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The start of a conversation on the value of New Zealand's human capital

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The Start of a Conversation on the Value of New Zealand's Human Capital

Suzy Morrissey

Office of the Chief Economic Adviser
Living Standards Series: Discussion Paper 18/02

February 2018

DISCLAIMER

This paper is one of a series of discussion papers on wellbeing in the Treasury's Living Standards Framework. The papers on [natural capital](#), [social capital](#), human capital, and [wellbeing frameworks](#) are discussion papers. The discussion papers are not the Treasury's position on measuring intergenerational wellbeing and its sustainability in New Zealand. Our intention is to encourage discussion on these topics.

There are marked differences in perspective between the papers that reflect differences in the subject matter as well as differences in the state of knowledge. The Treasury welcomes comments on these papers to help inform our ongoing development of the Living Standards Framework.

In contrast, [The Treasury Approach to the Living Standards Framework](#) is a Treasury Paper, which describes the current work on the Living Standards Framework and our plans for future work.

**LIVING STANDARDS SERIES:
DISCUSSION PAPER 18/02** | The Start of a Conversation on the Value of New Zealand's
Human Capital

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Executive Summary

This paper starts a conversation on the value of New Zealand's human capital stock. It adopts a definition of human capital as “an individual's skills, knowledge, mental and physical health that enable them to participate fully in work, study, recreation and in society more broadly”.

The paper is in four parts. Part 1 provides an introduction. Parts Two and Three describe educational and health outcomes as key components of human capital. Part 4 reflects on distributional issues.

This paper explores the strengths and weaknesses of different approaches to measuring human capital. With respect to education stock, New Zealand has data for the past 30 years using an incomes-based approach, which shows an increase in human capital, but highlights important differences between younger and older workers. Our working-age adults have high skills but not as high as those in other countries (perhaps reflecting fewer years in education). However, using qualifications as a proxy for skills is imperfect, and does not reflect either “soft skills” or technical skills acquired “on the job”.

This paper investigates options for calculating a stock value for health but concludes further work is required to find a suitable method. This would be worthwhile to pursue because of New Zealand's differential health outcomes based on ethnicity, and the recognised importance of health not just for building human capital, but also for building and utilising social capital.

Distributional issues are noted with respect to gender and ethnicity. In terms of gender, unequal labour market outcomes include the gender pay gap, and high rates of part-time employment among women. The unequal division of care and domestic responsibilities (unpaid work) between the genders is understood to act as a barrier to the output or utilisation of human capital. In terms of ethnicity, differential health outcomes are noted. Although not discussed in this paper, ethnic differences in educational outcomes are also acknowledged.

Overall, this paper finds that the measure of our human capital stock using the incomes-based approach has merit as a partial measure, which would be improved by reflecting the types of barriers noted above, and by including a stock measure of health.

We invite comment on all aspects of this paper, including the methodological issues of a stock measure for health, and the appropriateness of commonly used current wellbeing indicators (the Organisation for Economic Cooperation and Development [OECD] Better Life Index indicators have been referenced herein). Comment could also be provided on the policy issues of our internationally weakening skill profile, and its impact on human capital, or on options for improving the unequal division of care and domestic responsibilities between the genders.

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Part 1 – Introduction

The Treasury intends that, as the LSF develops to reflect a comprehensive statement of the capital stocks, the information and analysis of the role of human capital in our society will become more comprehensive. This paper is a beginning towards this goal. It is intended to act as a starting point in evaluating the role of human capital in New Zealand's living standards, yet it is not intended to be more than a brief introduction. Similarly, initial work on social and natural capital is also being released at this time.

Paper structure

Part 1 of the report introduces some definitional questions. It includes a definition of human capital from the OECD and introduces the links between human capital and the other capitals. Then it outlines some of the barriers to utilising human capital.

Part 2 of the report focuses on education. It looks at information on the total stock of human capital available in New Zealand, from an education and earnings perspective, and considers how this stock has changed over time.

Part 3 of the report focuses on health, which is often included alongside education and skills as part of the definition of human capital. Health is of particular relevance in New Zealand, where health outcomes are linked to ethnicity.

Part 4 reflects on distributional issues and includes a particular focus on unpaid work and gender. The burden of unpaid work can impact women's ability to grow their human capital through training, their ability to participate in paid employment and to benefit from human capital outputs.

Definitions

The OECD defines human capital as “the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being”.¹ By its nature, human capital is embodied in an individual and, while information may be written down, the ability to apply knowledge to a particular situation is necessarily something that relies on the skills of the individual involved.

The recent Global Human Capital Report² by the World Economic Forum included four elements in its working definition of human capital. They were:

- Capacity: the formal education received by the young and older generations
- Development: the formal education received by the next generation
- Deployment: the application and accumulation of skills, and
- Know-how: the use of specialised skills.

¹ OECD. (2001). *The well-being of nations: The role of human and social capital* (p.18). Paris: OECD.

² World Economic Forum. (2017). *The global human capital report. Preparing people for the future of work*. Switzerland: World Economic Forum

This paper proposes the following definition for human capital in New Zealand: “an individual’s skills, knowledge, mental and physical health that enable them to participate fully in work, study, recreation and in society more broadly”.

As human capital is focused on the productive wealth embodied in people, its measurement is generally focused on the education and skill level of the population, particularly since numerous studies have shown that qualifications and labour market earnings are highly correlated. This was the case in a previous Treasury working paper on human capital.³

However, it is embodied, so the usefulness of the person’s human capital is affected by the health of the individual and by another circumstances that may reduce their ability to use their skills to their best advantage. This paper seeks comment on how best to measure human capital in a way that includes health (in Section Three) and various barriers to utilisation are discussed below.

At the edges (and included in some definitions), human capital intersects with social capital. The ability of people to work in groups, their values and attitudes towards others and towards work, and other social norms that may limit their ability to express their skills and knowledge all impact on the value of the human capital in a society. The social environment is noted as being important in terms of mental health, as social isolation has a negative impact on individuals. In terms of broader societal engagement, there is the potential for formal education to be expanded to include subjects such as civics and cultural literacy, which may help build social capital through education.

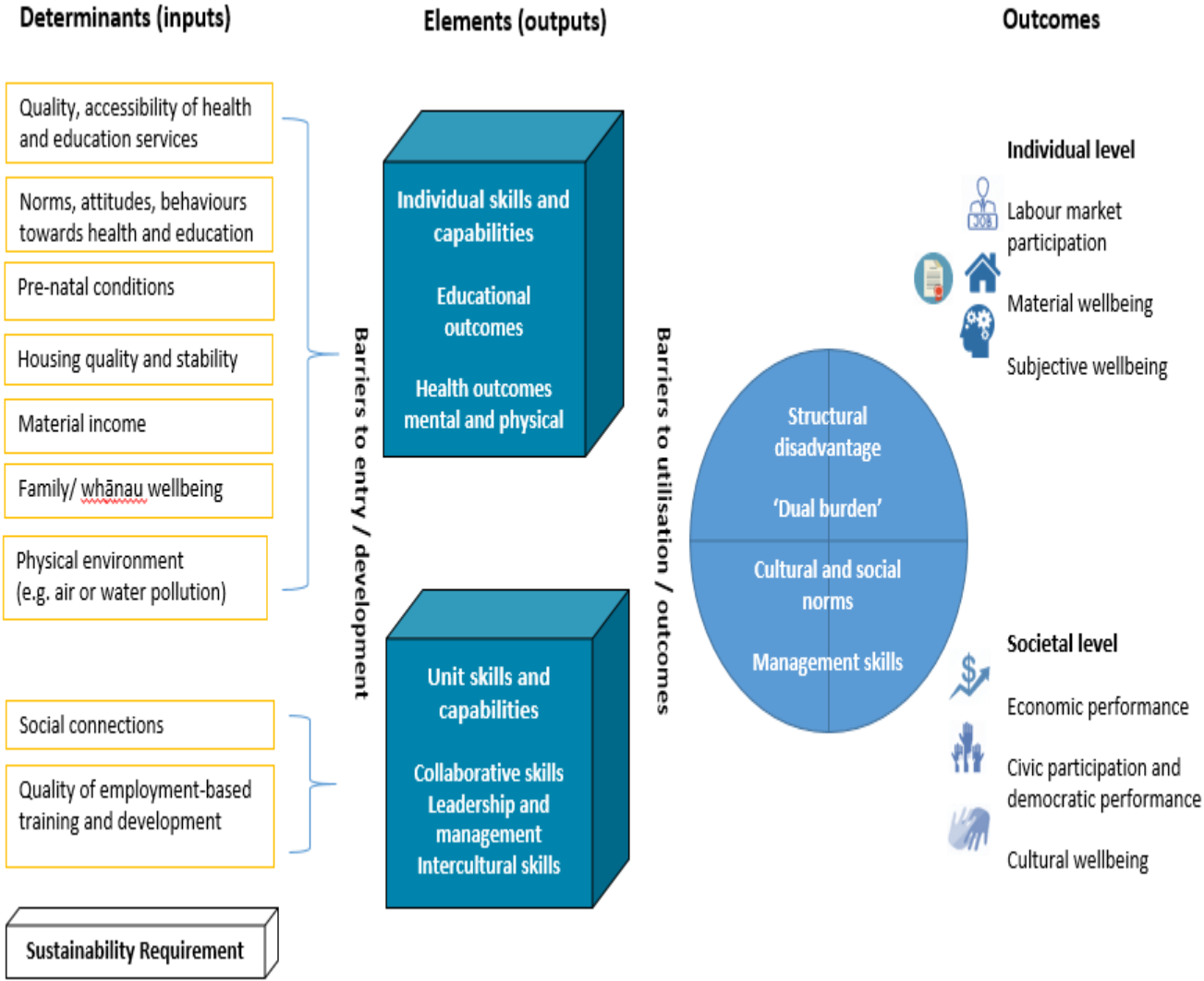
Although, intuitively, there are overlaps between human and social capital, this paper suggests that issues of taxonomy are less important than ensuring we are focusing on the areas that they represent, and neither double counting nor ignoring these important areas.

The value of human capital is also affected by the level of physical and financial capital in society. For a worker to be able to use their skills to the maximum value and to further develop their knowledge and skills, they need the tools, the organisational support and labour market openings that make the most of their human capital.

Figure 1 below identifies the elements and determinants of human capital along with the outcomes and the barriers to output.

³ *Treasury working paper 01/16 – Human capital and the inclusive economy.* Wellington: The Treasury.

Figure 1 – Human capital – determinants, elements, barriers and outcomes



Barriers

There are potential barriers to developing and utilising human capital. While not all inputs or determinants are required, we understand that the lack of many of them presents a barrier to successful acquisition of human capital. In the same way, some people face barriers to utilising their human capital and achieving positive outcomes. Barriers to utilisation include structural disadvantage, cultural and social norms, the “dual burden”, management skills and bias (although these can also act as barriers to development in some cases).

Structural disadvantage can mean that some people are hindered from entry or progression on the basis of some characteristic, such as income or wealth, gender or ethnicity. An example would be an expectation for students to take unpaid internships with a view to securing graduate job offers from prestigious firms. This would favour those from wealthy families who can afford to support their children over the holidays, without the students having to find their own paid employment. Another example might be an expectation for staff to participate in networking, perhaps over drinks after work, which presents challenges for those with childcare responsibilities or who do not drink alcohol. This would – generally – favour male workers and have an exclusionary effect on many women and people of certain religions.

Cultural or social norms can have the same hindering effect but are more subtle. An example is the expectation in New Zealand that men will work full-time and that mothers of young children will work part-time. Work expectations also form the next barrier of the “dual burden”. Although women are now participating in the labour market as well as men, the unpaid domestic and caring work that was previously undertaken by women has not been shared equally with men, so that women now face a dual burden of paid and unpaid work.

Management skills are important for obtaining quality training and development within employment and for growing collaborative skills that create productive environments. Finally, there is the issue of bias. This could occur in the education system or in the labour market and could be based on gender, race, ethnicity or other factors.

The mix of tangible aspects of human capital (such as qualifications, health, life expectancy) and intangible barriers (such as bias, cultural or social norms, structural disadvantage, the impact of personality and expectations) make the measurement of human capital problematic. At this stage, we do not have proposed measures for the intangible barriers to human capital, and this issue represents a potential area of future research and investigation. However, a number of methods have been proposed to measure the tangible aspects, and a selection are discussed in Parts Two and Three of this paper.

Part 2 – Education

Measuring human capital

Despite a long history of attempts to measure human capital, the methodology for measuring it is still not agreed. In 2002, Statistics New Zealand commissioned a review of the options for measuring human capital which concluded:

In the context of the current project, where the emphasis is on the measurement of Human Capital series, we do not see the absence of an all-encompassing widely accepted definition as an obstacle. Rather, it points to the need to proceed on a pragmatic basis identifying variables of interest whose measurement can be established and/or improved.⁴

There have been three major approaches to measuring human capital: a cost-based approach; an income-based approach; and an educational-stock-based approach. Each of these has its strengths and weaknesses.

There are some weaknesses common to all approaches, including health outcomes being ignored, as the approaches all focus solely on education-based outcomes (although health costs are included in the cost-based approach). The impact of barriers to entry or development of human capital (as identified in Figure 1) are also ignored, as is the opportunity cost of lack of utilisation through barriers to output, and any training or development received “on the job”.

Another critique is the narrow focus on educational outcomes rather than skills that are important for individual and societal wellbeing, such as communication skills, leadership skills, social skills, financial literacy, cultural literacy, etc.

The three approaches are as follows:

- **The cost-based approach** aggregates the resources used to rear children and provide schooling and healthcare, and then aggregates this across time. This approach is relatively easy in terms of data but its usefulness is undermined by the fact that the costs of providing these services have had relatively little relationship to the economic value of the human capital achieved from providing it. As a result, this approach has fallen out of favour largely because the cost of providing education bears little relationship to the labour market returns of higher qualifications.
- **The incomes-based approach** values the stock of human capital based on the incomes earned by each qualification type over the lifetime of people with this qualification. Using the income trajectory for each qualification means that this measure also includes the value of additional experience as people age. This has been the most popular approach in recent years, and estimates have been created for the United States, United Kingdom, Sweden, Norway, Canada, China and New Zealand. The OECD has also used this method for its human capital project.⁵ This approach is particularly useful for comparing with the value of other capital stock, but there are only relatively limited cross-country comparisons available, because not all countries have done these calculations.

⁴ Stroombergen, A., Rose, D. and Nana, G. (2002). *Review of the statistical measurement of human capital* (p.10). Wellington: Statistics New Zealand

⁵ OECD. (2011). *Measuring the stock of human capital for comparative analysis: An application of the lifetime income approach to selected countries*. Working paper no 41. Statistics Directorate. Paris: OECD.

- **The educational-stock-based approach** uses indices of key metrics to assess the countries' performance (such as years of education, degrees earned and life expectancy). This approach is useful because these measures have been collected for a longer time period and so a long-term series can be constructed to show trends and cross-country comparisons of performance in human capital. However, the approach is less useful for comparing the value of human capital with the value of the other capitals within the economy.

Measures of New Zealand's human capital using the incomes-based approach

New Zealand's human capital stock has been measured using the incomes-based approach for each of the census years from 1981 to 2013.⁶ In essence,⁷ this is measured by taking the population aged 18 to 64, dividing it into cohorts based on their gender, educational level and employment status and then estimating the future income trajectories of each cohort based on the current pattern.⁸ These are then capitalised using a discount rate to find the capital stock that would generate this income stream. As the trajectory is based on actual earnings it effectively includes the increased value from experience. However, the approach ignores the value of skills when they are not used to generate an income (in this it is similar to gross domestic product [GDP] – and we will return to that topic in Part 4 of this paper) and there is also an assumption that wage rates are a reasonable measure of the value of the work of the individual.⁹

This assumption is clearly problematic as professions such as teaching and nursing are often cited as being underpaid. These examples are both female-dominated industries, which are generally lower paid than male-dominated industries, a discussion that is beyond the scope of this initial paper but that is noted briefly in Part 4.

The incomes-based approach also assumes that qualifications are a reasonable proxy for overall skill levels. While it is known that skills vary within qualification groups, the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) survey,¹⁰ which tests the skill level of a random sample of the population, found a strong relationship between qualifications and skills in New Zealand. In particular, they found that those with no qualifications had the lowest skill level and those with Bachelors and higher qualifications had, on average, 36% higher literacy skill levels. Nonetheless, there was relatively little difference in skill level between those with school- and non-degree-level qualifications.

⁶ Le, T., Gibson, J., & Oxley, L. (2006). A forward-looking measure of the stock of human capital in New Zealand. *Manchester School*, 74(5) with additional analysis of the 2006 and 2013 censuses by Trinh Le for the Treasury (*the 2006 and 2013 analysis is unpublished*).

⁷ For the full methodology, see the paper in footnote 4.

⁸ The estimates allow for improvements to qualifications over the life course (which is especially important for the younger cohorts) and for mortality (which is especially important for older cohorts).

⁹ This is also how skills are considered for immigration policy.

¹⁰ The PIAAC information is taken from the Ministry of Education's summary of New Zealand's results, which are in three publications, and can be found here (see page 17). See https://www.educationcounts.govt.nz/publications/series/survey_of_adult_skills/skills-in-new-zealand-and-around-the-world-survey-of-adult-skills

The estimated value of New Zealand's human capital stock in 2013 was \$1,442.4 billion. In the 32 years since 1981, the real stock of human capital (after allowing for inflation) has more than doubled. There has been some variation in the rate of growth over time, with higher growth in the early 1990s and 2000s, and the lower growth in the late 1980s.

Table 1 – Aggregate value of human capital stock
(2013 billion dollars)

	1981	1986	1991	1996	2001	2006	2013
Male							
Unskilled*	267.2	224.5	175.2	199.2	222.8	214.1	206.6
Non-degree**	210.9	277.7	299.6	314.6	303.1	353.4	397.1
Bachelors	33.7	45.9	57	78.9	93.4	133	174.4
Postgraduate	16.5	28.8	31.4	42.8	48.4	62.5	92.5
Sub-total	528.3	576.9	563.3	635.5	667.7	763	870.7
Female							
Unskilled*	87.6	94.2	88.2	106.9	121.5	123	119.7
Non-degree**	64.8	102.3	140.6	166.5	184.1	204	220.8
Bachelors	8	13.4	22.7	37.7	61.4	104.9	151.6
Postgraduate	2.6	8.2	11.9	18.9	29.5	46.8	79.6
Sub-total	163	218.1	263.3	330.1	396.5	478.7	571.8
Total	\$691.3	\$795.1	\$826.6	\$965.5	\$1064.2	\$1241.7	\$1442.4
Change from last census		15%	4%	16.8%	10.2%	16.7%	16.2%
Annual growth rate from last census		2.84%	0.78%	3.16%	1.97%	3.13%	2.16%

* Unskilled includes those with no school qualifications and those with National Certificate of Educational Achievement (NCEA) Level 1 or equivalent.

** Non-degree includes those with NCEA Level 2 or Level 3 and non-degree tertiary qualifications.

Source: Le, T., Gibson, J., & Oxley, L. (2006). A forward-looking measure of the stock of human capital in New Zealand. *Manchester School*, 74(5), updated and with additional analysis by Trinh Le of the 2006 and 2013 census for the Treasury (*the 2006 and 2013 analysis is unpublished*).

There are three factors that have combined to produce the increased value of human capital:

- **The increasing qualification profile of the population.** In 1981, almost two-thirds of people had no post-school qualifications and less than 5% had Bachelors or higher qualifications. By 2013, 40% of the labour force had low skills, and those with Bachelors and above constituted 21% of the labour force.
- **The increase in lifetime earnings, particularly by women.** The increase in the level of labour market participation enhanced women's total lifetime earnings from 30% of male lifetime earnings in 1981 to over 60% in 2013.
- **A rise in the relative earnings by those with higher qualifications** compared to the earnings of unskilled workers, particularly over the period from 1981 to 1996. This will be

partly a wage effect, and partly because those with higher qualification are more likely to be in the workforce.

Using an incomes-based approach, we find that the application of New Zealand's education-based human capital is disproportionate between the public and private sectors. The public sector uses between 20% and 25% of the human capital stock but has 14.4% of the labour force. Further details are provided in Appendix 1.

New Zealand's human capital stock compared to its physical capital stock

Since 1986, New Zealand's stock of human capital has been, on average, 2.43 times the value of the stock of physical capital¹¹ as recorded in the national accounts. The ratio has been relatively stable since 2000, suggesting that the rate of increase for both physical and human capital has been about the same.

Table 2 – New Zealand's human and capital stocks, 1981–2013
(\$billions 2009/10 prices)

	1981	1986	1991	1996	2001	2006	2013
Human capital	\$691.3	\$795.1	\$826.6	\$965.5	\$1064.2	\$1241.7	\$1442.4
Capital stock		\$324.2	\$358.0	\$385.6	\$435.9	\$513.1	\$592.5
Human physical		2.45	2.31	2.50	2.44	2.42	2.43
Human capital/GDP		7.0	7.3	7.3	6.9	6.7	7.0

Source: Human capital from Table 1. Physical capital from Statistics New Zealand, Net capital stock by asset and industry chain-volume series expressed in 2009/10 prices. SNEA.SG07RAC03K90ZZ. Real GDP calculated from SNEQ.SG01RAC00B01.

Comparing New Zealand's human capital stock to other countries

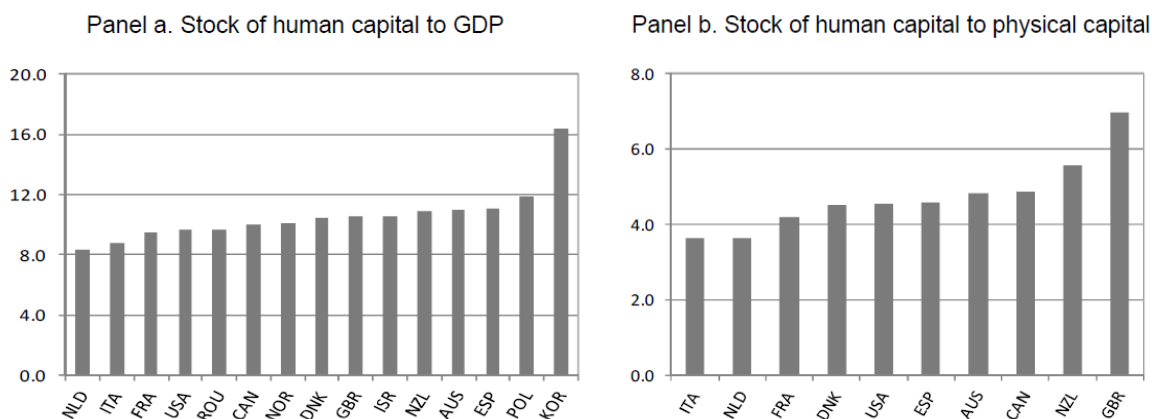
In 2011, the OECD produced preliminary measures of the stock of human capital using a very similar, but not identical, methodology to the calculations in the previous section.¹² Their work provides the best figures for a comparison of New Zealand's human capital against that of other high-income countries.

The OECD found that New Zealand was slightly above average in its ratio of human capital to GDP but that it was significantly above average in the ratio of human capital to physical capital (see Figure 2 below). This suggests that our economy has a greater dependence on human capital for its economic output, and may also suggest that having high levels of human capital is especially important for New Zealand's economic growth. The relatively high ratio of human capital to physical capital also raises the question whether we would get an even higher return to our human capital with a more typical capital:labour ratio.

¹¹ This is the stock of built capital included in the System of National Accounts (SNA), so it does not include natural or social capitals.

¹² Liu, G. (2011). Measuring the stock of human capital for comparative analysis: *An application of the lifetime income approach to selected countries*. Statistics Directorate working paper No 41, Figure 4. The figures are sufficiently different that they cannot be directly compared with those presented earlier in Figure 1. Paris: OECD

Figure 2 – International comparisons of the stock of human capital, 2006



Source: Liu, G. (2011). Measuring the stock of human capital for comparative analysis: An application of the lifetime income approach to selected countries. Statistics Directorate working paper No 41, Figure 4.

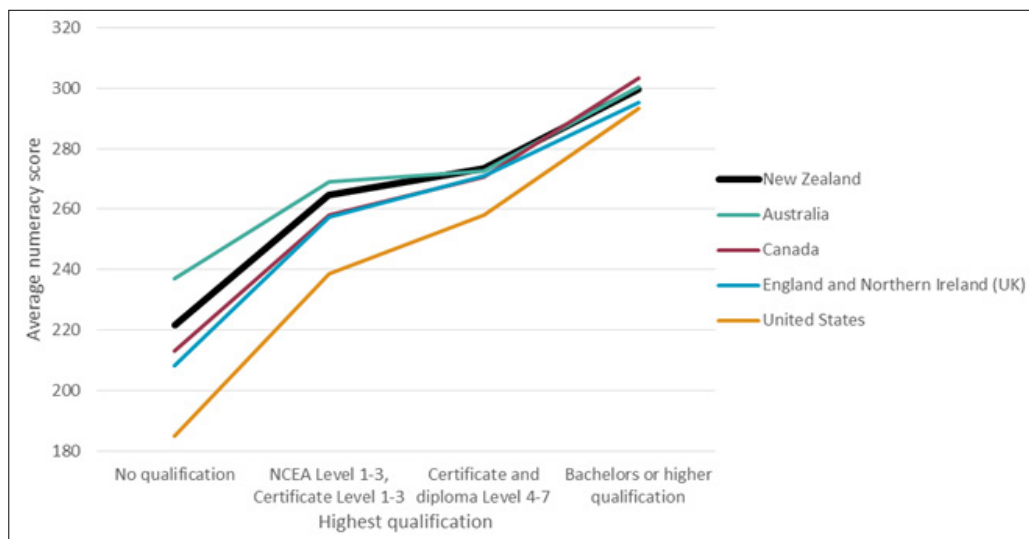
The findings of the PIAAC survey reinforce the conclusion that New Zealand’s workplaces have a higher dependence on human capital than found in most countries. As part of the survey, they collected statistics on how often key skills were used at work. Workers in New Zealand read, write, work with mathematics, solve problems and use computers in their jobs, more than the average across the OECD countries participating in the survey. In fact, compared to workers in the other 32 countries, New Zealand’s workers were first in their use of reading, fifth in writing, fourth in numeracy, second in ICT and third in problem-solving.

Research based on the PIAAC survey also showed a positive correlation between labour productivity (measured by GDP per hour worked) and the average use of reading skills at work, with the average use of reading skills accounting for 26% to 32% of the variation in labour productivity across countries. However, New Zealand is an outlier, as it has high skills but relatively low labour productivity.

The discrepancy between our skill use and productivity is not because our skills are low. PIAAC directly tested a sample of the adult population’s skills in literacy, numeracy and problem-solving in a technologically rich environment, and this showed that, out of 32 OECD countries that took part, New Zealand was ranked fourth in literacy; sixteenth (just above average) in numeracy; and fifth in problem-solving in a technologically rich environment.

It is also not because our qualifications signal lower skills than in other countries. In fact, workers in New Zealand with no or low qualifications are more skilled than in all the other main English-speaking countries except Australia, and those with non-degree and degree-level qualifications match the skill levels of the other countries. This is show in Figure 3 below.

Figure 3 – Numeracy skills and highest qualification



Source: Ministry of Education and Ministry of Business, Innovation & Employment. (2016). *Skills and education. Survey of Adult Skills (PIAAC)*¹³ (p.10).

Finally, it is not because there is a lack of continuing education once people enter the workforce. New Zealand workers reported the highest rate of on-the-job training and seminars/workshops in the study, and were also well above average in their rate of informal education such as learning from others and learning-by-doing.

In fact, the only area where PIAAC showed a significant negative result was that New Zealand workers are slightly less well matched in their jobs for their qualification level and significantly less well matched for their field of study. However, the implications of these mismatches on labour market outcomes are not clear. This is because, despite these mismatches, workers are well matched based on their measured literacy levels, and internationally this tends to be where the biggest penalty lies. At the same time, international evidence suggests that mismatches between work and field of study have relatively small impacts on labour market outcomes. Further research is required to know whether these findings are also true for New Zealand.

What we can learn from the education-stock-based measures

Incomes-based measures have generally only been available for a relatively short time, and New Zealand is unusual in having estimates back as far as 1981. For longer trends and international comparisons, most studies use the education-stock methodology, which uses a set of indicators to create an aggregate index. Which indicators and how they are aggregated varies between studies.

One major education-stock measure is the **World Economic Forum Index**¹⁴ which uses a comprehensive set of indicators to create an aggregate index, and sub-indices by age group

¹³ See http://www.educationcounts.govt.nz/_data/assets/pdf_file/0005/173516/Skills-and-education.pdf

¹⁴ World Economic Forum. (2016). *The human capital report. Switzerland: World Economic Forum* See http://www3.weforum.org/docs/HCR2016_Main_Report.pdf

and across two themes: learning and employment. A summary of the measures is provided in Appendix 2. In this index:

- New Zealand ranked sixth overall, behind Finland, Norway, Switzerland, Japan and Sweden. The scores of the top countries were close together so that the distance between the top and New Zealand was small (85.86 for Finland vs 82.79 for New Zealand).
- New Zealand's performance was significantly lower (17th) for working-age adults (25–54 year-olds) than for either older or younger age groups. We were second and third respectively for the 55–64 and 65+ age groups and ninth and seventh for the 0–14 and 15–24 age groups.¹⁵
- New Zealand's ranking compared to other countries was higher on the metrics regarding deploying skills (which made up the employment theme) than on the metrics that looked at the acquisition of knowledge (in the learning theme). Within the learning theme, performance was significantly higher for those over age 25 than for those under the age of 25, suggesting that our older workers' skills are relatively better than those of our younger workers.

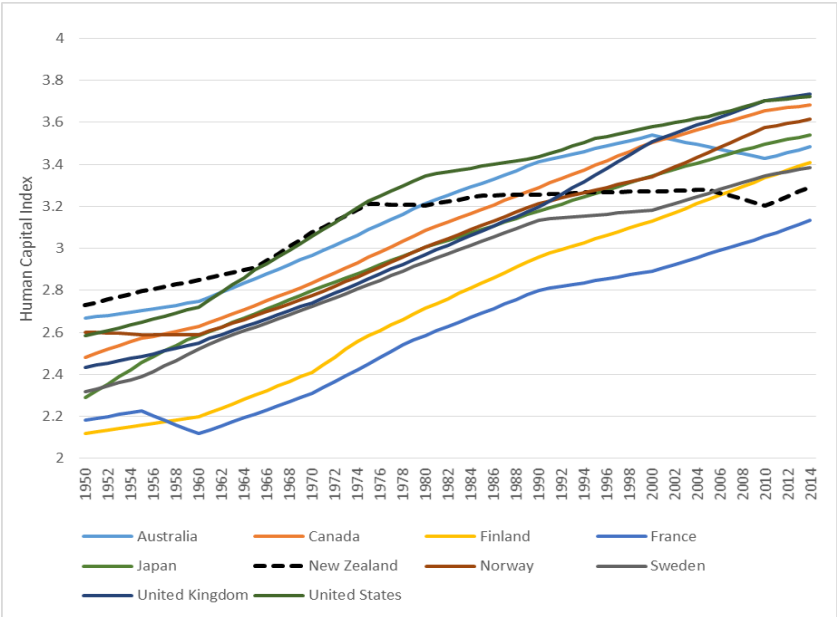
Another major education stock series is the ***Penn World Table***. It provides a longer-term look at the trends for human capital across countries, though it is a view that is limited by being focused on only two variables: the average years of education and the returns to education.¹⁶

Figure 4 shows the trends over the past 60 years for most of the high-performing countries in the World Economic Forum Index and the other high-income countries. New Zealand's human capital index was at the top of this group in the first two decades, but since 1974 our trajectory has been significantly lower than that of the other countries. As a result, by 2014 we were placed second to last in this comparison.

¹⁵ The lower rating for the core working age group was largely driven by their measures of economic complexity and labour force statistics (participation, unemployment and gender gaps) and by moderate (as opposed to stellar in the older age groups) tertiary education rates.

¹⁶ Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2015). The next generation of the Penn World Table. *American Economic Review*, 105(10), 3150–3182.

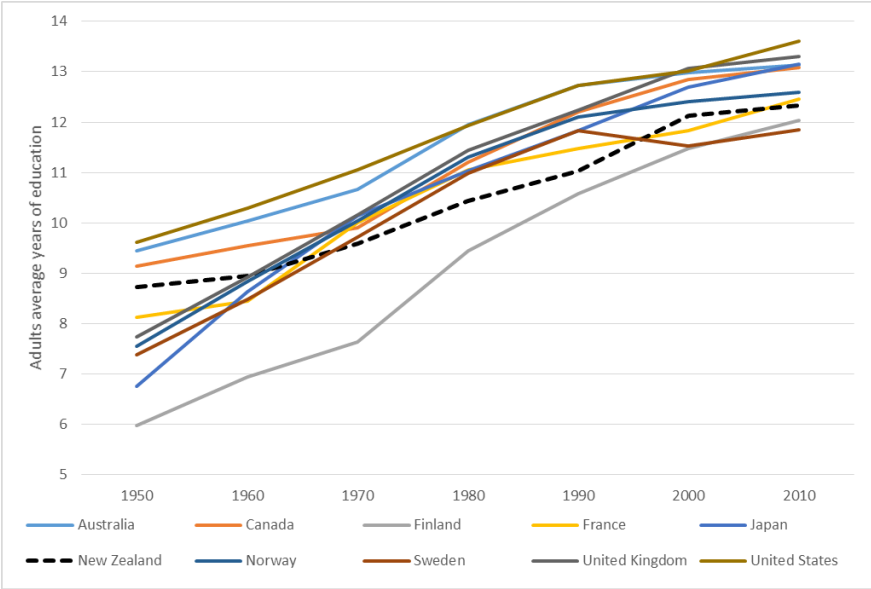
Figure 4 – Trends in human capital, 1950 to 2014



Source: Penn World Tables, version 9.

The main driver of the relative decline in the Penn World Tables Index was the slow growth in the number of years of education. New Zealand’s number of years of education was higher than most comparable countries in 1950, but while most other countries rapidly increased their years of education between 1970 and 2000, New Zealand’s years of education changed very little.

Figure 5 – Average years of education in the adult population

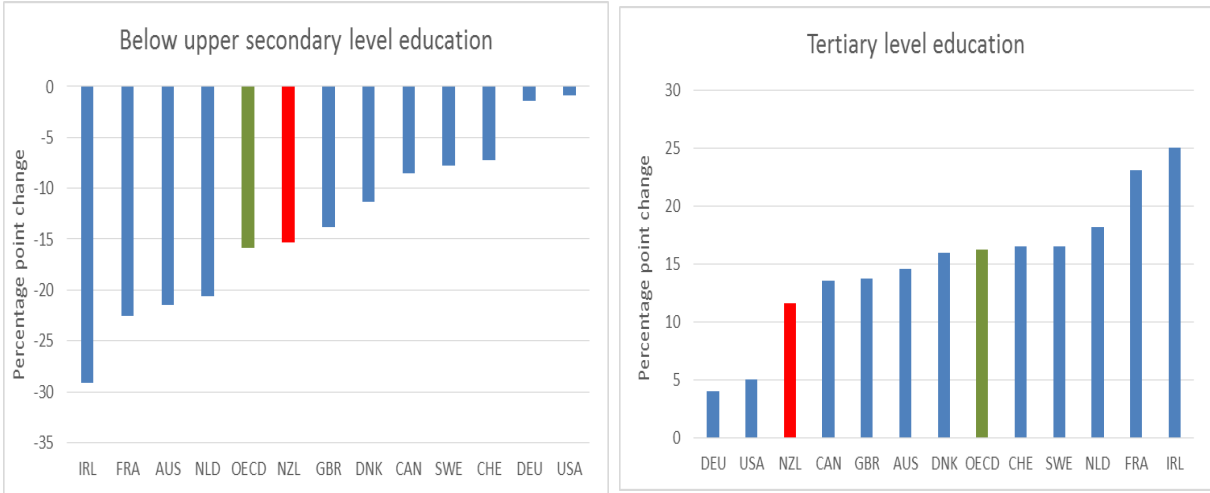


Source: van Leeuwen, B., & van Leeuwen-Li, J. (2015). *Average years of education*. <http://hdl.handle.net/10622/KCBMKI>, accessed via the Clio Infra website <https://www.clio-infra.eu/>

This is reflected in the relatively small difference in level of education between younger (aged 25 to 34) and older (aged 55 to 64) people. Compared to most OECD countries, the proportion of people with low qualifications in New Zealand fell only moderately (about the OECD average and less than many other countries including Australia). On the other hand, while most countries have seen a major lift in the proportion of young people with degree-level

qualifications or higher, New Zealand has one of the smallest differences between the proportions of young and old people with tertiary qualifications¹⁷ (see Figure 6 below).

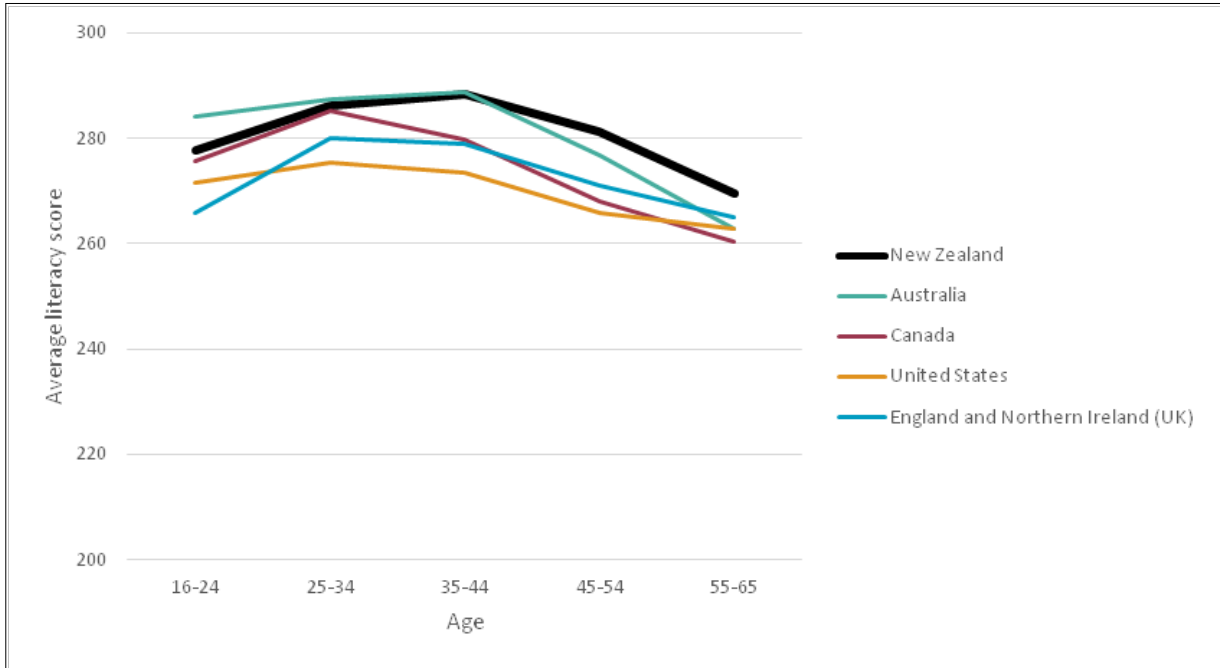
Figure 6 – Educational attainment gap between young and old, 2015



Source: OECD. See <http://dx.doi.org/10.1787/888933497312>

The PIAAC study also shows this same pattern; older New Zealanders outstrip those in the other English-speaking countries in their skills, but younger New Zealanders, while still having high skills, are now outstripped by Australia and are close to the skill level found for Canadian young people. This means that as older workers age out of the working-age population, New Zealand’s comparatively high skill advantage looks likely to fade, as shown in Figure 7 below.

Figure 7 – Literacy skills and age in New Zealand and selected countries



Source: Ministry of Education. (2016). Skills in New Zealand and around the world (page 14). The graph for numeracy is similar though the decline of young people is not as pronounced.

¹⁷ We are about average on the intermediate skills.

Current wellbeing indicators related to education

We have previously considered the education stock-based measures, which give a long-term view of this element of human capital. Another approach to measuring this element of human capital is through indicators, which provide a picture of the current state of education in a country. Indicators enable us to compare human capital at different points in time (a temporal dimension) and across different cohorts (a distributional dimension).

Commonly used wellbeing indicators for educational outcomes are:

- years in education
- educational attainment, and
- student skills.

Note to the reader

Do you think these indicators are appropriate for our use in New Zealand? Would you include other measures?

With respect to human capital more broadly, what other issues might require further work? Questions have been raised regarding non-educational training and development and the types of skills required in a globalised and technological world. Should these be pursued in more depth?

Distributional issues regarding ethnicity and socio-economic status (or any other factor) are acknowledged as missing from the analysis of education in this paper but are noted in Part 4.

Part 3 – Health

This section of the report considers health, which is often included alongside education and skills as part of the definition of human capital, because a certain level of health is required by individuals in order to gain and use their skills.¹⁸ Health is of particular relevance in New Zealand where health outcomes are linked to ethnicity.¹⁹

Stock-based measures of health

The literature on stock-based measures of human capital tends to focus on education elements, and their impact on earnings, rather than on health elements. However, an aggregate stock measure of health in New Zealand would be useful by way of a baseline. Challenges include whether, and if so how, to calculate a monetised value.

A key contribution to the literature on the stock of health was provided by Grossman (1972).²⁰ His model was focused on demand for primary healthcare services and individual decisions about investment in health. I suggest his stated assumption of only non-negative investment is a limitation of the model, because damaging health behaviours (such as poor diet or lack of exercise) could be argued to be negative investments, which should likely be captured in some way. The same is likely true of the negative impacts of a polluted natural environment.

Another potential stock measure is a cost-based calculation, based on the cost of healthcare, but the main limitation of such an approach is the lack of relativity between expenditure and outcome. Healthcare expenditure could be increased without necessarily achieving improvements in health outcomes; for example, in purchasing equipment or drugs that did not match the requirements of patients.

Grossman's model was not intended as a way to calculate total stock for a population, in the way that would be required to provide a complete picture of the stock of health in New Zealand, and nor does a cost model appear to be the way to produce such a picture. A suitable accounting-based method of calculating stock remains outstanding.

Note to the reader

We would welcome discussion about stock measures of health.

What would be a suitable methodology for measurement in New Zealand?

What data would be required and are they currently available?

What role could wellness measures play in determining the state of our health?

¹⁸ See Lui, G. & Fraumeni, B.M. *Human capital measurement: Country experiences and international initiatives* (para 16). Available from - http://www.worldklems.net/conferences/worldklems2014/worldklems2014_Liu.pdf

¹⁹ Annual Update of Key Results 2015/16: New Zealand Health Survey. Wellington: Ministry of Health. Pages ix and x refer (summary). See <http://www.health.govt.nz/system/files/documents/publications/annual-update-key-results-2015-16-nzhs-dec16-v2.pdf>

²⁰ Grossman, M. (1972). On the concept of health capital and the demand for health. *The Journal of Political Economy*, 80(2, Mar–Apr), 223–255.

Current wellbeing indicators related to health

The OECD included life expectancy at birth and perceived health status as indicators in its “How’s Life? 2015” report.²¹ New Zealand’s average life expectancy of 81 years is one year above the OECD average. Perceived health status in New Zealand was very high, with 90% reporting being in good health, compared to the OECD average of 69%.

The World Economic Forum (WEF) included a number of indicators in its 2013 Human Capital Report but when the report was reissued in 2017 it did not include health. In terms of perceived health status, WEF looked at stress and depression among respondents, along with life expectancy and unhealthy life years, and obesity. WEF also considered infant mortality and the survival gender gap, as well as health and water services, and the business impact of diseases.

The following were noted as key health indicators in the Ministry of Health’s 2015/16 Health Survey:²²

- smoking
- alcohol
- healthy eating
- exercise
- high blood pressure
- obesity
- chronic pain
- child physical punishment
- psychological distress
- GP confidence and trust
- free GP access for children
- unmet primary healthcare needs
- Māori, Pacific and Asian health outcomes, and
- socio-economic deprivation.

While most people rated their health as good or better, the New Zealand Health Survey also identified health disparities; people who are less financially well off and Māori and Pacific Island people rate their health lower and have more unmet need for healthcare. There are also some negative trends, including more people having difficulty accessing primary care, and the percentage of people experiencing psychological distress.

The Burden of Disease study²³ identified a number of important trends. Although New Zealanders’ health outcomes have been increasing over time, this is mostly attributed to people living longer, rather than an improvement in how healthy people are while alive. In fact, ill health is expanding, with pending impacts for caring for older people.

²¹ OECD. *How’s Life? 2015: Measuring well-being*. See <http://www.oecdbetterlifeindex.org/topics/health/>

²² See <http://www.health.govt.nz/system/files/documents/publications/annual-update-key-results-2015-16-nzhs-dec16-v2.pdf>

²³ See <http://www.health.govt.nz/system/files/documents/publications/health-loss-in-new-zealand-1990-2013-aug16.pdf>

The Institute for Health Metrics and Evaluation (IHME) collated the top 10 causes of death and disability for a set of comparable countries²⁴ and the findings raise questions about mental health in New Zealand. Our rates were higher than average for depressive disorders, migraine and anxiety disorders, although our rate for self-harm was just below the average. Overall, these findings suggest that there are some areas of wellbeing that may require potential policy intervention.

Commonly used wellbeing indicators for health include the first two below. The third indicator is proposed as relevant given the high rate in New Zealand:

- self-reported health
- life expectancy, and
- suicide rate.

Note to the reader

Do you think these indicators are appropriate for our use?

How can we capture differences in health expectation (to address issues with self-reported health)?

Would health expectancy be useful (to consider how we are ageing)?

Would you include other measures? If so, which ones?

Should we include some indicators relating to obesity and preventable conditions?

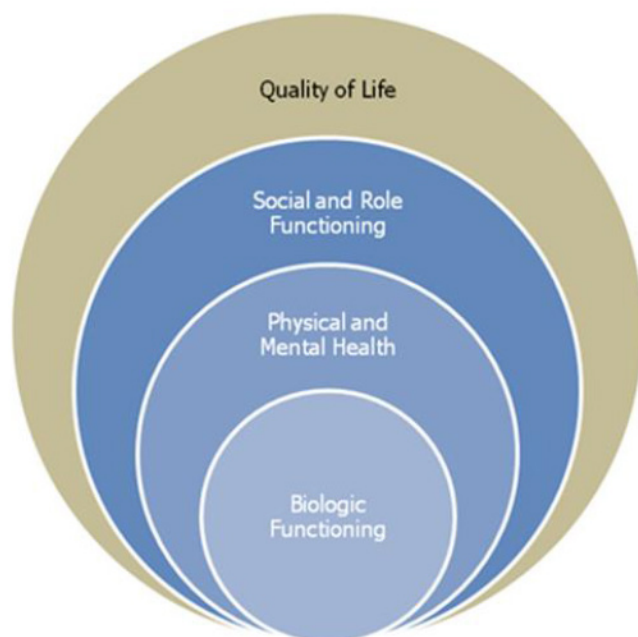
Should we include a disability indicator? Disability can impact a person's ability to acquire and utilise human capital.

Interdependencies with other capitals

Health is an element of human capital that has clear interdependencies with other capitals. In terms of social capital and institutions, the state of the healthcare system will directly impact on the health of individual people and their ability to grow and utilise their human capital. In addition, poor mental health can prevent social connections from being formed or maintained, although that may also be the case with some physical disabilities. Figure 8 below provides a depiction of health in the context of society and overall quality of life.

²⁴ IHME Country Profile – New Zealand see under 'How do causes of premature death compare to those in other locations?'. Available at <http://www.healthdata.org/new-zealand>

Figure 8 – Health Outcome Model – Ware and Davies



Source: HEALTH Outcome Measures.²⁵

From a financial/physical capital perspective, housing quality is a significant factor in health, as noted in Figure 1 of this paper. The physical environment is another key element in health, as if there are high levels of air and/or water pollution and low natural capital, people will experience lower health outcomes.

Research on healthy cities²⁶ suggests some key determinants of health and their interdependency on one another. Education is the highest scoring positive determinant, followed by environmental quality and then housing.

Issues arising

From a policy perspective, there are a number of issues to consider, and potential ways of thinking about health in New Zealand. We have identified ethnic-based differences in health. We have also identified a number of mental health issues. We are also aware of pending health issues associated with our ageing population. From a capitals perspective, we have seen the importance of education, housing and environmental quality for good health outcomes. Identifying these connections may be useful when considering trade-offs within policy.

By way of example, initiatives designed to improve mental or physical health could be considered as contributing not only to human capital stocks, but also to social capital stocks. They could be considered in terms of cohorts, such as working-age people, and the potential for positive productivity impacts of improved health. Another perspective for this age group is the contribution made to and for the next generation by those undertaking parenting

²⁵ *Improving people's lives through innovations in personalized health care.* Health outcome measures. by Kathi Kemper, MD, MPH and Gregg Gascon, PhD. See <http://www.ircimh.org/local/uploads/content/files/Health%20OUTCOME%20measures%202014-%20Kemper-Gascon%2020140227.pdf>

²⁶ Takano, T., & Nakamura, K. (2001). An analysis of health levels and various indicators of urban environments for Healthy Cities projects. *Journal of Epidemiology and Community Health*, 55, 263–270.

responsibilities. Similarly, initiatives to improve children's health could be considered in terms of investment in the future, or sustainability.

In terms of older, non-working-age people, health initiatives could be considered in terms of their importance in maintaining their social capital and individual wellbeing. We can see that health is important for both individual and society wellbeing outcomes.

Note to the reader

What other policy issues and questions arise from the discussion of health?

What other areas should we suggest to the academic community as being likely to benefit from greater research?

Part 4 – Distributional Issues

There are distributional issues with respect to human capital in New Zealand. Part 2 of the paper acknowledged that distributional issues exist with respect to educational outcomes but did not include any detailed discussion. Part 3 discussed how health outcomes vary based on ethnicity and socio-economic status (see pages 16 and 18). This part of the paper provides a detailed analysis of the issues related to human capital and gender but starts by briefly discussing intersectionality and sustainability.

Intersectionality

Intersectionality refers to having more than one characteristic such as being a Muslim woman, or a low-income woman, rather than simply “a woman”. It arose within feminist theory as a response to implicit assumptions in the discourse about women as Western, white and middle-class. It has developed to incorporate issues of geography (rural and urban, developed and developing countries) race, ethnicity, age, religion, physical ability, income, education as well as gender.

In policy-making, we can capture intersectional issues through a distributional analysis. However, as this paper is meant only as an introduction to the subject of human capital, a full intersectional analysis has not been undertaken. As such, the distributional analysis in this paper covers single elements (ie, gender or ethnicity), although individual people have a number of different characteristics. Distributional issues relating to human capital in the regions (such as labour market opportunities and housing) are also omitted from this paper but may benefit from future attention.

A particularly important characteristic to consider from a human capital perspective is age. Younger people are likely to be healthier but have lower incomes compared to older people who are likely to have higher incomes or wealth but lower health outcomes. Like most developed countries, New Zealand has an ageing population, which leads to questions about sustainability.

Sustainability

One of the reasons behind identifying and quantifying the stock of human capital in New Zealand is so that we can ensure its sustainability. There are at least three areas which are important to consider (although others may also be relevant): age; population size; and the changing labour market. As a result of the ageing population, we will need more care workers in the future, but those roles are currently low paid. This may present a challenge in attracting the greater numbers of people required into these roles.

A second issue to consider is the size of our population. It is often suggested that our small population, relative to the size of our country, positively contributes to the wellbeing of New Zealanders. However, alternative arguments are also raised that we should increase our population size through immigration. An increase of people with high levels of human capital could lead to competition and pressure on others to build their human capital, potentially increasing existing disadvantage. There is a risk in having a small population though, as it can limit the amount of competition between, and pressure on, people to build their human capital.

Finally, there is much debate about how the labour market will change in the future through digitalisation and globalisation. Although the exact nature of the changes is unclear, it is expected that many jobs will disappear or change significantly, which will impact on education

and training requirements; for example, if people start to have more than one career over their working life they will need to retrain as they go. However, our current measures only capture formal education; any training provided by employers is not captured. This is an important limitation of existing approaches to measurement. Another skills issue relates to globalisation, as global citizenship requires new skills such as cultural literacy, which would also need to be developed and measured. All these changes may affect some people in society more than others.

Gender

This section of the report considers the gender issues in human capital. Barriers to the utilisation of human capital were captured in Figure 1, in Part 1, of which the dual burden is the most relevant to women and merits further discussion here. As the dual burden refers to paid and unpaid work, this section will first consider issues connected to women in paid employment, then the burden of unpaid work they face.

Women and paid employment

There are a number of elements to consider with respect to women's acquisition of, return on and further development of human capital through paid employment. The next section will consider the rate of women's participation in the labour market, the gender pay gap, occupational segregation by gender and the future of work.

Participation rate

The World Economic Forum²⁷ noted that the gender gap in economic participation must be considered in human capital discussions as it remains a critical weakness in most labour markets around the world (2017, p. 5).

New Zealand has high overall rates of labour market participation.²⁸ Based on 2015 figures, New Zealand's overall rate of 79% was higher than the OECD average rate of 71.3%. However, significantly greater numbers of women than men are in part-time paid employment in New Zealand. Recent figures from the OECD²⁹ indicate that, on average, men in New Zealand spend 5.6 hours in paid employment per day, and women spend 3.41 hours. This compares to the OECD average of 5.47 hours for men and 3.58 for women. In summary, more women than men are in part-time employment, and women in New Zealand are employed for fewer hours than many of their OECD counterparts.

From this information, several policy questions arise. Firstly, there is a question as to whether women (and men) have the number of hours of employment that they desire or if they would prefer to work more. This is referred to as underemployment or underutilisation. The September 2017 quarter unemployment figures³⁰ showed the underutilisation rate unchanged

²⁷ World Economic Forum. (2017). *The global human capital report. Preparing people for the future of work.*

²⁸ Statistics New Zealand – *Labour force participation rate.* See http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-social-indicators/Home/Labour%20market/lab-force-particip.aspx

²⁹ OECD Stat – *Employment: Time spent in paid and unpaid work, by sex.* See <https://stats.oecd.org/index.aspx?queryid=54757#>

³⁰ Statistics New Zealand – *Labour market statistics.* See http://www.stats.govt.nz/browse_for_stats/income-and-work/employment_and_unemployment/LabourMarketStatistics_HOTPSep17qtr.aspx

at 11.8%. In terms of unemployment, the rate is currently 4.6% and there is gender difference within it, with 4.1% of men registered as unemployed, and 5.3% of women.

The unemployment and underutilisation rates indicate an area of potential growth in the capitals. Increasing labour market participation would increase an individual's human capital, the subject of this paper, but there are also implications for the other capitals. Social capital may be increased through improved material living standards and opportunities to build social connections and financial/physical capital would be increased through the GDP increase. Research in Europe³¹ has indicated that a forecasted increase of between 3.5 million and 6 million jobs by 2050 would increase GDP per capita by 3.2% to 5.5% in 2050. Although the increase of jobs and hours in New Zealand would be much smaller, it is still expected to increase our GDP figures. A Goldman Sachs report³² in 2011 suggested that a 10% increase in New Zealand's GDP could be achieved by closing the male and female employment rates.

The underutilisation of 11.8% could reflect a lack of demand if employers do not require any more labour or alternatively it could reflect the presence of a barrier to increasing the supply of labour. From a gender perspective, we understand³³ that for some women, the cost and availability of quality childcare is a barrier to their (increased) participation in the labour market.

A policy implication is whether the childcare settings are fit for purpose. From a regulatory perspective, there are settings regarding qualifications of staff and staff/child ratios. From a tax perspective, there are settings regarding the non-deductibility of childcare costs. From a transfer perspective, there are settings regarding state support for care of children of different ages, and eligibility for each type of support.³⁴

Gender pay gap

When discussing differential returns on human capital it is appropriate to consider what women are paid. New Zealand's gender pay gap is currently 9.4%, and although it has reduced since 1998 when it was 16.3%, reducing the gap has stalled in the past decade.³⁵

New Zealand's gender pay gap compares well internationally. Across 144 countries studied by the World Economic Forum there is a 32% gender pay gap.³⁶ Across the OECD, an

³¹ *How closing the gender labour market activity and pay gap leads to economic growth.* See 'Activity – Employment' at <http://eige.europa.eu/gender-mainstreaming/policy-areas/economic-and-financial-affairs/economic-benefits-gender-equality/activity-pay>

³² Goldman Sachs. (2011). *Economics. Closing the gender gap: Plenty of potential economic upside.* Research report. See 'Key Point's. Available from http://women.govt.nz/sites/public_files/Goldman%20Sachs%20Female%20participation.pdf

³³ Ministry for Women. (2012). *The labour participation response of mothers to changes in early childhood education costs at 7.1 on page 16.* Available from <http://women.govt.nz/documents/labour-participation-response-mothers-changes-early-childhood-education-costs-2012> and also see Changing Roles. The pleasures and pressures of a being a grandparent in New Zealand. A Families Commission Report. Research Report No 01/10, February 2010 at page 87. Available from <http://www.superu.govt.nz/sites/default/files/FC-changing-roles.pdf>

³⁴ See Ministry of Social Development website for Childcare subsidy (<https://www.workandincome.govt.nz/products/a-z-benefits/childcare-subsidy.html>), OSCAR subsidy (<https://www.workandincome.govt.nz/on-a-benefit/childcare/moving-from-childcare-subsidy-to-oscar.html>) and Ministry of Education website for 20 hours ECE (<https://parents.education.govt.nz/early-learning/early-childhood-education/20-hours-ece-2/>).

³⁵ *Gender pay gap.* See <http://women.govt.nz/work-skills/income/gender-pay-gap>

³⁶ *2017 World Economic Forum report.* See http://www3.weforum.org/docs/WEF_GGGR_2017.pdf at page vii. Switzerland: World Economic Forum.

average gender wage gap of 19.3% was noted in 2014, with a gap in New Zealand of 6.08%. However, the inequality itself merits consideration, even if it is smaller than in other countries.

In addition, there is merit in reducing the gap from a fiscal perspective, as there have been various reports suggesting significant growth in GDP if this occurred in countries around the world (although research in Europe³⁷ indicates that decreasing the participation gap would have a greater impact on GDP than closing the gender pay gap). The combined effect of participation and pay increases was considered by McKinsey³⁸ who concluded that potential growth of \$12 trillion globally could be achieved if women were to play an identical role in labour markets to that of men.

Occupational segregation is understood to be responsible for around 30% of the gender pay gap in New Zealand. Occupational segregation by gender refers to two features of the labour market – the prevalence of gender-dominated industries (known as horizontal segregation) and the domination of senior roles by men (known as vertical segregation). Both features are present in New Zealand, with around half of all women and men working in occupations where at least 70% of workers are of the same gender. A pattern of vertical segregation is also evident as men are more prevalent in managerial positions.³⁹

Future of work

A final note on women's ability to utilise their human capital in the future considers the expected impact of technological change. Although we do not yet know the full extent of potential future changes, it is expected that job losses from automation will not be experienced equally by men and women.⁴⁰ Retail and clerical jobs are under threat, as are bookkeeping and accounting which are also female dominated and suggested⁴¹ to be at 98% risk of becoming automated in the near future.

In summary we see that women's return on, and further development of, human capital through paid employment is lower than men's and that they may face more challenges in the future than men.

³⁷ *How closing the gender labour market activity and pay gap leads to economic growth*. See 'Pay Gap – GDP'. Available from <http://eige.europa.eu/gender-mainstreaming/policy-areas/economic-and-financial-affairs/economic-benefits-gender-equality/activity-pay>

³⁸ Woetzel, J., Madgavkar, A., Ellingrud, K., Labaye, E., Devillard, S., Kutcher, E., Manyika, J., Dobbs, R. and Krishnan, M. (2015). *How advancing women's equality can add \$12 trillion to global growth*. Available from <https://www.mckinsey.com/global-themes/employment-and-growth/how-advancing-womens-equality-can-add-12-trillion-to-global-growth>

³⁹ *Occupational segregation*. See <http://women.govt.nz/work-skills/paid-and-unpaid-work/occupational-segregation>

⁴⁰ *Automation and the future of work; bringing women into the debate*. See 'Women face greatest effects – but seem invisible in debates on automation'. Available from <https://www.ids.ac.uk/opinion/automation-and-the-future-of-work-bringing-women-into-the-debate>

⁴¹ Frey, C.B. & Osborne, M.A. (2013). *The future of employment: How susceptible are jobs to computerisation* at page 71 (Table in Appendix) See https://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

Unpaid work

Unpaid work consists of two elements – the domestic and care work undertaken in the home, and volunteer work.

Volunteer work is one way in which women can develop their human capital, such as gaining governance experience on boards or trusts; however, it also has some negative elements. Firstly, women are overrepresented in voluntary work,⁴² which may form a barrier to their ability to output their human capital in a paid environment. Secondly, the nature of the work undertaken is often female dominated,⁴³ and this can reinforce gendered bias about how human capital should be utilised.

There are implications for other capitals too. Volunteer work is often used as an indicator for social capital, and high levels are viewed as a positive characteristic of society, but this does not reflect the potential negative implications for human capital identified here.

Domestic work

Domestic work is unpaid work, undertaken in the home, which can also include care of children or the elderly. The Time Use Survey, undertaken by Statistics New Zealand, provides data on the amount of time spent on paid and unpaid work. Although men and women spend a similar amount of time on all paid and unpaid work activities combined, there are significant differences regarding payment. In the last survey (2009/10) 63% of work undertaken by men was paid but 65% of work undertaken by women was unpaid.⁴⁴ If we consider just those people who are not employed full-time, we also see a gender difference, with women spending an extra 1 hour and 45 minutes on productive activities than men. Statistics New Zealand suggests this reflects the fact that women undertake more unpaid work than men. These domestic findings support the large international literature on women facing a “dual burden” of paid and unpaid work.⁴⁵

The dual burden of paid and unpaid work may be a barrier to women’s participation in the paid labour market limiting women’s acquisition of, return on and further development of their human capital. We were able to note some policy implications to consider regarding the previously identified barrier of childcare (see page 22) but it may be more difficult to determine potential measures to address the barrier of an unequal distribution of unpaid work, as culture and norms are also likely to play a role. However, the OECD has suggested “family-friendly” policies, such as flexible working and parental leave, as a way of increasing male involvement in childcare and

⁴² See <http://www.volunteeringnz.org.nz/policy/statistics/>

⁴³ Te Mana Tu o te Wahine: Women as Leaders in the Community and Voluntary Sector. (2013). *Heathrose Research Ltd for Women in Leadership Aotearoa*. See graph on page 11 and Executive Summary at page 4. Available from <http://www.heathrose.co.nz/wp-content/uploads/2016/07/wila-research-te-mana-tu-o-te-wahine-report-2013.pdf>

⁴⁴ 2009/10 Time Use Survey quoted at <http://www.volunteeringnz.org.nz/policy/statistics/> See under ‘Time Use Survey, Statistics New Zealand’ header.

⁴⁵ See, for example, Davis. A. (2000). Straightening it out: Joan Williams on unbending gender. *American University Law Review*, 49(1999–2000), 823–849; Fineman. (2001). Contract and care. *Chicago-Kent Law Review*, 76, 1403–1440; Leira. (2002). *Working parents and the welfare state. Family change and policy reform in Scandinavia*. UK: Cambridge University Press; Mandel & Semyonov. (2006). A welfare state paradox: State interventions and women’s employment opportunities in 22 countries. *American Journal of Sociology*, 111(6), 1910–1949.

domestic work.⁴⁶ This suggestion has also been made previously in New Zealand by the Ministry for Women and the Department of Labour (now MBIE).⁴⁷

Unpaid domestic work also raises issues with respect to financial/physical capital because it is not captured in our measurement of GDP. The potential contribution of unpaid work is estimated to be significant.⁴⁸ This was noted some time ago in New Zealand⁴⁹ and, while the United Nations System of National Accounts (UNSNA) now includes provision for satellite accounts, which can include some unpaid work, they still do not include unpaid household work.⁵⁰

From an LSF perspective, there is a question of equity if some human capital outcomes are formally recognised as contributing to the wellbeing of the country, and some are not.

Current wellbeing indicators related to unpaid work and gender

Commonly used wellbeing indicators for unpaid work and gender generally come under one of three dimensions: work-life balance; jobs; and income.

Common wellbeing indicators for the work-life balance dimension are:

- time devoted to leisure and personal care
- employees working very long hours, and
- volunteering.

Common wellbeing indicators for the jobs dimension are:

- job security
- long-term unemployment rate
- personal earnings, and
- employment rate.

However, given the labour market participation figures noted above, additional indicators may be required to obtain a more complete picture with respect to women's employment, such as:

- underutilisation, and
- occupational segregation.

Common wellbeing indicators for the income dimension are:

- household financial wealth, and
- household net adjusted disposable income.

⁴⁶ OECD. (2014). See https://www.oecd.org/dev/development-gender/Unpaid_care_work.pdf

⁴⁷ Fursman, Dr L. & Callister, Dr P. (2009). *Men's participation in unpaid care. A review of the literature*. Wellington: Ministry for Women and Department of Labour.

⁴⁸ Statistics New Zealand estimated the value of productive unpaid work by New Zealanders in non-profit institutions in 2013 to be \$3.46 billion (equivalent to 1.57% of GDP). See Statistics New Zealand. (2013). *Non-profit institutions satellite account. An economic view of non-profit institutions in New Zealand* (p. 8). Available from http://archive.stats.govt.nz/browse_for_stats/economic_indicators/NationalAccounts/non-profit-institutions-2013.aspx

⁴⁹ Waring, Marilyn. (1988). *Counting for nothing: What men value and what women are worth*. Wellington, New Zealand: Allen & Unwin/Port Nicholson Press

⁵⁰ Saunders, C., & Dalziel, P. (2017). Twenty-five years of counting for nothing: Waring's critique of national accounts. *Feminist Economics*, 23(2), 200–218.

However, these indicators may not be the most useful for a picture of the wealth or income of women, as household-level indicators are likely to be heavily influenced by the earnings of male partners (where relevant). In addition, they assume a merit-based distribution within the household, which may not always occur.⁵¹

Note to the reader

Do you think these indicators are appropriate for our use?

Would you include other measures?

What other distributional issues do you suggest would benefit from greater research?

What other gender issues do you suggest would benefit from greater research?

⁵¹ *Financial abuse*. See <http://women.govt.nz/safety/what-violence-against-women>

Appendix 1 – The Use of Human Capital by the Public Sector⁵²

In 2016 the New Zealand public sector employed around 353,500 people, or 14.4% of the country's total workforce. The proportion of workers employed by the public sector has been declining in recent years; over the period 2011–16 the public sector workforce grew by 4.2% compared to private sector growth of 14.1%.

Public sector employment is split between a number of functions and the table below provides a summary of the key areas where public servants are employed.

Table 3 – Public sector employment in 2016

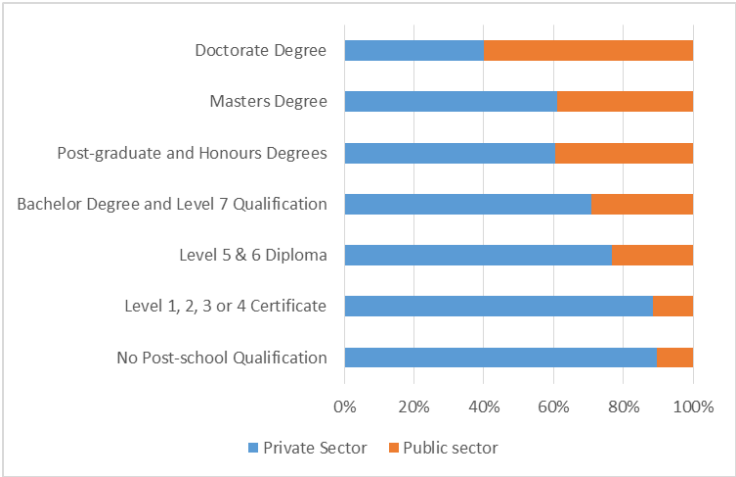
Sector	Number	Percentage
Education	108,100	31%
Health	68,800	19%
Local government	53,500	15%
Public service	47,570	13%
Other government entities	45,672	13%
State-owned Enterprises	29,900	8%

Source: State Services Commission, *Human resource capability in the New Zealand State service*

The qualifications of public service employees are, on average, significantly higher than those in the private sector. This is not surprising since the public service includes a number of areas where highly qualified people are likely to work, such as the health and education sectors. In fact, as qualification levels increase, the proportion that are employed by the public sector increases as well, so that in 2013, 32% of public sector employees had no post-school qualifications compared to 51% of private sector employees, and the proportion with a degree or higher qualification was 47.7% in the public sector compared to about 19% in the private sector.

⁵² This is drawn almost exclusively from the State Services Commission, *Human resource capability in the New Zealand State sector*. Available from http://www.ssc.govt.nz/sites/all/files/HRCReport-2016_0.pdf

Figure 9 – The distribution of skills between the public and private sector, 2013

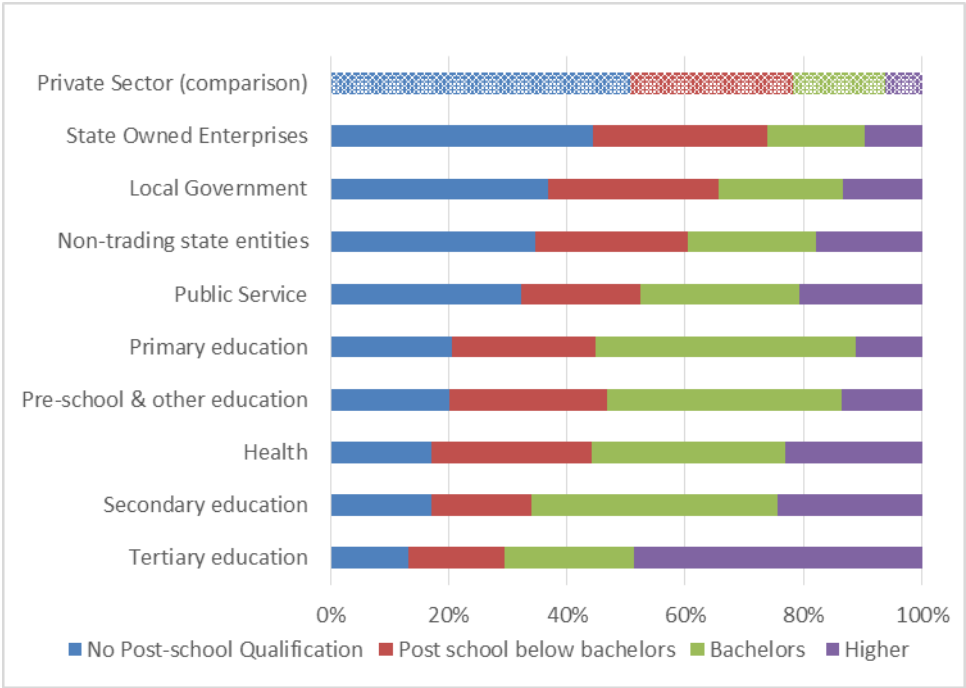


Source: State Services Commission, *Human resource capability in the New Zealand State service*

The higher qualifications profile in the public sector means that this sector is utilising a higher proportion of the human capital available to the economy than the proportion of the workforce that it employs. We estimate, using the lifetime incomes in the earlier analysis that the public sector uses between 20% and 25% of the human capital stock in New Zealand, even though it has 14.4% of the labour force.

All branches of the public sector are more highly skilled than the private sector average, but the health and education sectors have a particularly high level of skills. At the other extreme, the skill profile of State-owned Enterprises is only slightly higher than the private sector average.

Figure 10 – The qualification profile of different parts of the public sector, 2013



Source: State Services Commission, *Human resource capability in the New Zealand State service*

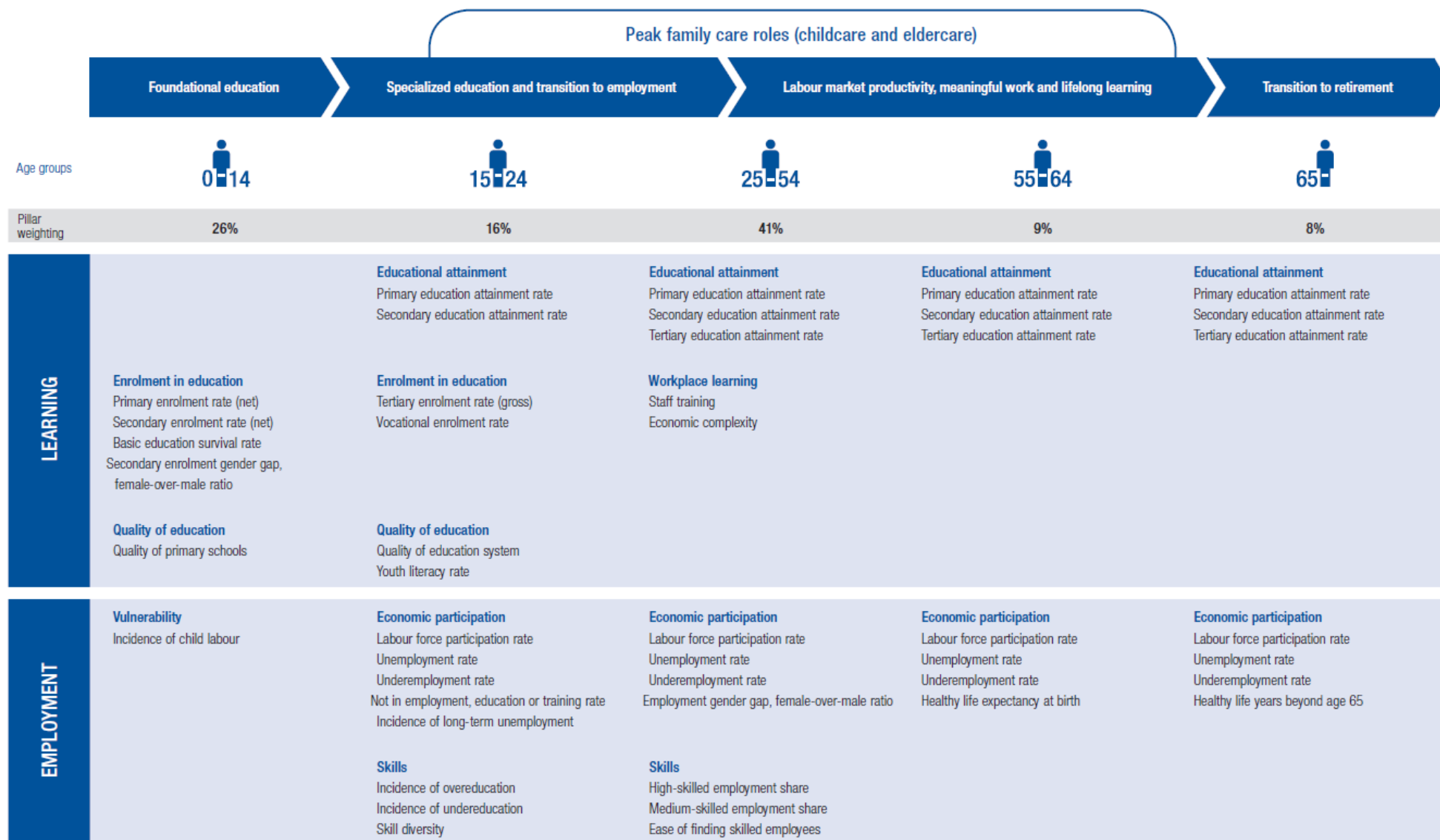
Appendix 2 – World Economic Forum Index

The Human Capital Index takes a life-course approach to human capital, evaluating the levels of education, skills and employment available to people in five distinct age groups, starting from under 15 years to over 65 years. The aim is to assess the outcome of past and present investments in human capital and offer insight into what a country's talent base will look like in the future. The index provides country rankings that allow for effective comparisons across regions and income groups.

The index is a weighted average of different measures for each of five key age groups. In each case the index is normalised as the difference between the country's performance and the minimum conceivable performance in that area.

The data are drawn from international sources, with an emphasis on their credibility and comparability across countries.

Figure 11 – Care roles across the life course



Source: World Economic Forum, The Human Capital Report 2016⁵³

⁵³ See Appendix, page 34. Available from http://www3.weforum.org/docs/HCR2016_Main_Report.pdf