dairy farmer John Nicholls looking at Fonterra's branding at the China Dairy Expo and Summit in Xian.



Denis Heenan, of Lumsden, with New Zealand milk powder in the Shanghai Auchan supermarket, China.



New Zealand's ambassador to China, Carl Worker.

GMO is the way to go – and grow – safely

New Zealanders need to lose their fear of genetic modification if we really want to be clean and green



Peter Kemp

Professor from Massey University's Institute of Agriculture & Environment

The acronym "GMO" set fear into the hearts of New Zealanders back in the 1980s and 90s, as worldwide research and debate around genetically modified organisms threw up all sorts of perceived risks and possibilities.

But a couple of decades on, those fears have been largely unfounded, and now is the time for New Zealand to seize the opportunities provided by the genetic revolution. There is really no other way to go if New Zealand's agricultural sector is to meet the environmental, climate change and economic challenges it is facing.

Using the genetic technologies and knowledge at our disposal would allow the sector to add value to its food production and decrease its environmental foot-

print. We already use genetic technologies in research on pastures, crops and livestock, but we have yet to approve a genetically modified organism for release in New Zealand. We are looking but not playing.

Most of us already use the products of the genetic revolution on a regular basis, including cotton clothes, some processed foods and medicines such as insulin and the hepatitis B vaccine.

Elsewhere in the world farmers quickly adopt genetically modified or engineered crop species. More than 70 genetically modified crop varieties are used worldwide, including maize, canola, soybean, cotton and papaya. Many of these products are fed to livestock or processed before human use. Some are directly consumed by humans.

So how safe are these genetically modified crops? No human health problems have been proven after decades of use and well-known research by University of California, Davis scientists on the effects of a trillion

meals of genetically modified crops consumed by livestock over 18 years also found no ill effects.

Instead of ignoring a highly successful and proven technology we should be seeking ways that make it work for us. A starting point might be to release genetically modified pasture, forage and tree varieties so their safety is well-recognised before we ask New Zealanders to directly consume food products from genetically modified organisms. It's an ultra-conservative approach, but step one must be to increase consumer confidence.

New Zealand should embrace genetic technologies where we can most benefit - the development and release of drought-tolerant ryegrass, kiwifruit resistant to bacterial canker (Psa) and sheep and cattle that produce less methane. The result would be less water needed for irrigation, lower pesticide use and less greenhouse gas emissions. Genetically modified plants and livestock will help us be clean and green.

EDUCATION

A recipe for NZ's global success

Faced with an ever-evolving technological and social future, today's school students need to be armed with the tools to rise to the challenge

The only certainty ahead for today's school children is this: life as we know it will change, and at a speed we probably can't anticipate.

We asked experts from different disciplines to give their thoughts on how our education system can best prepare young people to adapt, thrive and make sense of the unknown opportunities and challenges ahead. Here's their recipe for 21st century empowerment.

COMPUTER SCIENCE

The language of computer coding may be the next big innovation for school curricula, according to Andrew Jamieson, a former school teacher who is now based at Massey's National Centre for Teaching and Learning.

"To truly be innovative in a technological space we need our children to be creators as well as consumers," he says. "Being able to design, test, evaluate and modify have been the key drivers in some countries for including coding into their school curriculum."

"Teaching our children to understand the language of code to design their own solutions to tasks could take them from being consumers looking for a solution to creators designing a solution."

Every company in in the future will be a software company, to some extent, says Dr Daniel Playne of Massey's Institute of Natural and Mathematical Sciences. That means New Zealand's economy would also benefit from children learning coding.

"While information and communication technology is one of the fastest growing export areas for New Zealand, estimated at \$1.5 billion annually, our exports in software royalties, licence fees and computer services are still well below our imports," he says. "This is going to be an important part of many New Zealand companies. We need to start addressing our shortage in qualified IT professionals now."

CIVICS

Preparing youth to be the effective leaders and decision-makers of the future is a key issue. For political observers, this is being undermined by the decline in voter participation – particularly younger voters – over the past several elections.

Associate Professor Richard Shaw,

who heads Massey's politics programme, says the drums are sounding for the formal introduction of civics in our schools.

"Compulsory civics education has an intuitive appeal. After all, it seems hard to argue with the logic that if schools start producing people with a better understanding of our political system the problem of falling turnout will eventually go away."

He says that while civics education does take place, it's not offered as a standalone subject. The real issue is the calibre and content of civics education, not its compulsory status.

"What's needed is an approach to civics education that combines the transmission of information (about the political system) with activities allowing students to engage with decision-making processes within their schools. In short, citizenship education should be active, not passive. It should combine both knowing and doing."

SUSTAINABILITY

Teaching our children about environmental sustainability is vital to ensuring current and future generations will be better equipped for dealing with the complex challenges facing humanity on multiple fronts, on a global scale, says Dr Corrina Tucker, a sociologist in the School of People, Environment and Planning.

"Teaching children in a hands-on, practical way about how to grow food, about the benefits of walking, cycling or pursuing other active modes of transport to get about, and about not only recycling but minimising their waste and conserving energy and water, are all simple yet important ways to engage children in more sustainable practices," she says.

The greatest challenge underpinning this need is "escalating resource consumption propelled by a society that is driven by economic, rather than social or environmental rationales, and where consumerism is king. Teaching children to enjoy life's simple pleasures – the company of their friends and family, outdoor discovery and play – should be the basis of a reorientation toward simpler living and increased wellbeing that does not further degrade our environmental life support system."

CRITICAL THINKING

Dealing discerningly with torrents of information, and understanding the views of others in an increasingly



Additional online content available at <http://futurenz.massey.ac.nz>





Teaching our children to understand the language of code to design their own solutions to tasks could take them from being consumers looking for a solution to creators designing a solution

complex, diverse society are among the compelling reasons for teaching critical thinking and ethics. So says philosophy professor Bill Fish, who has been championing the teaching of critical and analytical thinking via philosophy at intermediate and secondary school levels for years.



The benefits for learning, he argues, are profound, wide-ranging and long lasting. He cites international research on the effects of studying philosophy that shows it increases cognitive ability, verbal skills, self-esteem and confidence across all subjects, and for years after a student has studied it.

At secondary school level, philosophy classes tend to work best when run as guided conversations about specific issues or problems, allowing students to express and argue their views, and hear what others think and why. Perhaps the most important thing any young person can learn through philosophical debate is that the way they see the world is just one of many points of view.

“They learn to recognise that their view of the world is shaped by their upbringing, the country they live in, the culture they belong to, and that others see the world differently,” says Professor Fish. “We need these skills more than ever.”

Exposure to philosophy, he says, “not only creates brighter, more engaged people, but more tolerant, open-minded people”.

LANGUAGES

Global citizenship isn't some vague catchphrase. We are now all global citizens thanks to technological and cultural interconnectivity.

“Given the need for New Zealand to trade into non-English speaking countries, the ability to speak a range of languages has become a priority,” says Distinguished Professor Paul Spoonley.



Dr Leonel Alvarado, who heads Massey's Spanish language programme, says the benefits are both economic and personal.

“All the stories we hear about languages – that they open doors, turn you into a global citizen, help you understand other cultures, maximise trade, raise cultural awareness, and even help you earn a living – are true. This has been proven over and over. People's lives are changed when they are exposed to another language because it is not only the language we make contact with, but also the culture.”



“Foreign languages are not alien to New Zealand, they are part of what makes the country diverse and vibrant. Exploring these connections at high school level – an age when language learning is often easier – can be the perfect way to start the journey.”

POLITICS

Candidates for change

Political parties must connect with the young, the poor and the disaffected or our democratic system will be ruined argues Associate Professor Richard Shaw.



Richard Shaw

Associate Professor, Director BA (External Connections) and a member of Massey University's Politics Programme

Our parliamentary democracy is one of the world's most stable and continuous, but things are starting to creak. These days virtually no one is a member of a political party, voting is a minority sport among those younger than 24 (and a spectator sport for nearly half a million others), and there is deep-seated cynicism about the political class. People are walking away from organised politics, and unless something is done, many of them will never return.

Notwithstanding the slight improvement in voter turnout at this year's election, the steady decline in young people enrolling and/or voting means an entire generation is at risk of being lost to the electoral process. Members of some migrant communities will join young people on the political sideline. With the poor, unemployed and swathes of the Maori population, these groups are drifting towards the democratic margins.

The contours of political divisions between urban areas and the regions will become sharper. As the critical mass of voters in Auckland grows, the city's social and economic imperatives will dominate the political agenda. The rural "heartland" will continue to exert an emotional hold on politics, but



We are in danger of losing an entire generation of voters unless something is done to encourage them.

that will fade into nostalgia as the regions slide into economic obscurity.

Politicians' resolve to attend to the wellbeing of all sections of society will be tested as those with political clout (those who vote; the wealthy; urban interests) press for policies that suit them, but which may be at odds with the needs of the growing political underclass (those who don't vote; the poor; rural interests).

How do we stop this from happening? There are four things the Government could do immediately: (1) abolish the one electorate seat threshold, so parties must cross the party vote threshold before gaining list seats; (2) kick-start the move to online voting; (3) make voting compulsory, as long as; (4)

a redesigned ballot paper is introduced to allow voters to register a protest vote.

Just boosting turnout does not address the underlying causes of disengagement. The roots of that malaise are deep-seated, and demand systemic changes to the way we "do" democratic politics.

The single most effective thing would be to reduce socio-economic inequality, because poor people and the unemployed are less likely to participate politically than those who feel they have a stake in their national community. Political institutions must find ways of connecting with the communities that comprise this colourful, diverse nation of ours. The most obvious candidates for change are our political parties.

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Navigating uncharted waters

We need a shift in mindset to adapt to the significant challenges posed by climate change, says Professor Bruce Glavovic



Bruce Glavovic holds the EQC Chair in Natural Hazards Planning at Massey University

The science is now unequivocal – climate change is unprecedented in recent human history. Even if we substantially reduce greenhouse gas emissions in coming decades, there is inbuilt momentum in the climate system that will lead to significant changes this century.

That means adapting is imperative and the challenge is more complex than simply predicting and responding to impacts.

According to the recently-released Intergovernmental Panel on Climate Change (IPCC) report, New Zealand is already experiencing higher temperatures, more hot extremes and fewer cold extremes, and shifting rainfall patterns in some regions. By 2100 the IPCC expects global sea levels to have risen by up to 1m above the 1986-2005 average in a high carbon scenario – and it could be much higher. We could experience increases of up to 10 per cent higher than the global average.

Though it's not possible to make precise local predictions for sea level at the end of the century, it's clear levels will rise for many centuries to come given our current greenhouse gas emissions. But the rate and scale will depend on future emissions.

With so many communities located at the coast, sea-level rise poses a serious risk in New Zealand. Climate change will also have a significant impact on our freshwater supply and ecosystem health, and low-lying coastal areas and floodplains will become prone to flooding and erosion.

Given projected patterns of development and population distribution, the combination of sea-level rise and increasingly heavy rainfall in some regions is especially concerning. At particular risk are low-lying ecosystems, massive public and private investment in exposed areas, public safety, community resilience and livelihoods, and an array of traditional Maori assets and practices.

By 2100 the IPCC expects global sea levels to have risen by up to one metre above the 1986-2005 average in a high carbon scenario

Many NZ communities are taking steps to adapt to climate change but efforts to address sea-level rise, for example, can be ad hoc, contentious and prone to costly litigation.

IPCC analysis shows our capacity to adapt is constrained by widely varying attitudes towards climate risk, and what constitutes appropriate adaptation. There is limited capacity at the local level to assess risks, and poor integration between government at the local and national levels, and with the private sector and public.

Adaptation planning is challenging for communities because it is often framed as a technical problem that can be solved by science. Yet science can't provide precise answers about the impact of climate change because of the complexity of the climate system and the inherent 'unknowability' of long-term changes. We are often too focused on responses that draw "a line in the sand", but climate change is progressive and layered with uncertainty; it requires flexible responses.

Protective seawalls and stopbanks can reduce the risk for communities located in places prone

to erosion and flooding, but can become unviable if the risk escalates over time. Relying on these structures can also result in a cycle of protection, development, increased protection, and further development. This cycle can be disastrous if an extreme event exceeds the design standards, as in New Orleans after Hurricane Katrina. So, while large barriers may be a necessary short to

medium-term option for protecting

key infrastructure such as airports and major rail and roading networks, they may not be the way forward as sea level rises. They are definitely not the long-term answer.

What's really key to climate change adaptation planning is the process for communities to make decisions. They need an effective forum for weighing up the costs, benefits and risks of different scenarios and deciding where future development should and should not take place. They need a

process to decide which assets and eco-systems should be protected in the short-term, what can be done to mitigate the effects of extreme events in the medium-term, and how to resolve competing interests when the only sensible option is to retreat.

These are tough, expensive questions with no easy answers. It's a process that requires legislative reform, a shift in mindset and new approaches to planning. It means accepting climate change is already happening and that it will progress in unpredictable ways – and that it's not a technical problem to solve, but a set of political decisions to be made.



Preventive measures such as the London flood barriers will not work long-term.

BIOSECURITY

Planning and prevention are

Biosecurity remains the greatest threat to New Zealand's economy: Dr Chris Jewell and Dr Honour McCann assess the risks



Dr Chris Jewell

Lecturer in biostatistics at Massey University's Institute of Fundamental Sciences



Dr Honour McCann

Postdoctoral Research Fellow at Massey University's New Zealand Institute for Advanced Study

An outbreak of foot and mouth disease would cripple New Zealand's economy, but how prepared are we?

In 2001, Britain was gripped by the most devastating foot-and-mouth disease outbreak the developed world has known. It changed the agricultural landscape. A strong pound and rising property prices convinced many farmers who had lost their herds – and some who hadn't – to simply give up farming.

The public, most of whom were exposed to images of a national disease response for the first time, were appalled at the slaughter, the restrictions on tourism, and the resulting £8 billion cost to the local and national economy.

New Zealand is fortunate that it has never had an outbreak of foot and mouth. We have some of the strictest border biosecurity in the world, yet the recent emergence of theileria in cattle, and Psa in kiwifruit, reminds us we are not immune to disease introduction. Sooner or later, despite our best efforts, foot and mouth is likely to enter the country. Cattle, sheep and deer herds will be slaughtered to eliminate infected animals. Tourism will cease as trails crossing farmland are closed to prevent the disease spreading. Half our export market will evaporate instantly. We will lose an expected \$10 billion from our economy.

What may save us is how up to date our data on livestock is. This is where we face real risk. Farmers provide data on what livestock are where, and how they are moved around the country. Data collection takes considerable effort, as any farmer who has tried to update their FarmsOnLine records, or enter their NAIT (National Animal Identification and Tracing) movements, will know.

Yet without this information we are paralysed during an outbreak and unable to take advantage of powerful analysis and prediction technology. The UK experience serves as a reminder: complacency in keeping livestock data up to date delayed the tracing of movements of infected animals, allowing foot and mouth to spread widely and escape local control measures. New Zealand's livestock databases are in many cases out of date, leaving us open to a catastrophic failure of our New Zealand brand.

As a lifestyle farmer and researcher I believe our responsibility is to ensure our records in FarmsOnLine and NAIT are up to date. If there was an outbreak, I'd rather know sooner than later that my newly purchased calves had been on an infected farm. The Government must continue to uphold its end of the bargain, ensuring data is easy to submit and kept private, and guaranteeing against its use for reasons other than disease prevention.

So, if foot-and-mouth disease entered New Zealand tomorrow, would we be ready to respond? The answer now is no. Instead, we wager precariously on the belief that border biosecurity is enough; reality says it isn't and cannot be.



The emergence of the kiwifruit disease Psa (main picture) was a hard lesson for the industry.

Our best defences

What we learned from Psa

The kiwifruit canker disease caused by the bacterium *Pseudomonas syringae* pv. *actinidiae* (Psa) was first reported in Italy in 2008. In two years it had been detected in most of the world's kiwifruit growing regions. Although its precise route of entry into New Zealand remains unknown, Psa's impact on the kiwifruit sector is clear: up to \$885 million in losses over 15 years.

The threat of diseases spreading globally is greater for agricultural industries reliant on crops with limited genetic diversity. In New Zealand the kiwifruit industry staked much of its fortune on a single cultivar of gold kiwifruit (Hort16A), which happened to be especially vulnerable to Psa. Although the industry is now recovering, the hard lessons learned cannot be forgotten or the next outbreak – whether in kiwifruit, another agricultural commodity or native species – will catch us unprepared.

We simply cannot afford to be ignorant of the biosecurity threats outside New Zealand. Although government, industry and scientific organisations were all aware of the emergence of Psa in Italy, there was a failure to communicate and translate this into more stringent import requirements and biosecurity regulations. Psa was also known to infect green kiwifruit as early as 1984, yet pathogen resistance was not given enough attention during the development of new gold cultivars. Obtaining a better understanding of vulnerabilities in current crops should inform the identification of risks.

Though the outbreak exacted a heavy toll, we have gained insights into the nature of the pathogen. Whole genome sequencing of a broad set of Psa isolated from 1984 until the present has revealed unexpected diversity. Although the latest outbreak was caused by a single lineage, other strains of Psa are capable of causing kiwifruit disease.

There are also signatures of the exchange of genetic material between these different strains of Psa, as well as with other bacterial species. The most striking implication of this is that new variants of Psa are likely to arise. New cultivars of kiwifruit must be evaluated for their resistance to multiple evolving threats, rather than focusing exclusively on a single lineage of Psa.

Isolation has been a defining force shaping New Zealand's unique environment, but we have entered a new era of globalisation and must prepare for the challenges ahead. Though initially caught off-guard by Psa, government and industry supported the establishment of new collaborations and international forums for the communication of research findings, which will hopefully endure.

New Zealand's success in protecting our agricultural industry and natural resources from future disease outbreaks also depends on whether fundamental research on plant pathogens continues to be supported beyond times of acute need. The best victory is secured without needing to fight a single battle.



Foot and mouth disease is likely to hit New Zealand at some time. Contamination control (top picture) and up-to-date data on livestock will be essential in fighting it.

SPORT

Some corner of a foreign field . . .

Snatching victory from the jaws of defeat has become an All Black signature. Is this mental toughness enough to win the World Cup?



Warrick Wood

Lecturer in sport psychology at Massey University.

In 2015 the All Blacks will face a challenge they have experienced only once since the inception of the Rugby World Cup in 1987. They will travel to England to defend their World Cup title.

Their 8-7 win over France in the 2011 final brought an end to what has been referred to as a “24-year hangover” since their last, and only, successful Webb Ellis Cup campaign. Though widely accepted as the best, most consistent rugby team in the world, the All Blacks did have a propensity for underperforming in World Cups.

The 2011 victory was a turning point because it showed the world, and more importantly the All Blacks themselves, that they could perform under immense pressure.

Both the All Blacks’ World Cup titles were won on home soil. Though it’s often believed there is a home field advantage, in reality it can actually create greater pressure for the athletes when the expectations of the audience are perceived to be overwhelming.

This scenario came to fruition in this year’s football and basketball World Cups, where Brazil and Spain succumbed to pressure and experienced a rapid capitulation of performance. The way the All Blacks were able to harness the motivation the nation provided in 2011, but also maintain focus in the moment, play by play, makes the victory that much more remarkable.

WHAT CHALLENGES WILL THE ALL BLACKS FACE IN ENGLAND IN 2015?

The big question is whether or not the All Blacks can win a World Cup on foreign soil for the first time. Recent games suggest an ability to focus exclusively on performance and exert considerable mental toughness when results are important. In the last game of the 2013 season, they trailed Ireland in the closing minutes but scored a try on the final whistle to achieve an unbeaten season.

Going undefeated in a calendar year is a



Richie McCaw is the face of the All Blacks’ success.

remarkable feat, never before accomplished by any nation in the professional era. However, it was the nature of the All Blacks’ performance in the final minutes of the game that was so pleasing. The team demonstrated high levels of determination and audacity, while maintaining composure, allowing them to perform at their best regardless of the scoreboard.

When a situation is perceived as stressful (which occurs regularly in elite sport), there is a tendency for thoughts to drift to uncertainties - like what happens if we lose? - and this can severely undermine the athlete’s ability to perform in ‘the moment’.

The complex ability to maintain composure

and a present-centred focus, in an environment that uses results to determine success, is a skill that is developed over time. Through their work with longtime mental skills trainer Gilbert Enoka, the All Blacks seem to be doing just that.

After a close match against South Africa earlier this year, All Blacks halfback Aaron Smith attributed their success to the team’s ability to stay calm. Smith reported that during the closing minutes, captain Richie McCaw instructed the team to “stay calm boys, we’ve got this, trust our systems and it’ll work”. Composure and focusing on the present won them the game.

The All Blacks have adopted a stance in which they understand that if a better team is able to get around or through them, there is little that can be done about this. But they also believe they will not be beaten due to a lack of spirit or trust. This approach heightens perceived controllability, and maintains appropriate levels of arousal and anxiety that will enable them to perform fully in ‘the moment’.

The All Blacks have all the tools to be successful and will, in all likelihood, lift the Webb-Ellis trophy at the end of the tournament. This is despite the team’s 22-test win streak coming to an end in a match against South Africa at Ellis Park, in Johannesburg.

Teams need to experience highs and lows together as it helps to avoid complacency and can solidify their desire to keep improving. The All Blacks have been placed in a less competitive pool than some of their rival nations and, therefore, it is important that during the build-up to the event, they experience some degree of adversity.

That loss in Johannesburg was the end of the All Blacks’ perception of invincibility. But even without this psychological edge, they have demonstrated enough physical skill and mental toughness to compete with the level of confidence and trust needed to win the World Cup.

Two World Cups, but where’s the money?



Dr Sam Richardson

Lecturer in the School of Economics and Finance and an expert in the economics of sport

With the glory of the 2011 Rugby World Cup now a faded memory, New Zealand is once again preparing itself to host not one, but two, international tournaments – the ICC Cricket World Cup and Fifa Under-20 World Cup. Securing the hosting rights for these two events bodes well for New Zealand’s economy next year – or does it?

It’s useful to contrast the Cricket and Under-20 World Cups to the 2011 Rugby World Cup. That event was said to have a TV audience of 4.2 billion and saw an influx of 133,000 international visitors, spending as much as \$340 million, according to official figures. Rugby World Cup tourist spending was approximately 1.5 per cent of total tourism spending in New Zealand in 2011.

Based on potential global audience size, the

Cricket World Cup is half of the size of the Rugby World Cup, and only half the event will be hosted here. That means a possible 33,250 international tourists might spend approximately \$85 million.

The Fifa Under-20 World Cup could attract as many as 16,625 tourists and a \$42.5 million visitor spend. These figures should be considered cautious estimates as precise calculations of economic impact are fraught with difficulty.

There are several reasons we shouldn’t expect economic windfalls from big sporting events. Event tourism is often affected by “crowding-out”, where other international visitors decide not to travel to avoid a major event.

And the public money spent on sporting events is substituted from alternative uses.

The 2011 Rugby World Cup was widely considered a success, despite taxpayers having to pick

up two-thirds of the \$31.3 million operational loss. Political strife dogged the 2014 World Cup in Brazil, while “white elephant” stadiums dotted South Africa following its hosting of the 2010 World Cup. The price tag attached to mega sporting events is escalating to unprecedented levels, and countries have started to balk at the costs.

So, is the hosting of major international sporting events a feasible strategy for New Zealand? Past experience has shown economic windfalls do not arise from even the largest of sporting events. For New Zealand, events that use existing infrastructure and do not require substantial capital outlay in the form of taxpayer dollars are opportunities worth considering.

Fortunately, both upcoming tournaments will largely use the same stadia as those developed for the Rugby World Cup. Neither are likely to stimulate the economy in any major way but they shouldn’t cost us the earth to host either.



Technology

From the hover board to the bionic arm, Peter Griffin offers a taste of some of the technology coming down the pipeline from the world's most creative scientists and gadget creators



ENDLESS ENERGY

Imagine a generator small enough to sit on the back of a truck, but producing enough juice to power 80,000 homes - with no globe-warming emissions. That's what US defence contractor Lockheed Martin plans to deliver within a decade as it ramps up R&D efforts on a compact nuclear fusion reaction. Unlike nuclear fission, the better-known power source which sparked disaster at Chernobyl and Fukushima, nuclear fusion is safe and clean but incredibly difficult to produce. Work on fusion power has been under way for decades but hasn't worked outside the lab. But Lockheed claims its prototype will take the technology mainstream, starting with power generation for navy ships and planes and then for power plants and factories, replacing dirty coal, gas and nuclear-power for good.



DIY SATELLITES

With Space X founder Elon Musk recently unveiling plans to launch a fleet of 700 microsats to supply wireless internet access globally, the private space race is about to ramp up a gear. Now we even have crowd-funded DIY efforts to put satellites in orbit. Planetary Resources is attempting to launch Arkyd, a low-cost version of the Hubble Telescope, featuring sophisticated cameras that can take high-resolution images of space and Earth. The founders say it can be controlled by "three people in their pyjamas and an iPad", with financial backers able to book time on Arkyd to undertake their own stargazing.

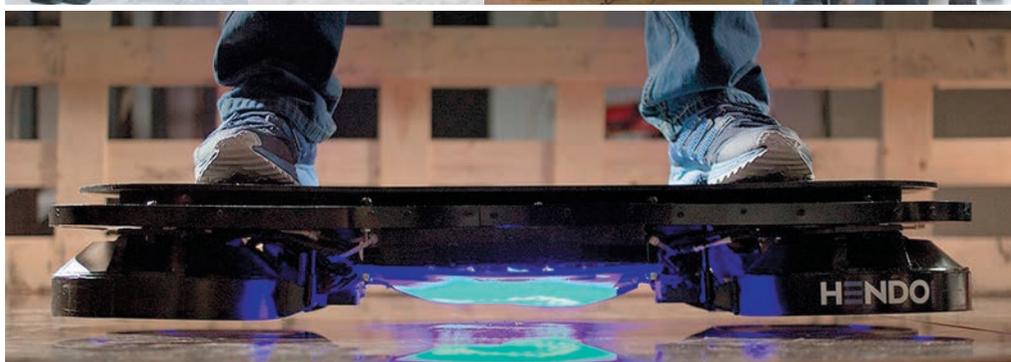
Arkyd picked up US\$1.5 million in a Kickstarter funding campaign last year and was scheduled to be in orbit last month. However, the rocket taking it to space exploded on lift-off, vaporising Arkyd. So it's back to the drawing board for the Planetary Resources boys, who already have Arkyd II in the works.



ROBOTIC STRENGTH

Auckland-based Rex Bionics has already won worldwide acclaim for its exoskeletons, which allow paralysed people to get upright and moving again. Now the Titan Arm, designed by four mechanical engineering students at the University of Pennsylvania, could offer "augmented strength" technology to anyone whose job involves a lot of heavy lifting.

The powered, upper body exoskeleton uses sensors to detect body motion and the weight of an object, increasing a user's strength to carry up to 20 additional kilograms, while bracing the back. The robotic arm won't cost the earth either - its creators aim to have it on the market for around \$3000.



HOVERING AROUND

It doesn't get more Back to the Future than this - the Hendo Hoverboard, a type of skateboard that does away with the wheels. Instead, the Hendo features four 'engines', which emit magnetic fields pushing against each other and allowing the board and its rider to levitate off the ground. Currently the hoverboard only works over metal surfaces, allowing a smooth glide an inch off the ground. Its creator, Californian Greg Henderson, is not planning a great big metal hover park to allow people to test ride the Hendo; his ultimate aim is to develop the hoverboard to work over any surface, including water, and he has secured millions in funding to work on the prototypes with the aim of having hoverboards on the market late next year.



FOLDING STUFF

Some iPhone 6 users were shocked in September to find the screen of their fancy new smartphone could flex and bend - something Apple's designers certainly didn't intend. But we are on the verge of having truly flexible screens on our gadgets and Plastic Logic's PaperTab screens may well be the first large screen devices to market. The 27cm PaperTab can literally be folded up like a newspaper, its full-colour screen no worse off for it. The computer processor and other essential innards are contained at one end of the tablet. Purposely curved phones like the Samsung Round and the LG G Flex have set the theme for next year, when we may well see the first smartphone that you can roll up.

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