ASEAN HRD READINESS

SINGAPORE COUNTRY REPORT
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Written by: Dr Jaclyn Lee, Dr Tay Wan Ying, Dr QueAnh Dang

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Jaclyn Lee, Tay Wan Ying and QueAnh Dang

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Abbreviations

ASEAN	Association of Southeast Asian Nations
AEN	Adult Educators Network
AU	Autonomous Universities
CDAC	Chinese Development Assistance Council
CCS	Critical Core Skills
CET	Continuing Education and Training
CSC	Civil Service College
CPD	Continuous Professional Development
FEC	Future Economy Council
FWAs	Flexible Work Arrangement
HR	Human Resources
HRD	Human Resource Development
LLL	Lifelong Learning
MOE	Ministry of Education
MRSD	Manpower Research and Statistics Department
MYS	Mean Years of Schooling
GCE	General Certificate of Education
GCE 'A' Level	General Certificate of Education Advanced Level
GDP	Gross Domestic Product
GPA	Grade Point Average
IAL	Institute for Adult Learning
IBF	Institute for Banking and Finance
ISCs	ITE Skills Certificates
IHRP	Institute for Human Resource Professionals
ILO	International Labour Organisation
ITE	Institute of Technical Education
ITMs	Industry Transformation Maps
ISCs	ITE Skills Certificates
ISEAS	The Institute of Southeast Asian Studies
JRG	Job Redesign Grant
M^3	A collaborative effort between three key community institutions — Islamic Religious Council of Singapore (Muis), MENDAKI and MESRA
MOE	Ministry of Education
MOM	Ministry of Manpower
MSF	Ministry of Family and Social Development
LCN	Localised Community Network
NAE	National Academy of Engineering
NCPR	National Committee on Prevention, Rehabilitation and Recidivism
NTUC	National Trade Union Congress
NLB	National Library Board
NITEC	National Institute of Technical Education Certificate
NEET	Not in education, employment or training
NUS	National University of Singapore
NTU	Nanyang Technological University
OECD	The Organisation for Economic Co-operation and Development
PET	Pre-employment Training
PIAAC	Programme for the International Assessment of Adult Competencies ()
PISA	Programme for International Student Assessment
PSLE	Primary School Leaving Examination
PMETs	Professionals, Managers, Executives and Technicians
PR	Permanent Residence
PwDs	People with Disabilities
QAFU	Quality Assurance Framework for Universities
R&D	Research and Development

SARS	Severe Acute Respiratory Syndrome
Sinda	Singapore Indian Development Association
SBF	Singapore Business Federation
SBFF	Singapore Business Federation Foundation
SEPs	Self-employed Persons
SICC	Singapore International Chamber for Commerce
SIRS	Self-Employed Person income relief scheme
SIT	Singapore Institute of Technology
SLS	Student Learning Space
SMEs	Small and Medium Enterprises
SMU	Singapore Management University
STEM	Science, Technology, Engineering, and Mathematics
S$:	Singapore Dollar
SSG	SkillsFuture Singapore
SUTD	Singapore University of Technology and Design
SUSS	Singapore University of Social Sciences
TVET	Technical and Vocational Education and Training
UNDP	The United Nations Development Programme
UNESCO	The United Nations Educational, Scientific and Cultural Organisation
VWOs	Voluntary Welfare Organisations
WDA	Workforce Development Agency
WSDip	Work Study Diploma
WSG	Workforce Singapore

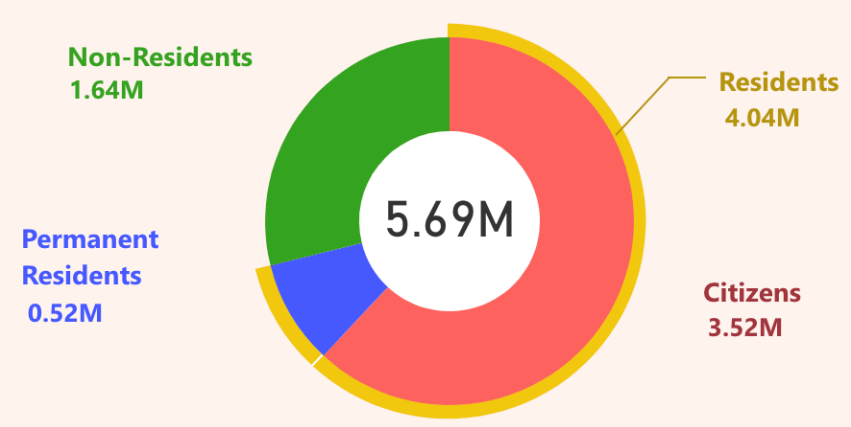
Chapter 1
Statistical Facts about HRD and Lifelong Learning in Singapore

1. Population structure and ethnic composition

The total population of Singapore comprises residents and non-residents. As of June 2020, it was 5.69 million of which 4.04 million (71%) are residents and 1.64 million (29%) are non-residents including foreign workforce across all pass types, dependants, and international students. The resident population consists of 3.52 million Singaporean citizens and 0.52 million non-Singaporean Permanent Residents (PR). The majority of PRs are aged between 25 and 59 years. The numbers of individuals who were granted citizenship and PR have been largely stable for the last ten years (National Population and Talent Division, 2020[1]).

The non-resident population (highlighted in green in the figure below) comprises foreigners who are working, living or studying in Singapore but not granted permanent residence, excluding tourists and short-term visitors. Overall, Singapore's total population declined slightly by 0.3% from June 2019 to June 2020. This is largely due to a decrease in the non-resident population, particularly foreign workers in the service sector which has been affected by the covid-19 related challenges, such as lower demand and travel restrictions.

Figure 1: Singapore's Total Population, June 2020



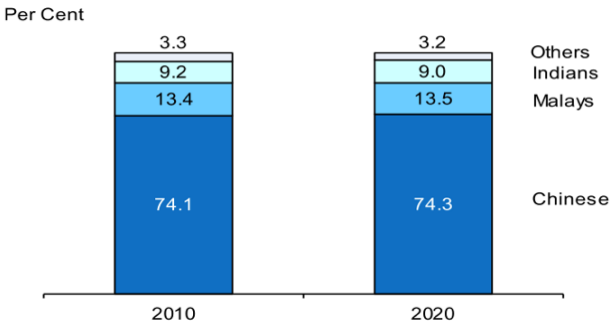
Source: The Department of Statistics, Singapore's Government 2020 [2]

Among the resident population, as of June 2020, Chinese made up 74.3%, followed by Malays at 13.5 % and Indians at 9.0% as shown in the figure below. There are differences in the education attainment rates among the ethnicities which may require different policy interventions.

[1] https://www.population.gov.sg/files/media-centre/publications/pib-2020-final.pdf (last access 28 January 2021)

[2] https://www.singstat.gov.sg/find-data/search-by-theme/population/population-and-population-structure/visualising-data/population-dashboard (last access 15 October 2020)

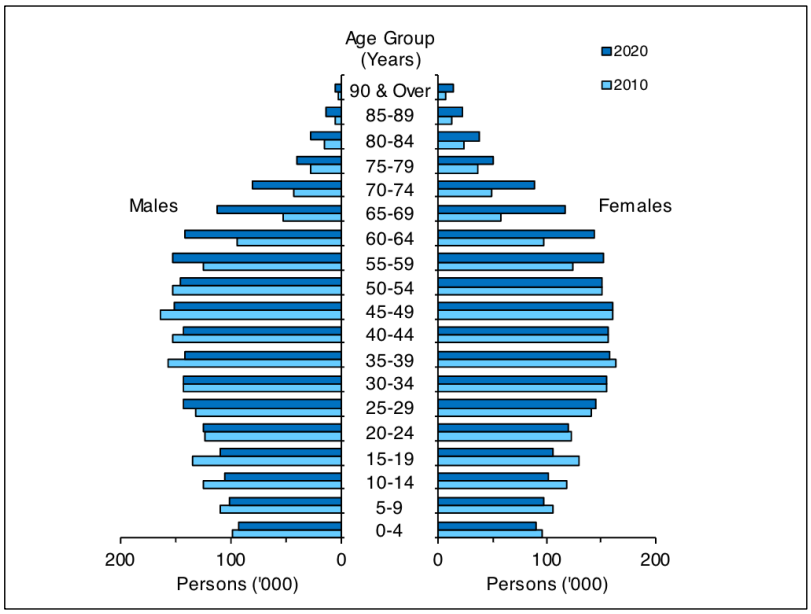
Figure 2: Ethnic Composition of Resident Population



Source: (The Department of Statistics, "Population Trends 2020" report, Singapore's Government 2020, p.5)

In terms of age structure, there has been a clear trend of increasing ageing population and of declining fertility rate. The median age of the resident population rose from 34.0 years in 2000, to 37.4 years in 2010, and reached 41.5 years in 2020. The proportion of residents aged 65 and above increased from 9.0% in 2010 to 15.2% in 2020[3]. The resident total fertility rate is around 1.2 births per female in the past 10 years and only 1.14 births per female in 2019.

Figure 3: Age Pyramid of Resident Population



Source: (The Department of Statistics, "Population Trends 2020" report, Singapore's Government 2020, p.4)

The manpower constraints, ageing population and below replacement fertility rate of the Singapore's resident population, have indicated some directions of the future HRD policies that prioritises digitalisation and automation, and pays more attention to unlocking the potential of older Singaporeans.

[3] https://www.singstat.gov.sg/-/media/files/publications/population/population2020.pdf (Department of Statistics "Population Trends 2020" report, Singapore's Government 2020, page 4, last access 25 January 2021)

2. Literacy, enrolment and education attainment

The statistics in this section are only applicable to the resident population.

2.1 Mean Years of Schooling

In the past three decades the mean years of schooling (MYS) of Singapore has significantly increased over the past three decades and has become the highest (11.2 years in 2019) among the ASEAN countries, followed by Malaysia (10.2 years in 2018).

Table 1: Mean Years of Schooling 1990-2019

Year	Mean years of school (years)*		
	Total	Males	Females
1990	6.6	7.3	5.9
2000	8.6	9.2	8.1
2010	10.1	10.6	9.7
2015	10.7	11.2	10.3
2016	10.7	11.2	10.3
2017	10.9	11.3	10.4
2018	11.1	11.6	10.6
2019	11.2	11.6	10.8

Source: (The Department of Statistics, "Population Trends 2020" report, Singapore's Government 2020, p. 61)

*among residents aged 25 years and above who are not currently attending educational institutions as full-time students. The data include those who are upgrading their qualifications through part-time courses while working.

2.2 Literacy Rate

Table 2: Literacy Rate, 2018

Year	Age	Literacy rate (%)		
		Total	Males	Females
2018	15-24 years	99.9%	99.9%	99.9%
2018	15 years and older	97.3%	98.9%	95.9%
2018	65 years and older	86.4%	95.5%	78.9%

Source: UNESCO Institute for Statistics[4]

2.3 PISA Results

Singapore's 15-year-olds are among the top performers in the OECD Programme for International Student Assessment (PISA) since its first participation in 2009. Singapore was ranked nr. 1 in 2015 and nr. 2 in 2018 globally. It has been observed that high scores on PISA tests correlate to economic success as measured by the Gross Domestic Product (GDP). However, there has been increasing critique that PISA focuses narrowly on cognitive achievement and human capital (Rappleye et al. 2020).

[4] http://uis.unesco.org/en/country/sg (last access 15 October 2020)

Having acknowledged the importance of student's well-being, the Singaporean Education Minister noted that 'doing well in international rankings is not Singapore's end goal, but such benchmarking is useful … to reflect on where we can improve, such as making education more holistic, including greater joy for learning and creating an environment where failure is much more accepted' (Teng 2019).

Table 3: 2018 PISA 15-year-old Student Performance

Student Performance in Reading	OECD average	Singapore
Students performance in reading (mean score)	487	549
Boys' performance in reading (mean score)	472	538
Girls' performance in reading (mean score)	502	561
Student Performance in Mathematics		
Students performance in maths (mean score)	489	569
Boys' performance in maths (mean score)	492	571
Girls' performance in maths (mean score)	487	567
Student Performance in Science		
Students performance in science (mean score)	489	551
Boys' performance in science (mean score)	488	553
Girls' performance in science (mean score)	490	549
Participation in Education		
Students attending government or public schools (15 year-old %)	83.2	90.5
Students attending private schools (15 year-old %)	16.8	9.5
Students enrolled in a pre-vocational or vocational programme (%)	12.5	0.0

Source: OECD Education GPS[5]

2.4 School Enrolment Rates

According to the Compulsory Education Act 2000, all Singaporean citizens born after 1 January 1996 and living in Singapore must attend a national primary school regularly (compulsory school age is above the age of 6 and less than 15 years) unless an exemption is granted.

National primary schools in this context refer to government or government-aided primary schools, and government-funded special education schools offering primary level education.

Even prior to the introduction of the Compulsory Education Act, only about 3% of each cohort was not enrolled in national primary schools[6]. Today, almost all children receive primary and secondary education, which provides them with a firm foundation for further education.

Table 4: Net Enrolment Rate of Primary and Secondary Education[7]

Year	Net enrolment rate of primary education of female and male students aged 6-11	Net enrolment rate of secondary education of female and male students aged 12-15
2017	99.7%	99.8%
2016	99.7%	99.5%
2015	99.6%	99.5%

Source: Data.gov.sg 2020

[5] https://gpseducation.oecd.org/CountryProfile?primaryCountry=SGP&treshold=10&topic=PI (last access 15 October 2020)

[6] Report of the Committee on Compulsory Education in Singapore, July 2000.

[7] Data refers to resident population, i.e. Singapore citizens and permanent residents.

To reinforce the above act, the government also introduced penalties for non-compliance. Parents may be guilty of an offence if their child fails to attend a national primary school regularly. If convicted, a parent shall be liable to a fine of up to S$ 5,000 or imprisonment for a term of up to 12 months, or to both.

The statistics of UNESCO still show a small number of residents (Singaporean citizens and permanent residents) who were out-of-school children and adolescents in 2018. The above act is applicable to Singaporean citizens residing in Singapore only.

Table 5: Out-of-school Adolescents and Children

Year	Out-of-school adolescents of lower secondary school age		
	Total	Male	Female
2018	437	78	359
	Out-of-school children of primary school age		
2018	476	326	150

Source: UNESCO Institute for Statistics 2020[8]

2.5 Tertiary Education Gross Enrolment Ratio

Data.gov.sg statistics show tertiary education gross enrolment which include various forms of post-secondary education, pre-employment training (PET): Institute of Technical Education (diploma), polytechnics (diplomas and advanced diplomas); private education institutions (diplomas, degrees and higher degrees) and universities (degrees and higher degrees).

Table 6: Gross Enrolment Ratio at Tertiary Education

Year	2016	2017	2018
Total	83.9%	84.8%	88.9%
Female	90.6%	91.2%	95.4%
Male	77.9%	78.9%	82.9

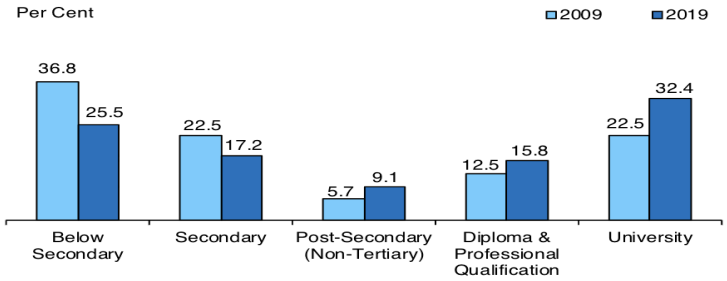
Source: data.gov.sg 2020

2.6 Highest Qualifications of Resident Population

Within a decade (2009-2019) there was a significant increase in the highest qualifications attained by Singaporean residents aged 25 years and over. In 2019, 57.3% of them had at least post-secondary education qualifications compared to 40.7% in 2009 as shown in the figure below.
This increase was mainly due to the higher proportion of university graduates which rose from 22.5% to 32.4% between 2009 and 2019. During the same period the proportion of residents with diploma and professional qualifications also increased from 12.5% to 15.8%.

[8] http://uis.unesco.org/en/country/sg (last access 15 October 2020)

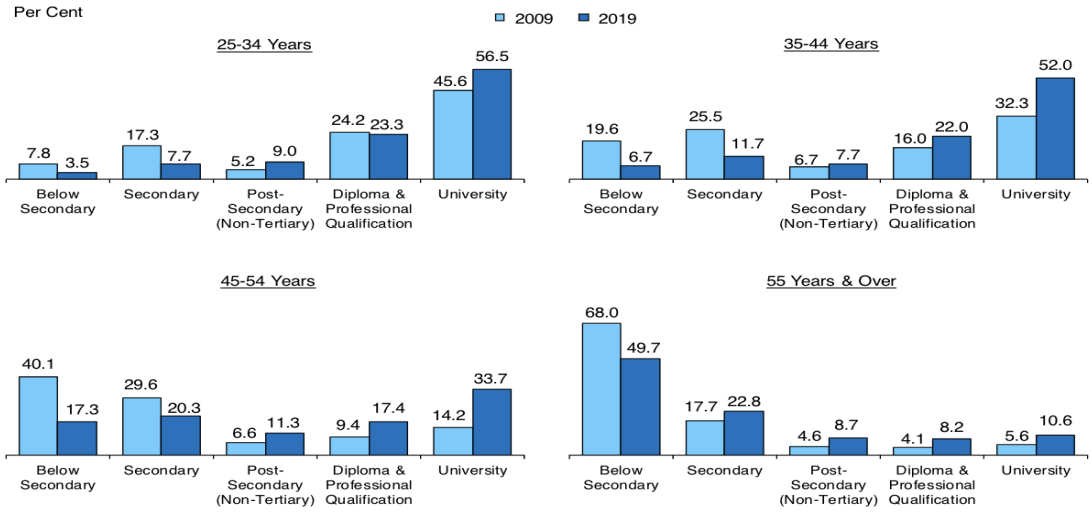
Figure 4: Highest Qualifications Attained of Resident Population



Source: (The Department of Statistics, "Population Trends 2020" report, Singapore's Government 2020, p.10)

The 2020 Population Trends report also showed the increase in university qualifications across all age groups over the period of 2009-2019 as depicted in the figure below. In 2019, 56.5% of residents aged 25-34 years hold a university degree and there was a slight decrease in the proportion of diploma and professional qualifications. Residents aged 35-44 years and 45-54 years showed the largest increase by almost 20 percentage points in the university qualifications attained in the same decade, from 32.3% to 52.0% for the 35-44 age group, and from 14.2% to 33.7% for the 45-54 age group.

Figure 5: Highest Qualification Attained of Resident Population



Source: (The Department of Statistics, "Population Trends 2020" report, Singapore's Government 2020, p.11)

3. Comparative Analysis and Implications for HRD Policies and Practices

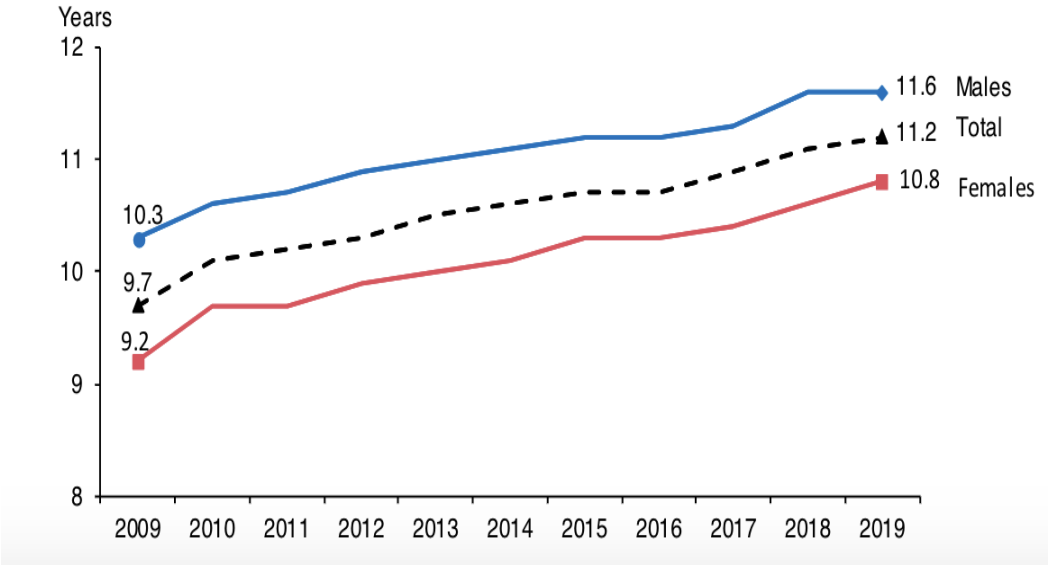
3.1 The Mean Years of Schooling (MYS) and Gender Gap

Although the 2019 MYS of Singapore (11.2 years) is the highest among the ASEAN countries, it is lower than that of Finland (12.4 years), Denmark and Norway (12.6 years), New Zealand (12.7years), Germany (14.1 years) in 2018 according to the UNDP Human Development Report[9].

[9] http://hdr.undp.org/en/indicators/103006 (last access 15 October 2020)

Additionally, there is a gender gap in the MYS, the female MYS in 2019 was 10.8 compared to 11.6 of male as depicted in the figure below. This gap is mainly due to older females having lower educational qualifications as compared to older males in the same age group. The educational profile of younger females are generally on par with younger males.

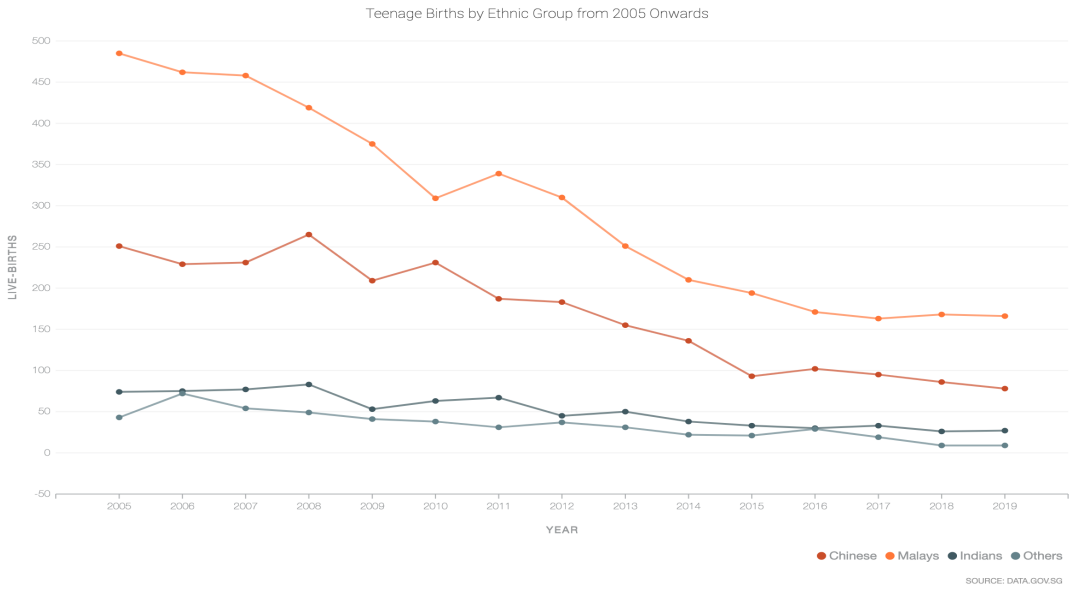
Figure 6: Mean Years of Schooling among Resident Population aged 25 and over



Source: (The Department of Statistics, "Population Trends 2020" report, Singapore's Government 2020, p.12)[10]

There are still a number of teenage marriages among girls and dropouts of girls (Rahman, 2009; Tan 2007) due to births born to teenage mothers in the past 15 years as shown in the figure below.

Figure 6a: Teenage Mothers by Ethnic Groups (2005-2019)



Source: data.gov.sg[11]

[10] https://www.singstat.gov.sg/-/media/files/publications/population/population2020.pdf (see page 12, last access 25 January 2021)

[11] https://data.gov.sg/dataset/single-parent-births-by-ethnic-group (last access 20 December 2020)

One of the policies aimed at increasing the MYS of Singaporean citizens is the SkillsFuture national scheme, which was introduced in 2015 to build a culture of skills development and lifelong learning. The MYS data in Singapore also includes those who are upgrading their qualifications through part-time courses while working (see Singapore Population Trends 2020 report[12], page vi). All Singaporeans aged 25 and above are eligible to receive different kinds of credits which can be redeemed by taking training and development courses to improve their skills and/or qualifications. Since 2016, these credits can be used for over 10,000 approved skills development courses spanning 60 areas of interest. Although the number of Singaporean citizens and enterprises allocated credits by the SkillsFuture scheme has steadily increased in the recent years[13], the actual redemption rate varies across age groups.

The latest available data for the breakdown by age groups is as of end-2019. The percentage of older Singaporeans (aged 60 and above) who had used their SkillsFuture Credit (SFC) was about 16%. For Singaporeans in the other age groups (i.e. 25 to 39 years old, and 40 to 59 years old), it was around 22%. Overall, about 540,000 or 20% of eligible Singaporeans had utilised their SFC by the end of 2019, and as of end-August 2020, about 600,000 or 23.5% of eligible Singaporeans had utilised their SFC according to the Ministry of Manpower's data released on 4 January 2021[14].

3.2 Workforce in 2019

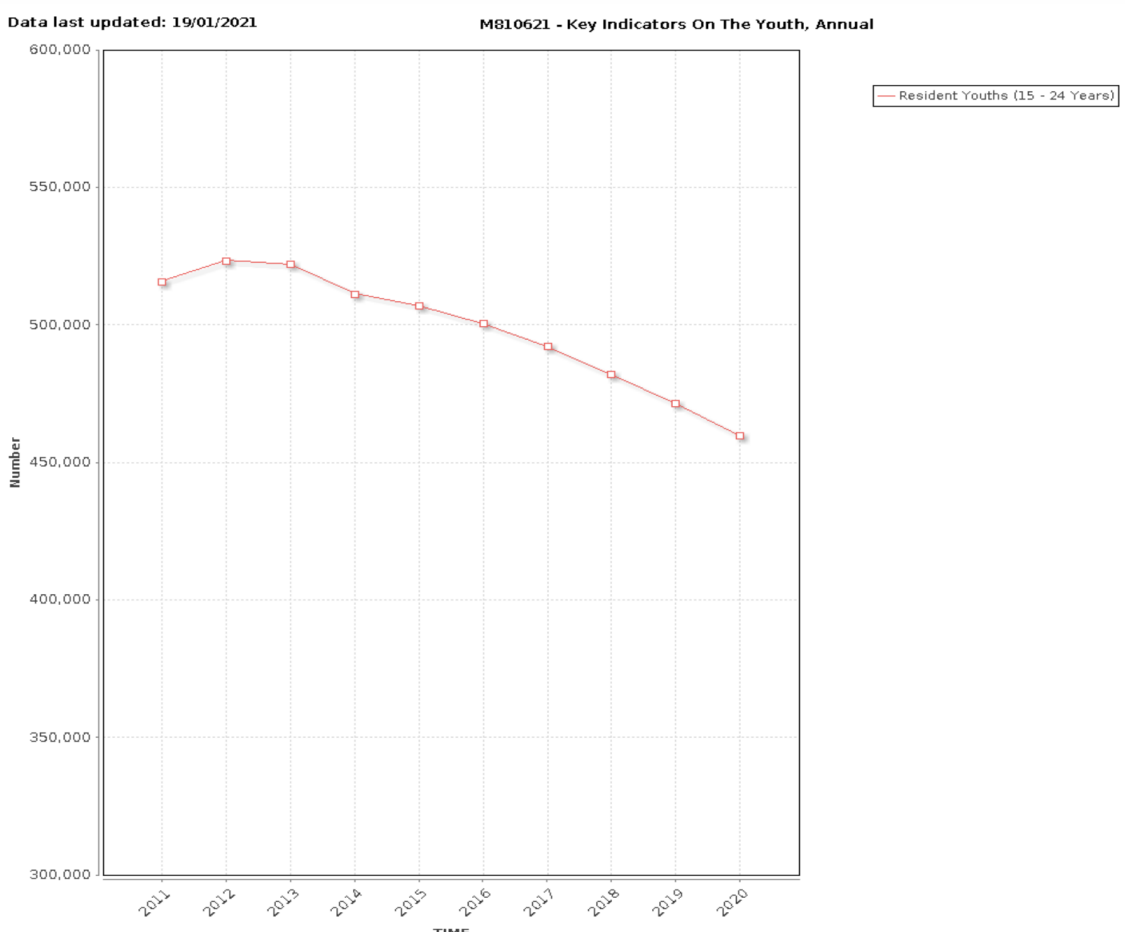
According to the 'Labour Force in Singapore 2019' report, employment rate among residents aged 25 to 64 and older residents increased, with more female, more older residents and more tertiary-educated residents in the workforce. Among the employed residents, the occupational group of professionals, managers, executives and technicians (PMETs) accounts for 58.3% in 2019 (51.4% in 2009), whereas lower-skilled job groups decreased in the same decade. The group of clerical, sales and service workers made up 22.2% in 2019 (down from 24.5% in 2009) and the group of production, transport operators, cleaners and labourers/agricultural and fishery workers was 19.5% in 2019 (down from 24.2% in 2009).

Notably, young graduates continued to have good employment outcomes. The employment rate for degree holders aged 25 to 29 from local autonomous universities remained high at around 90% in June 2019. Importantly, the vast majority of these workers held permanent jobs, predominantly full-time (Ministry of Manpower 2019).

Youth Workforce
Singapore faces the issue of a steadily declining young population, especially youth aged 15-24 years as shown in the figure below.

[12] https://www.singstat.gov.sg/publications/population/population-trends (last access 20 December 2020)
[13] https://www.straitstimes.com/singapore/540000-singaporeans-benefited-from-skillsfuture-initiatives-in-2020-skillsfuture-singapore (access 7 March 2021)
[14] https://www.moe.gov.sg/news/parliamentary-replies/20210104-skillsfuture-credits-utilisation (last access 13 March 2021)

Figure 7: Declining Singapore Resident Youths 2011-2020



Source: singstat.gov.sg[15]

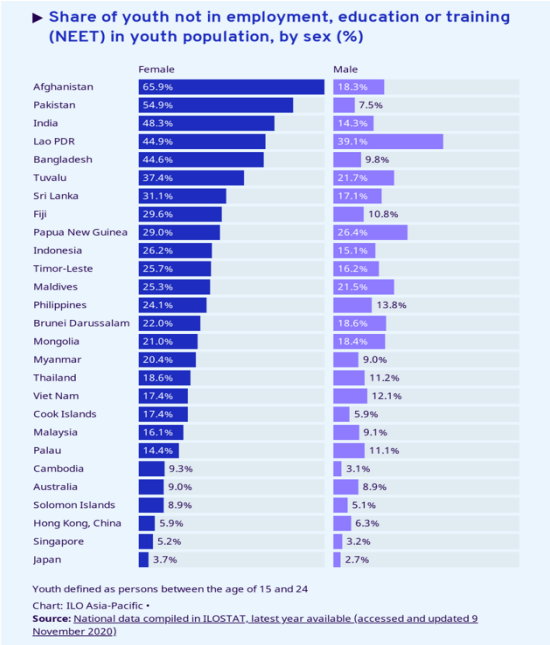
According to the government data above, there has been a clear declining pattern of resident youth population. The Singapore resident youths aged 15-24 years in 2020 was 459,800 (declined from 523,400 in 2012).

There is also a small share of youth not in education, employment or training (NEET). This NEET figure was 4.5% in 2017, 4.3 % in 2018 and 4.1% in 2019[16] of all male and female youths according to the International Labour Organisation.

[15] https://www.tablebuilder.singstat.gov.sg/publicfacing/displayChart.action# (access 14 March 2021)

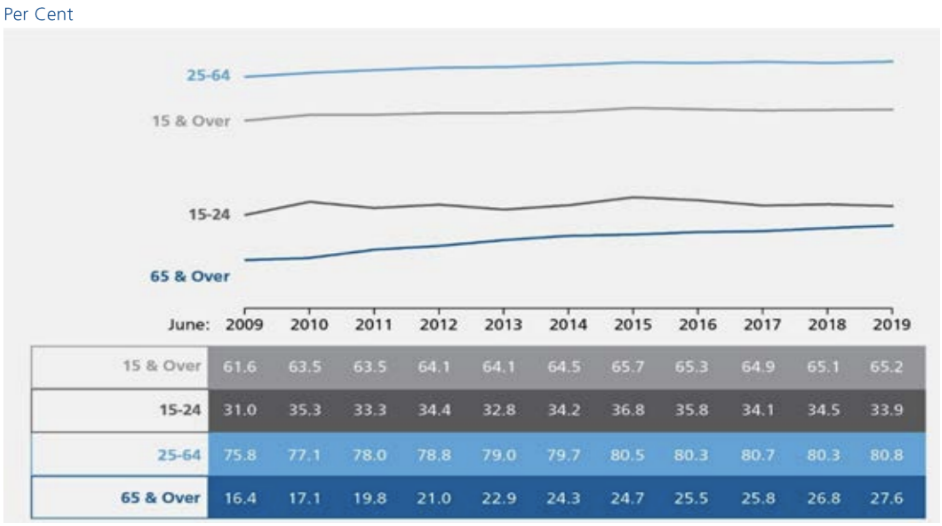
[16] https://www.ilo.org/gateway/faces/home/ctryHome?locale=EN&countryCode=SGP&regionId=4&_adf.ctrl-state=lw33zploa_4# (access 07 November 2020)

Figure 8: Share to Singapore Resident Youth not in Education, Employment or Training in comparison with other ASEAN countries (by gender)



Source: International Labour Organisation, 2020[17]

Figure 9: Resident Employment Rate by Age



June:	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
15 & Over	61.6	63.5	63.5	64.1	64.1	64.5	65.7	65.3	64.9	65.1	65.2
15-24	31.0	35.3	33.3	34.4	32.8	34.2	36.8	35.8	34.1	34.5	33.9
25-64	75.8	77.1	78.0	78.8	79.0	79.7	80.5	80.3	80.7	80.3	80.8
65 & Over	16.4	17.1	19.8	21.0	22.9	24.3	24.7	25.5	25.8	26.8	27.6

Source: (Ministry of Manpower 2019)

The government's 'WorkPro Grant Scheme' introduced in 2013, the 'Work-Life Works!' portal launched in 2014, and the campaign 'Ability is not limited by age' in 2016 were some examples of effective interventions to encourage employers to foster age-friendly workplaces through job redesign, skills development and age-management practices for older workers (Ko 2018). For example, the WorkPro Job Redesign Grant (JRG) provides funding support of up to S$300,000 per company to help them create physically easier, safer and smarter jobs for older workers aged 50 and above. Companies could explore different redesign projects to benefit different groups of older workers

[17] https://www.ilo.org/asia/media-centre/news/WCMS_737997/lang--en/index.htm (access 9 November 2020)

through improvements to the work environment or processes, thereby enhancing their job scope and allowing them to be more productive. Since the enhancement of WorkPro JRG in Jul 2016, over 1,750 companies and about 20,000 older workers have benefited from the scheme (Workforce Singapore 2019). The WorkPro Scheme has ceased with effect from 1 April 2020, information on Work-Life Harmony can be found on Tripartite Alliance for Fair and Progressive Employment Practices (TAFEP) website instead of the now defunct 'Work-life Works!' portal, and the Workpro Job Redesign Grant scheme has ended on 31 March 2020. However, many other new initiatives have recently been introduced. Chapter 4 of this report will provide more analyses on them.

All these various efforts to strengthen the employability of older workers saw the employment rate for residents aged 65 and over rise firmly from 16.4% in 2009 to 27.6%in 2019, with males from 25.7% in 2009 to 37.2% in 2019 and females from 8.9% in 2009 to 19.6% in 2019 (Ministry of Manpower 2019).

Chapter 2
HRD and LLL Intervention Areas – Findings from Surveys and Interviews

1. Introduction

The nature of the workforce and workplaces have changed significantly. This shift is driven mainly by a few trends that are fundamentally changing the structure of talent and work: changing demographics, globalisation, and technological advancement. In Asia, the number of older workers aged 60 years or older is projected to increase from 549 million in 2017 to 1.3 billion in 2050 (United Nations, 2019). Boosted by the sustained efforts of the government in strengthening the employability of older workers in Singapore, there has also been a steady rise in the employment rate among residents aged 65 and above, as mentioned in chapter 1.

We began our study with the overarching question of "How do state bodies encourage, launch, support, promote, and implement areas of intervention in key fields of HRD (general education, TVET, higher education, corporate learning & development, non- and informal learning) in Singapore? As such, the survey questions were designed and tailored to suit the Singaporean context and to find out if there is a readiness gap between what the respondents viewed as important and the degree of realisation of HRD and LLL. In other words, we would like to find out if Singapore is perceived to be on its way to a modern HRD system.

Our survey findings suggest that the majority of participants are aware of the resources, policies and initiatives made available to them and these are generally perceived to be helpful. However, there is still a sizable portion of the surveyed workforce which felt that although the supporting structure is there and there is much commitment from the agencies involved, they are often held back from pursuing these opportunities due to the lack of time or support from their companies.

Yet there are signs that companies are on the right track. Not only are they addressing issues that are inevitable in the career transitions of workers who are in their later years such as health, but they are also showing signs of adopting cultures and practices that show their commitment to training and developing their employees.

These findings are corroborated by the responses in the focus group discussions, noting that there was a greater focus on employee-centric policies and emphasis on employees themselves as part of the companies' culture. This appears most commonly in the form of business practices that focus on benefiting the employees first and foremost.

2. Research design and sample

Adopting a mixed-methods approach, we collected and analysed data from questionnaires and interviews. We designed and collected data from three questionnaires, one focusing on the importance and degree of realisation of six intervention areas, the second on future skills in general education and the third on lifelong learning. A total of 46 responses for the first questionnaire, 25 responses for the second questionnaire and 96 responses for the third have been received. The respondents included school students, parents, students in tertiary education, professionals (including managers, executives, engineers, and technicians), policy makers, government officers and people who are currently not in employment (seeking employment, retired, etc.). Participation was voluntary, and potential respondents were sought through convenience sampling and snowball sampling approaches. Potential respondents were informed about the purpose of the study, the time it would take to complete the survey (no more than 10 minutes), participation is voluntary, and that they could withdraw from the survey anytime they would like to.

Apart from surveys, we also conducted interviews with policy makers, government officials, senior leaders in companies and employees, coaches, human resource practitioners as well as job seekers. A purposeful sampling method was employed, as that we would be able to find out more information

on policies, initiatives, practices, and programmes relevant to HRD culture and lifelong learning. We also triangulated our data with secondary documents such as newspaper articles and policy papers.

Using a thematic analytical approach in examining our interview data, we allowed themes to emerge from respective codes (i.e., first-order categories), followed by the constant comparative method to look for emerging themes (i.e., second-order themes) and the overarching concept (Goulding, 1999). This coding process continued until we came to a point where additional coding added little or no further value to the already developed categories (Corbin & Strauss, 2008; Burden & Roodt, 2007).

In this section, we will present the results of the questionnaires. We will also be discussing the implications of our findings, focusing on the gap between the desired outcomes and reality of the situation, and the areas that would require the most interventions. In the subsequent individual chapters 3-6, we will discuss these findings together with our interview data, to illuminate the various areas of interventions.

3. Findings from surveys

3.1 Readiness Questionnaire on HRD development

In this survey, we asked respondents to assess the importance and the degree of realisation of six areas of HRD intervention in their country. These areas include: (1) promote HRD culture; (2) adopt inclusive approach; (3) strengthen enabling structures; (4) modernise HRD/ LLL programmes; (5) professionalise teaching personnel; and (6) promote engagement of the business sector in HRD.

The respondents were asked to give their assessment on these 6 areas, and rate them on a scale of 1-6 (1 being the lowest (none); 6 being the highest (very high)). Respondents spent about 5 mins on average to complete the questionnaire.

We collected a total of 46 responses. The respondents came from various institutions, with the majority working at the research institution or university, and companies. Other respondents included teaching staff at primary or secondary schools, TVET, college or academy, and employees from business membership organisations.

Table 7: Respondents' institutional affiliation

Your Institutional affilation:	Count	Percentage
Other	1	2.17%
Business membership organisation	3	6.52%
Company	17	36.96%
Primary / Lower secondary school	2	4.35%
Technical vocation and ecucation training (TVET) school / College / Academy	2	4.35%
University / Research institution	21	45.65%
Ministry	0	0%
TOTAL	46	100%

(Source: Readiness survey on HRD development)

The majority of the respondents came from higher education institutions and corporate learning and development sectors, with some from working in the area of non-formal/ formal education, and general/ basic education, as well as technical and vocation training.

Table 8: Respondents' main expertise areas

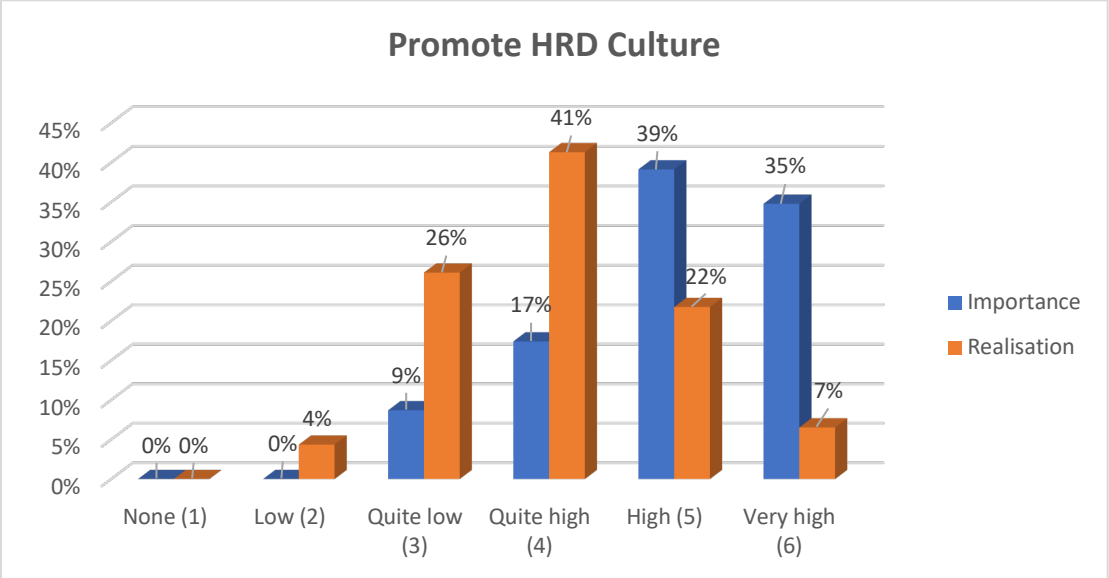
Main expertise	Count	Percentage
Corporate learning & development	17	36.96%
General / Basic education	4	8.70%
Higher education	19	41.30%
Non-formal / Informal education	4	8.70%
Technical and vocational education	1	2.17%
Other	1	2.17%
TOTAL	46	100%

(Source: Readiness survey on HRD development)

Our findings suggest that in all six areas of HRD development, there were differences in the level of importance and the level of realisation, as assessed by our respondents.

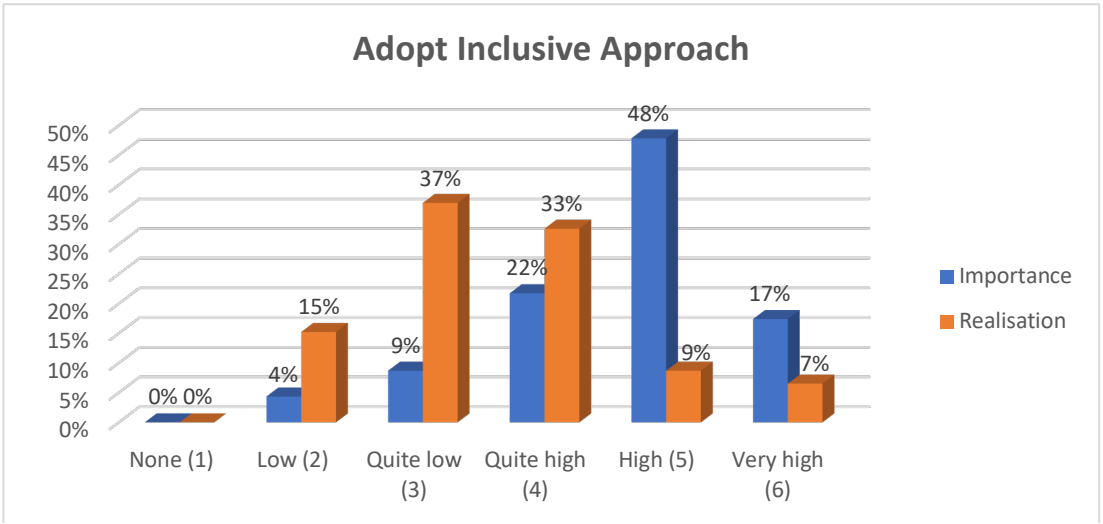
In the area of promotion of HRD culture, it could be observed that there were gaps between the level of importance and level of realisation. While there were mixed responses, it could be observed that the realisation of a strong HRD culture lagged behind the level of importance.

Table 9: Results of Readiness Survey - Promote HRD Culture



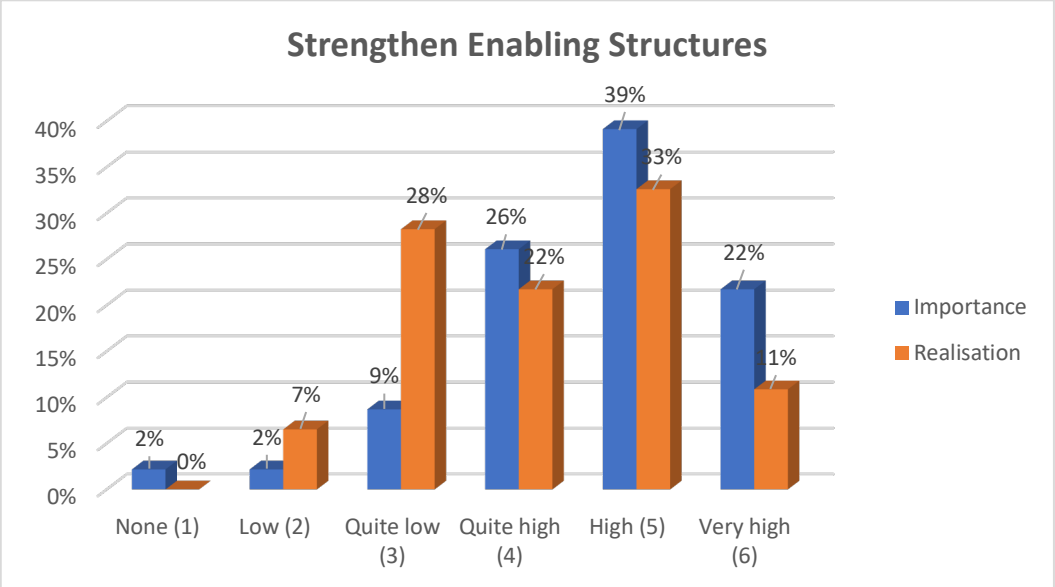
Similarly, on inclusivity, while the majority of respondents felt that it was an important area, most of them felt that the adoption of an inclusive approach had not caught up with the level of importance. As could be observed from Figure 11 below, the gaps between the level of importance and level of realisation were quite big.

Figure 10: Results of Readiness Survey - Adopt Inclusive Approach



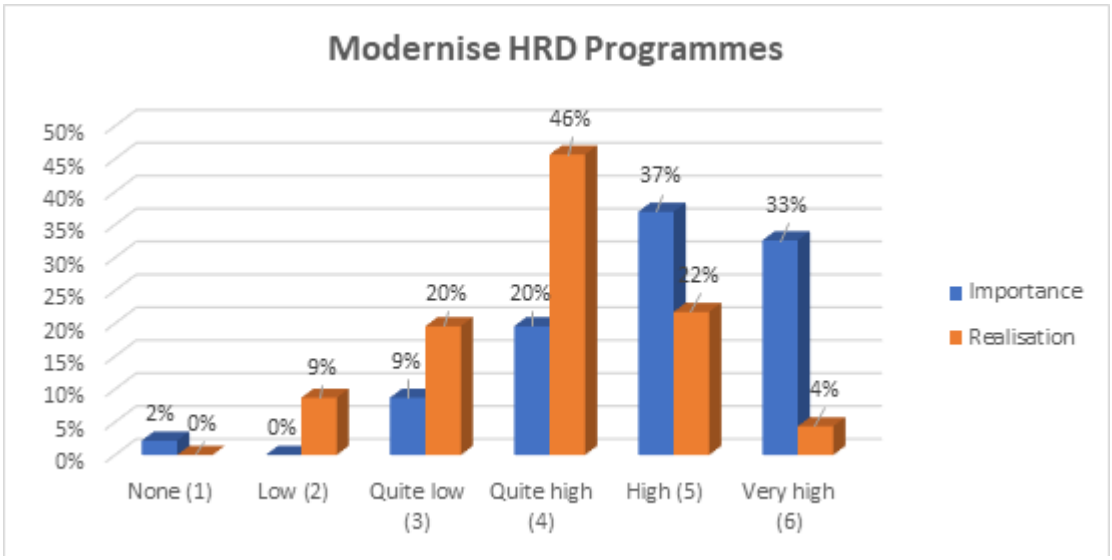
In the third invention area – strengthen enabling structures, the gaps between the level of importance and realisation were much smaller, as compared to the previous two areas.

Figure 11: Results of Readiness Survey - Strengthen Enabling Structures



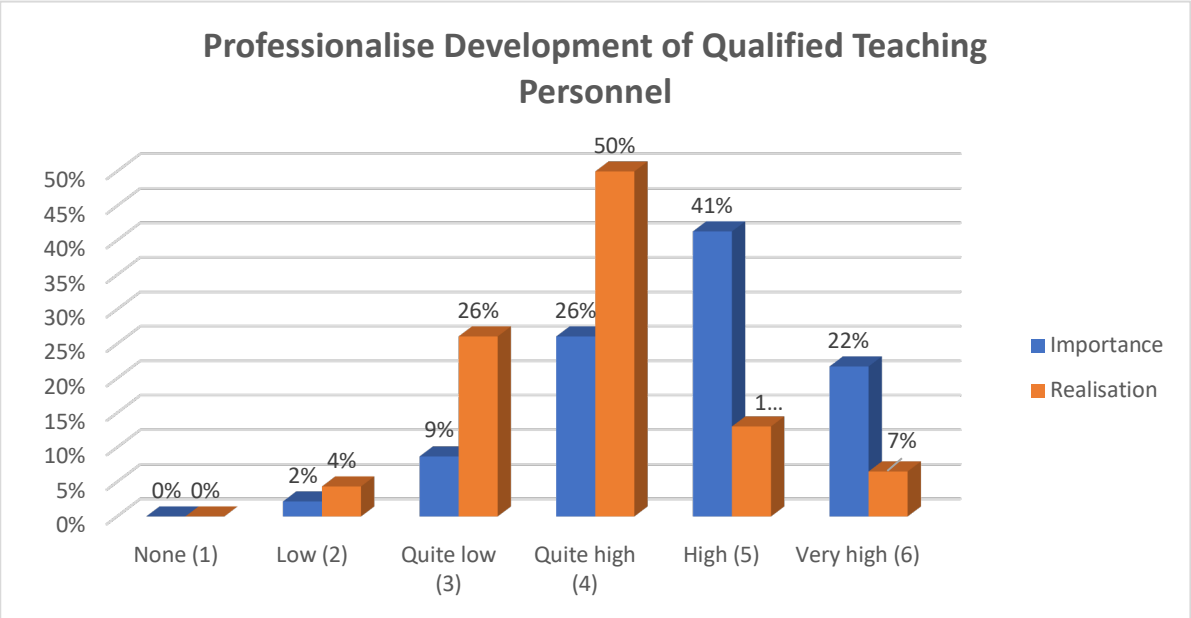
For the area on modernisation of HRD programmes, there were significant gaps between the levels of importance and realisation, which suggested that while this was perceived to be important, HRD programmes in Singapore might have not caught up with the trends of HRD development.

Figure 12: Results of Readiness Survey - Modernise HRD Programmes



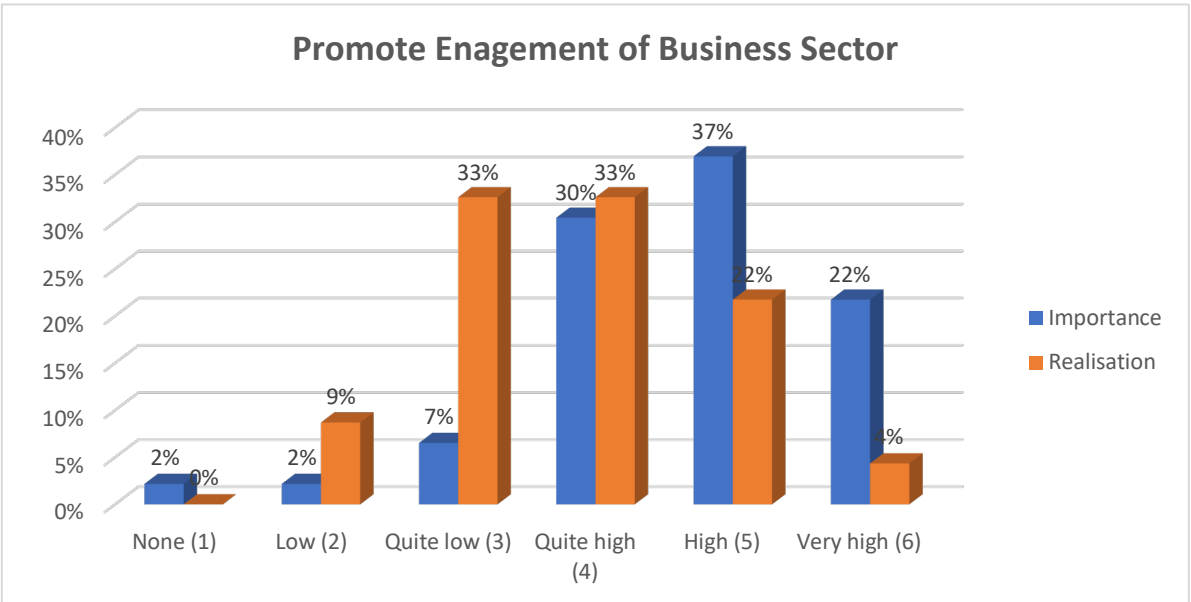
Likewise, in the area of professionalising the development of qualified teaching personnel, there were gaps between the levels of importance and realisation. However, the development of qualified teaching personnel was generally regarded quite highly, with the majority of respondents responding positively on the level of realisation.

Figure 13: Results of Readiness Survey - Professionalise Development of Qualified Teaching Personnel



For engagement with the business sector, gaps were similarly observed between the levels of importance and realisation, however, there were differing views from the respondents, with some respondents observing that the promotion of engagement of the business sector was done well, but there were some others who felt that more could be done to engage the sector.

Figure 14: Results of Readiness Survey - Promote Engagement of Business Sector



3.2 Future Skills in General Education

In this survey, we asked respondents their views on future skills and the extent to which these skills have been taught and learned in schools. The respondents were asked to give their views on a total of five questions and rate them on a scale of 1-6 (1 being the lowest (none); 6 being the highest (very high)). Respondents spent about 6 mins on average to complete the questionnaire. The questions included perception on whether the general education curricula and assessment foster and address future skills such as critical thinking skills, creativity, learnability, and character development, and

whether the provision of educational programmes and resources (physical and/or online) adequately prepare people to tackle challenges for future work and workplaces.

As our findings suggest, numeracy and literacy skills as well as STEM skills are perceived to be taught explicitly in the school curriculum. However, skills such as learnability, character qualities, social skills and problem solving in complex settings are perceived to be less emphasised in the school curriculum (please see figure below).

Figure 15: Results of Future Skills Survey - Curricula

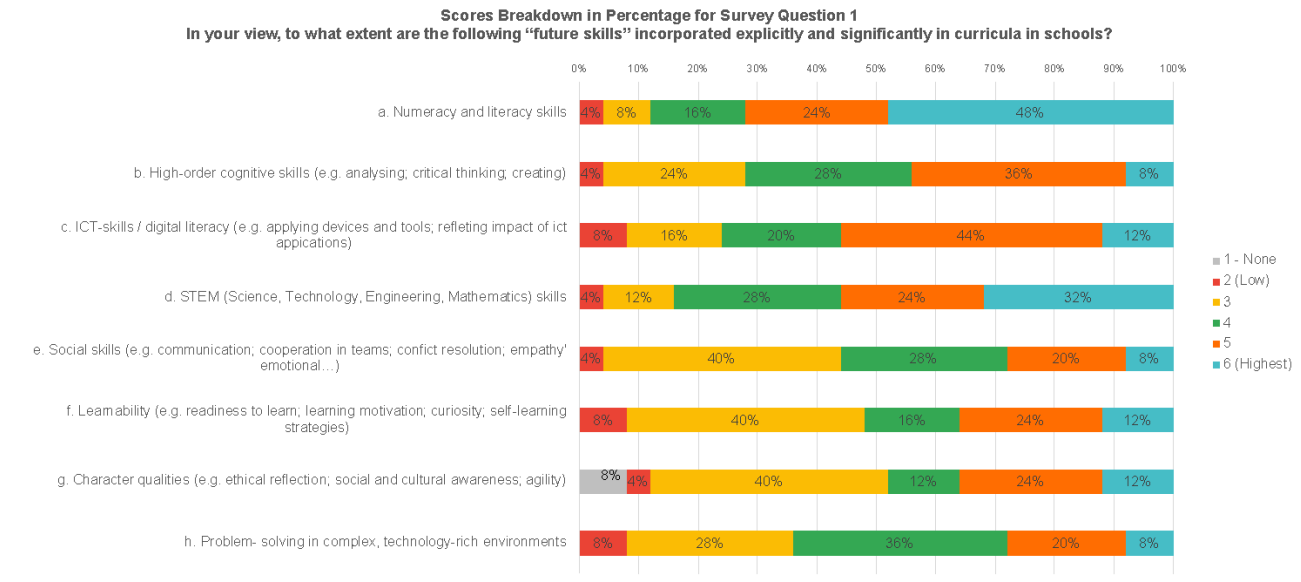


Table 10: Mean, median and mode scores of respondents' views on the coverage of future skills in curricula (Calculated based on scores of 1-6; originally 0 (none) - 5 (very high))

Skills	Mean	Median	Mode
Numeracy and literacy skills	5.04	5	6
Higher-order cognitive skills	4.20	5	5
ICT/ digital literacy skills	4.36	5	5
STEM skills	4.68	5	6
Social skills	3.88	4	3
Learnability	3.92	4	3
Character qualities	3.76	3	3
Problem-solving skills	3.92	4	4

Likewise, in terms of coverage in assessment, foundational and technical skills like numeracy and literacy, and STEM skills are perceived to be high. However, skills such as learnability, character qualities, social skills and problem solving in complex settings are perceived to be less emphasised in assessment (please see figure below). The scores for this question are also generally leaning towards the lower spectrum, as compared to the previous question on curricula.

Figure 16: Results of Future Skills Survey - Assessment

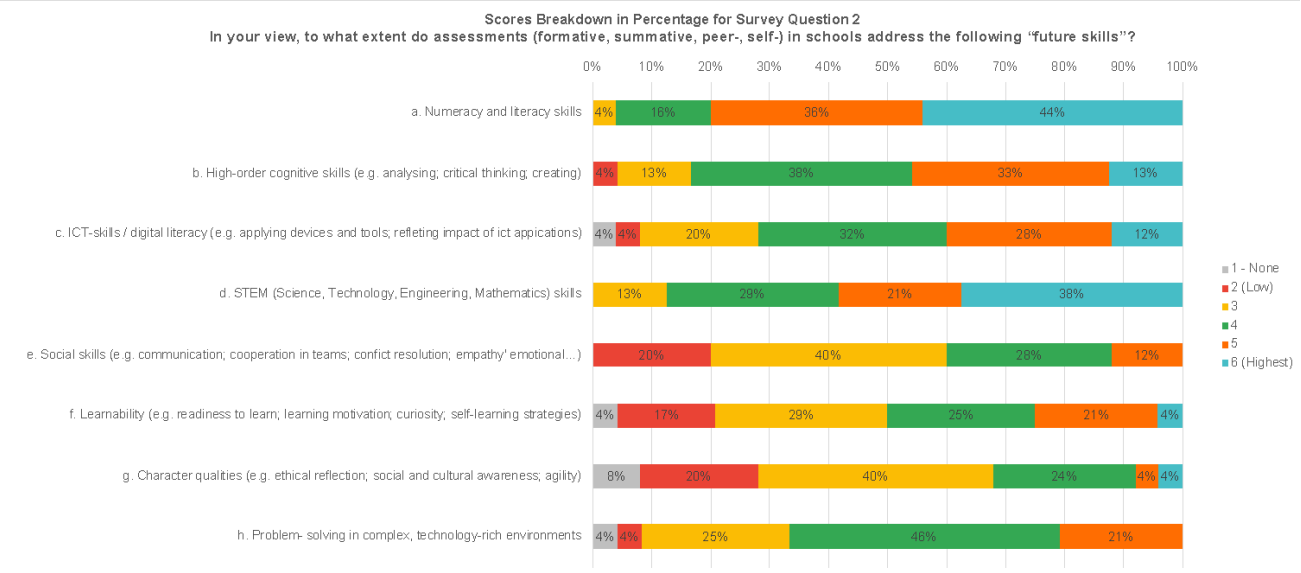
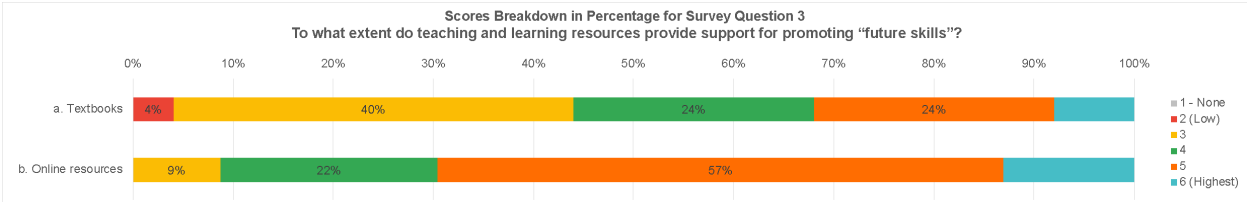


Table 11: Mean, median and mode scores of respondents' views on the coverage of future skills in assessment

Skills	**Mean**	**Median**	**Mode**
Numeracy and literacy skills	5.20	5	6
Higher-order cognitive skills	4.38	4	4
ICT/ digital literacy skills	4.12	4	4
STEM skills	4.83	5	6
Social skills	3.32	3	3
Learnability	3.54	3.5	3
Character qualities	3.08	3	3
Problem-solving skills	3.75	4	4

We also asked a question related to teaching and resources, and whether respondents felt that they provide support for promoting future skills. The finding suggests that the online resources (Mean=4.73) are perceived to be providing more support than physical textbooks (Mean=3.92).

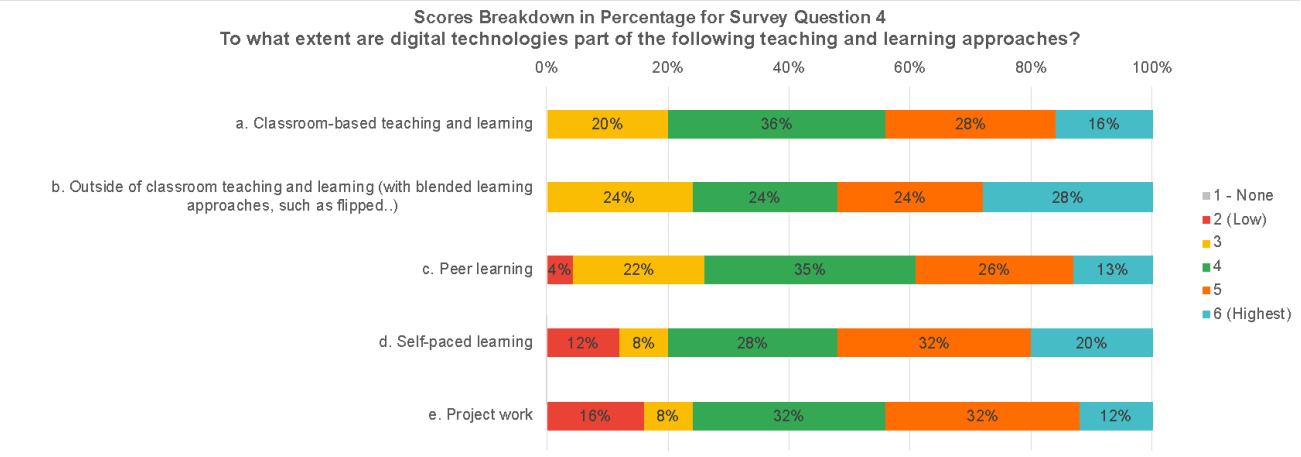
Figure 17: Results of Future Skills Survey - Resources



On whether digital technologies are used for teaching and learning, it was found that it was used mostly to support outside of classroom learning (such as blended learning, flipped classroom approaches) (Mean=4.56) and self-paced learning (Mean=4.4). The findings also suggest that digital

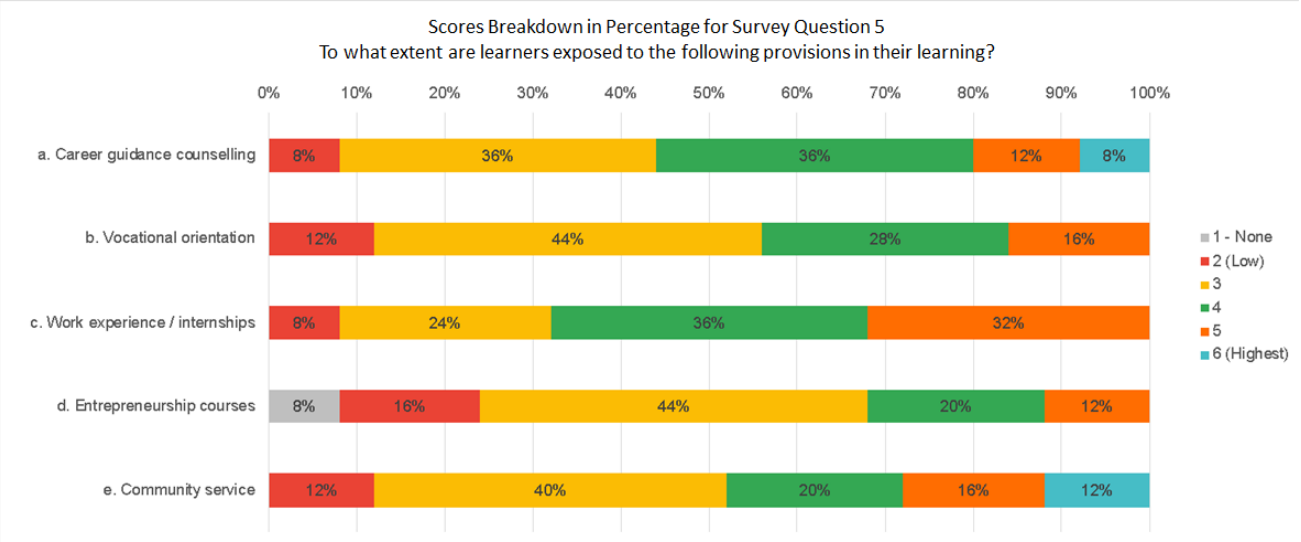
technologies are generally perceived to support other forms of learning approaches, including classroom-based learning, peer learning and project learning.

Figure 18: Results of Future Skills Survey - Technology for Teaching and Learning



In terms of provision of learning experience relevant to future work and workplaces, respondents felt that workplace learning and internships to be the highest (Mean=3.92) and entrepreneurial courses to be the lowest (Mean=3.12).

Figure 19: Results of Future Skills Survey - Learning Experience



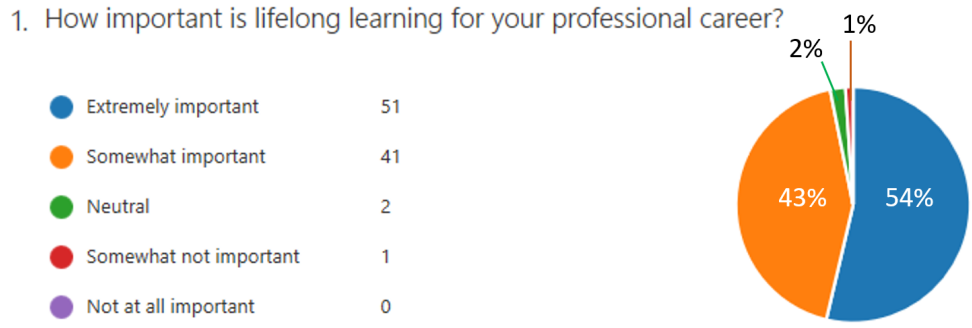
3.3 Survey on perceptions towards lifelong learning

In this survey, we asked respondents their views on lifelong learning, and how it impacts their personal and career development. The respondents were asked 10 questions in total and spent about 15 mins on average to complete the questionnaire. Respondents were asked to rank their views on the survey items, with 1 being the lowest and 5 being the highest. We adapted the questions from the questionnaire[18] designed by the National Academy of Engineering (NAE) in the United States to understand lifelong learning needs and experience in the context of Singapore, and specifically, for addressing readiness and gaps.

[18] https://www.nap.edu/read/13503/chapter/7#26 (access 17 November 2020)

Our findings suggest that lifelong learning is perceived to be important for one's professional career.

Figure 20: Results of Lifelong Learning Survey - Importance



When asked about why they might consider taking up a learning programme in the future, respondents rated fulfilling government or accreditation requirements as the likely reason (Mean=4.83) and upgrading of skills for work advancement (Mean=4.07) as the least likely reason (see Table below).

Table 12: Mean, median and mode scores of respondents' views on why they would sign up for a learning course in the future

Reason	Mean	Median	Mode
To upgrade your skills for career growth at your current workplace	4.07	4	4
To develop your skills for career growth beyond your current workplace	4.38	4	4
To satisfy your intellectual curiosity	4.12	4	4
To fulfil government or accreditation requirements	4.83	4	4

We also asked two questions on whether respondents are required to take up a learning programme to retain their position and whether lifelong learning opportunities would increase their chances of securing a higher position or new job. Our findings suggest that while receiving continuing education, training or certification may not be a job requirement for the majority of the respondents, the respondents felt that it may be helpful for their career development and advancement (see figures below).

Figure 21: Results of Lifelong Learning Survey - Training Requirements

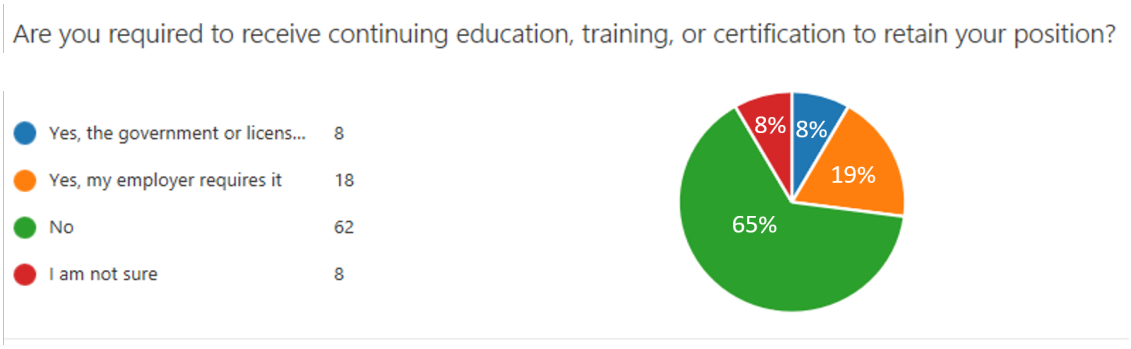
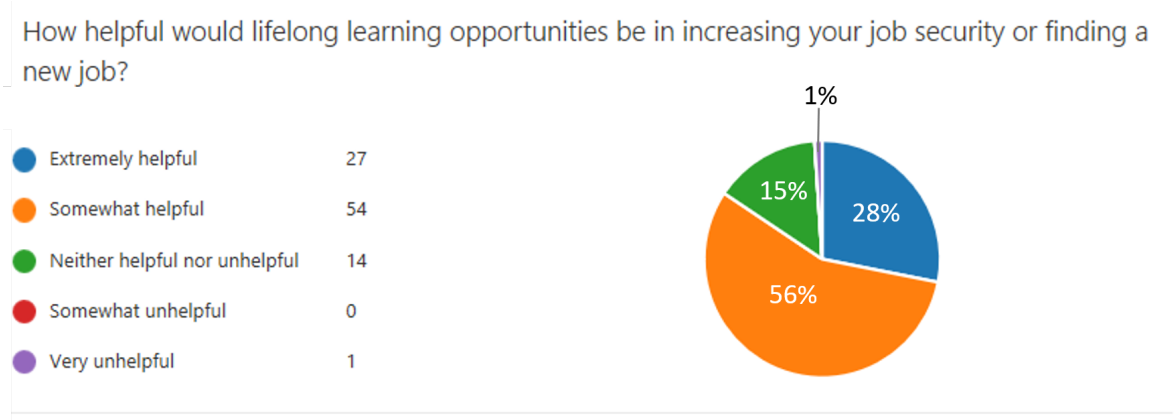


Figure 22: Results of Lifelong Learning Survey - Opportunities



On their views for not engaging in lifelong learning, respondents felt that the lack of time and high cost are the main obstacles. They were less or not impeded by the location or not knowing which course to take up (see table below).

Table 13: Mean, median and mode scores of respondents' views on what might be an obstacle of lifelong learning

Obstacle	**Mean**	**Median**	**Mode**
High cost	4.03	4	5
Inconvenience location	3.17	3	4
Lack of time	4.09	4	4
Lack of support from employer	3.32	4	4
Not sure which course to take up	2.52	3	3

3.4 Implications of the findings – Adopting an age-integrated paradigm for modernising HRD and LLL

Our findings suggest that foundation and technical skills are perceived to be well-covered in curricula and assessment. However, soft skills such as learnability, social skills, etc., are not covered sufficiently in curricula or adequately assessed. Online resources and digital technologies are perceived to be supporting learning and teaching in both classroom and out-of-classroom settings.

On provision of programmes that could help prepare individuals to address future challenges in personal and working lives, respondents felt that while there had been opportunities for work placements/ internships and career guidance counselling, more emphasis could be placed on entrepreneurial training and support for understanding one's vocational orientation.

Findings from the survey on lifelong learning suggest that respondents recognised the importance of lifelong learning for career development. While it may not be a requirement for them to retain their jobs, they viewed lifelong learning to be helpful for changing or advancing their career. However, they may be deterred by high cost and the lack of time.

Apart from addressing potential gaps in HRD and LLL, there may also be a need to re-examine existing human capital paradigms that may intervene with our desire and will to put forward practices that are more relevant in the current climate. A common paradigm for examining human resource development is the life-course framework, that is, we study when we are young, work during our adulthood, and retire when we are old. However, it may be limited in that learning and working are increasingly perceived as a lifelong endeavour and that retirement age may be stretched further.

Instead, we propose adopting an age-integrated paradigm for examining human resource development, through adopting an inclusive approach. It departs from a 'traditional' life-course model consisting of three distinct phases of life – education, work, and retirement – to a more age-integrated, horizontally distributed life-course involving work, education and leisure, family, and community more flexibly throughout the life-course.

Adopting an age-integrated paradigm allows us to shift the focus from using age as a progression of life pursuits and achievements; rather it focuses on extending and increasing the attractiveness and motivation of engaging in lifelong learning, transitioning from one career to another, and a lifetime engagement with family, community, and society.

4. Conclusion

In this section, we discussed our findings from surveys on respondents' perception of the HRD and LLL structure, if and how they have tapped on the resources, and if they perceived a gap in the readiness of a modernised HR culture. We also proposed an age-integrated paradigm as a way for thinking about HRD and LLL in Singapore, to meet the changes in the global economy and the demographic changes to our population and workforce.

Chapter 3
Country Strategies, policies and programs on HRD and Lifelong Learning

1. Introduction

Singapore, a small country state of approximately 5.7 million people, is hailed as one of the more technologically advanced city states in the world. Rapid industrialisation in the 1960s propelled the country's development and manufacturing became the main driver of her growth (The World Bank in Singapore, 2018) Today, the country has a thriving economy with almost full employment and many of its key growth sectors are in manufacturing, wholesale and retail trade, finance and insurance, business services, transportation and storage, information and communications and other services. Recently, it attracted many high-profile investments from companies such as Dyson and Tencent who have made Singapore their Regional Headquarters. Hyundai Motors has also announced on 17 August 2020 that they will be setting up a manufacturing plant in Singapore to manufacture electric cars and the facility will carry out artificial intelligence research and conduct trials in the manufacturing process of electric vehicles. (The Business Times, August 17, 2020)[19]

The country has built its success based on its strategic focus on Human Resource Development, Vocational Training and more recently, Lifelong Learning. In the most recent "World Bank Human Capital Index"[20] (The World Bank in Singapore), it ranked Singapore the best country in the world for human capital development.

As a country with no natural resources, developing human capital is a key feature for success. Prime Minister Lee Hsien Loong in a Straits Times Article published on Oct 13, 2018[21] (Lee, 2018) reiterated that Singapore has always heavily emphasized on Human Capital and her basic philosophy is to maximize her peoples' potentials and abilities.

Together with strong financial support from the government, the country continues to strengthen the nimbleness and flexibility of its workforce by providing continuing education such as the Skills future initiative. Government spending on continuing education is now estimated to be around $1 billion yearly.[22] (Ng, 2015)

Today, Singapore's HRD Strategy adopts a multi-prong approach to ensure that its citizens are well equipped with the relevant core competencies as well as future skills needed for the digital economy. The various state bodies work in unison to develop, implement, monitor and update the country's Human Resource Development Strategies. The roles of the different ministries are spelt out below:

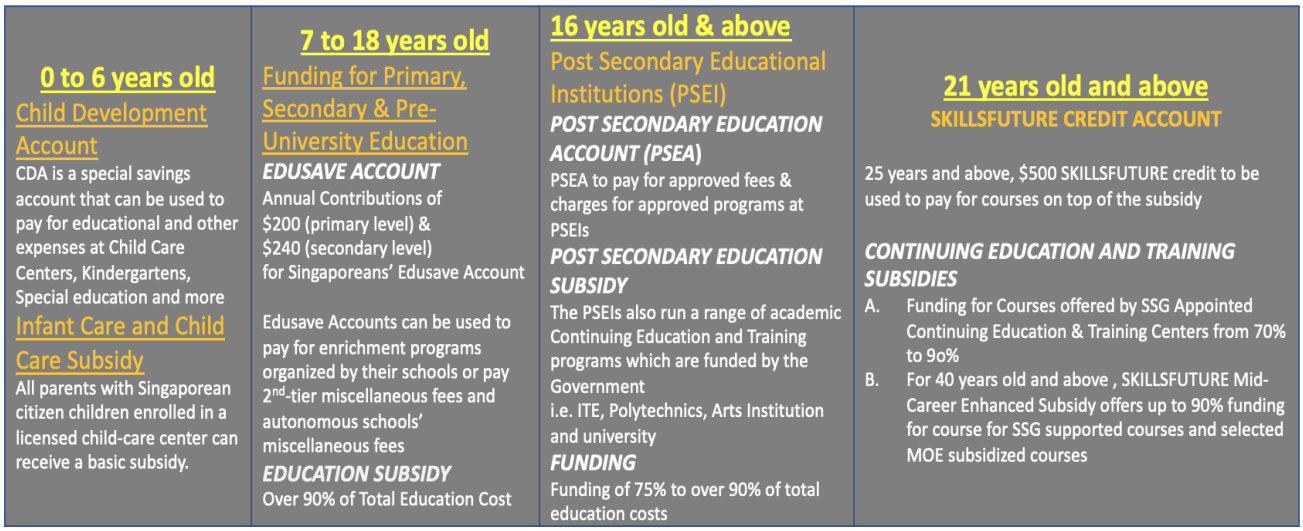
Ministry of Trade & Industry – to promote economic growth and create good jobs, to enable Singaporeans to improve their lives.
Ministry of Manpower – to develop a great workforce where Singaporeans can aspire to real income growth, fulfilling careers and financial security, while we maintain a manpower-lean and competitive economy. The aim is to enable companies to provide good jobs and Singaporeans to take up good jobs, to build a strong Singaporean core.
Ministry of Education (MOE) – mould the future of the nation by moulding the people who will determine the future of the nation. To do so, MOE provides children with a balanced and well-rounded education, develops them to their full potential, and nurtures them into good citizens conscious of their responsibilities to family, community and country.
Workforce Singapore – to oversee the transformation of the local workforce and industry to meet ongoing economic challenges. To do so, Workforce Singapore (WSG) will promote the development,

[19] Taken from "The Business Times", *Hyundai Motors to make electric cars in Singapore*, August 16, 2020.
[20] https://www.worldbank.org/en/country/singapore/overview (access 20 October 2020)
[21] https://www.straitstimes.com/opinion/when-it-comes-to-developing-people-the-job-is-never-done (access 20 October 2020)
[22] https://www.todayonline.com/singapore/s1b-year-help-sporeans-chart-lifelong-learning-journeys (access 20 October 2020)

competitiveness, inclusiveness, and employability of all levels of the workforce. This will ensure that all sectors of the economy are supported by a strong, inclusive Singaporean core.
SkillsFuture Singapore – to drive and coordinate the implementation of the national SkillsFuture movement, promote a culture and holistic system of lifelong learning through the pursuit of skills mastery, and strengthen the ecosystem of quality education and training in Singapore. Together with the Sector Agencies, the above entities will ensure that Singapore's economy continues to be competitive, support companies to be manpower-lean and help workers meet their career aspirations and secure quality jobs at different stages of life.

Today, the government invests close to S$13 billion yearly on education spending. This represents about 17% of total government spending for 2019. Every Singaporean child will receive over $180,000 of education subsidies in total by the time they turn 16, which includes $50,000 in Government subsidies over five years when they enrol in a full-day childcare programme with one of the Anchor Operators[23].(Budget 2020 Statement) Here is a diagram to illustrate the various educational support subsidies that the Singapore government contributes to the lifecycle of a Singaporean from 0 to 21 years and above.

Figure 23: Lifelong Learning Journey of a Singaporean



Source: Adapted from SkillsFuture, Lifelong Learning Journey[24]

As we can see above, a Singaporean starts to receive educational subsidies very early in life, from preschool through primary and secondary education, post-secondary, all the way to adult learning.

In the next section, we will start to examine the facets of Singapore's education system from widely available materials and interviews with key stakeholders from the various ministries in Singapore. These ministries include the Ministry of Education, Ministry of Manpower, Institute of Technical Education, SkillsFuture Singapore and Institute for Adult Learning.

2. Singapore Education System: An overview

2.1 Primary to Secondary Education

Singapore's education system developed alongside the different phases of growth in the country's development. During the years from 1959 to 1978, the focus was on expanding basic education and building schools and establishing English as the national language alongside a student's mother

[23] https://www.singaporebudget.gov.sg/budget_2020/budget-speech/c-caring-for-singaporeans-building-an-inclusive-home(access (31 Jan 2020)
[24] https://www.ssg.gov.sg/individuals/lifelong-learning-journey.html (access 20 October 2020)

tongue which could be Chinese, Malay or Tamil. During the efficiency phase from 1979 to 1996, rising competition from other Asian countries resulted in considerable changes to the Singapore education system. It was overhauled to provide more pathways for students, with the aim of developing the skills required in a new capital and skill intensive economy. Students were offered different courses in schools, with a differentiated curriculum to help them progress through secondary schools and post-secondary institutions. (OECD Singapore's PISA 2015 Report)[25] Singapore also expanded on postsecondary education, and began setting up polytechnics and vocational institutes, and invested heavily in building the campuses and also strengthening the curriculum. The aim was to equip students with practical knowledge and skills that would help them find meaningful and well paid jobs. In the third phase from 1997 to today, Singapore created diverse pathways for students to progress through the education system. A Normal (Technical) stream in secondary schools was set up to cater to students who were more technically-inclined and prepared them for technical-vocational education. These strategic moves enabled most students to complete secondary education, and go on to post-secondary institutions. In the subsequent phases, other specialised schools such as the NUS High School of Mathematics and Science, the School of Science and Technology, the Singapore Sports School and the School of the Arts were formed to cater to students with talent and a strong interest in mathematics and science, the arts, sports or applied learning (Lee, 2018)[26].

In later years, schools like North Light School and Assumption Pathway School were created to cater to students who would benefit from a more customised and vocational education. As society progresses, special needs education schools were set up to cater for those with special needs. In this way, no one was left behind, and every student was given opportunities to progress in education.

The provision of more state funded preschools were created to cater to the growing population. 80 percent of pre-schoolers will by 2025 have a place in government-supported preschool. The Ministry of Education will run about 60 kindergartens by 2025.

Turning to future skills, Singapore's education system is constantly evolving to equip students with digital literacy and capabilities. In February 2016, MOE announced that 19 schools would offer programming as part of the new O Level subject computing. From 2016 to 2018, seven new subjects, including robotics and electronics, was introduced to the O and N level syllabuses to promote more hands on learning[27] (Soon, 2016).

2.2 TVET Education in Singapore

Singapore's technical and vocational education and training (TVET) system provides diverse programmes and pathways to cater to the different learning needs, interests and aspirations of its population. The Ministry of Education (MOE) is the main agency responsible for oversight of the TVET sector, and provides funding to institutions such as the polytechnics and the Institute of Technical Education (ITE) to provide educational opportunities to improve the employability and livelihood of Singaporeans, and to provide the economy with a pool of quality manpower.

Vocational education has come a long way since the inception of the Institute of Technical Education (ITE), which was set up to provide technical education for those with at least 10 years of general education. It has evolved into a pathway that is well recognised by Singaporeans. The image of TVET has changed and it is now well recognised because of the transformation in industry that has made skills based training necessary for industries to function. Furthermore, ITE has also launched an image building campaign in 1998-2000 which resulted in a significant improvement in public perception of technical education. Today ITE is seen as an attractive option for those who enjoy applied learning and is the sector coordinator for land transport, restaurant operations and landscape

[25] https://www.oecd.org/pisa/PISA-2015-singapore.pdf

[26] https://www.straitstimes.com/opinion/when-it-comes-to-developing-people-the-job-is-never-done (access 20 October 2020)

[27] https://www.straitstimes.com/opinion/leave-no-one-behind-in-move-to-digital-economy (access 20 October 2020)

sectors where it collaborates closely with industry and identifies new skills required[28] (The Straits Times, 2017).

ITE and the Polytechnics takes in about 70% of the Singapore cohort to go through more applied learning. The quality of the TVET curriculum has also changed over the years to make it more practice oriented so that students learn skills that are required in industry. There is also more competency based training making TVET graduates highly employable. To enhance teaching and learning in the institutes, ITE and the polytechnics employ educational technologies such as augmented reality (AR) and virtual reality (VR) and are equipped with the latest learning facilities. One good example is ITE receiving substantial funding from the government to build world class learning facilities. Other aspects of TVET education include non-formal learning, workplace learning: school-to-work transition and career progression of TVET graduates. Courses in the polytechnics and ITE have also become more broad-based over the years, to better prepare students for careers in a knowledge-based economy where individuals are expected to adapt to jobs in new growth areas and pick up new skills quickly. There is also an increasing emphasis on nurturing innovative and enterprising individuals.

Another major transformation in TVET education is the improvement in the quality of the academic staff. ITE and the Polytechnics recruit the best and brightest academic staff by providing them with good compensation and career progression schemes. Many of the academic staff were from industry and they bring with them relevant industry experience to share with students and ensure the curriculum remains current. The high calibre teachers in essence augment the educational experience for the students.

2.3 Tertiary Education

As an advanced economy that is currently undergoing extensive economic transformation, Singapore has been placing a strong emphasis on higher education so as to equip Singaporeans with the skills and talent required for the changing world. The Committee on the Future Economy emphasizes the role of universities and other tertiary institutes in ensuring that workers possess the necessary skills and capabilities for new and emerging economic sectors (Committee on the Future Economy, 2017).

While Singapore's higher education institutions have always retained a focus on human capital development, it was only with the city-state's transition to a service and knowledge-based economy in the 1990s that the alignment of higher education with industry needs took on greater significance. The polytechnics and ITE geared toward providing cutting-edge mid-level technical, management, and service skills, and universities were tasked with training high-level skills for both the public and private sectors' (Goh & Gopinathan, 2008).

The various government agencies such as the Ministry of Education, Ministry of Trade & Industry and Ministry of Manpower work together in unison to improve student's employability and provide the industry with a pool of qualified manpower for economic growth (Lim, K.M 2014).

List of Institutes for Higher Learning

Public-funded ('autonomous') universities in Singapore include:

- National University of Singapore (NUS)
- Nanyang Technological University (NTU)
- Singapore Management University (SMU)
- Singapore University of Technology and Design (SUTD)
- Singapore Institute of Technology (SIT)
- Singapore University of Social Sciences (SUSS)

[28] https://www.businesstimes.com.sg/government-economy/bosses-should-help-ite-be-a-key-anchor-in-push-for-life-long-learning-dpm-tharman (access 20 October 2020)

Polytechnics

- Nanyang Polytechnic
- Ngee Ann Polytechnic
- Republic Polytechnic
- Singapore Polytechnic
- Temasek Polytechnic

Vocational training institutes

- Institute of Technical Education

Private educational institutions for the arts

- Lasalle College
- Nanyang Academy of Fine Arts

Other government-affiliated educational institutions

- Building and Construction Authority Academy
- Singapore Aviation Academy
- IP Academy

Singapore's six universities have different emphasis and are set up to link students to capabilities needed in the 23 sectors in our Industry Transformation maps. They also prepare students for the new digital economy.

Training of Research Talents are also an integral part of the university eco-system. Out of the 6 autonomous universities (AU), four are more research intensive, and they head up different areas of research interests and emphasis. Research intensive universities in Singapore play an important role in bridging the needs of industry with the outcome of research. There are also a great number of research centres that are set up either through governmental research grants or corporate funding that are situated within the universities. This is called the private-public-AU partnerships. Research is the key engine of growth for Singapore and especially so in the new areas propelled by Industry 4.0

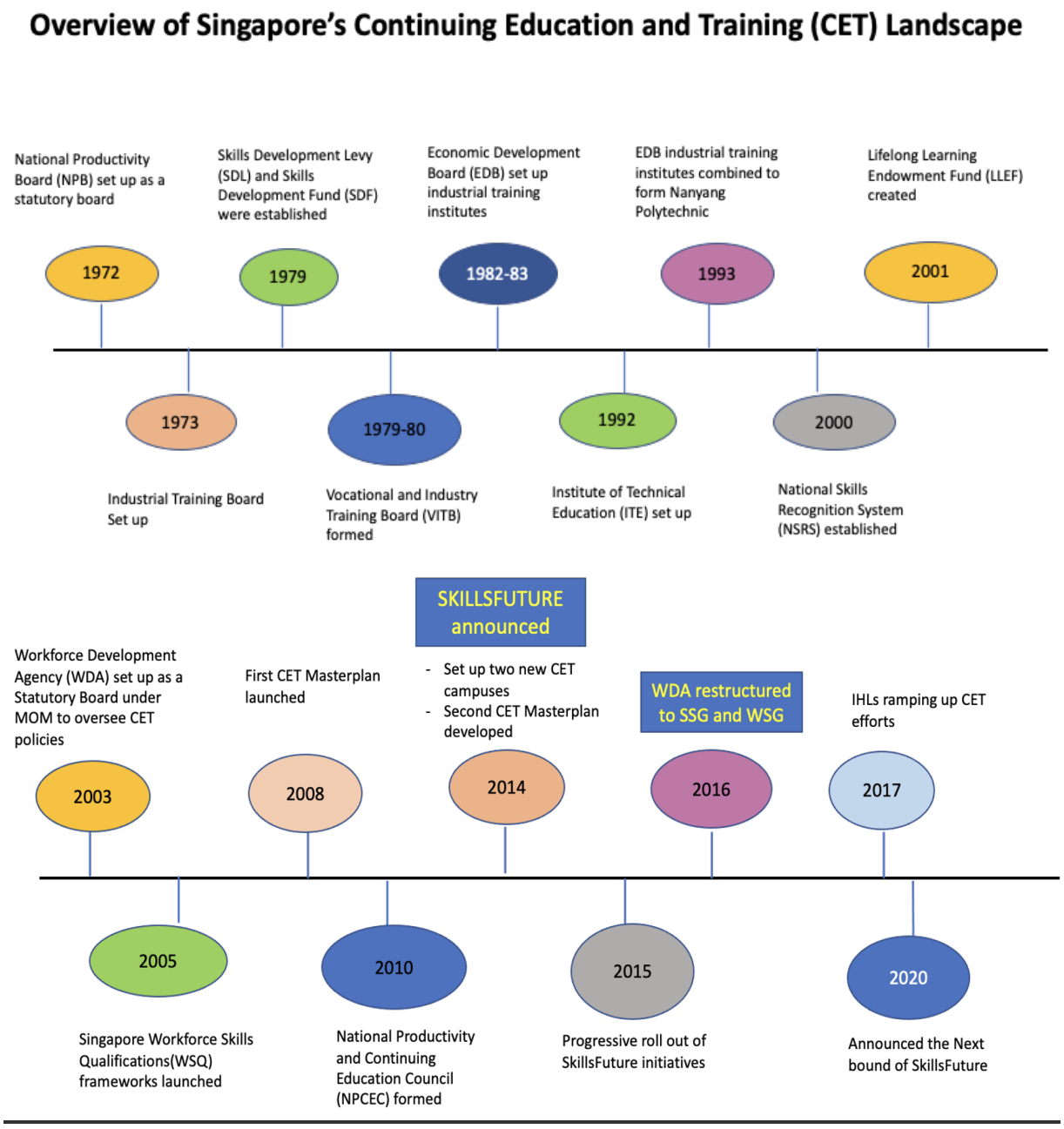
2.4 SkillsFuture and Lifelong Learning

The learning journey continues for working adults in Singapore as they are enabled through continuous skills training led by strategic initiatives and programs conceptualised by SkillsFuture Singapore (SSG). SSG was set up as a Statutory Board under the Ministry of Education on 3rd October 2016. Its purpose is to:

a. Drive and coordinate the SkillsFuture Movement
b. Strengthen the ecosystem of quality education and training, including adult training infrastructure and adult educators
c. Promote a culture of lifelong learning through pursuit of skills mastery
d. Raise quality of private education institutions and training providers

It works closely with Workforce Singapore, which is another statutory board formed in 2016 to help workers meet their career aspirations and secure quality jobs. Other functions of Workforce Singapore include helping companies become manpower-lean enterprises to remain competitive. Workers in transition are supported through career counselling and job placements schemes provided by Workforce Singapore. We provide below an overview of Singapore's Continuing Education and Training Landscape throughout the years.

Figure 24: Overview of Singapore's CET Landscape



Source: Courtesy of SkillsFuture Singapore

For Lifelong learning, the target groups and respective policy focuses for each of them are:

- Individuals: Move from funding to curated information as a key lever, to enable individuals to make more informed decisions
- Enterprises: Strengthen the nexus between enterprise transformation and training, and focus resources on training that supports transformation
- Training providers: Expand training modalities, including going beyond classroom-based learning to workplace-based learning

The Skills Framework would be relevant for each of the workforce segments below.

- Individuals can use the Skills Frameworks to make informed decisions on education and training, career development and skills upgrading based on information in the framework.
- Employers can use them to design progressive HR management and talent development plans.
- Training providers can use them to gain insights into sector trends and skills in demand, which allow them to innovate and contextualise their curricula design and training programmes to suit the needs of the sector.

2.5 *SkillsFuture Movement*

The Singapore government puts in place initiatives to promote HRD through the SkillsFuture movement. This is done by giving its citizens aged 25 and above a SkillsFuture Credit to keep current through continuous learning. Launched since 2016, the scheme now sees over 10,000 approved skills development courses spanning some 60 areas of interest.

Another big initiative to drive skills training is through the Industry Transformation Maps (ITMs), which are roadmaps comprising growth and competitiveness plans for 23 sectors in the Singapore economy, and are driven by the Ministry of Trade and Industry. Skills Framework are an integral part of the ITM, and are co-created through an extensive consultation process by employers, industry associations, education institutions, unions, and the Government. They provide key information on:

i. the overview of each sector,
ii. the career pathways available,
iii. the key occupations and job roles one can take on in each pathway,
iv. the skills and competencies required for each job role, as well as
v. the training programmes people can attend to develop these skills and competencies.

SSG engages lead agencies and references the ITMS for the various sectors to co-create the Skills Framework. The Skills Framework content is then validated with:

1. Companies in the industry
2. Tripartite partners (including industry associations, TACs, Unions)
3. Institutes of Higher Learning (IHLs) and anchor training providers

In 2019, SSG kick started efforts to improve its anticipation and identification of skills needed for the Singapore workforce by leveraging technology and data. SSG procures jobs- and skills-related data from various sources, and employs data analytics and machine learning techniques on the data to provide more responsive, comprehensive and customised Jobs-Skills Insights (JSI) to different stakeholders for timely signposting. Enterprise-centric insights will also be made available for their reference in the design of HRD/LLL policies, where relevant. The above process will help to complement other state agencies' ongoing efforts to identify trends and drive manpower development for the various sectors under their purview.

Citizens can get advice on HRD and LLL through job coaching and job placement schemes. Currently the Singapore government has launched the SGUnited Jobs and Skills Package as well as the Professional Conversion schemes to help displaced workers upskill and/or reskill themselves for future opportunities.

Today we have about a 49.1% training participation rate of workers as compared to 35% in the previous years.[29] The different trade unions spend a great deal of effort mobilising the ground to encourage workers to improve their own skills and embrace lifelong learning. As a result, many are going online for digital learning. Through the lens of the National Trade Union Congress (NTUC), they share that training participation has gone up and e-learning has accelerated due to the Covid-19

[29] MOM's Labour Force Survey released in Jan 2021 https://stats.mom.gov.sg/lfs/Results.aspx (accessed 11th March 2021)

situation. E-learning and reskilling has taken on a new form. At the company level, everyone is also making a conscious and concerted effort to embrace learning.

3. Conclusion

From very early in Singapore's journey, governmental policies and initiatives place human resource development at the heart of its country strategies. Our early architects of Singapore's education policies set a firm foundation for the rigorous training of its citizens from a tender age. Every citizen has the opportunity to excel in their learning journey starting from 6 years of age till the end of life. This is done through carefully thought through policies and mechanisms to enable learning and skills development in all segments of the population. This journey continues for life for Singaporeans as they embrace lifelong learning and continue to unlearn, learn and relearn to stay competitive.

Chapter 4
Adopt Inclusive Approach

1. Adopting an all-inclusive approach towards inclusion

In Singapore, the changing demography of our population, shifting trends of the global economy, responses to the recent COVID-19 pandemic, have accentuated the need to have an all-inclusive approach towards inclusion. This approach calls for the involvement of multiple stakeholders, including governments, businesses, and employees, to support current and future employees in ways that are pro-active, focused, holistic, rather than reactive.

Due to these changes in their workforce, companies are implementing novel age-inclusive practices, including redeployment, reemployment, retraining, and redesigning of jobs. The COVID-19 pandemic has accelerated some of these practices, for example, working from home, having flexible work arrangements, etc. We could expect to see more changes in labour markets, societal structure and budget for subsidising upskilling and retraining, as economies recover from the impact brought about by this global pandemic.

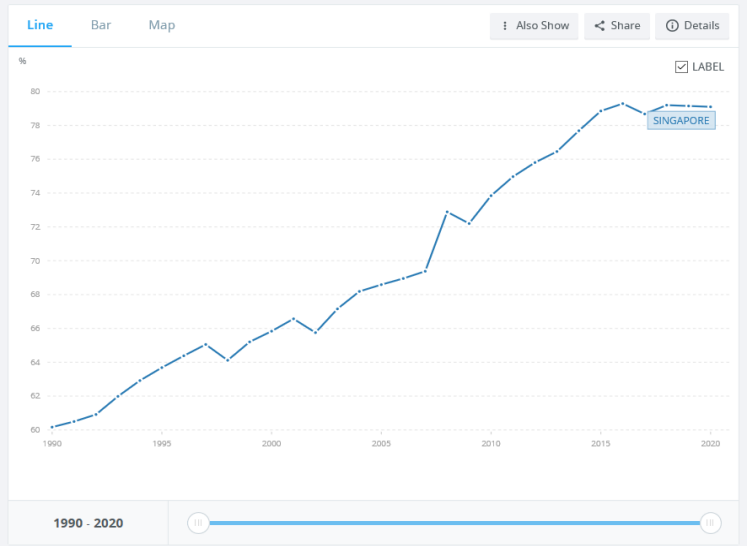
2. Labour force participation of vulnerable groups

Singaporeans have one of the highest employment rates internationally. Based on the statistics from the Ministry of Manpower[30], Singaporeans make up a majority of the resident labour force, at about 85%. The employment rate of Singaporeans has risen from 60.0% in June 2009 to 63.6% in June 2019. The unemployment rate has been kept stable at about an average of 3.1% from 2010 to 2019 (June periods), although it went up lately due to the impact from the COVID-19 pandemic.
In this section, we will present the statistics of labour force participation of vulnerable groups including female workers, older workers, and persons with disabilities.

2.1 Female workers

The population labour force participation rates of males and females as of June 2020 are 75.4% and 61.1% respectively.[31] The ratio of female to male labour force participation rate (%) derived using data from International Labour Organisation (as of June 2020) is also on the rise, as seen from the diagram below.

Figure 25: Labour Participation Rates



Source: International Labour Organisation, June 2020

[30] https://stats.mom.gov.sg/Pages/Singapore-Citizens-in-the-Labour-Force.aspx (access 20 October 2020)

[31] https://www.singstat.gov.sg/find-data/search-by-theme/economy/labour-employment-wages-and-productivity/latest-data (access 20 October 2020)

In comparison to the OECD countries, Singapore has improved from 17th to 9th place from 2009 to 2019, in terms of female labour force participation. To help more women join and stay in the workforce, a number of initiatives[32] have been put in place:

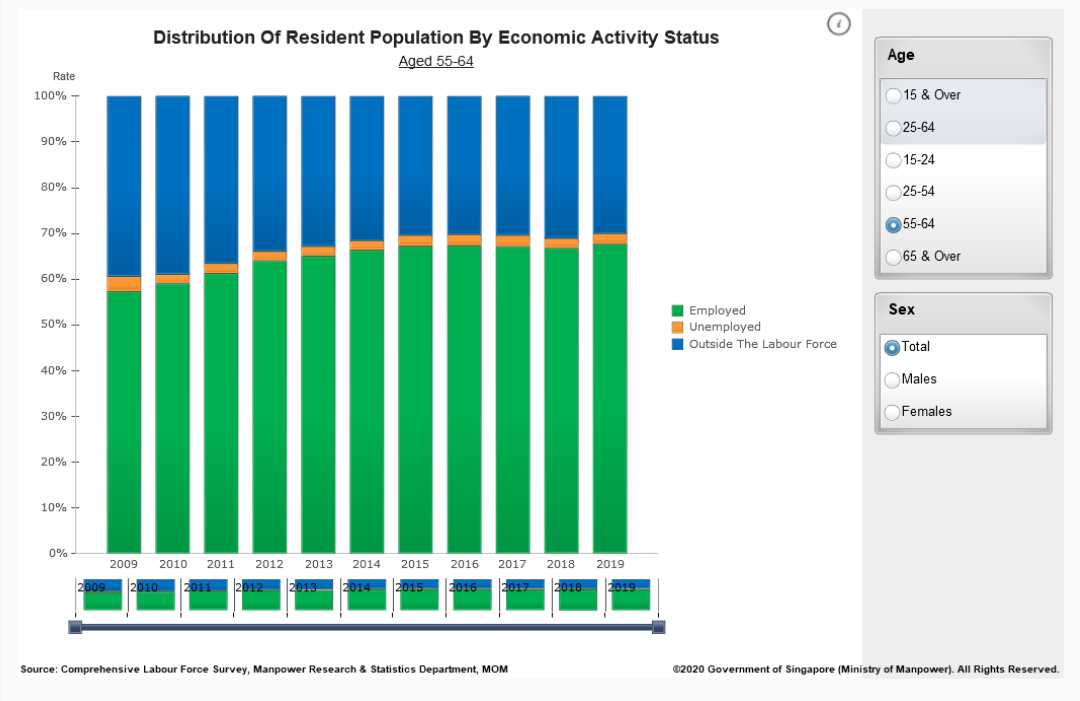
- Adapt & Grow initiative for job matching, training subsidies and salary support;
- WSG's Careers Connect or NTUC's Employment and Employability Institute (e2i)'s career centres;
- MyCareersFuture portal to find jobs best suited to their skills;
- Tripartite Standard on Flexible Work Arrangement (FWAs) to encourage more employers to offer FWAs;
- Funding support for employers, through the Work-Life Grant, of up to S$105,000 per company;
- Voluntary mediation services provided by Tripartite Alliance for Dispute Management.

2.2 Older workers

To sustain economic growth and in anticipation of even more changes to the world of work and workplaces of the future, governments around the world have undertaken massive preparations for their country's workforce. For example, governments are taking more and more policy action to encourage aging workers to extend their working lives beyond the usual retirement age and to stimulate their employers to retain them as employees and to sustain their employability (Dymock, Billett, Klieve, Johnson & Martin, 2012).

From the national statistics from MOM (see figures below), the numbers of employed older workers aged 55-64, and 65 and above have increased steadily over the years.

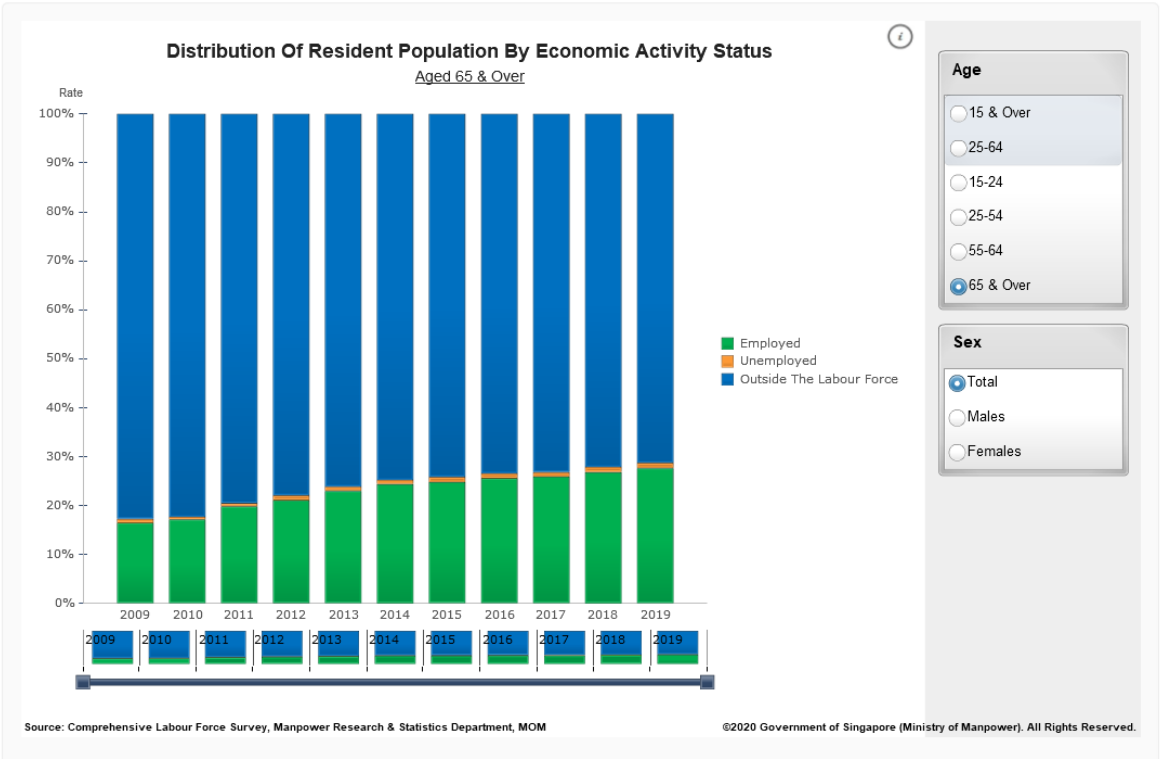
Figure 26: Distribution of Resident Population by Economic Activity Status



Source: Ministry of Manpower, June 2020

[32] https://www.humanresourcesonline.net/mom-singapore-ranks-9th-in-oecd-for-female-workforce-participation-rate (Accessed on 2 Jan 2021)

Figure 27: Distribution of Resident Population by Economic Activity



Source: Ministry of Manpower, June 2020

This can be attributed to the re-employment legislation that was enacted in 2012 which states that an employer must offer an eligible employee employment up till their re-employment age, though the job scope and pay scale may change. Since the announcement of the legislation, over 90% of workers, who are eligible for re-employment and wish to continue working, have been offered re-employment opportunities. In 2017, the re-employment age was raised from 65 to 67.

2.3 Persons with disabilities

In Singapore, there are many initiatives supporting employment of people with disabilities (PwDs). Companies are becoming more inclusive and supportive or recruiting PwDs. In March 2020, President Halimah Yacob launched the President's Challenge Enabling Employment Pledge and over 100 employers pledged to build a more inclusive workforce for those with disabilities[33].
In terms of employment, the Employment Support for Persons with Disabilities is a programme supported by Workforce Singapore and administered by SG Enable[34], to enhance the employability of and increase employment options for PwDs. PwDs can benefit from the programme in the following areas:

- Career advisory services from SG Enable's employment coaches and its Job Placement and Job Support partners to help PwDs establish his or her job readiness, and identify possible training and career options;
- Course fee subsidies of up to 90% for SG Enable's list of curated training courses to support PwDs' training efforts to enhance their employability and employment options; and
- Training allowance of S$4.50 per hour for unemployed PwDs.

[33] https://www.straitstimes.com/singapore/staying-committed-to-hiring-people-with-disabilities (access 25 October 2020)
[34] https://www.wsg.gov.sg/programmes-and-initiatives/employment-support-for-persons-with-disabilities.html?_ga=2.81467479.1719957652.1583200512-754360598.1580365884 (access 25 October 2020)

With effect from 1 July 2020, the programme will be enhanced as follows[35]:

- Increase in course fee subsidies from 90% to 95%;
- Increase in training allowance from S$4.50 per hour to S$6.00 per hour;
- Extension of training allowance beyond unemployed PwDs to include employed PwDs; and
- Introduction of a training commitment award of S$100 per completed course to encourage PwDs to take up training.

Companies can also use a tool called the BenchmarkABILITY™-Singapore, a Workplace Disability Inclusive Index jointly developed with Cornell University and supported by Singapore Business Federation Foundation (SBFF), to see how inclusive they are. This tool measures the following:

Figure 28: BenchmarkABILITY Tool



Source: Workplace Disability Inclusive Index[36]

These initiatives have brought about a rise in the number of PwDs being hired. According to 2019's manpower figures, the labour force participation rate of PWDs (aged 15 to 64) at 32.8 percent, is less than half of the entire population (aged 15 and over) at 68 percent[37]. There are 4.2 percent of PwDs in this age range without a job and actively looking for one, as mentioned by the Minister of State for Manpower, Zaqy Mohamad, in Parliament in September 2019.

Nonetheless, with keen efforts from Government agencies like SG Enable and the Ministry of Manpower, and availability of more grants, legal protection and training for both employers and PwDs, it is evident that Singapore is making strides in improving employment opportunities for individuals with disabilities. In the next section, we will look at some of these initiatives in greater detail.

3. Scope of initiatives and challenges with regard to HRD/LLL for vulnerable groups

The scope of initiatives and challenges put forth by the Singapore government, agencies, companies, and social enterprises, in support of HRD and LLL for vulnerable groups can be described to be extensive and encompassing. In this section, we will examine five main areas: (1) enhancing skills and capabilities; (2) forging a lifelong learning culture; (3) developing resiliency and ensuring continued employability; and (4) strengthening enabling structures to ensure diversity and inclusion; and (5) providing financial support in difficult times.

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[35] https://www.mom.gov.sg/-/media/mom/documents/budget2020/factsheet-enhanced-employment-support-pwd.pdf?la=en&hash=D003BBEEF2D975924D2BE3433DF640FA (access 25 October 2020)

[36] https://s3-ap-southeast-1.amazonaws.com/sgenableprod/wp-content/uploads/2019/07/24073118/5th-EEA-e-prog-booklet_final2.pdf (access 25 October 2020)

[37] https://www.channelnewsasia.com/news/singapore/persons-with-disabilities-jobs-unemployment-discrimination-12542338 (access 25 October 2020)

3.1 Enhancing skills and capabilities

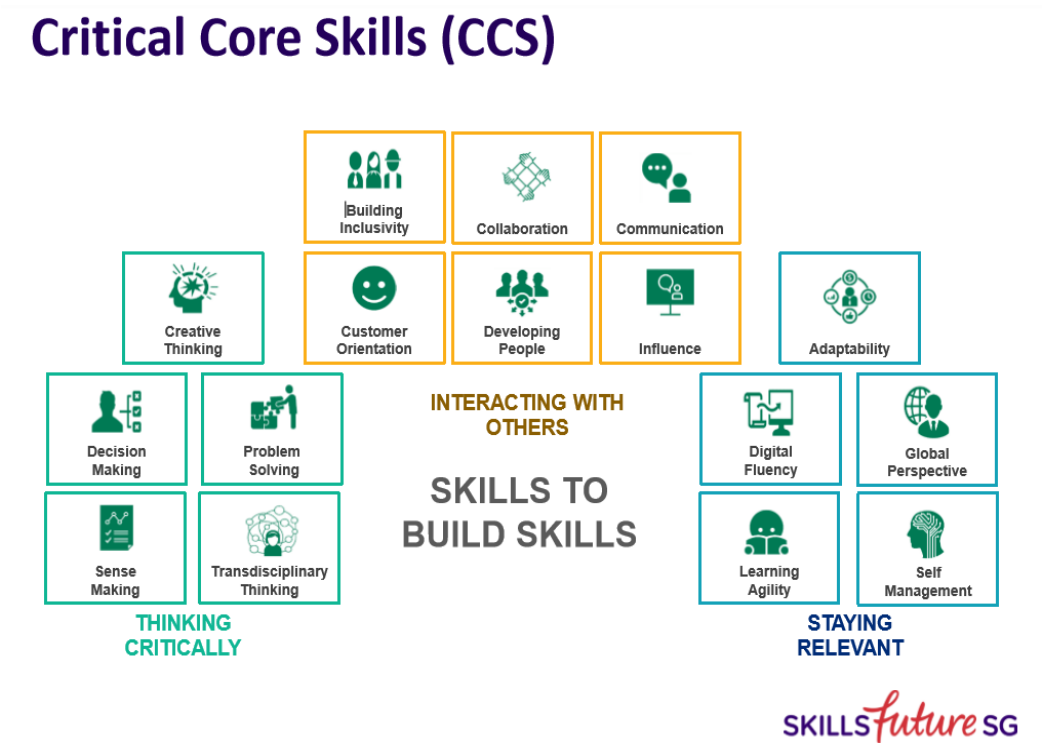
In terms of skills and capabilities, Singapore is not only emphasising on developing technical skills, but also soft skills. For example, SkillsFuture, a government agency, embarked on a review of the Generic Skills Competencies (GSCs) in Aug 2019 to formulate the new Critical Core Skills (CCS), which comprises a total of sixteen (16) competencies grouped into three (3) clusters of skills that workplaces deem most essential. They are:

Thinking Critically – These are cognitive skills that are needed to think broadly and creatively in order to see connections and opportunities in the midst of change. Cognitive skills are the root of technical skill development and progression.

Interacting with Others – Learning from other people is one of the most effective ways to acquire new skills and ideas. Being effective at interacting with others means thinking about the needs of other people, as well as being able to exchange ideas and build a shared understanding of a problem or situation. Increasingly people need to be able to combine their technical skills with those of others to succeed.

Staying Relevant – Managing oneself effectively and paying close attention to trends impacting work and living provide the strategies, direction and motivation for technical skill development.

Figure 29: Critical Core Skills



Source: SkillsFuture Singapore, 2020

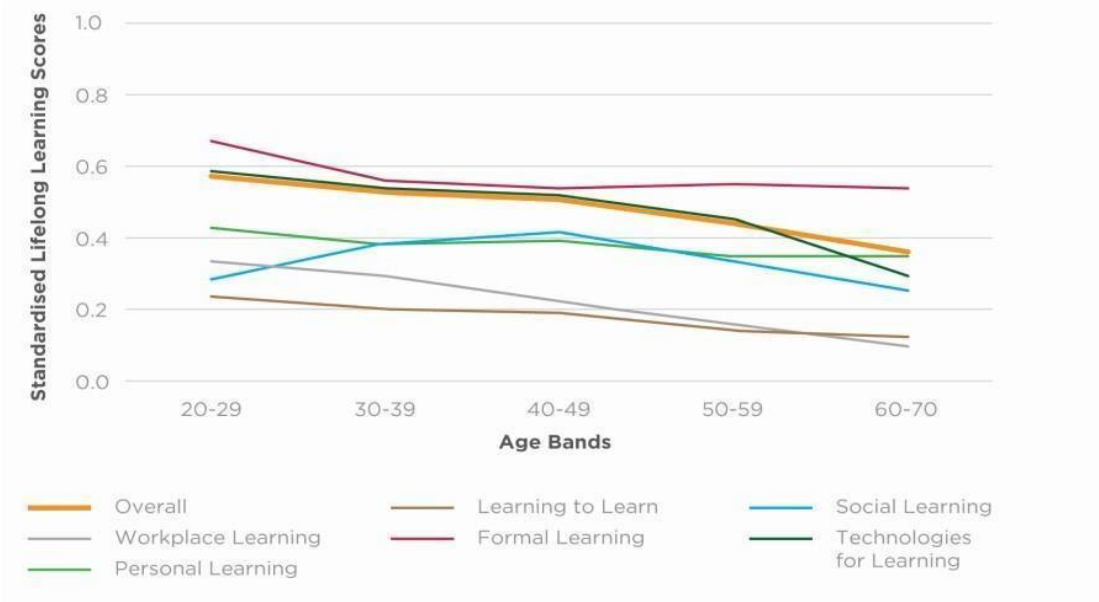
3.2 Forging a lifelong learning culture

According to Tan (2016), three models of LLL that are most relevant in the context of Singapore are: the skills growth model, the personal developmental model, and the social learning model. The skills growth model is linked to the human capital thesis that sees a correlation between upskilling and economic prosperity. The personal developmental model, in contrast to the skills growth model, goes beyond material concerns and technical skills to include individual self-fulfilment in all spheres of life. The social learning model underlines the role of institutions of trust and cooperation as the means to bring about not just economic progress but also social equity. When the three models are combined,

the 'triadic' nature of LLL integrates the aims of economic progress and development, personal development and fulfilment, as well as social inclusiveness and democratic understanding and activity. The combination of the three models is crucial in the underpinning of Singapore's LLL framework.

A study by Civil Service College (CSC), a public service training arm in Singapore, found that learning is negatively associated with age, even after we take education attainment, employment status, and parents' education into consideration. Overall, the findings suggest that the perception towards learning was not that different across different age groups. Notably, it observes that the "social learning" scores peak at the ages of 40 to 49 years old, and the scores for seniors are not that different from 20- to 29-year-olds and the "personal learning" scores for seniors are not that different from those of other age groups.

Figure 30: Survey on Learning Outcomes Lifelong Learning Scores, by Age Bands



Source: https://www.csc.gov.sg/articles/lifelong-learning-and-ageing-evidence-from-singapore

While the advancement of LLL through the SkillsFuture movement is primarily driven by economic considerations, it also allows employees to respond to a changing world with changing demands for skills and knowledge[38]. Our findings from the readiness survey also found that learning is viewed positively and in fact perceived to be a necessity for continued employment (please see Chapter 2).

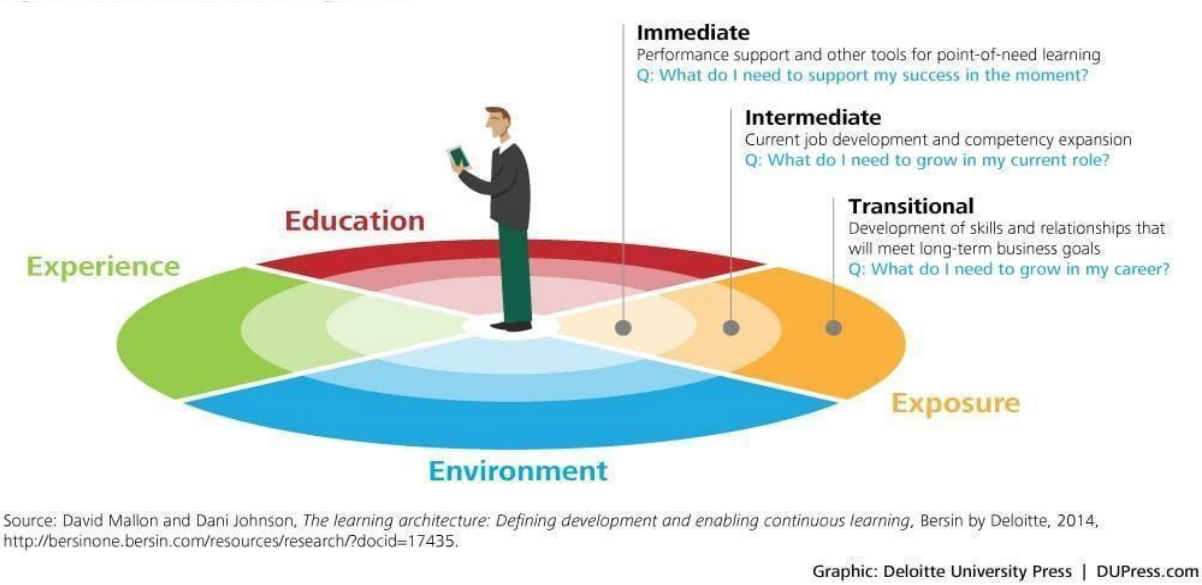
3.3 *Developing resiliency and ensuring continued employability*

In the case of Singapore, there are many efforts and policies that have been put in place to develop the training and adult education sector. One of the recent initiatives is the launch of a new road map that aims to ensure the employability and continued relevance of mid-career workers (Straits Times, Oct 2020). In doing so, employees can keep up with their learning and upskilling, in alignment to changing business needs. Consequently, this brings about a shift of mindset – from one that simply addresses training needs when they arise, to one that fosters a culture of continuous learning throughout an employee's entire career. It allows employees to focus not only on immediate training needs but also intermediate ones which may be helpful in cross-functional roles, as well as transitional

[38] https://www.straitstimes.com/singapore/education/skillsfuture-changing-education-mindset-says-ong-ye-kung (access 25 October 2020)

goals to better align to business outcomes and their personal and professional growth (see Figure 31 below). It also allows employees to stay relevant and ahead of the curve.

Figure 31: The Learning Architecture: Defining Development and Enabling Continuous Learning



Source: Mallon & Johnson (2014).

Companies are including more diversity and inclusion, age-inclusive practices for their employees. As observed by Peeters and van Emmerik (2008, p. 359), older workers create value for organisations and numerous positive organisational outcomes such as increased employee loyalty, decreased employee turnover, retention of institutional knowledge, memory, as well as increased employee productivity. Individuals are, too, doing their part, by engaging in lifelong learning, upskilling and retraining is fast becoming part of their work life.

As part of the SkillsFuture Mid-Career Support Package (SMCSP) in the Unity Budget, salary support is provided to employers who hire local mid-career workers aged 40 and above through eligible reskilling programmes[39]. Through these programmes, mature workers can remain competitive in the job market. Employers can also benefit from having a skilled worker who has the relevant work experience.

3.4 *Strengthening enabling structures to ensure diversity and inclusion*

Social inclusion can be defined as "the process of improving the terms on which individuals and groups take part in society—improving the ability, opportunity, and dignity of those disadvantaged on the basis of their identity" (The World Bank, online[40]).

In Singapore, a study of Singaporeans' attitudes towards social inclusion[41] found that many saw the importance of 'celebrating diversity' and making a greater effort to understand vulnerable groups. This also suggests that Singaporeans, in general, recognise everyone plays a part in making Singapore more inclusive.

More recently, due to COVID-19, the nature of the vulnerable groups have changed, yet again. In particular, the PMET (professional, manager, executive and technician) group have been identified as the group whose jobs have been displaced and required help in terms of job support. About 58 per cent of locals - Singaporeans and permanent residents - are in jobs classified as professionals,

[39] https://www.wsg.gov.sg/hiring-incentive.html (access 25 October 2020)
[40] https://www.worldbank.org/en/topic/social-inclusion (access 25 October 2020)
[41] https://www.fas.nus.edu.sg/srn/archives/56766 (access 25 October 2020)

managers, executives and technicians (PMETs). Responding to the National Trades Union Congress (NTUC)'s commitment to providing better support for displaced PMEs[42], NTUC's secretary-general, Mr Ng Chee Meng, said that,

> *"No stone will be left unturned but, ultimately, it must be some form of organised body to bring them in so that we can actually have meaningful and consistent, sustained engagement to build a relationship."*

There are also other forms of support, for example for the own account workers or self-employed persons (SEPs). They can also receive a training allowance to attend and complete courses under the SkillsFuture series and approved sector-specific training programmes.

Similarly, students who have just graduated from ITE, polytechnics, universities or other institutes of higher learning can apply to companies as trainees to be equipped with relevant work experience and boost their employability[43]. Announced in May, the SGUnited Jobs and Skills Package is a S$2 billion programme aimed at creating 100,000 jobs, traineeships and skills training opportunities. Trainees will gain valuable industry experience and receive a training allowance for the duration of the SGUnited Traineeship Programme. As of September 2020, more than 1,000 fresh graduate trainees have taken up traineeships under the SGUnited traineeships programme[44].

Mid-career individuals can also apply to the SGUnited Mid-Career Pathways Programme. This programme is supported by the government and agencies such as the Singapore Business Federation[45], which will help provide company attachments and onboarding support for host companies and their trainees.

3.5 *Providing financial support in difficult times*

More recently, in view of COVID-19, the Minister for Finance announced a series of stimulus packages[46] to soften the impact of the COVID-19 pandemic. On 18 February 2020, a S$4 billion Stabilisation and Support Package (as part of Unity Budget) to cushion the blow of COVID-19 on local businesses and workers. A second stimulus package (known as the Resilience Budget, was announced on 26 March 2020, with the aim to support households, help workers stay employed and provide support for businesses to emerge stronger when the economy recovers.

The Government also pledged to support industries that have been deeply impacted by the COVID-19 outbreak such as the Aviation, Tourism, Food Services, Land Transport and Arts & Culture sectors. A third stimulus package worth S$5.1 billion (known as the Solidarity Budget), targeted at cushioning the impact of the "circuit breaker" on the local workforce and livelihoods of workers. The Government announced a fourth stimulus package worth S$33 billion (known as the Fortitude Budget) on 26 May 2020, with focus on (1) creating jobs and building skills for workers; (2) boosting transformation for enterprises and (3) strengthening resilience for community.

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[42] https://www.straitstimes.com/singapore/manpower/ntuc-weighs-forming-organised-body-to-help-pmes (access 25 October 2020)

[43] https://www.straitstimes.com/singapore/education/thousands-of-traineeships-for-fresh-ite-poly-and-uni-grads (access 25 October 2020)

[44] https://www.mom.gov.sg/newsroom/parliament-questions-and-replies/2020/0904-written-answer-by-mrs-josephine-teo-minister-for-manpower-to-pq-on-sgunited-traineeships (access 25 October 2020)

[45] https://www.sbf.org.sg/media-centre/sgunited-traineeships-programme (access 25 October 2020)

[46] https://www.cnbc.com/2020/04/06/coronavirus-singapore-plans-third-stimulus-package-to-support-economy.html (access 25 October 2020)

Additionally, the Self-Employed Person (SEP) could apply for an income relief scheme (SIRS) to tide over this period of extraordinary economic uncertainty. As of end October 2020, close to $1.8 billion has been disbursed to about 200,000 SEPs through SIRS[47].

4. Provision of community resources and networks

Various key agencies provide resources to help citizens be better prepared to meet the needs and skills of the future economy. There is a wide array of reading resources, including academic journals, that are accessible via the National Library Board (NLB). Besides having regional and community libraries all over Singapore, NLB is also working with agencies such as SkillsFuture Singapore (SSG) to provide a suite of resources and National Transformation roadmaps that can help people make well-informed choices regarding training and careers, look for career opportunities, and be more innovative, and the Council for Third Age (C3A) for training programmes on positive ageing areas conducted by the National Silver Academy.

As shared by one of our respondents, who has been spearheading many initiatives on adult learning in Singapore, the Adult Educators Network (AEN) plays an important role to provide support for practitioners, who could then contribute by coaching and mentoring others:

> *"the Adult Educators Network to provide an ecosystem for the practitioners to carry out peer-to-peer learning, professional exchange opportunities and also a marketplace for individuals or groups to offer free or paid programs to fellow practitioners to generate this ongoing dynamic in promoting learning as a whole. This scheme has gotten SkillsFuture's support and incentives and awards such as SkillsFuture Fellowships and SkillsFuture Study Awards respectively. These may also contribute to the impetus or motivation for practitioners to aspire to win the accolades and at the same time contribute back to the community."*

Community organisations are playing pertinent roles in supporting vulnerable groups as well. For example, M^3, a collaborative effort between three key community institutions — Islamic Religious Council of Singapore (Muis), MENDAKI and MESRA, brings together professionals and community leaders to strengthen families, and provides help for social and educational programmes, reaching families in need. During the COVID-19 pandemic, the M^3 network hosted two virtual career fairs and received over 700 job applications and continuing education and training provider Mendaki Sense is facilitating job placements[48].

The Singapore Indian Development Association (Sinda) has announced a S$1.8 million package, which aims to benefit at least 3,000 families and students[49]. As mentioned by Sinda president Indranee Rajah, who is also Minister in the Prime Minister's Office,

> *"We want to reassure vulnerable families and individuals that they can have peace of mind, with the knowledge that the community is here for them."*

To support low-income families with school-going children for their home-based learning, about 930 families received brand new foldable tables and chairs from the Chinese Development Assistance Council (CDAC). During the COVID-19 pandemic, schools transited to full Home-based learning in April. Students were asked to log on to the Student Learning Space (SLS) to access learning materials

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[47] https://www.mom.gov.sg/newsroom/parliament-questions-and-replies/2020/1104-written-answer-by-mrs-josephine-teo-minister-for-manpower-to-pq-on-sirs-for-business-owners (access 25 October 2020)

[48] https://www.straitstimes.com/politics/support-network-for-those-in-need-in-malaymuslim-community (access 25 October 2020)

[49] https://www.straitstimes.com/singapore/coronavirus-sinda-joins-other-self-help-groups-in-providing-more-aid-as-need-grows (access 25 October 2020)

and complete assignments. There are plans by the Ministry of Education to make blended learning a regular feature of the curriculum.

The Ministry of Family and Social Development (MSF) have recently piloted two key initiatives to better support at-risk children and youths[50]: (i) a Localised Community Network (LCN) pilot and (ii) a lengthening of Post-Care Support for youths discharged from MSF Youth Homes. Supported by the National Committee on Prevention, Rehabilitation and Recidivism (NCPR), the primary aim of the initiatives is to develop and implement a coordinated and integrated approach to prevent offending and re-offending, and enhance the rehabilitation of offenders.

In particular, the LCN pilot will involve relevant Government agencies, schools, Voluntary Welfare Organisations (VWOs), community organisations and volunteers, in having a better understanding of the challenging family circumstances that children/youths may face, and better coordination of the support required, to help these children/youths with complex families or at-risk behaviours, such as chronic absenteeism.

5. Role of individuals in driving LLL and HRD initiatives

There are indeed many support initiatives from multiple stakeholders for lifelong learning and human resource development. However, in order for an age-integrated approach to work (see Chapter 2) and be sustainable, it will be important to have the mindset that we learn and develop because we want to. While governments can take steps to facilitate lifelong learning, much of the onus is on the individual because it requires self-motivation and self-direction.

To drive this change of mindset, one of the respondents we interviewed felt that a national movement to recognise lifelong learning could be a possible approach:

> *"Another way may be to start a movement to encourage all the professional societies to come together to solicit national support or they can leverage their own industry trade associations or champions to push for similar efforts… the recognition is towards a lifelong learning award… they can also organise an annual 'learning festival' for their profession to inculcate going beyond certification requirements. They can form CoP and Learning Circles from the ground up for a start to encourage professional exchanges and grow from there. Perhaps, simple recognition of individuals' efforts may go a long way to encourage their efforts."*

Additionally, a national movement called the SG Cares, which aims to support the efforts in building a more caring & inclusive home for all, is gaining good traction. During this critical time of the pandemic, about 550 volunteers under the SG Cares Community Networks have been reaching out to the vulnerable groups, working closely with the Social Service Offices and government agencies to ensure they do not fall through the cracks[51].

6. Conclusion

In this section, we discussed how Singapore adopts a holistic, all-inclusion and integrated approach towards social inclusion. It brings about a collective and coordinated effort from multiple stakeholders such as government agencies, VWOs, community organisations, companies, and individuals themselves. The scope of initiatives are extensive and encompassing. As the nation works towards

[50] https://www.msf.gov.sg/media-room/Pages/Enhancing-Support-for-At-Risk-Children-and-Youth.aspx (access 25 October 2020)

[51] https://www.straitstimes.com/politics/singapore-ge2020-govt-is-strengthening-social-safety-net-says-paps-desmond-lee (access 25 October 2020)

the collective goal of being more diverse and inclusive, values such as being altruistic, compassionate and showing empathy will further help to drive these initiatives to a greater scale.

Chapter 5
Strengthening Enabling Structures

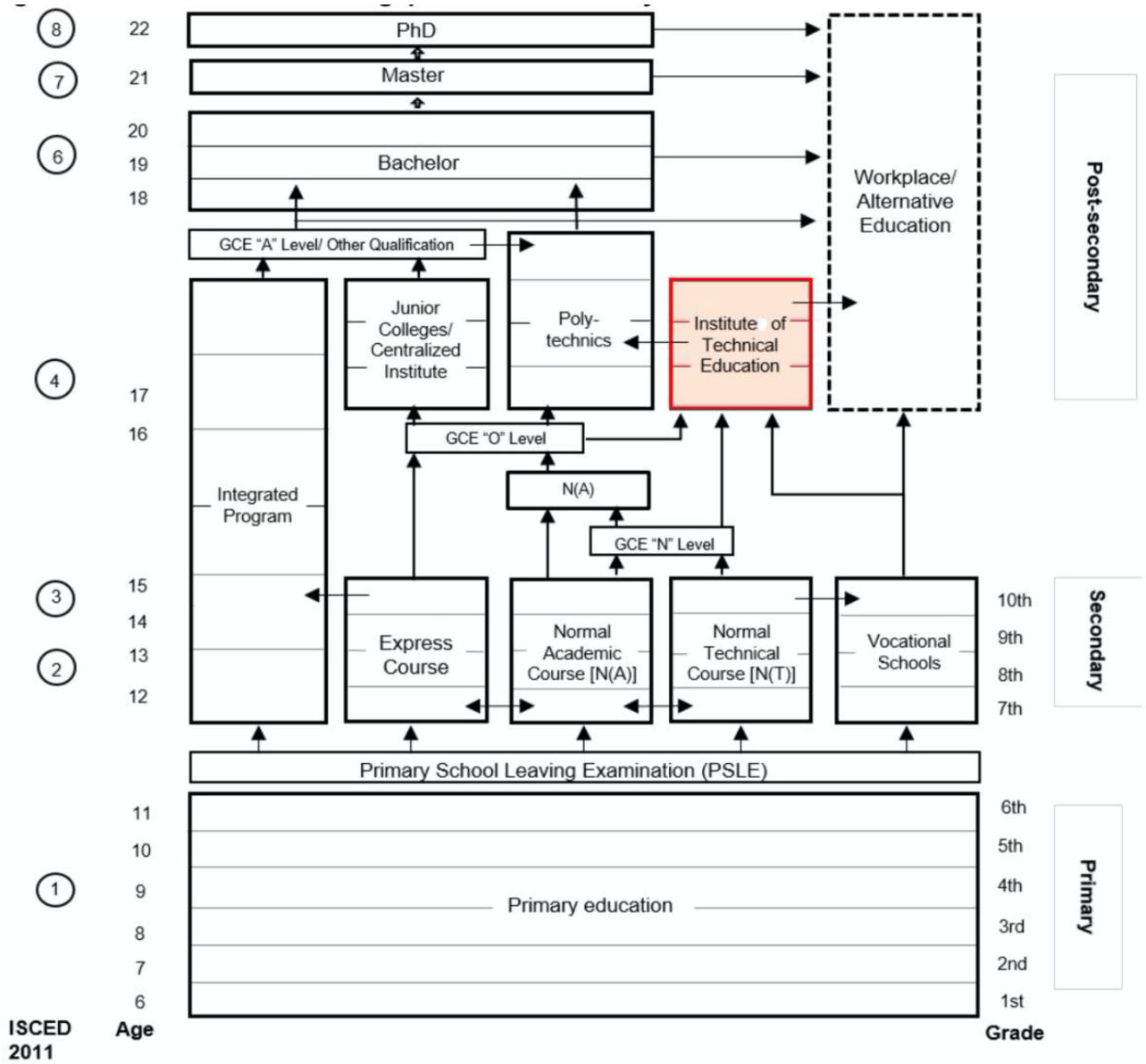
1. Provision, Access and Pathways

The design of the education system, including policies and investment in the provision and access to pathways, are part of the essential enabling structures. Human resource development is a joint endeavour of the education system, formal and non-formal training providers, the government, employers, unions, individuals and NGOs.

Further to chapter 3, the analyses of this chapter focus on capacity of the system, the factors influencing access and educational equality, such as high-stake exams, pupil-teacher ratio, pathways between different levels and types of education. The chapter also looks into governance, financing, research on the labour market and measuring lifelong learning.

The national education system in Singapore consists of compulsory primary education (6 years), secondary education (4 to 5 years), post-secondary education, and workplace/alternative education, as illustrated in the figure below. Preschool education is voluntary and offered both by the Ministry of Education and by private providers.

Figure 32: The Singaporean Education System



Source: (Renold et al. 2016, 53)

2. Academic Grading System and Examinations

Since each educational stage in Singapore has its own examinations, the grading system varies. Even at the same stage, the grading system may vary from stream to stream. The high stakes examinations and grades in the education system have important consequences for students, teachers, schools, life chances/education pathways and workforce planning. Examples of different grading systems and classifications can be seen below:

- Primary 5 to 6 standard level grades: A*, A, B,C, D, E, U [52]
- Primary 5 to 6 foundation level grades: grade 1, grade 2, grade 3, grade 4, U
- Secondary Singapore-Cambridge GCE O-level examination grades: A1, A2, B3, B4, C5, C6, D7, E8, F9
- Secondary Normal (Academic) grades: 1, 2, 3,4,5, U
- Secondary (Technical) grades: A, B, C, D, U
- Junior College grades: A, B,C,D,E,S, U
- Polytechnics grades:

Table 14: Polytechnics grades

Grade	Grade Description	Grade Point
AD	Distinction (Top 5% score in the subject)	4.0
A	Excellent	4.0
B	Very good	3.5
B	Good	3.0
C	Above Average	2.5
C	Average	2.0
D	Pass	1.5
D	Borderline pass	1.0
F	Fail	0

- University grades:

Table 15: University Grades

Grade	Grade Description
I	First Class Honors
II	Second Class Honors, First Division
II	Second Class Honors, Second Division
III	Third Class Honors

[52] This grading system is valid till 2022. There will be a new Primary School Leaving Examination (PSLE) grading system in the near future.

As an example, Singapore has a Primary School Leaving Examination (PSLE) at the end of grade 6, which is a placement exam that determines pupils' secondary school stream and school choices. It is normally held over four days in October, about two hours each day. Each pupil is tested on their knowledge in English, mother tongue, math and science. The grading system will be changed from 2021, to use wider scoring bands and to reflect a student's individual level of achievement regardless of how his or her peers have done.

According to the latest announcement of the MoE in Singapore, the current grading system will be changed from 2021 by introducing wider scoring bands to reflect individual academic performance regardless of how his or her peers have done. While the nature, format and purposes of the PSLE remain unchanged, further research on impacts of the new grading system will be necessary in the future.

2.1 Primary and Secondary Education

Every Singaporean child is required to attend compulsory primary education of 6 years (Compulsory Education Act 2000) and has the opportunity to receive at least 4 years of education at secondary level. The high net enrolment rates (almost 100%, see chapter 1) at both primary and secondary levels provide a firm foundation for further education. Around 97% of the Primary One cohort continues to secondary education. Around 90% of the secondary school leavers continue to post-secondary education by following either an academic or technical vocational route as shown in the figure above.

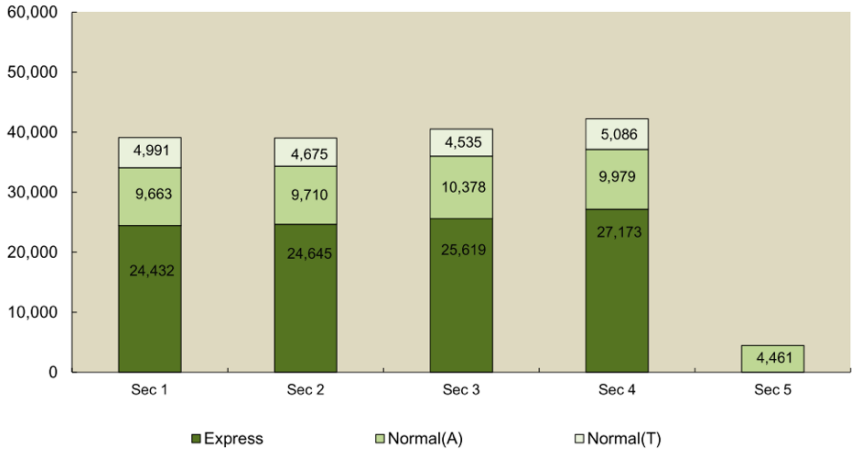
At the end of grade 6, pupils take the Primary School Leaving Examination which assesses their suitability for secondary education and places them in the secondary school course that suits their pace of academic learning and aptitude.

At the secondary level, three core courses which last 4-5 years are designed to match students' academic progress and interests. In other words, these are mechanisms of early sorting and tracking of pupils.

a) Express Course: leading to the Singapore-Cambridge General Certificate of Education (GCE) O-Level exam. Students learn English, Mother Tongue Languages, Mathematics, the Sciences and the Humanities. The majority of pupils enrol in this course (see figure below).
b) Normal (Academic) [N(A)] Course: leading to the GCE N(A)-Level exam. Students learn subjects similar to those in the Express course. This is the second most popular choice of pupils. Those who do well at the N(A)-Level will qualify for an additional year to prepare for the O-Level exam. Since 2013, students who do well at the N(A)-Level have two "through-train" pathways to the polytechnics – (i) a one-year Polytechnic Foundation Programme or (ii) a two-year Direct-Entry-Scheme to Polytechnic Programme via Higher Nitec courses at the Institute of Technical Education.
c) Normal (Technical) [N(T)] Course: leading to the GCE N(T)-Level exam. Students learn English and Mother Tongue Languages, Mathematics and subjects with technical or practical emphases to enhance experiential and practice-oriented learning. Compared to the above courses, much less students follow this course.

According to the Ministry of Education, there is a plan to remove the above stream labels from 2024 onwards and to introduce subject-based banding instead which allows students to offer a more demanding level according to their subject-specific abilities and interests.

Figure 33: Secondary Enrolment by Year/Level and Course, 2018



Source: (Singapore Ministry of Education 2019, 7)

Additionally, there are several options designed to suit the needs of every pupil.

- Specialised Schools and Specialised Schools for Normal (Technical) offer customised programmes for pupils who are more inclined towards a hands-on and practical learning experience.
- Integrated Programme which is a 6-year programme offered by some schools for academically strong pupils who prefer a more independent and less structured learning approach. Pupils proceed to pre-university education without sitting for the O-level examinations and sit for the pre-university exams at the end of six years.
- Specialised independent schools cater to pupils with talents and strong interest in the specific fields of math and science, arts and sports. Pupils seek admission to these secondary schools based on their achievements and talents through the Direct School Admission assessment.

2.1.1 Ratio of school pupils to teaching staff

The pupil-teacher ratio is the number of primary or secondary pupils divided by the number of teachers in primary or secondary schools. The figures below include pupils and teachers in all government, government-aided, independent, specialised independent and specialised schools in Singapore. These ratios are compared favourably with other ASEAN countries. For example, the pupil-teacher ratio in Vietnam is around 22 at primary schools, and 19 at secondary schools in 2018 (see Vietnam national report in this series).

Table 16: The Pupil-teacher Ratio in Singaporean Schools

	2013	2014	2015	2016	2017	2018
Primary	16.5	16.5	16	15.5	15.2	14.8
Secondary	13.2	12.5	12.2	11.9	11.6	11.6

Source: (Singapore Ministry of Education 2019, xvi)

In terms of capacity and provision of primary, secondary and pre-university education, there were 356 institutions in 2018 of which 186 are primary schools, 139 are secondary schools, 16 are mixed level schools, and 15 are junior colleges/centralised institutes. The vast majority of them are government and government aided schools. The total number of enrolments at these 356 institutions in 2018 were 428,773 pupils (including 210,316 female or 49%) (Singapore Ministry of Education 2019).

The average class size in Singapore at primary schools is 33.1, and 33.8 at secondary schools, compared to 30.5 at primary schools and 36 at lower secondary schools in Viet Nam, or 21.6 in Denmark (grade 1-9, folkeskole, 2016[53]). While Singapore's pupil-teacher ratios are comparable to the OECD averages, class sizes tend to be larger due to Singapore's needs-based resourcing approach. Some measures are in place, such as schools are given additional teachers to run significantly smaller classes in a targeted fashion to support students with enhanced needs, rather than to implement a broad-based reduction in class sizes. For instance, literacy and numeracy support programmes are conducted in smaller pull-out classes of 8 to 10 students at the primary level to provide more focused support for lower progress students. Singapore also focuses on maintaining high teacher quality, including a stringent selection process for all teacher applicants, and providing strong support for teachers to pursue professional development.

2.2 Post-secondary Education

In terms of publicly-funded provision, there is the Institute of Technical Education (which has three colleges), five polytechnics, two Colleges of Arts, and six autonomous universities. Generally, more students studied TVET programmes than academic programmes. Even at the tertiary level, more students attended and graduated from polytechnics than from universities in 2018 as shown below. These facts have implications for policies about TVET and HRD.

Table 17: Intake, Enrolment and Graduates of Institute of Technical Education, Polytechnics and Universities (Full-time), 2018

Full-time study, 2018	**Intake (new enrolment)**		**Enrolment**		**Graduates**	
	Total	Female	Total	Female	Total	Female
Institute of Technical Education (ITE)	14,819	5,629	28,367	10,707	13,421	5,026
* Arts diploma	1,340	930	3,778	2,627	1,001	704
* Arts publicly funded degree	510	363	1,382	1009	444	329
Polytechnics Diploma	23,869	11,394	70,985	33,723	22,614	11,175
Universities first Degree	20,041	10,001	70,690	35,293	16,823	8,475

Source (Singapore Ministry of Education 2019, 17–21)

Note *: The figures refer to LASALLE College of the Arts and the Nanyang Academy of Fine Arts (NAFA)

2.2.1Technical and Vocational Education (TVET)

The formal TVET system is structured as follows:

- Students go through 6 years of primary school, and 4-5 years of secondary school (16-17 years old). At this point, they have the option to choose a more **applied/technical** pathway at the polytechnics and ITE.
- For admission to ITE, students must have secondary education qualification (GCE O-level, or GCE N(A)-level or GCE N(T)-level or alternative qualification). The 2-3 year TVET programmes are offered at ITE, leading to National ITE (Nitec) or Higher National ITE Certification (Higher Nitec), or Diploma. During their courses, students are often required to take internships organised jointly by ITE and partner companies. Nitec and Higher Nitec certificates enable students to be admitted to Polytechnics.

[53] https://www.folkeskolen.dk/612708/skolestart-klassekvotienten-i-folkeskolen-stiger-igen- (access 22 October 2020)

- For admission to the polytechnics, students must have GCE O-level, or GCE A-level, Polytechnic Foundation Programme (PFP)[54] certificate, or Nitec, or Higher Nitec certificates. The 3-year hands-on, practice-based diploma programmes offered in five polytechnics are in practical fields, such as engineering, applied science and biotechnology, ICT, healthcare, early childhood education, business studies, accountancy, mass communication, social sciences and digital media. Polytechnic graduates who wish to further their studies may be considered for admission to local or international universities based on the results of their diploma qualifications. They may get one year of credit exemptions for their university degree at local and international universities.

2.2.3 Pathways into university degrees

For many years, the five Polytechnics have been partnering with various international universities, especially Australian universities to offer special pathways to university degrees. For example, the University of Technology Sydney (UTS), Faculty of Science has designed unique pathways for Singaporean polytechnic students. Students with a GPA of 3.0 or above receive 1.5 years of recognition of prior learning. Students who successfully complete a research internship at UTS Science as part of their Polytechnic Internship Programme (12-14 weeks) will be granted 0.5 year additional recognition of prior learning[55].

As part of the SkillsFuture Work-Study Programme, the local Singaporean polytechnics and universities started to launch a new pathway programme. For example, Temasek Polytechnic has cooperated with the Singapore University of Social Sciences and the Singapore Institute of Technology to offer the new 'through-train' accelerated pathway for students in the building services and mechatronics subjects in 2020. Similarly, Singapore University of Technology and Design also offers pathway courses in aerospace electronics, computer engineering, engineering with business, electrical and electronic engineering. They will be selected normally at the end of year 1 or in the beginning of year 2 in polytechnics for the pathway programme based on their aptitude and interest in these industries.

In order to streamline the modules for the new work-study pathway and avoid repetition, students will take three or more university-modules in their third year of polytechnic, go on an internship with their sponsoring companies and graduate with a diploma. During their undergraduate years, they will study and work concurrently for the company, and after graduation will become a full-time employee. Students on this route will graduate from university nine months to a year earlier than most of their peers.

The two world-class research-intensive universities also offer these new pathway programmes. The Nanyang Technological University started to offer six new work-study degrees in areas such as engineering, data science and business analytics from 2019. The National University of Singapore offers five degrees in aerospace electronics and engineering areas from 2020[56].

Currently, local Singaporean universities offer 16 work-study pathway degree programmes. This new pathway is expected to offer a practice-oriented learning approach, industry-relevant courses, a head-start into university degrees and job security upon graduation.

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[54] The Polytechnic Foundation Programme (PFP) is a one-year programme specially designed for the students with GCE N(A) level. Instead of continuing to GCE O-level exams in Secondary year 5, students can join PFP for a pre-selected diploma course.

[55] https://www.uts.edu.au/future-students/science/about-science/singaporean-polytechnics-pathways (last access 25 January 2021)

[56] https://www.sp.edu.sg/docs/default-source/seee-doc/sp-sutd-nus.pdf (access 27 October 2020)

3. Legislation, Policies and Strategies for Lifelong Learning and HRD

The key policies and strategies to develop 'Thinking Workers and a Learning Workforce' in Singapore include:

3.1 The Lifelong Learning Endowment Fund Act', 2001

For adult learners, the government introduced the 'lifelong learning endowment fund act' in 2001 with a budget of S$ 1.5 billion in order to support 'the acquisition, development and upgrading of skills and expertise of persons to enhance their employability' (The Law Revision Commission 2002). Lifelong learning is not an end itself but a journey.

3.2 Manpower 21 Plan and the Singapore Workforce Development Agency, 2003

Some of the key recommendations of the Manpower 21 plan is to establish a school of lifelong learning to address the needs of the workforce at all levels. This required the setting up of a national skills recognition system, incentives for employers and individuals to stimulate lifelong learning and one-stop career centres, etc. Therefore, the Singapore Workforce Development Agency (WDA) was established in September 2003 under the Ministry of Manpower (MOM) to help workers to meet their career aspirations and secure quality jobs throughout their life. It's role is to build a first-class lifelong education and training system to enhance the employability and competitiveness of both employees and job seekers. Lifelong learning in the period of SARS crisis (2003) involved building capabilities and also having the capacity to respond quickly and effectively to changes in the external environment. Lifelong learning is no longer an option but a necessity.

The government has also initiated Lifelong Learner Awards and the Singapore Learning Festival to help change mindsets and promote a new lifelong learning for employability culture.

3.3 SkillsFuture Singapore Agency Act 2016 (No. 24 of 2016)

Following the promulgation of the above Act, the SkillsFuture Singapore (SSG) – a statutory board under the Ministry of Education (MOE) was established. SSG took over some of the functions performed by the previous Singapore Workforce Development Agency (WDA) and absorbed the Council for Private Education (CPE), an existing statutory board under the MOE.

SGG coordinates the implementation of the national SkillsFuture movement and promotion of culture and holistic system of lifelong learning through the pursuit of skills mastery, and creates synergies in continuing education and training (CET) and pre-employment training (PET). The emphasis is placed on 'career' and 'skills mastery' linked to lifelong learning.

In collaboration with lead agencies in different economic sectors, employers and unions, SSG co-develops medium-term manpower and skills plans for each key sector in order to support industry growth and enhance productivity of the workforce. These sectoral manpower strategies identify sector-specific manpower and skills requirements over a five-year period and outline a holistic package of measures to meet these requirements. SkillsFuture has been seen as the next round of workforce development strategy. Thanks to the pragmatic approach to policy making in Singapore, lifelong learning took off again quickly under SkillsFuture.

Launched in 2016, under the S$ 4.5 billion Industry Transformation Programme, the Industry Transformation Maps (ITMs) have been developed for 23 industries to address issues within each industry and deepen partnerships between government, companies, industries, trade associations and chambers.

The Future Economy Council (FEC) takes overall responsibility for the implementation of the ITMs and establishes six sub-committees with each committee overseeing a group of ITMs within the same cluster of industries, including manufacturing, built environment, trade and connectivity, essential domestic services, modern services and lifestyle. Each ITM consists of a growth and competitiveness plan, supported by four pillars:

- productivity,
- job and skills,

- innovation, and
- trade and internationalisation.

The Skills Framework – an integral part of the ITM, is co-created by employers, industry associations, unions and the government. The Skills Framework provides key information on sector and employment, career pathways, occupations/ job roles as well as existing and emerging skills required for the identified occupations/job roles. It also outlines a list of training programmes for skills upgrading and mastery.

The Skills Framework creates a common skills language for individuals, employers and training providers. This common understanding further helps to facilitate skills recognition and support the design of training programmes for skills and career development.

3.4 Measuring lifelong learning in Singapore

The expanded goals of SkillsFuture and lifelong learning are to provide learning opportunities for everyone by providing funding support to equalise participation opportunities and to facilitate individual decision making. In the current debate on how lifelong learning may make further progress under SkillsFuture which covers every citizen and not just those in full-time education and in work, the ability to measure results and progress is important. Monitoring mechanisms are crucial to feedback into policy and practice. Singapore has introduced several methods to obtain the right information to aid policy making such as:

a) To identify gaps in provisions of learning opportunities among various segments of the population to provide more targeted support: Conduct skills and learning research, surveys on the perceptions of lifelong learning
b) To perform comparative studies with other cities to identify best practices and gaps that can feedback to strengthen local practices: Singapore participated in the second round of Cycle 1 (2012-2016)[57] of the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) to assess literacy, numeracy and problem solving skills of adults between the ages of 16 and 65. The plan is to participate again in PIAAC Cycle 2 (2021-2023)[58]
c) To evaluate effectiveness and quality of learning and training initiatives/courses to ensure that they meet standards and learning needs: to use tools such as training quality and outcomes measurement, Training and Adult education Landscape study, collection of learners' feedback after completion of training programmes through publication of quality and outcome ratings on the MySkillsFuture training exchange online portal. This kind of quality assurance method will help learners make more informed decisions and training providers improve their course offerings. Thus, this will ensure government funding for training programmes are optimally allocated and utilised.

In 2016, following the announcement of PIAAC results[59], one of the significant initiatives sponsored by SkillsFuture scheme was the development of a lifelong learning measure to track lifelong learning in Singapore. Drawing on a wide range of developments and expertise in lifelong learning around the world, the Institute for Adult Learning (IAL) has developed the Singapore's Lifelong Learning Framework and a Singapore Lifelong Learning Index.
The Framework adapted UNESCO's Delors four pillars (learning to know, to do, to be and to live together) and added two more pillars: technologies for learning and learning to learn[60].

[57] https://www.ial.edu.sg/access-research/research-at-ial/research-projects/programme-for-the-international-assessment-of-adult-competencies.html (access 27 October 2020)
[58] https://www.ial.edu.sg/access-research/grants-and-schemes/programme-for-the-international-assessment-of-adult-competencies.html (access 27 October 2020)
[59] http://www.oecd.org/skills/piaac/Skills-Matter-Singapore.pdf (access 27 October 2020)
[60] https://www.ial.edu.sg/access-research/research-at-ial/expert-roundtable/lifelong-learning-expert-roundtable-2019.html (access 27 October 2020)

Table 18: The Singapore's Lifelong Learning Framework, 2019

Nr	Pillar	Description
1	**Formal Learning** (learning to know)	Qualifications often pursued in the first cycle of education
2	**Work-related learning** (learning to do)	Training and learning for work-related purposes
3	**Social Learning** (learning to live together)	Individual competence and resilience to societal issues such as inequality, charitable activities and social inclusion which provide strong basis for community development
4	**Personal Learning** (learning to be)	Personal growth that is not necessarily defined by economic gains but areas like personal fulfilment, development, career building and intellectual development
5	**Technologies for learning** (added, digital skills)	Individual's ability to use, adapt and benefit from rapidly changing technologies and new learning media
6	**Learning to learn** (added, learning strategies)	Internal dispositions required to successfully pursue lifelong learning

Source: Sim Soo Kheng (2019), Institute for Adult Learning Singapore, presentation at the Think Tank meeting on Lifelong Learning, Shanghai, 4-5 December 2019.

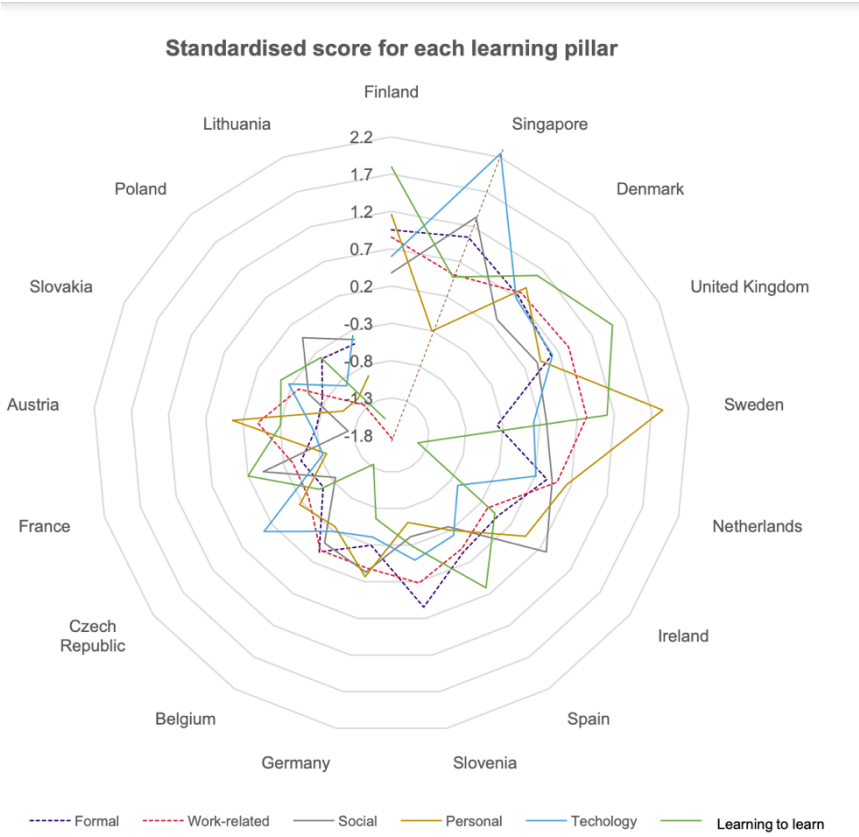
Based on the Framework, the Institute for Adult Learning has adapted the set of questions in PIAAC, Eurobarometer surveys, International Social survey and Eurostat survey and developed a set of relevant indicators to measure learning in each pillar and compare with other 16 European countries where data were available from the above-mentioned surveys.

For example, in the pillar 'Work-related Learning', the indicators include:

- Learning-by-doing from the tasks you perform at least once a month
- Learning work-related things from colleagues at least once a month
- Attendance at structured training for work-related purposes (employed only)
- Employers have provided adequate opportunities to pursue work-related training
- Have often displayed an inclination towards being good at what they do.

Between February 2017 and March 2018, the Institute for Adult Learning conducted a large-scale national survey of 8,000 individuals aged 20 to 70 randomly selected from national resident population. The key findings for Singapore of this study are summarised in the figure and table below:

Figure 34: Comparison of 6 Singapore's Learning Pillars with 16 European Countries



Source: Sim Soo Kheng (2019), Institute for Adult Learning Singapore, presentation at the Think Tank meeting on Lifelong Learning, Shanghai, 4-5 December 2019.

Table 19: Key findings of the 'Leverage Skills and Learning Study in Singapore' (2017-2018)

Nr	Pillar	Findings for Singapore
1	**Formal Learning** (learning to know)	Singaporeans have the right mindset, the majority agree that learning new things is more important than qualifications
2	**Work-related learning** (learning to do)	High work-related structured training participation rate (63%), but learning from colleagues is low (48%) compared to Denmark, Sweden (78%), Finland (75%), UK (64%) Low level of informal learning at work. About 70% do not aspire for skills mastery
3	**Social Learning** (learning to live together)	Generally high except for the following: Low participation in voluntary work and in community organised activities, more hours are spent looking after family.
4	**Personal Learning** (learning to be)	Low attendance rate at museums, galleries, sports events, theatres and public library; Low level of engagement in recreational activities. Sweden and Finland score high in these areas.
5	**Technologies for learning** (added, digital skills)	Comparatively high usage of ICT for learning Low ICT adoption by the seniors

6	**Learning to learn** (added, learning strategies)	High display of love for learning but majority lack self-confidence towards learning, especially seniors.

Source: Sim Soo Kheng (2019), Institute for Adult Learning Singapore, presentation at the Think Tank meeting on Lifelong Learning, Shanghai, 4-5 December 2019.

The Singapore Lifelong Learning index and the results of recurrent national research can support the effort in developing a lifelong learning culture and generate international, regional interest in research collaborations.

4. Governance

4.1 Governance in Formal Education

The Ministry of Education (MOE) formulates and implements education policies on education structure, curriculum, pedagogy, and assessment. The MOE oversees the management and development of government-funded schools, the Institute of Technical Education, polytechnics and autonomous universities.

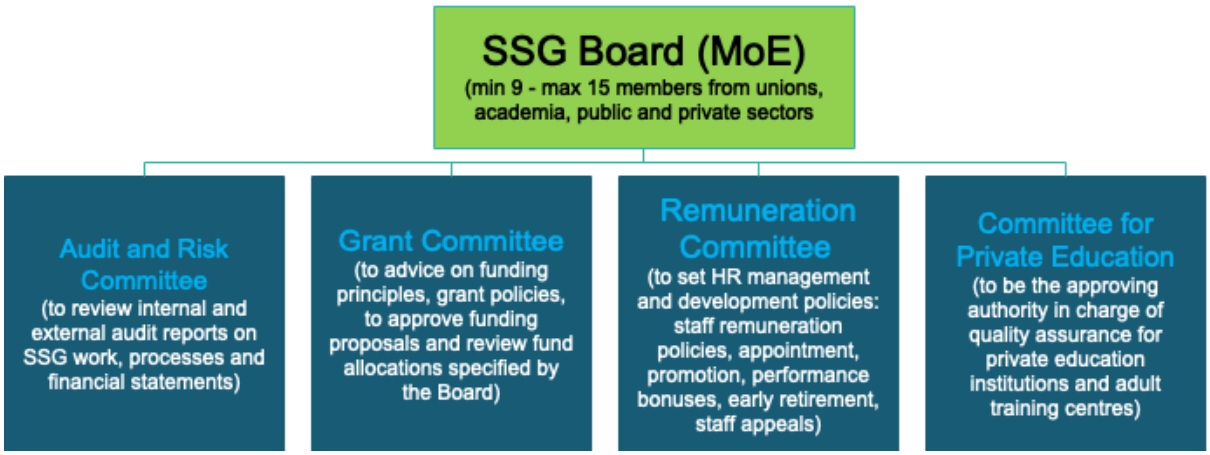
For example, the governance model of universities includes external and internal mechanisms. The government subsidises about 75% of the total cost of university education. Universities can diversity their funding sources by setting up spin-off companies, providing consultancy services to governmental institutions, such as commissioned research for the Agency for Science, Technology and Research (A*STAR), ministries and industries. In the Singapore context, in order to safeguard public interest, the MOE implements the following external governing measures.

Firstly, the MOE is granted the power to appoint/remove the Board of Trustees of universities. The universities' missions have to remain firmly aligned with Singapore's national strategic objectives.
Secondly, the MOE ties public funding to policy agreements to be signed by the universities and MOE. The agreement stipulates the key policy parameters, such as tuition fee setting, entry requirements, and cost control measures by which the universities must abide.
Thirdly, the universities are subject to external review under the MOE's Quality Assurance Framework for Universities (QAFU).
Fourthly, the MOE is allowed full and free access to the university's financial information. The universities also introduce internal governing measures, such as appointment of internal staff members and students in the Board of Trustees, disclosure of the contents of annual reports, etc. The MOE is willing to give more control and autonomy to the university administrators in the presence of a high standard of corporate governance (Lee and Gopinathan 2008; Sam 2016).

4.2 Governance in HRD and Lifelong Learning (SkillsFuture)

The SkillsFuture Singapore (SSG) is one of the 10 statutory boards under MOE. SSG drives and coordinates the implementation of the national SkillsFuture movement. The SSG Board provides guidance and advice to the SSG Management on all matters including its policy, regulatory and promotional roles. It also reviews and approves the strategic plans and budgets of SSG. Under the SSG Act 2016, the SSG board shall comprise between 9 and 15 members. The SSG Board members come from diverse backgrounds such as the unions, academia, public and private sectors.
The Act also empowers the Board to form committees, from among its own members and other persons, which guide the development of specific work areas of SSG. The current SSG structure is shown below.

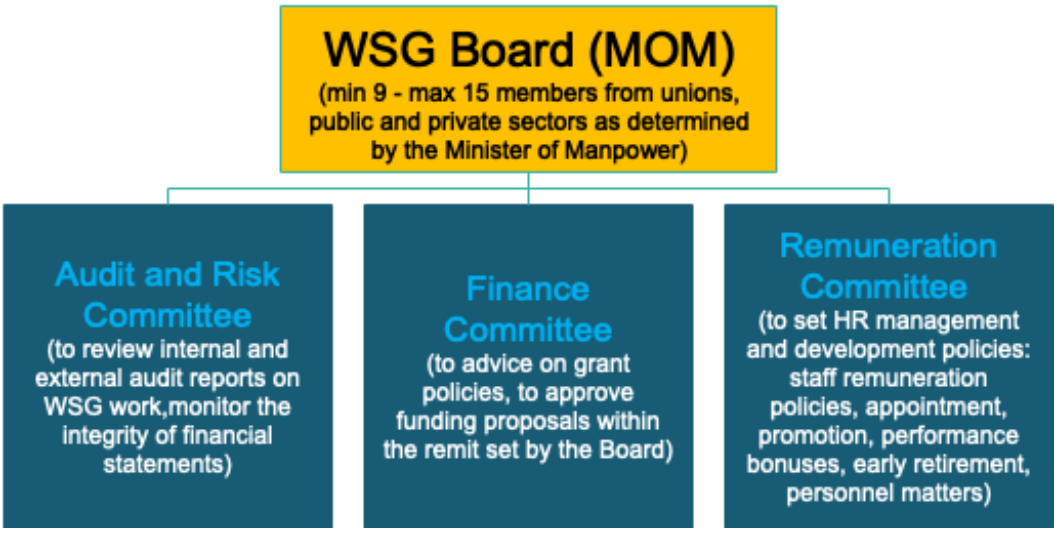
Figure 35: SkillsFuture Singapore (SSG) Governance Structure, 2020



Source: Dang's compilation from https://www.ssg-wsg.gov.sg/about.html

Workforce Singapore (WSG) is a statutory board under the Ministry of Manpower (MOM) which comprises 15 divisions and three statutory boards. It oversees the transformation of the local workforce and industry to meet ongoing economic challenges. WSG promotes the development, competitiveness, inclusiveness, and employability of all levels of the workforce.

Figure 36: Workforce Singapore Governance Structure, 2020



Source: Dang's compilation from https://www.ssg-wsg.gov.sg/about.html

Perhaps the most effective governance tool is the joint one-stop online platform (https://www.ssg-wsg.gov.sg/) for individuals, employers and training providers. SSG launched offers MySkillsFuture.sg which is an online personal guide for skills upgrading and career planning, helping individuals make informed decisions about their career path and lifelong learning. It caters to people from all age groups and different stages of life, from primary school students to working adults. For primary 5 and 6 students, the portal offers interactive games to gauge their strengths and interests. They can also learn more about secondary school and find out more about working life.

Similarly, WSG introduces MyCareersFuture.sg, a smart online portal which enables jobseekers to be more aware of the skills they possess, and connects them to relevant jobs based on their current skills and competencies. It also highlights jobs which are eligible for Government support through WSG's Adapt and Grow Initiative. More than 30,000 job-seekers had found new jobs through Adapt and Grow, and over 7,000 companies had benefited from WSG's programmes (Workforce Singapore 2019).

SSG and WSG work closely together although they are under the auspice of two different ministries. SSG coordinates the implementation of SkillsFuture national movement, which aims to provide Singaporeans with the opportunities to develop their fullest potential throughout life, regardless of their starting points. WSG focuses on jobs and ensuring enterprises can become manpower-lean while remaining competitive.

5. Financing

The Singaporean government expenditure on education has increased over the years from S$11.598 billion for 2014 to an estimated S$ 13.28 billion for 2020. Singapore spent about 3.1% of its gross domestic product (GDP) on education in 2020[61].

Table 20: Singapore Government Expenditure on Education

Expenditure	2014	2015	2016	2017	2018	2019	2020
As % of GDP	2.9%	2.8%	2.8%	2.7 %	2.5 %	2.5 %	2.6%
As % of total government expenditure	20.4%	17.6%	17.5 %	17.2 %	16.5 %	16.4 %	15.8 %

Source: Singapore Budget 2020[62]

According to Eurostat[63], general government expenditure in the European Union (EU) on education amounted to EUR 624 billion or 4.6 % of GDP in 2018 as shown in the figure below. As a percentage of GDP, the highest amounts were reported by Sweden (6.9 % of GDP), Denmark (6.4%), followed by Belgium and Estonia (both 6.2 % of GDP) and Latvia (5.8 % of GDP) as well as by Iceland (7.3% of GDP) in 2018.

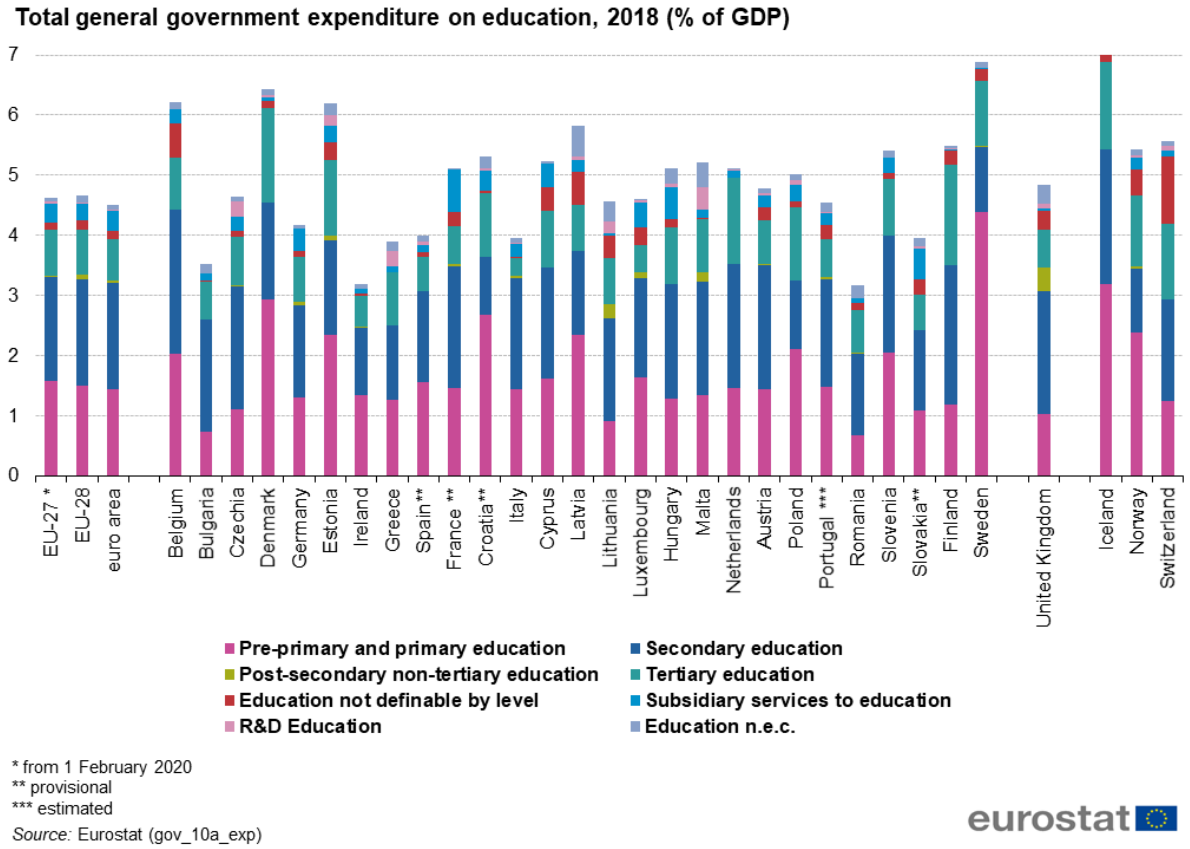
As a percentage of GDP, Singapore's spending may be lower compared to other countries. However, in terms of actual outcomes, the city-state has managed to do more with less. The adherence to the principles of prudence and accountability has allowed Singapore to deliver highly-efficient outcomes in both healthcare and education without the need for excessive spending.

[61] https://safe.menlosecurity.com/https://www.singaporebudget.gov.sg/budget_2020/revenue-expenditure (access 1 Feb 2021)

[62] https://safe.menlosecurity.com/https://www.singaporebudget.gov.sg/budget_2020/revenue-expenditure (1 Feb 2021)

[63] https://ec.europa.eu/eurostat/statistics-explained/index.php/Government_expenditure_on_education (last access 25 January 2021)

Figure 37: Total General Government Expenditure in the European Union on Education



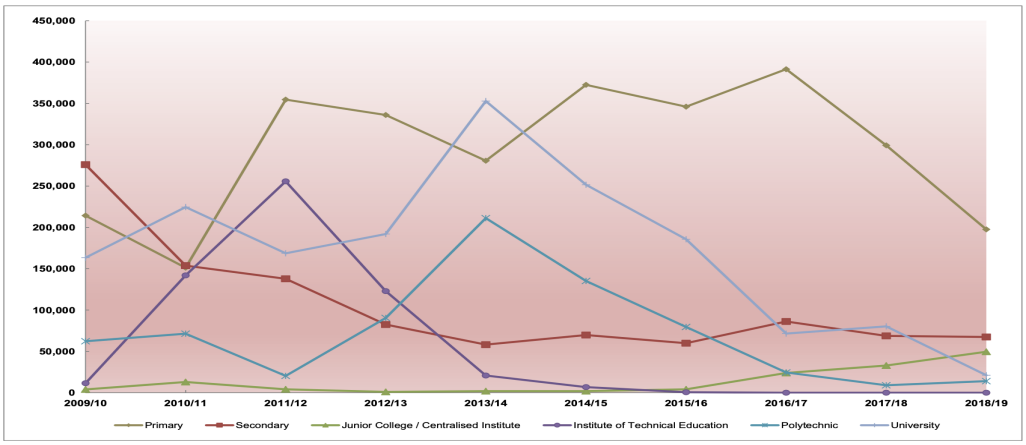
5.1 Development and Recurrent Funds

The MoE provides development and recurrent funds to all educational institutions.

5.1.1 Development Funds

The total development funds fluctuate according to the annual needs of the respective institutions. These needs vary greatly depending on type and level of education as shown in the figure below.

Figure 38: Government Development expenditure on Education (thousand, S$)



Source: (Singapore Ministry of Education 2019, 47)

According to the Singaporean government data[64], between 2009 and 2019 the highest development expenditure was for primary schools, whereas there was no development expenditure for four consecutive years from 2016 to 2019 for the Institute of Technical Education and nine consecutive years for the National Institute of Education between 2011 and 2019. The development expenditure for universities has reduced between 2013 and 2018, but increased in 2019.

Table 21: Total Government Development Expenditure on Education (in million S$)
Source: data.gov.sg[65], Ministry of Education, last update 02 November 2020, rounded up

Year	Institute of Technical Education	Junior Colleges / Centralised Institute	MOE Head-quarters	National Institute of Education	Others	Poly-technics	Primary Schools	Secondary Schools	Special Education	Universities
2019	0	33.9	93.8	0	30.6	19.1	216.8	83.8	9.1	303
2018	0	49.6	80.1	0	*18.4	14.0	197.6	67.4	1.9	21.1
2017	0	32.9	115.2	0	2.3	9.0	299.3	68.8	3.3	80.2
2016	0	23.9	56.1	0	0	24.5	391.4	86.2	3.0	71.6
2015	0.5	4.2	23.3	0	0	79.5	346.0	59.9	0.2	185.7
2014	6.8	1.9	46.7	0	1.6	135.1	372.5	69.8	0.08	251.6
2013	20.8	1.9	45.8	0	0.42	211.2	280.7	58.2	1.6	352.8
2012	122.9	1.0	31.5	0	0	90.4	336.0	82.4	3.3	192.0
2011	255.7	4.1	83.0	0	0.39	20.4	354.6	137.8	17.9	168.6
2010	142.0	13.0	104.5	1.3	1.0	71.4	151.2	153.7	14.0	224.7
2009	11.5	4.0	74.8	9.4	3.9	62.3	214.2	275.9	27.72516	163.4

Note *: Figures for year 2018 are preliminary, 'Others' category includes ISEAS - Yusof Ishak Institute, Science Centre Board, Nanyang Academy of Fine Arts, LASALLE College of the Arts, and Singapore Examinations and Assessment Board and SkillsFuture Singapore Agency.

[64] https://data.gov.sg/dataset/government-development-expenditure-on-education?view_id=2b3fdc2a-9dd5-4400-befe-ff8c08cfa5e6&resource_id=ceb94ae8-9d00-40b0-8191-fc5ff05857a0 (last access 25 January 2021)

[65] ditto

5.1.2 Recurrent Funds

The government recurrent expenditure on education per student has increased in terms of absolute number, but remained relatively stable in percentage of per capita GDP between 2015 and 2018 for all levels and types of education, with the exception of full-time degree courses (last column in table 22 below) where there is a decrease from 29% in 2015 to 25% in 2019.

Table 22: Total Government Recurrent Expenditure on Education per Student (in S$)

Year	*Per capital GDP (Gross Domestic Product)	Primary Schools	Secondary Schools	Junior Colleges/Centralised Institutes	Full-time Nitec / Higher Nitec courses	Publicly-funded full-time diploma courses	Publicly-funded full-time degree courses
2019	88,991	11.531	15,289	16,670	14,285	16,069	21,981
	% of per capita GDP**	13%	17%	19%	16%	18%	25%
2018 ***	87,108	12,020	15,518	17,702	14,743	16,408	22,192
	% of per capita GDP**	14%	18%	20%	17%	19%	26%
2017	83,265	11,338	14,527	17,440	14,582	16,561	21,624
	% of per capita GDP**	14%	17%	21%	18%	20%	26%
2016	78,364	10,596	13,869	16,602	13,968	15,934	21,757
	% of per capita GDP**	14%	18%	21%	19%	20%	28%
2015	76,503	10,081	13,213	15,326	13,619	16,118	21,988
	% of per capita GDP**	13%	17%	20%	18%	21%	29%

Source: data.gov.sg, Ministry of Education, last update 2 Nov 2020; *: Ministry of Trade and Industry, Department of Statistics, December 2020; ** Dang's own calculations (per capital recurrent expenditure divided by per capital GDP); ***: Figures for 2018 are preliminary

5.1.3 SkillsFuture Credit – Personal Ownership for Learning

Since 2016, all Singaporean citizens aged 25 and above receive S$ 500 of SkillsFuture credit for use in SSG approved skills development courses. To further encourage Singaporeans to reskill, in 2020, a one-off SkillsFuture credit top-up of S$ 500 is offered to every Singaporean citizen aged 25 and above as at 31 December 2020. This top-up can be used on all SkillsFuture eligible courses and will expire on 31 December 2025. (https://www.skillsfuture.sg/Credit)

Additionally, to improve individuals' access to career transition programmes, a one-off SkillsFuture credit of S$ 500 is also provided to every Singaporean citizen aged 40 to 60 (inclusive as at 31 December 2020). From 1st October 2020, eligible adults can use this additional credit (mid-career support) on SGUnited skills programme, SGUnited mid-career pathways programme- company training, and Career transition programmes. This additional credit will be expired on 31 December 2025 (skillsfuture.org/credit)

The SkillsFuture credit is not meant to be only a monetary grant, but it is a signal of empowerment and personal ownership for lifelong learning and skills advancement. The SkillsFuture credit, however, is not available for PR holders nor foreigners on work permits or work passes in Singapore.

6. Research on the labour market and future skills forecast

6.1 Data.gov.sg

The government of Singapore launched Data.gov.sg in 2011 as the government's one-stop portal to its publicly-available datasets from 70 public agencies covering a number of sectors, such as economy, education, environment, finance, health, infrastructure, society, technology, transport. It aims to make government data relevant and understandable to the public, through the active use of charts and articles.
Prime Minister Lee Hsien Loong stated in his speech on 28 May 2014 *'we are venturing into new industries, new technologies; globalisation is progressing, people talk about big data. We are part of that. We want to be a smart city, a smart nation".*

The aims of the data.gov.sg portal include:

- Provide one-stop access to the government's publicly-available data
- Communicate government data and analysis through visualisations and articles
- Create value by catalysing application development
- Facilitate analysis and research.

Data.gov.sg is an initiative by the Ministry of Finance and is managed by the Government Technology Agency of Singapore.

6.2 Manpower Research and Statistics Department

Manpower Research and Statistics Department (MRSD) within the Ministry of Manpower, provides statistics and analysis on Singapore's workforce and the state of the labour market to facilitate informed decision making within the government and the community at large. They carry out surveys regularly to gather labour market data such as unemployment and retrenchment numbers and how quickly people can find a new job. The department employs more than 300 people[66]. Besides interviewers, there are also statisticians, data scientists and others who ensure data is accurate. Data from the household and employer surveys is released twice per quarter- first as preliminary estimates around the fourth week of the next quarter based on the earlier part of the quarter in question, and then as final data around the tenth week of the next quarter.

The department is piloting an automated reporting system for companies to submit survey data automatically through their human resources systems. The companies benefit through getting a dashboard to see how they are performing compared to the industry average.

To improve the survey experience for respondents, the department is also working on breaking online surveys down into smaller parts so that they can answer on the go, and using speech analytics to monitor how effectively interviewers interact with respondents.
Singapore is also a member of the UN Economic Commission for Europe steering group on measuring the quality of employment which acknowledges MRSD's sound methodology and raises the nation's profile.

6.3 Workforce Development Applied Research Fund (WDARF)

The WDARF is a national level research fund set up as part of the SkillsFuture Singapore movement to encourage inter-disciplinary research in the areas of workforce development and lifelong learning. In establishing the research fund, SSG seeks to support evidence-informed policies and best-in-class practices that are underpinned by high quality, reliable and responsive workforce development research.

Administered by the Institute for Adult Learning (IAL), the research grant is awarded annually through an open, competitive bidding process in which proposals are reviewed by an international technical expert panel before they are recommended to a Research Committee for approval. Researchers based at Singapore's Institutes of Higher Learning (https://www.ica.gov.sg/common/list_ihl) are

[66] The Strait Times, 20 September 2020 'MOM team gathering and analysing labour market data busier than usual amid Covid-19'. Access 20 Nov 2020.

eligible to apply. Foreign institutions and researchers may partner with the Singapore institutions to submit proposals.

The scope of annual calls in the past four years centres around three thrusts:

1) **Enabling and sustaining economic performance through workforce development and skills.** This thrust invite proposal addressing the question of 'what is the role of workforce development and skills in enabling and sustaining economic vibrancy and growth in Singapore'?

2) **Shaping employment and continuing education and training (CET) decisions of all stakeholders.** This thrust invites proposals that tackle questions, such as 'how can we support all stakeholders concerned to make better employment and CET decisions? What are the career and education trajectories that individuals are experiencing in an increasingly digitalised economy and society'?

3) **Developing effective and impactful approaches in learning, technology and pedagogy to enhance CET.** This thrust calls for proposals addressing the question about 'what are the ways to ensure and enhance the efficacy, accessibility, adaptability and appropriateness of learning, through technology, pedagogy and innovations for effective and impactful learning and employability outcomes'?

Examples of awarded projects range from 'development and evaluation of building resilience at work training among healthcare workers', 'understanding workers' learning motivation, skill acquisition and skill utilisation in the context of CET' to 'establishing work readiness benchmarks and standards to ensure Singapore International Competitiveness'.

Chapter 6
Promote engagement of business sector in HRD

1. Industry Driven Manpower Plans

Singapore's Manpower Development Plans are driven by inputs from the Ministry of Trade and Industry, who develop industry maps to allow agencies, universities and training institutes to integrate skill sets needed to drive business transformation in Singapore's key economic sectors. There are, today, 23 Industry Transformation Maps covering all the major economic sectors ranging from Manufacturing, Built Environment, Transport & Logistics, Essential Domestic Services, Modern Services and Lifestyle. The Industry Transformation Maps (ITMs) developed for 23 industries under 6 clusters. cover over 80% of Singapore's GDP. Each ITM consist of a growth and competitiveness plan, supported by four pillars:

- **Productivity**: Strategies to support companies especially Small and Medium Enterprises (SMEs) to move to higher value-added activities and raise operational efficiency;
- **Jobs & Skills**: Investing in our people, to equip them with deep skills to support the shift to greater value creation;
- **Innovation**: Strategies to leverage R&D to develop new products and services;
- **Trade and Internationalisation**: Supporting companies in expanding to overseas markets.

In order to ensure workers catch up with the pace of digital transformation, public funding of the SkillsFuture Program provides subsidies of up to 90 percent for workers seeking to enrol in courses related to future skills such as data analytics, cyber security, and development of network infrastructure, to name a few. Singapore's institutes of higher learning also work closely with the government to provide education at both undergraduate and graduate levels which are relevant to industry needs. All of the institutes of higher learning have also set up lifelong learning institutes or academies to provide training for adult learners in relevant skills.

SkillsFuture Singapore has developed 34 Skills Framework supporting the 23 ITM sectors. Each Skills Framework provides key information on the sector, available career pathways, key occupations and job roles one can take on in each pathway, the skills and competencies required for each job role, as well as the training programmes people can attend to develop these skills and competencies. Information in the Skills Framework was developed in consultation with employers, industry associations, education institutions, unions and the Government, and they provide a common reference for skills and competencies for different stakeholders.

- Individuals: Make informed decisions on education and training, career development and skills upgrading;
- Employers: Design progressive HR management and talent development plans;
- Training providers: Gain insights into sector trends and skills in demand, which allow them to innovate and contextualise their curricula design and training programmes to suit the needs of the sector.

Through courtesy of SSG, they have provided a sample table (below) with the mapping of skill sets needed in the fields of artificial intelligence (AI), Automation and Technology. The list gets refreshed as the economy progresses.

Table 23: Digital Skillset in Different Industry Clusters

Nr	Industry Cluster	Digital Skillsets
1	Electronics (Semiconductor)/Precision Engineering/ Manufacturing	Cyber Risk Management, Data Analytics System Design, Data Synthesis, Embedded System Integration, Internet of Things (IoT) Management, Automated Operation Monitoring, Automated System Design, Automated System Maintenance, Automation Process Control, Process Integration, Sustainable Manufacturing,

2	Energy and Chemicals/ Energy and Power	Process Optimisation, Robotics and Automation Application, Data Analytics System Design, Business Intelligence and Data Analytics, Internet of Things (IoT) Management, Autonomous Systems Technology Application
3	Marine and Offshore/Sea Transport	Additive Manufacturing, Laser and Optics Application, Robotics and Automation Application, Big Data Analytics, Interface Management, Systems Architecture Design, System Configuration Management, Systems Integration, Condition-based Monitoring
4	Engineering Services	3D Modelling, Building Information Modelling Application, Artificial Intelligence Application, Condition-based Assets Monitoring Management, Data and Statistical Analytics, Internet of Things (IoT) Management, Financial Modelling
5	Logistics	Data and Statistical Analytics, Material Flow Modelling, Supply Chain Solutioning/ Modelling/ Planning/ Strategising, Automation Design, Autonomous Logistics Design and Application, Technology Infrastructure Management and Integration, Integrated System Design and Application, Cloud Computing Application
6	Air Transport/Aerospace	Internet of Things (IoT) Application, Data Analytics, Human-Robot Collaboration (HRC), Composites and Advanced Coatings, Additive Manufacturing
7	Environmental Services	Data and Statistical Analytics, Internet of Things (IoT) Management, Knowledge Management, Robotics and Automation Application
8	Security	Access Control Management, Robotics and Automation Application, Security Surveillance Management
9	Healthcare	Data Analytics, Automated Distribution Management,
10	Landscape	Data Analysis and Interpretation, Automation of Landscape Operations
11	Retail	Consumer Intelligence Analysis, Customer Behaviour Analysis, Market Trend Analysis Sentiment Analysis, Inbound Marketing, Paid Search Engine Marketing, Search Engine Optimisation, Social Media Marketing, Social Media Management, E-Commerce Campaign Management, Marketing Campaign Management, Data Analytics, Data-Mining and Modelling, Infographics and Data Visualisation, Merchandise Performance Analysis, Delivery Optimisation
12	Infocomm Technology/Media	Analytics and Computational Modelling, Applications Development, Business Innovation, Business Needs Analysis, Business Process Re-engineering, Cyber Forensics, Data Design, Data Engineering, Data Governance, Data Strategy, Data Visualisation, Enterprise Architecture, Emerging Technology Synthesis, Infrastructure Design and Strategy, Integrated Marketing, Network Configuration, Security Architecture, Security Assessment and Testing, User Experience Design, Game Artificial Intelligence Development, Artificial Intelligence Application, Internet of Things, Cybersecurity, Immersive Media, 5G
13	Financial Services	Technical Analysis, Behavioural Finance, Credit Assessment, Credit Risk Management, Customer Experience Management, Data Analytics and Computational Modelling, Emerging Technology Synthesis, Fraud Risk Management, Market Risk Management,

		Regulatory Compliance, Technology Application, Trading Management
14	Accountancy	Audit Compliance, Fraud Risk Management, IT Adoption and Innovation
15	Human Resource	Human Resource Digitalisation, Technology Integration, Human Resource Analytics and Insights, Digital Marketing and Communication
16	Public Transport	Computer-based Asset Monitoring Management, Data and Statistical Analytics, Internet of Things Application, Robotics and Automation Application
17	Design	Data Analysis and Interpretation, Data and Information Visualisation, Emerging Technology Synthesis
18	Wholesale Trade	Social Media Management, Data Analytics, Technology Integration, Data Mining and Modelling, Market Profiling, Market Research, Credit Risk Management, Fraud Risk Management, Market Risk Management, Customer Experience Management, Customer Relationship Management, Credit Assessment, Delivery Management
19	Hotel and Accommodation Services/Tourism	Data Analytics, Hospitality Data Collection and Analysis, Business Data Analysis, Data Mining and Modelling, Internet of Things, Technology Adoption and Innovation, Digital Marketing, Social Media Marketing
20	Training and Adult Education	Emerging Technology Synthesis, Technology-Enabled Learning Delivery

Source: Courtesy of SkillsFuture Singapore (2019)

2. Connecting Industry with Curriculum developed in Institutes of Higher Learning

Nancy Gleason in her book, "Singapore's Higher Education Systems in the Era of the Fourth Industrial Revolution" shares that information transfer is no longer a viable form of education to ensure employment and a career. She shares that today's Institutes of Higher Learning will need to collaborate more aggressively with industry and governments (Gleason, 2018).

In the latest report from Committee of the Future Economy[67], it lists out 7 strategies for Singapore to compete in the world economy. The three areas that are specific to Higher Education include:

- Deepening and diversifying international connections
- Acquire and utilize deep skills
- Build strong digital capabilities

To accommodate the shift to look into future and relevant industry skills, ITE today offers 100 full time courses and has many memorandums of understanding (MoU) with industries. There are 7 advisory committees that look into curriculum and trends. Advisory members are business owners, chief executive officers (CEOs), professionals or HR directors. The industry provides equipment, technology transfer and has industrial attachment programs for ITE students. Companies also provide software and hardware for training. Some examples include Keppel Shipyard donating ship hulls for lab work, and the Airforce donating helicopters and planes to help contextualise training.

As part of the national SkillsFuture movement involving industries, another development in recent years to enable ITE graduates to upgrade is the introduction of the ITE SkillsFuture Work Study Diploma (WSDip), which is a 'work-study' programme designed to create an alternative skills-based upgrading pathway for ITE graduates. Through learning by doing, WSDips enable career

[67] Extracted from the Report of the Committee on the Future Economy of February 2017

development based on skills mastery and prepares ITE graduates for higher level jobs which require deeper skills. The trainee is employed by a company to undergo a WSDip course leading to a diploma awarded by ITE. During the period of training, the trainee is an employee of the company and receives a monthly salary as well as benefits similar to other full-time employees. All course fees are fully paid by sponsoring companies. In addition to theory and practical lessons conducted at ITE, trainees for the WSDip perform on-the-job training on actual jobs, which ensures that the trainees pick up the most up-to-date skill requirements to respond to the industry's constantly evolving needs. The WS Dip courses offered by ITE are developed and delivered in close partnership with key employers. ITE also works closely with employers to ensure that supervisors within the company are able to take on the role of training. As the new programmes are developed with participating employers and the trainee is an employee of the company, they will give WSDip holders career opportunities to take on larger roles and even supervisory roles in areas involving skills mastery and craft.

Today, the six national universities, and polytechnics have launched more than 500 skills based modular courses.

2.1 Comparative Survey

In a survey of 13 HR Leaders from various industries ranging from the public sector, to local companies and global multinational corporations, we ask them what they thought of the involvement of the business sector in TVET. The ranking of 1 being the lowest and ranking of 5 being the highest. Leaders interestingly perceived that the involvement of the private sector with technical training Institutes could be greatly improved. The only area which ranked relatively better was the delivery of vocational education and training which stakeholders felt that the industry was more involved.

Table 24: Survey of business sector involvement with TVET Institutes

Forms of involvement	Average number
Delivery of vocational education and training	3.62
Provision of equipment and teaching materials to schools	2.31
Supporting of teaching personnel	2.38
Providing inputs in assessments and examinations	2.46
Supporting the development of curricula and skills standards	2.77
Proving inputs at National level	2.85

In another survey of 14 HR leaders on what they thought of the involvement of the business sector was in Higher Education, to which most of them perceive that involvement as a partner in delivery of courses, supporting training personnel, providing inputs in assessments as well as transfer of skills set can be improved. They however were satisfied with private sector involvement in development of courses and in joint projects.

Table 25: Survey of business sector involvement with Higher Education Institutes

Forms of involvement	Average number
As a partner through support in the development of courses and programs	3.36
As a partner through support in the delivery of courses and programs	2.71
Support in the training of university personnel	2.38
Providing inputs in assessments and examinations	2.5
As a partner in joint projects	3.71

As a partner through transfer of skill sets between industry and academic personnel	2.79

The survey results could indicate that more involvement might be needed from Institutes of Higher Learning to be further plugged into the industry and to train students who can tackle the challenges of this rapidly changing and complex world. This observation is confirmed in a recent article written by President of NUS, Professor Tan Eng Chye. Professor Tan shares that NUS must radically transform itself and that steady and incremental changes is a luxury they can no longer afford. He also reiterated that universities largely focused on pre-employment training and this assumption can no longer hold. The traditional approach to education with deep specialisation has to change as students enter a complex world. Thus, NUS is embarking on an interdisciplinary approach to education by merging the college of science and humanities[68]. (Tan, 2020)

We also caught up with a senior university administrator from the Singapore University of Technology and Design (SUTD), a university specialising in multi-disciplinary learning integrated with design. He provided interesting insights into the perceived discrepancy and what can be done to close the gap. He shares that most universities tend to develop their core subjects first and thereafter make subsequent revisions to it along the way. They thus seek industry's view on the curriculum only at a later stage. Curriculum development is typically more complex and needs to take into context world issues such as global warming, climate change and sustainability. Secondly, Universities would want their students to attain a certain level of mastery before involving industry. This is illustrated in students in the later years who would have attained more training and can work with industry on capstone projects.

He shares that for subjects like Systems Engineering, they typically need raw data and problem statements from industry for students to work on. However, obtaining raw data from industry is a challenge. There are ways to solve this perceived gap which can be done through introducing innovative ideas. As an example, SUTD has implemented the "Architect in Residence" scheme, where experienced architects with a wealth of industry experience are appointed to be mentors and advisors to both students and faculty. This can eventually help to bring academia and industry together.

Representatives from the Ministry of Education also shared their thoughts on the survey questions. They feedback that for internships and placements, the polytechnics and ITE typically involve the employers in the grading process as employers are involved in the training. In terms of TVET teaching personnel, the polytechnics work closely with industry partners to deploy teaching staff for industrial attachment and Industry engagement activities on a regular basis. This is to ensure staff are kept abreast and connected to industry to stay current/relevant in their technical/domain competencies.

In the area of supporting TVET curricular and skill standards, the polytechnics and ITE work closely with their industry partners to design and offer courses that meet the needs of the industry. They look out for emerging technologies, best practices and industry trends from industry and institutional partners. This is done through extensive networking and formal meetings with the Board of Governors, School Advisory and Technical Committees and Management Councils comprising industry experts and leaders. These representatives from industry play an important role by providing recommendations on courses to be launched, giving input to curriculum design, providing internship opportunities for students, and giving feedback on graduates' performance in the workforce.

Based on consultations with industry, new diploma courses are developed, and existing courses are updated in response to evolving needs of the economy. Questionnaires, interviews and meetings with employers, graduates, students and staff are conducted to obtain feedback on the quality, relevance and effectiveness of current courses as well as the need for new course offerings. Identified requirements are then prioritised in accordance with the institution's mission and strategic plans to ensure resources are optimised before proposing new courses to MOE for approval.

[68] https://www.straitstimes.com/opinion/universities-need-to-tear-down-subject-silos (access 25 October 2020)

ITE also collaborates with its industry partners in developing its skills standards and curriculum content. ITE utilises the internationally-recognised 'Developing a Curriculum' process to ensure the relevance and responsiveness of its curriculum.
Two examples on companies involved in curriculum development:

Table 26: Companies' Involvement in Curriculum Development

Course	Companies involved in Curriculum Development
WSDip in Marine & Offshore Engineering	● Sembcorp Marine ● Keppel Offshore & Marine
WSDip in Logistics & Supply Chain Management	● Army Logistics Training Institute ● SCALA ● YCH Group ● Griffin Kinetic Pte Ltd ● Shalom Movers ● Singapore Logistics Association

Lastly, the polytechnics and ITE have extensive collaborations with industry and leverages on technology and capabilities of industry partners to enhance students' learning environment and outcomes.
Some examples of these collaborations include:

a. Ngee Ann Polytechnic (NP) & Fidor AG on curriculum enhancement for FinTech training. Fidor AG provides NP with application programming interface (API) software and helps to enhance the curriculum content with Fidor technologies;
b. Nanyang Polytechnic (NYP) & StarHub to establish the Application & Experience Centre (APEX) 5G Centre on the NYP campus, with the latest technology from the communication industry;
c. Singapore Polytechnic (SP) & Bosch to develop an innovation lab on the SP campus, equipped with the latest Bosch equipment and technologies; and
d. Institute of Technical Education (ITE) & Shell for scenario-based training designed by Shell;.
e. Institute of Technical Education (ITE) & the National Environment Agency offering Pest Control and Pest Management joint certifications to adult learners who wish to become Vector Control Workers and Vector Control Technicians

3. Government and Industry led HRD efforts

3.1 Enterprise Development Grants

The government provides different grants and initiatives to companies for human resource development. These are done through several lead agencies and also through professional business associations. One of the key agencies is Enterprise Singapore, who have a plethora of grants and initiatives to help businesses in people development. Enterprise Singapore operates the Enterprise Development Grants whose main aim is to strengthen Business Strategy Development, Financial Management, Human Capital Development, Service Excellence and Strategic Brand and Marketing Development in companies. In the areas of automation, it provides incentives for Automation, Process Re-Design and Product Development. In the area of Human Capital Development, the grants are given to strengthen the company's Human Resource capabilities, which in turn can help support business growth strategies.

3.2 HR Industry Manpower Plan

Another key effort by the government is the HR Industry Manpower Plan which was conceptualised to provide a clear roadmap to strengthen the HR profession and HR services sector in Singapore. The idea is that by strengthening the HR Profession, they in turn can effectively partner business leaders in developing a future-ready workforce, which contributes to business competitiveness and Singapore's economic tranformation.

The Industry Manpower Plan was developed as a result of increasing automation combined with the rise of digital workplaces and mobile workforces, which are changing the way businesses function

and compete, and the way people work. In order for companies to be sustainable, their workforce have to become more agile and relevant. Thus, organisations that value people as "human capital" and invest in their development will be better-positioned to take advantage of new and emerging opportunities. As a result, there is an urgent need to upgrade and lift the HR profession in Singapore to become more agile, so that they in turn, can help their organisations to transform.

3.2.1 What does the HR Industry Manpower Plan cover?

A Sectoral Tripartite Committee for HR comprising representatives from the tripartite partners, industry, HR bodies and associations, and academia, was set up to develop the HR Industry Manpower Plan. The Committee conducted extensive consultations with more than 700 HR and business leaders in developing its recommendations.

The HR Industry Manpower Plan sets out 3 key strategies to achieve the vision of a strong HR industry so as to unlock the potential of people and businesses. The 3 strategies are:-

- Strengthen capabilities of the HR profession.
- Enhance HR support for employers.
- Nurture a vibrant HR services sector and HR ecosystem.

3.3. Other Programmes

In our conversations with representatives from Enterprise Singapore and SSG, they share that one of the more prominent programs for companies to develop HRD is the WSG-Adapt and Grow Scheme. In this program, incentives are given to companies to train their employees through the subsidising of salaries. Companies receive salary and course fee support for hiring or reskilling mid-career workers.

Business membership organisations and associations play a big part in supporting the role of Human Resource Development in Singapore. The Singapore Business Federation (SBF) is today the appointed business association for the programs that are run by state agencies, i.e. the professional conversion programs. These programs help to identify citizens and train them in the new skills. In Singapore's Industry 4.0 human capital initiatives, SBF is also being appointed to run the programs associated with it. Other associations include the Singapore International Chamber for Commerce (SICC) as well as the Association of Small and Medium Enterprises who are also appointed associations who help provide training programs to its members.

Today, the following institutes, agencies, unions, and employer/employee bodies, work closely with the government and private sectors to uplift workers' skillsets

- Institute for HR Professionals
- Tripartite Alliance for Fair and Progressive Employment Practices
- National Trades Union Congress
- Singapore National Employers Federation
- Enterprise Singapore
- SkillsFuture SG
- Workforce Singapore
- Human Capital Leadership Institute

3.4 Support for Small Medium Enterprises (SMEs)

The Singapore government provides grants to support many SMEs in the development of their people. Enterprise Singapore, who is the key engine supporting SMEs in Singapore, has a primary objective of helping SMEs with worker development and business innovation. An initiative called the "Global Ready Talent Programme" is available for SMEs and this scheme provides subsidies for internships so that companies will hire workers and train them for the future. It also aims to build a pipeline of global-ready talent for Singapore enterprises through exposing more Singaporeans to internships and overseas work opportunities. Singapore enterprises offering student internships or management associate programmes are eligible for up to 70% funding support on qualifying costs.

Another recent scheme that is being set up is the SGUnited Skills training program. Under this scheme, full time training courses are offered by Continuing Education Training Centres and IHLS to mid-career professionals to help equip them with new and emerging skills needed for the digital economy. Participants receive assistance from WSG to defray the cost of training.

Lastly, in the last week of October 2020, Enterprise Singapore launched a new Enterprise Leadership for Transformation Programme to help local SMEs undertake a one year curriculum designed to address knowledge gaps in leadership and business fundamentals, and provide them with specific guidance in areas such as drawing up execution road maps (Choo, Oct 2020).

4. Conclusion

We can see that today there are many mechanisms that promote the engagement of the business sector with HRD activities, ranging from TVET to Higher Education. Industries are also involved in providing advisories on courses and donating appropriate learning materials to ITE and the Polytechnics for learning. At the tertiary level, they are typically engaged in internships, as well as joint projects with universities. In view of the rapidly evolving technological landscape coupled with changing business conditions brought on by the pandemic, business leaders perceive that institutes of higher learning need to be more aggressive in engaging with industry and adapt their curriculum quickly to a changing world.

The Singapore government plays an active role in promoting HRD activities with the business sector through its multi-prong approach in engaging with businesses through state agencies, as well as business associations.

All these interacting mechanisms work in unison to ensure that HRD and skills development is current and relevant for this changing and evolving world and for Singapore to stay competitive.

Chapter 7
Summary and Recommendations

1. Summary

This report outlines the overall HRD Strategy, Policies, Processes, Systems, Structures as well as the mechanism in which Singapore develops its Human Resource to achieve its national objective.

This report highlights the following areas of HRD:

1. An investigation into HRD Readiness and Areas of Interventions
2. An overview of the country's strategies, policies and programs on HRD
3. A review of how inclusive is Singapore's HRD strategy when dealing with vulnerable groups
4. An analysis of the enabling systems and structures underpinning HRD Strategy
5. A study into the engagement of business sector in the country's HRD Strategy and programs

2. Key findings and recommendations

Strengths

1. Clear and well thought through strategy for HRD intervention in the country;
2. Clear vision of the Singapore government for HRD strategy and policies are executed through well-designed and well-resourced systems and structures;
3. Effective inter-ministerial and cross-sectoral collaborations to ensure success of programmes. This includes the participation of Unions, trade associations and chambers working in unison with the government to encourage lifelong learning;
4. High commitment and pragmatic approach of the government are illustrated through public spending on education and building the right infrastructures for teaching and learning;
5. Good collaboration between industry and TVET helps make the curriculum and TVET graduates relevant to industry;
6. Respect for knowledge and highly driven people help in forging a lifelong learning culture and creating a national identity.

Weaknesses

1. Large group of PMETs who are unable to catch up with changes caused by Industry 4.0
2. Skills gap issue in future capabilities needed for Industry 4.0
3. Disconnect between higher education and grand challenges posed by a changing world
4. Heavy focus on academic attainment versus fostering life skills
5. Falling behind of vulnerable groups

In the following segments, we summarise the intervention areas in alignment with the ASEAN HRD Roadmap and propose some recommendations. There are also some practical suggestions for short-term and implementation, while other ideas may be for a longer term plan and will require further research.

3. Education attainment and HRD/Lifelong Learning Culture (Outcome 1 in the ASEAN HRD Roadmap)

3.1 Summary

Workforce development has always been an integral part of Singapore's nation building and its economic growth strategy. The pragmatic approach and economic purposes significantly influenced the construct of education, learning and training policy to the extent that education and training policy may as well be synonymous with workforce development policy (Sung and Freebody 2017). When Singapore became independent in 1965, the country was confronted with severe unemployment, poor infrastructure, limited higher education, with the provision of only one university and a housing shortage. Today the city-state is ranked as one of the most liveable cities with an advanced education and lifelong learning system and the highest level of human capital development in the world according to the latest World Bank Human Capital Index[69].

We started the report by outlining key demographics and statistics of Singapore and followed by the analysis of the country's high literacy rates, enrolment and education attainment from primary to tertiary levels. We also looked at the performance of Singapore students in the OECD Programme for International Student Assessment. The country's 15 years olds are among the top performers.

On top of having high literacy rates, the country's educational attainment has been increasing from year to year with 56.5% of residents aged 25-34 years holding a university degree in 2019.

The world class education system fosters good employment outcomes as can be seen in the latest workforce statistics in 2019. This is complimented by strong workplace learning and lifelong learning programmes

3.2 Recommendations

Singapore is facing several challenges, such as manpower constraints, ageing workforce and low fertility rate, therefore the HRD policies continue to be carefully devised to enhance productivity by digitalisation and automation as well as redesign jobs and workplaces to unlock the potential of senior citizens.

Although the academic achievements of school pupils are high, more attention still needs to be paid to developing their social skills, self-efficacy and well-being. This will help to improve 'personal learning' in their adulthood.

As Singapore is a multi-ethnic, multi-religious state, social inclusion and racial harmony were key concerns of the government at independence and continue to be central pillars of policy today. Among the resident population, the education attainment rates among the ethnicities vary and require different policy interventions. Furthermore, the sheer number of non-residents in the workforce in the last decade makes social integration a real challenge. Whether they are highly skilled or low skilled workers, due to their temporary contracts, workers might be treated as transient and while there are efforts to integrate them in the Singapore society, it can be improved. For Work Permit holders, including first time foreign domestic workers, they are required to undergo the Settling-In Programme (SIP), which is a 1-day orientation programme to educate them on Singapore's social norms, their employment rights and responsibilities, as well as Singapore's law and where and how to seek assistance.

Employers who are hiring a foreign domestic worker for the first time or have changed workers frequently are required to attend the Employer' Orientation Programme (EOP), which is a 3-hour programme that helps employers understand their role and responsibilities as an employer of a foreign domestic workers.

Some good practices of lifelong learning, such as the Welcome Centre in Hamburg, Germany or International House in Copenhagen, Denmark could be drawn on. In the long-term, non-formal lifelong learning opportunities to enhance social cohesion and multi-culturalism for both Singaporeans and the guest workers (including highly skilled workers and domestic workers) would be a way forward to

[69] https://www.worldbank.org/en/country/singapore/overview (access 27 October 2020)

tackle this increasingly pressing issue. This will help sustain Singapore's economic vibrancy and deepen its international connectivity near and far, not least to attract talent and successfully lead the Global Innovation Alliance.

4. HRD Readiness and Future Skills Development (Outcome 3 in the ASEAN HRD Roadmap)

4.1 Summary

From the surveys on respondents' perception of the HRD and LLL, our findings suggest that while foundation and technical skills are perceived to be well-covered in curricula and assessment, respondents felt that there is less emphasis on soft skills such as learnability, social skills, etc. At the same time, these soft skills are increasingly perceived to be important, especially to meet the future demands of the workforce.

Additionally, on provision of programmes that could help prepare individuals to address future challenges in personal and working lives, respondents felt that more emphasis could be placed on entrepreneurial training and support for understanding one's vocational orientation. Also, there is a general consensus in support of lifelong learning, especially to help individuals be more agile in switching or advancing their career, however, respondents felt that cost and time may deter them from their plans to engage in learning courses and activities.

4.2 Recommendations

To mitigate the perceived gap in the readiness of a modernised HR culture, we propose an age-integrated paradigm as a way for thinking about HRD and LLL in Singapore, and to meet the changes and demands of the future of work and workplace. Through adopting an age-integrated paradigm, it shifts the focus from using age as a lens for viewing one's pursuit for education, work and retirement in a certain timeframe; rather it focuses on one's lifetime engagement with learning activities, progression and transition in one's career, and community involvement and contribution to the society throughout one's lifespan.

5. Better Employability and More Employment Opportunities (Outcome 4 in the ASEAN HRD Roadmap)

5.1 Summary

Singapore has a clear roadmap and strategy for fostering HRD in the country. It spares no efforts in ensuring that each and every one of its citizens has access to education and lifelong training programs. Educational subsidies start from 0 year of age till tertiary levels. Singapore has its strengths in science and mathematics as well as in TVET education. It has also in later years created many educational pathways for its citizens who may have other aspirations in life, or are not so academic. TVET education has evolved throughout the years to become a well-recognised pathway for Singaporeans. This has been successful because of the commitment of the government to pour in resources to enable a world class TVET education system for Singaporeans. In recent years, the efforts have also focused on lifelong learning with the setting up of SkillsFuture Singapore to foster and train the Singapore workforce to cope with industry demands. Participation rates of the citizens in lifelong learning have steadily risen over the years which makes uplifting of skills an easier task for the city-state.

5.2 Recommendations

With the advent of technological innovations and industry 4.0, there are a great deal of displaced workers who are not able to keep up with change. Thus, although the education system tries to be comprehensive, the changes are fast and rapid and universities in Singapore are still organised in Silos. Reforms are needed in higher education to train students and workers in multi-disciplinary skills so that they can manage grand challenges caused by climate change and also create a more

sustainable world. The closing of skills gaps for older workers and PMETS will need to be more rapid so that Singapore will not lose its competitive edge.

6. Inclusiveness (Outcome 2 in the ASEAN HRD Roadmap)

6.1 Summary

We discussed how Singapore adopts a holistic, all-inclusion and integrated approach towards social inclusion. Through this approach, there is a collective and coordinated effort from multiple stakeholders in driving towards initiatives that are designed to help and support residents, especially the vulnerable groups.

The scope of initiatives and challenges put forth by the Singapore government, agencies, companies, and social enterprises, in support of HRD and LLL for vulnerable groups can be described to be extensive and encompassing. The synthesis of our interview data and literature review revealed five main themes: (1) enhancing skills and capabilities; (2) forging a lifelong learning culture; (3) developing resiliency and ensuring continued employability; and (4) strengthening enabling structures to ensure diversity and inclusion; and (5) providing financial support in difficult times.

6.2 Recommendations

As the nation works towards the collective goal of being more diverse and inclusive, values such as being altruistic, compassionate and showing empathy will further help to drive these initiatives to a greater scale. Nationwide initiatives designed to encourage individuals to help others such as SGCares and recognising individuals' lifelong learning efforts could help ensure continued involvement from community-driven networks and individuals, and the longevity and sustainability of government-initiated programmes.

7. Enabling Structures: Governance and Financing (Outcome 5 in the ASEAN HRD Roadmap)

7.1 Summary

The analyses of this chapter focus on capacity of the system, the factors influencing access and educational equality, such as high-stake exams, pupil-teacher ratio, pathways between different levels and types of education. The chapter also looks into governance, financing, research on the labour market and measuring lifelong learning.

Following 6 years of compulsory universal primary education, the secondary education classifies students into different tracks, including Express course (54%), Normal (Academic) course (32%) and Normal (Technical) course (14%) in 2018 (Dang's compilation based on table 26). At post-secondary level, TVET attract the vast majority of students both to Nitec/ Higher Nitec certificate and polytechnic diploma programmes compared to university degree programmes. The number of enrollers at polytechnics alone is similar to the number of university degree enrollers in 2018.

As part of the SkillsFuture Work-Study Programme, the local Singaporean polytechnics and universities started to launch a new pathway programme which enable students to obtain university degrees by studying top-up years while taking internships at companies.

Currently, local Singaporean universities offer 16 work-study pathway degree programmes. This new pathway is expected to offer a practice-oriented learning approach, industry-relevant courses, a head-start into university degrees and job security upon graduation.

Launched in 2015, the ground-breaking 'national SkillsFuture movement', aims to promote a culture and holistic system of lifelong learning through the pursuit of skills mastery, and creates synergies in continuing education and training (CET) and pre-employment training (PET).

7.2 *Recommendations*

The high stakes examinations and grades in the education system have important consequences for students, teachers, schools, life chances/education pathways and workforce planning. Considering the importance of the joy for learning and the well-being of young pupils, perhaps it would be visionary to encourage further research into the effectiveness of the Primary School Leaving Examination

(PSLE) and an exploration of an alternative assessment approach which is more in line with the 'learning for life' goals instead of sorting and labelling pupils' abilities too early.

Many countries around the world often draw on experience from the Finnish successful school system. Similar to Singapore, Finland also has an external examination at the end of grade 6. However, a grade 6 external exam is optional for pupils and is used to assess schools and the system rather than individual pupils. The pupils are not given a specific mark or grade based on their exam performance. Assuring the quality of teaching-learning and the well-being of young pupils are the priority in Finland; external exams in school are a secondary means to this end.

Drawing on good practices in the Nordic countries and various recent research results on positive effects of smaller class size on non-cognitive skills development which are important for subsequent academic and employment success, it is worth considering a combination of interventions including class-size reductions and class-room curriculum design to promote social skills and emotional intelligence among young students.

Some novel initiatives in SkillsFuture, such as career building through education and career guidance services, are not simply labour market facilitation, rather they are about identifying individuals' skills, orientations and expertise for making career plans and achieving deep learning. It is a big challenge of instilling deep learning among citizens spanning all generations. Therefore, investment in people shall remain the vital commitment of governments, employers, individuals and community. The role of the government, especially the effectiveness of e-government in Singapore is the catalyst for transformation in HRD and lifelong learning.

The Singapore Lifelong Learning index and data collection to measure lifelong learning for employment and personal fulfilment could be a good practice to share with other ASEAN members to support the effort in developing a lifelong learning culture and generate regional interest in research collaborations.

8. Engagement of Business Sector (Outcome 4 in the ASEAN HRD Roadmap)

8.1 Summary

At the national level, Singapore has begun the integrated roadmaps to drive industry transformation through broader sector-focused strategies to sustain growth and competitiveness of the economy and industries. To achieve maximum synergies in industry transformation over the next few years, the Singapore Government announced the S$4.5 billion Industry Transformation Programme at Budget 2016. So far this targeted and industry-focused approach has help deepen partnerships between Government, firms, industries, trade associations and chambers.

To drive the transformation and to ensure that skills development keep pace with the needs of the industry, the Institutes of Higher Learning work in cohesion with the business sector to train, develop, and prepare students and workers for the future economy and future skills. Today, the ITE and Polytechnics supply a steady stream of well-trained students to the industry for skills specific jobs, while the universities trained students in higher order skills to drive productivity, transformation and research.

The government also spares no effort in ensuring that SMEs are supported through various grants and schemes to strengthen their bench strength in HRD as well as in business innovation and transformation. Global companies, SMEs, trade unions, trade associations, chambers and government agencies work in unison to achieve the highest level of HRD for the country to carry out the mission of Singapore.

8.2 Recommendations

There seem to be a disconnect between how universities train students to be ready for Industry 4.0 and what industries are looking for in future graduates. Transformation in the university sector will need to happen rapidly to equip students for a more complex world, in which multi-disciplinary skills are needed to solve issues such as global warming, climate change, food shortages, healthcare and sustainability.

The Polytechnics and ITE seem much more plugged into industry as skill sets trained are much more specific as compared to higher order skills needed in universities.

Companies will also need to move along fast with HRD programs initiated by the Singapore government and get their workers to reskill and relearn multiple times in their lives. The SME sector will have a lot of catching up to do in order to be able to stay competitive and come up with business innovation. All these need good leadership skills and ability to change cultures, all of which needs strong HRD Intervention.

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Annexes

1) HRD Readiness Questionnaire
2) Lifelong Learning Questionnaire
3) Survey on Involvement of Business Sector in TVET
4) Survey on Involvement of Business Sector in Higher Education