

THIRTEENTH PARLIAMENT OF SINGAPORE

First Session

SECOND REPORT OF THE ESTIMATES COMMITTEE

Parl. 9 of 2017

Presented to Parliament on

15 November 2017

ESTIMATES COMMITTEE

Members

Ms Foo Mee Har (Chairman)

Miss Cheng Li Hui

Mr Darryl David

Mr Christopher de Souza

Mr Lee Yi Shyan

Mr Pritam Singh

Dr Tan Wu Meng

Mr Zaqy Mohamad

CONTENTS

	<i>Page</i>
SECOND REPORT OF THE ESTIMATES COMMITTEE	
<i>Implementation of Recommendations by the Committee on the Future Economy</i>	1
- Monitoring Systems and Setting Targets	4
- Utilisation of Funds Allocated to the Industry Transformation Programme	7
- Sustaining Singapore's Competitiveness and Deepening Singaporeans' Capabilities	8
<i>Programmes and Schemes to Help Singapore Workers</i>	12
<i>Monitoring of Government Funds</i>	16
- Top-ups to National Productivity Fund and the National Research Fund	17
- Programmes Funded by the National Research Fund	18
- Research, Innovation and Enterprise 2020 ("RIE2020")	19
- Commercialisation and transfer rate of R&D	22
<i>Effectiveness of Productivity Schemes in Helping Business</i>	27
- Key Schemes to Help Firms Improve Productivity and Outcomes	27
- Singapore's Productivity Growth	30
- Productivity and Innovation Credit (PIC) Scheme	33
ANNEXES	
Annex A: List of 19 Endowment Funds and Trust Funds	37 – 38
Annex B: List of Programmes supported by the NR Fund	39 – 40
Annex C: Key Schemes to support firms in improving productivity	41 – 42
APPENDIX	
Minutes of Proceedings	43 – 46

SECOND REPORT OF THE ESTIMATES COMMITTEE

The Estimates Committee, appointed in pursuance of Standing Order No. 100 (3), had agreed to the following Report:

1 The Estimates Committee considered the Budget for the Financial Year (FY) 2017/2018 (Paper Cmd. 8 of 2017) and enquired into certain matters, including the implementation of recommendations by the Committee on the Future Economy (CFE), programmes and schemes to help Singapore workers, monitoring of Government Funds and the effectiveness of productivity schemes in helping businesses.

2 In the course of its enquiry, the Committee received three memoranda from the Ministry of Finance (MOF) on 9 June 2017, 23 August 2017 and 2 November 2017. On 19 September 2017, the Committee also heard evidence from the Permanent Secretary and officials of MOF.

IMPLEMENTATION OF RECOMMENDATIONS BY THE COMMITTEE ON THE FUTURE ECONOMY (CFE)

3 The Committee noted that in his Budget 2017 speech, Minister for Finance Heng Swee Keat spoke about the different measures to build Singapore's capacity for the future economy. These measures largely responded to the ideas put forth by the Committee on the Future Economy (CFE) which included the Industry Transformation Maps (ITMs). The Committee also noted that the Government announced the S\$4.5 billion Industry Transformation Programme at Budget 2016 where there would be Industry Transformation Maps (ITMs) developed for 23 industries under six clusters.

4 The Committee enquired into the programmes and initiatives that were in place or being implemented to support these measures including systems to monitor the effectiveness or performances of these programmes and initiatives.

5 MOF shared with the Committee that the programmes and initiatives which responded to the CFE report fell under three main thrusts, namely:

- (a) Strengthening capabilities in our enterprises: In Budget 2017, the Government introduced measures to strengthen the capabilities of our enterprises to digitalise, innovate and internationalise through schemes such as the SMEs Go Digital Programme (GDP)¹, the Operation and Technology Road-mapping² (OTR) and the International Partnership Fund³.
- (b) Deepening our people's capabilities: The Global Innovation Alliance (GIA) would help Singaporeans deepen their capabilities to operate overseas by building networks and collaborating with foreign counterparts in overseas markets. The SkillsFuture Leadership Development Initiative (LDI) supported companies in the grooming of Singaporean leaders with skills required to operate with a global perspective, for example by sending promising individuals on specialised courses and overseas postings.
- (c) Forging partnerships for shared success: Beyond developing capabilities of individual enterprises and people, the Government would continue to build partnerships through the ITMs, which were platforms that integrated and aligned the efforts of various stakeholders – firms, Trade Associations and Chambers (TACs), unions and the Government. Each ITM would focus on the needs of that sector to develop it, and included strategies for (i) Growth and Competitiveness, (ii) Productivity, (iii) Jobs and Skills, (iv) Innovation, (v) Trade and Internationalisation, and (vi) the use of Government enablers. To support TACs to enhance their capacity and help their industries transform, the Government had also put in place the Local Enterprise and Association Development (LEAD) programme.

¹ SMEs GDP encourages the adoption of digital technology by providing funding support and advice to SMEs on the use of technologies in their business processes

² The OTR programme helps enterprises identify technologies to better innovate and compete.

³ The International Partnership Fund co-invests with Singapore-based firms to help them scale up and internationalise. This builds on existing efforts under the Co-Investment Programme (CIP), which co-invests with the private sector to catalyse more patient growth capital for Singapore-based firms.

6 To support the three main thrusts, the Government had put in place programmes and initiatives along these categories listed below:

- (a) Productivity: The Government provided funding support through schemes such as the Capability Development Grant (CDG) to encourage companies to move to higher value-added (VA) activities and raise efficiency. In addition, the Government had also set up Productivity Centres (e.g. Singapore Productivity Centre, Hotel Productivity Centre) to provide advice to companies on the adoption of relevant productivity solutions.
- (b) Jobs and Skills: Under the SkillsFuture Initiative, the Government also supported training programmes to equip our people with broad and deep skills to support the shift to greater value creation.
- (c) Innovation: Schemes such as the Research Incentive Schemes for Companies (RISC) were in place to encourage companies to develop new products and services. In addition, the Government had also set up Centres of Innovations which provided laboratory facilities, technology consultancy and training courses to help companies test new products.
- (d) Trade and Internationalisation: Companies were encouraged to expand overseas through schemes such as Market Readiness Assistance (MRA) and Global Company Partnership (GCP).

7 The Committee enquired into the progress of launching all 23 ITMs that had been announced by Minister Heng in his Budget Statement. MOF informed the Committee that eight ITMs had already been launched⁴ as of 19 September 2017 and that the other ITMs were progressing well, with three or four ITMs put up every few weeks to the Future Economy Council (FEC) for direction and inputs before being finalised.

⁴ As of 15 November 2017, 14 ITMs have been launched.

Monitoring Systems and Setting Targets

8 MOF assured the Committee that similar to other Government programmes and initiatives, those implemented for CFE had been and were subjected to monitoring systems, namely (i) Setting and Tracking of Key Performance Indicators (KPIs) and (ii) Value-For-Money (VFM) Reviews. These efforts sought to improve performance and ensure accountability of Government programmes/initiatives.

9 On the setting and tracking of KPIs, MOF explained that Government programmes and initiatives had their output and outcome KPIs set prior to their funding approval and disbursement of funds. Before the end of the funding period, the Government would review the progress of each programme to assess if Ministries were on track to meet their KPIs. Funding reallocation was reviewed where necessary. At the end of the funding period, the Government would review the outcomes of the programmes to decide whether to continue with the programme. KPIs were re-established if funding was renewed and the programme would be revised if necessary. These could be existing KPIs if they remained sound, or additional KPIs which were more effective in measuring performance.

10 On the VFM Reviews, the Committee was informed that the Accountant General's Department (AGD) conducted Value-For-Money (VFM) reviews to assess the cost-effectiveness of programmes, identify potential areas of concern and provide recommendations to improve programme outcomes. These findings, along with the achievement of KPIs, were factored into the review of programmes at the end of the funding tranche to inform future funding decisions.

11 MOF explained that all ITMs had indicators and targets that sought to measure the effectiveness of the ITM strategies. For example, the collective strategies and initiatives under the Hotel ITM aimed to create 200 new PMET jobs annually from now until 2020. This was in line with the end vision of transforming the industry into one that achieved sustainable growth and created good jobs for Singaporeans. MOF also shared that the Retail ITM outlined the goal of achieving an average annual productivity growth rate of 1.0% from now till 2020 without increasing the sector's overall reliance on manpower. For the Food Manufacturing ITM, it was the goal of developing Singapore into Asia's leading food and nutrition hub and there were quantitative targets to galvanise stakeholders' efforts to realise this goal. The Food Manufacturing ITM also aimed to grow the local Food Manufacturing sector's value-added

(VA) by 6.5% per annum, overseas income by 8% per annum, and productivity by 4.5% per annum, by 2020. These were ambitious targets that the ITM was working towards.

12 MOF further shared the productivity and manpower targets for the ITMs that had been launched in [Table 1](#).

Table 1 – Productivity and Manpower Targets for launched ITMs

ITMs	Productivity Targets <i>(Nominal unless otherwise stated)</i>	Manpower Targets
Retail	1% VA/Worker CAGR (2015-20)	No manpower growth
Food Manufacturing	4.5% VA/Worker CAGR (2015-20)	2,000 new PMET jobs created by 2020
Hotels	2.0% VA/Worker CAGR (2015-20)	200 new PMET jobs annually until 2020
Precision Engineering	8.0% VA CAGR (2014-20)	3,000 new PMET jobs by 2020
Food Services	2% VA/Worker CAGR (2015-20)	No manpower growth
Air Transport	<u>Real</u> VA CAGR of 2.9% (2015-20)	8,000 new jobs by 2025
Logistics	5% VA CAGR (2015-20)	2,000 new PMET jobs by 2020
Wholesale Trade	<u>Real</u> VA CAGR: 3.3%-3.5%, <u>Real</u> VA/Worker CAGR: 2.5% - 2.6% (2016-20)	10,000 new jobs by 2020

Source: MOF

13 Noting that there were wide variations in the targets of the various ITMs, the Committee queried MOF further on how the Ministry ensured that the ITMs' strategies and targets established were sufficiently stretched to deliver a minimum set of outcomes to commensurate with the funding provided.

14 MOF explained that the ITMs were a joint effort by industry partners, trade associations, unions and public agencies to support the transformation of the sector. The Government's role was to bring industry stakeholders together to catalyse action. In using the ITMs for transforming the 23 sectors (and the sub-sectors within them), MOF recognised that each sector faced different opportunities and challenges. As such, the strategies and targets necessarily differed. The “stretch” was achieved, not by making all targets the same, but during the process of developing each ITM, when the partners considered key dimensions of growth, such as the need to internationalise (to capitalise on fast-growing markets), digitalise, increase productivity and innovate. Where relevant, past performance and industry trends were taken into account to ensure that the targets were “stretch” targets. For example, under the Precision Engineering ITM, the target for value-added (VA) CAGR is 8.0% from 2014-2020. This was an ambitious and stretch target given that VA for the Precision Engineering sector grew at 4.8% CAGR from 2009-2014. Where there were significant uncertainties, targets and strategies were also proposed based on different scenarios.

15 The Committee also learned that the progress of the ITMs would be monitored through the Ministries' and agencies' existing review mechanisms, including periodic post-implementation and block budget reviews. Regular updates would also be provided to the FEC which included representatives from industry, unions, trade associations, institutes of higher learning and the Government who would raise observations and feedback to improve the ITMs or identify areas of work. The FEC also had regular meetings where they received tracking reports on the ITMs that have been rolled out and the progress.

16 The Committee was of the view that effective monitoring, review and evaluation provided information on emerging issues, improved performance and ensured accountability. As such, the Committee asked MOF whether there were any whole-of-government guidelines on the monitoring, review and evaluation system for Government programmes/initiatives. In addition, the Committee wanted to know whether there was a feedback component/channel, for stakeholders such as the public, on implementation, experiences and outcomes of these programmes/initiatives.

17 MOF informed the Committee that guidance on KPI-setting, monitoring of key programmes, and evaluation of the output, outcomes and impact of the programmes, were available to Ministries via internal sharing of case experiences by MOF and training courses organised by the Civil Service College. MOF informed the Committee that the Ministries would continue to improve their monitoring and review mechanisms and level up the evaluation capability of the Government. The performance of key programmes were publicly reported in the Budget Book or Singapore Public Sector Outcomes Review for public accountability. In addition to collecting statistical data from businesses, lead agencies worked closely with companies, business associations and unions. Through such regular contact, they obtained feedback on stakeholders' experiences and outcomes. Potential areas of concern and emerging issues would also be identified to refine programmes or the implementation approach.

Utilisation of Funds Allocated to the Industry Transformation Programme

18 To the Committee's query on the breakdown for the utilisation of the \$4.5 billion allocated to the Industry Transformation Programme, MOF informed the Committee that of the \$4.5 billion set aside to support enterprises for financial years 2016 to 2020, approximately \$950 million had been committed at the end of financial year 2016, of which about \$850 million supported the development of firm-level and industry-level capabilities. This included training and development, and spending for the associations. The remaining \$100 million had been committed to facilitating market access and plugging gaps in the financing landscape through market-based solutions and initiatives.

19 On a further query from the Committee about how the funds were allocated across to each of the 6 ITM clusters and the plans for balance amount of funds which had not been committed, MOF shared that funds from the \$4.5 billion earmarked for the Industry Transformation Programme were administered by the economic agencies, which assessed applications by enterprises and TACs based on their merits. Funds were progressively committed as applications were received. This allowed for flexibility to respond to changes in market conditions. Since the ITMs were work-in-progress, and to date, about \$950 million had been committed as at the end of FY16, the balance would be used to continue supporting the progress of the ITMs.

Sustaining Singapore's Competitiveness and Deepening Singaporeans' Capabilities

20 Noting the programmes/initiatives and the monitoring systems in place, the Committee asked MOF whether these programmes/initiatives to support the recommendations of CFE would be able to sustain Singapore's competitiveness as regional countries stepped up their development. The Committee also asked how the Government intended to facilitate transfer of best practices across different industries under the ITMs and how the ITMs tied in with the education and training of Singapore workers such as the SkillsFuture Earn and Learn Programme.

21 MOF shared that the key to Singapore remaining competitive in a fast-changing world with global and regional economies stepping up their development, would be for our firms and our people to build deep capabilities, and work adaptably in partnership with one another to seize opportunities. The programmes and initiatives developed in response to the CFE's recommendations sought to achieve this by helping our firms to digitalise, innovate and internationalise, and by supporting our people in continuously learning and re-learning skills. The FEC would oversee the progress of these strategies. Where necessary, the strategies and programmes would be adjusted as circumstances changed. For example, the GIA aimed to deepen and diversify the international connections of our people and firms to counterparts in global markets who were at the forefront of innovation and technology. This would facilitate the exchange of ideas and possible collaboration, and give our people and firms the competitive edge to seize opportunities in the region and beyond.

22 As for the transfer of best practices, MOF informed the Committee that there were various cross-ITM structures in place which ensured that learning points and best practices were systematically shared across ITM sectors, and common issues/needs for clusters of sectors were identified and strategies developed to address these.

23 On a broader scale, MOF explained that the FEC would oversee and coordinate all 23 ITMs. The FEC secretariat actively organised sessions to share best practices across ITM lead agencies. In addition, ITMs were organised into six clusters of related industries, each led by an FEC sub-committee and supported by a cluster lead agency. Within each cluster, the FEC sub-committee and the cluster lead agency looked to foster synergies across its industries such as by using skills adjacencies to support the provision of skilled manpower. Each would formulate strategies at the cluster level which applied across industries and represented a way

of spreading best practices across industries. Agencies would continue to look across the economy to formulate and implement strategies which applied across a range of industries.

24 MOF assured the Committee that the Government held the view that education and skills training were integral parts of every ITM. MOF also informed the Committee that a key focus of the ITMs was ensuring our workers had the jobs and skills to support and benefit from each industry's transformation. Each ITM included a tailored Industry Manpower Plan, which would identify strategies to (i) build a Singaporean Core, (ii) achieve manpower-lean growth, (iii) foster a highly-skilled and complementary foreign workforce and (iv) enhance skills development to meet future needs.

25 MOF shared that these Industry Manpower Plans were driven by sectoral lead agencies and actively supported by Workforce Singapore and SkillsFuture Singapore. They involved close collaboration with industry, associations, unions, education institutions and training providers to develop and refine programmes to support manpower development in line with industry needs and developments. For example, the Precision Engineering (PE) ITM, launched in October 2016, aimed to shift the industry towards higher value-added activities that would form the foundation for the next era of manufacturing. In particular, the move to digital manufacturing would see the creation of 3,000 PMET jobs by 2020, including jobs like robot coordinators and industrial data scientists. As part of this ITM, the PE workforce would receive strong support from the Government to acquire the skills and capabilities needed for performing new roles. The SkillsFuture Earn and Learn Programme (ELP) Specialist Diploma in Precision Engineering was designed in close collaboration with employers in the Precision Engineering sector to ensure that the skillsets being taught were useful to fresh graduates who enrolled in this programme. Other education and training initiatives included the development of a Skills Framework for PE, which provided workers with insights on career pathways, job roles, and training programmes in the sector, and Professional Conversion Programmes to support mid-careerists in reskilling for new careers in PE.

26 With regard to initiatives to develop local workers' capabilities under GIA and LDI, the Committee asked MOF how promising Singapore leaders were identified and tracked under these initiatives and the outreach to local companies to invite them to participate.

27 MOF explained that the objective of the GIA was to establish networks to create more opportunities for Singapore students, entrepreneurs and business owners to gain overseas

experience, connect and collaborate with their overseas counterparts. EDB had started setting up the GIA Programme Office (GIA PO) to coordinate the overall initiative. GIA PO, IE and MOE were in discussion with various in-market Operating Partners (OPs) to set up GIA networks in the four focus cities under GIA Phase 1, namely San Francisco, Beijing, Jakarta and Bangkok. In terms of outreach, participating autonomous universities (AUs) would reach out to their students; IE Singapore and SPRING would reach out to local start-ups and SMEs; and participating accelerators, incubators and VCs (i.e. the OPs) would help to amplify the outreach to start-ups. Singapore students would be selected for GIA programmes based on their entrepreneurial attributes, character maturity and ability to thrive in a highly competitive foreign environment. OPs would assist the companies and entrepreneurs on the basis of their track record, rigour of their business plan, and market potential of their products/services.

28 The SkillsFuture Leadership Development Initiative (LDI) aimed to strengthen the pipeline of Singaporean talent to take on leadership roles in companies, by supporting companies that groom our talent. Singaporean employees with leadership potential were identified by participating companies, according to their internal talent development processes. LDI co-funded leadership development programmes for these Singaporean employees to support companies in providing training beyond what they would normally have provided based on their existing resources. Training partners and economic agencies such as EDB, IES, and SPRING monitored the LDI's progress through longitudinal surveys of participants and participating companies. To create awareness of LDI programmes, the training partners and economic agencies would continue to reach out to identified companies. Interested local companies or MNCs with a presence in Singapore could also reach out to the economic agency responsible for their sector.

Observations and Recommendations

29 The Committee expressed their appreciation to MOF for their sharing on the implementation of the recommendations made by the CFE, including the many different programmes, schemes and the ITMs. The Committee acknowledged the efforts by the Government to put in place the monitoring and review mechanisms and the progress made for the ITMs thus far. The Committee expressed the need for robust KPIs setting, monitoring and accountability of the various initiatives under CFE including ITMs. As the Government had a big facilitation role through the regulatory framework, the Committee suggested that the Government stay agile in adapting and updating regulations as part of the eco-system

supporting ITMs. The Committee cited the Monetary Authority of Singapore (MAS) as a good example of introducing a series of regulations to facilitate innovation in the finance sector including the regulatory sandbox framework. The Committee expressed the need to provide scope for experimentation and innovation throughout the ITMs' design and implementation, and to also allow room for learning and breaking new grounds.

30 At the oral hearing on 19 September 2017, MOF shared that the Government was encouraging public agencies to collaborate with the private sector to seek innovative solutions to a range of issues. The Committee agreed with MOF that in addition to innovating within the Government, more could be done to reach out to the private sector and get more ideas. The Committee urged MOF to continue working on this so that private sector's skills, acumen and productivity could be tapped on, whether in developing the ITMs or solutions to the issues faced by the public agencies.

31 The Committee urged MOF to continue to improve the monitoring and review mechanisms, and to level up the evaluation capability of the Government. The Committee encouraged MOF to have continual periodic reviews of the Government's monitoring and review mechanisms, which may include learning from mechanisms deployed in other countries.

32 The Committee urged the Government to ensure that education and skills training were integral parts of every ITM. The Committee was of the view that more outreach could be done for the various initiatives under the Industry Manpower Plans and LDI to make the availability of such schemes more widely known and to encourage more Singaporeans and more local companies to participate in these schemes and initiatives. Rather than leave the participation entirely on a voluntary basis, the Committee encouraged Government agencies to be pro-active in approaching certain companies to participate in leadership development programmes for their Singaporean employees so that there is a ready pool of Singaporean talent to take on leadership roles.

PROGRAMMES AND SCHEMES TO HELP SINGAPORE WORKERS

33 In his Budget 2017 speech, Minister Heng touched on how the Government was helping workers adapt to structural shifts in the economy, especially those who sought to move to a different sector or industry. Besides strengthening the “Adapt and Grow” support initiative and the new “Attach and Train” initiative, the Government would increase wage and training support provided under the Career Support Programme, the Professional Conversion Programme (PCP) and the Work Trial Programme. An additional sum of up to \$26 million a year would also be committed from the Lifelong Learning Endowment Fund and the Skills Development Fund to support these initiatives.

34 As such, the Committee asked MOF how effective these programmes/schemes were in helping Singaporeans especially PMEs secure good jobs and make career switches amidst economic re-structuring and technology disruption, including career conversion programmes and skills training. The Committee also wanted to know what were the KPIs or outcome indicators that the Government was using to measure the success of these programmes/schemes and how Singaporeans had benefitted from them.

35 MOF shared that in 2016, the Government had embarked on two key strategies under the Adapt and Grow (A&G) initiative to help Singaporeans during this period of economic transition. These were: (i) enhancing career-matching services to help ready jobseekers find suitable jobs and to minimise missed matches; and (ii) enhancing employment support, such as through career conversion and wage support programmes, to minimise jobs, skills and wage mismatches. In 2015, the A&G initiative helped over 17,000 jobseekers secure employment. This rose by about 15% to more than 20,000 in 2016, of which about half were for PMET positions. In total, the placements achieved in 2016 under the A&G initiative addressed more than 16,000 missed matches and overcame close to 5,000 mismatches. The placement success rate for the career-matching services (i.e. WSG Career Connect and NTUC-Employment and Employability Institute (NTUC-e2i)’s career centres) under the A&G initiative in 2016 was about 70% for Rank-and-File (RnF) workers, and about 60% for PMETs.

36 The Government was cognisant that mismatches in the labour market would tend to rise over time as the economy restructured and businesses transformed. Thus, the A&G programmes aimed to address this by helping to match more jobseekers to jobs. The Government also tracked various indicators, including the resident unemployment rate,

resident long-term unemployment⁵ (LTU) rate and resident PMET unemployment rate. Under the A&G initiative, Workforce Singapore (WSG) worked closely with its programme partners to track and review the placement targets committed for each scheme, and collect feedback for all programmes and services. The A&G initiative would also be reviewed regularly based on the placement outcomes and feedback received.

37 The A&G schemes were targeted at adults who had been in the workforce for a while and were now seeking new jobs or career transitions. For younger Singaporeans, the Ministry of Education (MOE) and SkillsFuture Singapore (SSG) had introduced the SkillsFuture Earn and Learn Programme (ELP) to increase workplace exposure and on-the-job training. Under this programme, fresh graduates from polytechnics and the Institute of Technical Education (ITE) were matched with jobs related to their area of study. They would then undergo 12 to 18 months of structured on-the-job training and mentorship with the company. Since its inception in March 2015, 40 ELPs covering 23 sectors had been launched.

38 On a further query from the Committee asking for placement targets for PMETs and rank and file workers for 2017, MOF shared that the overall number of job placements depended largely on the labour market situation, which influenced the number of jobseekers who approached WSG/NTUC-e2i for job assistance. Under the A&G programme, there were schemes tailored to the needs of different segments of workers. Hence, it was more meaningful to look at placement targets for the major schemes. For example:

- (a) Professional Conversion Programme (to re-skill PMETs to take on new careers): Target of 1,500 placements in 2017;
- (b) P-Max Programme (to help SMEs improve talent management practices to better recruit and retain PMET hires): Target of 1,400 placements in 2017; and
- (c) RnF Placement Programmes (to train RnF workers to acquire skills to be placed into hiring occupations): 1,250 placements in 2017.

39 MOF also informed the Committee that the prevailing labour market situation, jobseeker/partner feedback and other indicators were considered in assessing if the placement

⁵ Long-term unemployed refers to persons aged 15 years and over who have been unemployed for 25 weeks or more.

results achieved were in line with expectations. In addition, at the interview with MOF officials, it was shared that there was no one umbrella measure because each of the schemes targeted different segments and needs, hence requiring different levels of resources, training and consultations. The Ministry of Manpower (MOM) also tailored the programmes with tiered support to try and help who were older and unemployed for longer period to get back into the job market or who were retrenched.

40 The Committee asked MOF why some workers were not successful in finding placements through the A&G programme and whether there had been any subsequent follow-up action carried out.

41 MOF shared with the Committee that WSG and NTUC-e2i provided continued employment assistance to registered jobseekers until they found a job, declined further assistance, or became uncontactable. Some jobseekers found employment through recruitment agencies, job portals or their own networks, and not all updated WSG/NTUC-e2i when they did so. It was also shared with the Committee that the seasonally adjusted resident long-term unemployment rate was 0.7% in June 2017 and the employment rate for residents remained high. This suggested that most workers who were not placed by WSG and NTUC-e2i were likely to find work eventually.

42 MOF was of the view that while WSG and NTUC-e2i did their best to place jobseekers, jobseekers and employers also had to do their part. Jobseekers had to be prepared to be reskilled or upskilled so that they could meet the requirements of their preferred jobs. MOF also took the view that it was in employers' interest to invest in coaching and training employees, and give opportunities to jobseekers who might not possess the full set of skills and experience, but who were prepared to learn.

43 Arising from the oral hearing where the Committee asked MOF to reach out to sectors/industries where retrenchment was likely, MOF shared that since January 2017, it had been mandatory for employers to notify MOM of impending retrenchments. The Taskforce for Responsible Retrenchment and Employment Facilitation (comprising WSG, MOM and NTUC) would then help retrenched local employees. The Taskforce would provide employment facilitation assistance (e.g. career-matching services, career guidance) for retrenched workers and conduct briefings to employers on responsible retrenchment practices.

For sectors which had a higher likelihood of retrenchment, the scope of Professional Conversion Programmes (PCPs) was expanded in 2016 to allow for conversion to different jobs within the same sector, or to different jobs within the same company. More than 36 new PCPs were also launched in the same year to help more than 1,000 PMETs switch careers and take on job openings in the sectors that were still growing and hiring.

Observations and Recommendations

44 The Committee noted the different schemes and programmes to help Singapore workers and acknowledged the efforts by the Government to help Singapore workers. As there was a number of such schemes, the Government could explore ways to simplify the communications and reach out to more Singaporeans.

45 The Committee supported the programmes which placed and trained workers as being the most appropriate and efficient route, but was of the view that companies offering such programmes and having ready job vacancies for workers could be more visible to members of the public and their MPs. The Committee also urged the Government or relevant agencies to tie up with companies or large sectors laying off workers to inform them of the relevant schemes such as the PCPs in the growing industries.

46 While the Committee understood the inherent complexity of measuring the effectiveness and success of such schemes and programmes, the Committee held the view that there were benefits to be gleaned from monitoring the effectiveness and success of these schemes which could then be channelled into designing future schemes/programmes. The Committee also urged MOF to apply the periodic reviews of the Government's monitoring and review mechanisms, mentioned in the previous section, to the different schemes and programmes to help Singapore workers as well.

MONITORING OF GOVERNMENT FUNDS

47 The Committee noted that the total spending from the Government Endowment Funds and Trust Funds was estimated to be \$4.5 billion in financial year 2016. The Government had also announced in Budget 2017 that \$4 billion would be set aside for top-ups to funds to support key commitments. In view of the large sums of monies budgeted, the Committee wanted to know what the total number of Government Endowment Funds and Trust Funds was, their respective purposes and the existing governance framework in place to monitor the usage and allocation of these Funds.

48 MOF informed the Committee that there were 19 Endowment Funds and Trust Funds in existence. The list of funds and their purposes are specified in Annex A. These funds were set up to meet specific current and future needs. The scope of usage for a fund was defined and set out in the fund's legislation or trust deed. Topping up such funds when the Government was able to do so was a fiscally prudent approach that provided assurance to the public that there was sustainable funding to meet future needs. Any allocation or transfer of monies to funds, including top ups, was taken through the Budget process as set out in the Constitution. The monies transferred to the funds were appropriated through the annual Supply Bill process, passed in Parliament and assented to by the President with the advice of the Council of Presidential Advisors (CPA).

49 The legal framework for each fund specified the requirements for the keeping of proper accounts and records of all transactions, ensuring payments out of the fund were correctly made, properly authorised and audited. Annual financial statements were required of every fund. The funds could also be subject to audit by AGO. While the AGD worked with Ministries to ensure accountability and good governance of their funds, the ultimate responsibility of the funds lay with the overseeing agency.

50 On the Committee's query on what were the KPIs or outcome indicators that the Government was using to measure the success of funding measures through these Endowment and Trust Funds, MOF explained that the agency overseeing each fund was responsible for reviewing the outcomes and KPIs to assess whether the fund was meeting its objectives and purpose. Examples of indicators included tracking the number and profile of recipients of the grants, amount of grants disbursed each year, utilisation rate of grants given to recipients and

the details of projects and initiatives funded by the grants. MOF would take into account the progress and KPIs when reviewing the funds.

51 Noting that the funds had different reporting requirements, the Committee queried MOF on the requirements or guidelines for the overseeing agency to publish financial details of these Funds.

52 MOF clarified that every fund set up by legislation was required to present its financial statements to Parliament e.g. the Edusave Endowment Fund, Goods and Services Tax Voucher Fund, and Pioneer Generation Fund. For a fund where a Statutory Board (SB) was a custodian, trustee or agent of the fund, the SB was required under financial reporting standards to present the fund's financial details together with its own financial statements. For example, CPF Board was the trustee for funds such as Special Employment Credit (SEC) Fund and CPF Life Bonus Fund; the financial details of these funds could therefore be found in the CPF Board's financial statements. The financial statements of funds that were charitable in nature were subject to rules on financial reporting under the Charities Act and the financial details of these funds could be found on the Charity Portal.

53 Lastly, MOF assured the Committee that although the funds had different reporting requirements, MOF retained an overview of all injections of Government resources into these Funds.

Top-ups to National Productivity Fund and the National Research Fund

54 The Committee took note of the top-up of \$1 billion to the National Productivity Fund (NPF) and \$500 million to the National Research Fund (NR Fund) as announced in Budget 2017 to support innovation and industry transformation efforts. The Committee queried how the Government would evaluate the effectiveness of these two funds to support innovation and industry transformation efforts.

55 MOF shared that for the NPF and the NR Fund, there were two levels of oversight to evaluate their effectiveness. Firstly, at a macro level:

- (a) The effectiveness of the NR Fund was tracked as part of the broader national Research, Innovation and Enterprise 2020 (RIE2020) plan, which sets out Singapore's research and development strategies over a five-year period from 2016

to 2020. The plan was developed by the National Research Foundation (NRF) Board, which oversees national RIE policies and programmes, and determines macro budget allocations. In the development of the RIE2020 plan, the NRF Board had reviewed the achievements in the previous five-year plan (RIE2015, from 2011 to 2015) to determine the strategic shifts required. One key shift recommended by the NRF Board was to capture more value from investments and research.

- (b) To track the progress in achieving the desired shifts, NR Fund measured how its research outcomes translated into innovative products and solutions, through KPIs such as the number of industry research and development (R&D) projects and industry's R&D spending, as well as how well their schemes supported industry growth and start-up formation, through indicators such as the number of start-ups.
- (c) Similarly, the NPF supported the efforts laid out under the various ITMs, and the NPF's effectiveness was evaluated as part of the broader evaluation of the ITMs. Each ITM had been assigned specific KPIs tracking the progress of industry transformation efforts at the sectoral level.

56 Secondly, at the programme level, implementing agencies monitored, tracked and reviewed the effectiveness of their programmes. This included interim reviews to assess if programmes were on track to meet their KPIs, at which point funding reallocation could be done if necessary. The programmes were also reviewed at the end of each funding tranche, to assess if existing strategies have been successful. Where appropriate, programmes may have their budgets reduced or terminated.

Programmes Funded by the National Research Fund

57 The Committee further queried MOF to provide details on the number of projects, programmes and schemes funded by the NR Fund, and to share details on the projects that have reaped benefits such as commercialisation of R&D.

58 MOF shared that 11 key programmes had been funded to date and the descriptions of these programmes can be found in Annex B. In addition to commercialising R&D to maximise value creation and capture, there were also programmes to grow our scientific base. These investments were made to build up Singapore's scientific base, to create our own technologies

in order to be a knowledge-based economy. Through these investments, Singapore had built up a credible research reputation. For example, through a particular CRP on “Enabling the Next Wave of Ultra Low Power Nano-systems,” the research team was able to deliver significant advances in the field of micro-electronics, including delivering the world’s first junctionless nanowire transistor. As a result of these investments, the research capabilities of our local universities had also improved. The National University of Singapore (NUS) and the Nanyang Technological University (NTU) were well-placed in international rankings of universities, placing within the top 20 for the Quacquarelli Symonds (QS) World University Ranking and top 60 for the Times Higher Education (THE) World University Ranking.

59 In addition, the innovation and enterprise initiatives have benefitted Singapore workers and firms. It had also helped Singapore to overcome constraints, for example, with water technologies. Through investments in water technologies under the Environment & Water Technologies SRP, Singapore had been able to triple the number of water companies since 2006 and established Singapore as a Global Hydrohub. On the Additive Manufacturing front, the partnership between Osteopore International, a local company, and the National Additive Manufacturing Innovation Cluster (NAMIC) had resulted in the development and commercialisation of a patented composite material for next generation bio-scaffold products. This included innovative 3D scaffold technology that facilitates natural tissue healing and regenerative functions. This gave Osteopore a competitive edge over its competitors, enabling it to aggressively expand into the United States and Europe.

60 MOF informed the Committee that NRF tracked the intellectual property arising from Singapore’s research and development investments through the number of licences as well as the licensing revenue generated. The number of licences produced by the AUs and the Agency for Science, Technology and Research (A*STAR) had grown over the past five years. MOF had observed an acceleration in licensing, with over 300 licenses and \$10 million in licensing revenue generated in FY2016.

Research, Innovation and Enterprise 2020 (“RIE2020”)

61 The Committee noted that the NRF Board reviewed the achievements of the RIE2015 to develop RIE2020 and wanted to know whether the learning points/experience learnt from RIE2015, if any, were applied to RIE2020.

62 MOF shared that in developing the RIE2020 Plan, there were three key learning points applied from the RIE2015 Plan:

- (a) Sharpen our focus on value creation. Over the past tranches of RIE, a strong base of research capabilities had been built. This was reflected in the transformation of our universities into globally competitive research universities; and the development of our hospitals into academic medical centres. Building on investments in RIE2020, focus was sharpened on growing private-sector R&D capabilities and nurturing high growth innovative enterprises that leverage technology, so that these investments are turned into products, services and solutions that create better economic and societal outcomes for Singaporeans.
- (b) Closer integration of research thrusts. Given that measures to increase value creation would increasingly cut across traditional policy boundaries and potential cluster synergies that could be reaped from technology areas, planning efforts were re-oriented along four technology domains of Advanced Manufacturing and Engineering, Health and Biomedical Sciences, Services and the Digital Economy and Urban Solutions and Sustainability, to encourage multidisciplinary collaboration across agencies, so that cluster-level synergies could be better harnessed.
- (c) Increase allocation of RIE budget towards competitive funding. As the RIE ecosystem matured, there was a need to continually ensure that the best ideas and the most deserving needs were funded amidst a tighter fiscal space. Thus, more public R&D funding had been made open to competition and the proportion increased from 20% under RIE2015 to 40% under RIE2020.

63 Noting the three key learning points from RIE2015, the Committee further queried how funding under the RIE2020 supported the translation of R&D efforts into more innovative products and solutions.

64 To this, MOF shared that one-fifth of the RIE2020 budget had been allocated to innovation and enterprise (I&E) activities aimed at translating research into industrial

application and commercial use and covers a wide range of programmes, some of which were started in earlier RIE tranches. Examples of such activities included:

- (a) Innovation and Enterprise Offices (IEOs). A*STAR, as well as each of the research-intensive AUs, had technology transfer units called “IEOs” that were responsible for driving the transfer of technology into industry. To support a more vibrant I&E culture, seed entrepreneurial intent, and achieve greater volume and value of IP translations, the IEOs took on I&E education and incubation roles on top of their existing technology transfer functions under RIE2020. The aim was to increase the quality of start-ups/ spin-offs as a result of the incubation efforts, which included providing critical support and mentorship along a start-up’s life cycle.
- (b) Industry Alignment Fund (IAF). The IAF, started under RIE2015, incentivised publicly-funded research performers to conduct R&D in partnership with companies to co-create industry-relevant solutions. Under RIE2015, the IAF supported industry-relevant research and the setup of corporate/joint laboratories which were established through partnerships between the AUs, public research institutes and companies. The corporate laboratories allowed public research performers to work on developing cutting-edge solutions for problems faced by the industries.
- (c) Tech Consortia. For emerging technology areas that were more complex and required system-level integration, Singapore had set up platforms that aimed to bring together a consortia of partners from different parts of the value chain, such as public research performers, suppliers and large enterprises. There were five to date, in the areas of spintronics, photonics, cybersecurity, synthetic biology and data science.

Commercialisation and transfer rate of R&D

65 Noting the work and the many activities and programme spurred by the NR Fund, resulting in an acceleration in licensing, with over 300 licences and \$10 million in licensing revenue generated in FY2016, the Committee asked MOF about the commercialisation rates and transfer rates of R&D, as well as the percentage of publicly funded IP being translated, and the average duration for such translation efforts.

66 In reply, MOF shared that commercialisation could take many forms. For instance, commercialisation could take the form of R&D projects conducted with large companies, culminating in multiple IPs being commercialised; or start-ups being spun out from the IPs developed by public research performers. As the size of research projects with companies and the value of licences varies, there were limitations to indicators such as number of company collaborations, number of licences or licence revenues as proxies for successful commercialisation. To further increase the commercialisation of publicly funded IP, NRF was also working with the Intellectual Property Office of Singapore (IPOS), A*STAR and other key public agencies to develop an IP set of guidelines on how public agencies could work with companies to drive value capture for Singapore.

67 While MOF was of the view that it was not meaningful to calculate the percentage of publicly funded IP that was translated because of the many ways that R&D could be translated into use and impact, MOF shared with the Committee the licensing revenue generated by the AUs and A*STAR research institutes from 2011 to 2015 in Table 2.

Table 2 – Number of licenses and licensing revenue by the AUs and A*Star

	FY2011	FY2012	FY2013	FY2014	FY2015	RIE2015
Licenses	142	185	318	485	302	1,432
Licensing Revenue (\$ million)	3.7	4.8	4.8	10.2	3.8	27.3

Source: MOF

68 MOF also shared in Table 3 the achievements under RIE2015 and RIE targets for (i) the number of industry projects and (ii) the number of start-ups across the RIE tranches. MOF informed the Committee that these were useful proxies as they tracked the activities along two key pathways of realising value from R&D: firstly, partnering industry to develop new products and services from proprietary technologies developed through R&D and secondly, spinning out these proprietary technologies in the form of start-ups.

Table 3 – Number of industry projects and start-ups achieved under RIE2015 and targets for RIE2020

	RIE2015 Achievement	RIE2020 Target
Number of industry projects	3,618	4,100
Number of start-ups*	165	250

**Refers to successful start-ups for the RIE2020 target.*

Source: MOF

69 It was also explained to the Committee that mechanisms had been put in place to support more industry-relevant basic research in our AUs. For example, when deciding on the allocation of basic research funding to the AUs, the Ministry of Education (MOE) took into account the extent of AUs' collaboration with industry, including indicators such as number of industry projects and the amount of industry co-funding for research and development, to prioritise limited funds. In addition, for research that resulted in industry applications, researchers in the AUs got to share in the royalty or licensing revenue. They were also given due recognition for impactful, innovative research work when they worked on research projects which met industry needs.

70 The IEOs in the AUs were the focal point for technology transfer. They had been recently expanded under RIE2020 to work closely with economic agencies and provide guidance and training for the research community to commercialise their products. They also provided funding from RIE2020 to support early stage translational projects, which could include proof-of-concept or prototyping activities to improve the commercial or market potential of research outcomes. Such projects served to improve the readiness level of the technology to a stage where it could be more easily deployed by the industry.

71 The Committee took note of the results thus far and asked how Singapore as fared as compared to other countries and how these results and developments had wider societal benefits for Singapore.

72 At the hearing with MOF officials, they explained that MOF monitored the amount of R&D spending by the private sector and tracked whether the share and ratio to GDP were rising. MOF held the view that these were useful indicators as they tracked whether the private sector was embracing R&D and using R&D to think of new products or processes.

73 MOF informed the Committee that the economic impact from the RIE investments could be seen from the increase in Business Expenditure in R&D (BERD), which was reported by OECD countries annually. As shown in the breakdown of Singapore's BERD over 2011 to 2015 in Table 4, BERD had increased under RIE2015. A comparison of Singapore's BERD against US, UK and other similar-sized advanced economies for the year 2015 is detailed in Table 5.

Table 4 – Singapore's Business Expenditure on R&D (2011 to 2015)

	2011	2012	2013	2014	2015
Business Expenditure on R&D (\$ million)	4628	4415	4496	5216	5825

Source: National R&D Survey of Singapore

Table 5 – BERD as % of GDP in 2015

Country	BERD as % of GDP
New Zealand	0.64
Netherlands	1.11
United Kingdom	1.12
<i>Singapore</i>	<i>1.45</i>
Denmark	1.89
Finland	1.93
Switzerland	2.43
Israel	3.63

Source: OECD

74 The Committee emphasised to MOF at the oral hearing the importance of concretely demonstrating to the public how the Government's R&D expenditures were translating to actual results.

75 To this, MOF informed the Committee that NRF would continue with efforts to ensure accountability of our public investments in R&D through a two-pronged strategy:

(i) Ensuring effective public communications on the outcomes of our RIE investments.

NRF had publicly communicated efforts to focus research spending on areas with economic impact or strategy need through various platforms (e.g. mainstream media, social media challenges and public events). Examples included:

- a. Investing in new strategic areas to address our national challenges and position our industries for the future (e.g. Public announcements on new initiatives in Artificial Intelligence, data science, cybersecurity, diabetes research, next generation energy grid)
- b. Value creation and capture through growing industry receptacles and strengthening industry-science linkages (e.g. Launch of corporate laboratories)
- c. Growing a vibrant start-up ecosystem (e.g. Singapore Week of Innovation & TeCHnology (SWITCH))
- d. Building a strong core of talent to drive the RIE efforts (e.g. Global Young Scientists Summit)

(ii) Framework to Measure Impact of RIE.

In RIE2020, KPIs were designed to have a sharper focus on the economic and societal outcomes from our RIE investments. Some of the new economic outcome KPIs introduced included:

Enabling industry growth	Good jobs
Indigenous companies that conduct R&D	Total industry Research, Scientists and Engineers
Sales revenue from commercialisation of R&D	% Research Scientists and Engineers (RSEs) that are Singaporean Citizens

Policy goals were also introduced to articulate the impact to be achieved in areas of national priority as such:

Area of national impact	Policy goal
Healthcare	<ul style="list-style-type: none"> 1% drop in total disability adjusted and quality adjusted life year (DALY and QALY) arising from all services, medical intervention or health policy implemented from NMRC-funded initiatives
Energy efficient water production	<ul style="list-style-type: none"> Achieve long-term goal of less than 1 kWh energy used per cubic metre of desalinated water desalinated seawater at the system level, down from the current 3.5 kWh/m³ (RIE2020 target: less than 2 kWh/m³)

76 MOF was of the view that the addition of these new outcome indicators and policy goals would drive RIE efforts toward commercialisable research in areas of strategic need/industry need.

Observations and Recommendations

77 The Committee acknowledged the efforts and achievements in stimulating R&D in Singapore under NRF and its RIE plans to support Singapore's innovation and industry transformation efforts. The Committee undertook this query with the aim of helping the public understand that the funds injected into NRF were fuelling an important element to elevate and position Singapore for the future.

78 The Committee felt that it was important that agencies disbursing research funds made the outcomes of the projects they were sponsoring more transparent and accountable to the deliverables.

79 The Committee noted that there were various pathways for collaborating between industries and research institutes and AUs such as the Industry Alignment Fund and the Tech Consortium. The Committee encouraged MOF to nurture an ecosystem to drive more multidisciplinary collaborations and encourage research institutes and AUs to work on real world issues by ensuring compensation and career prospects of our researchers and academics are aligned to transfer of research to industry applications. Singapore should also aim to build distinct cutting edge research expertise in certain areas such as water technologies to spur more research demands.

EFFECTIVENESS OF PRODUCTIVITY SCHEMES IN HELPING BUSINESSES

80 The Committee noted that the Government had launched a number of productivity schemes or established funds in previous Budgets to help businesses in Singapore such as the Productivity and Innovation Credit (PIC) Scheme. The Committee asked MOF how many productive schemes there were to help businesses, and the amount of grants and subsidies that had been disbursed since 2010 for domestically oriented sectors such as construction and food services.

Key Schemes to Help Firms Improve Productivity and Outcomes

81 MOF shared that key schemes to help firms improve their productivity fell largely into two categories: funding support (grants and tax schemes) and in-person help and advice. Examples of key schemes to support firms in improving productivity are listed in Annex C.

82 The Committee was informed that firms could tap on broad-based schemes that provided funding support, such as SPRING's Capability Development Grant, which co-funded the adoption of automation equipment and business process re-design. In addition, there were sector-specific schemes, including some funded by NPF, to provide targeted grant support relevant to the sector. An example was BCA's Mechanisation Credit which helped defray the cost incurred to adopt technology specific to the construction sector to improve productivity for construction projects. In total, the NPF had funded close to 34,000 projects involving companies.

83 In addition to grant and tax schemes, firms could seek advice on productivity-related issues from SME Centres and Productivity Centres. SME Centres were integrated one-stop centres which provide firms with general advice and information on improving productivity and operational efficiency. The Productivity Centres provided more targeted support, especially to firms in specific sectors such as the hotel and retail sectors, and a comprehensive range of services and solutions to help firms, including in-depth productivity consultancy, conferences and workshops on productivity-related topics, benchmarking and applied research.

84 It was shared with the Committee that from 2010 to 2015, the key grants disbursed to the Construction and Food Services sectors, which were domestically-oriented sectors, averaged around \$600 million per year and \$150 million per year respectively. During the same period of 2010-2015, productivity (in terms of real VA per actual hour worked) for domestically-oriented sectors grew by 1.1% per annum. Sector-specific productivity outcome indicators had shown signs of improvement. For instance, from 2010 to 2015, construction site productivity (defined as square metres constructed per man day) grew by 1.5% per annum, and productivity in Food Services (revenue per square foot) grew by 5.0% per annum.

85 Noting the different outcomes which MOF shared for Food Services and Construction sectors, the Committee asked MOF for the reasons that accounted for the different outcomes and what lessons could be learnt. The Committee took the view that Government funding for productivity improvements should be effective and asked MOF to provide more details on the grants disbursed to domestically oriented industries/sectors and their productivity growth with a comparison on how Singapore fared against other countries.

86 MOF explained that generally, the total impact of the various schemes on national productivity had to be viewed both at the programme level and at the macro level. Overall, productivity growth, as measured by value-added per hour worked, grew by an average of 2.6% between 2009 and 2016, and higher for the internationally tradable sectors.

87 MOF agreed with the Committee that Government funding for productivity improvements should be effective and further explained that different industries had different starting points and faced different challenges. For example, for construction, the greater use of pre-fabricated elements helped in raising productivity but as the market was still small and the adoption of such productive technologies was still nascent, there was a need for a greater degree of Government funding support to jump-start the shift. In addition, the construction value chain comprised multiple stakeholders which included developers, main contractors, consultants, sub-contractors, specialist sub-contractors, suppliers and rank-and-file workers. It was shared with the Committee that the lead government agencies worked with companies to take a more customised approach to set sector-specific outcome indicators (SSOIs). These SSOIs measured productivity growth within each sector, were concrete to businesses, and set targets for them to aspire to. MOF also provided more details on the grants disbursed to some domestically-oriented industries/sectors and their productivity growth in Table 6. This

comprises key grants/funding disbursed to these sectors, including schemes not specifically targeted at productivity.

Table 6 – Grants disbursed to domestically-oriented industries/sectors and outcomes

Domestically oriented Industry/ Sectors	Grants/ Funding Disbursed [^]	Share of GDP (average 2010-15)	Productivity Growth based on SSOI (2010-2015)	Jobs Created (2010-15)	International Best in Class benchmark
Food Services	\$150 million	1.2%	Revenue per square foot: 5.0% Revenue per worker: 1.3%	47,100	<i>Nominal VA per worker (% p.a., International \$, PPP Adjusted), 2009-2012*</i> UK: 6.2% USA: 2.8% South Korea: -5.6% Singapore: 6.4%
Construction	\$600 million	4.9%	Site productivity in terms of floor area constructed per manday of site labour: 1.5%	122,700	<i>Real VA per AHW (% p.a.), 2010-2015</i> Japan: 3.6% South Korea: - 0.4% UK: 0.4% Germany: 0.1% Singapore: 1.1%
Retail	\$190 million	1.9%	Revenue per square foot: 1.8% Revenue per worker: 0.1%	22,400	<i>Nominal VA per worker (% p.a., International \$, PPP Adjusted), 2009-2012*</i> South Korea: -1% UK: 0.9% Singapore: 4.6%

Source: MOF

[^] This comprises key grants/funding disbursed to these sectors, including schemes not specifically targeted at productivity.

* For Food Services and Retail, the latest available data from the benchmark countries is as of 2012. In addition, these benchmark countries do not publish VA per AHW stats.

Note: The SSOIs are based on ITM definitions. Retail productivity growth used for international benchmarking are similarly based on ITM definitions, for both Singapore and other countries. All other figures are based on AES definitions.

88 It was also explained to the Committee that Singapore's productivity schemes had resulted in positive outcomes for the targeted companies and sectors. For example, an impact evaluation study in 2015 found that the overall impact of SPRING's Capability Development Grant (CDG) scheme on firms' revenue was positive and statistically significant. On average, firms' revenue was 9.3% higher after joining the CDG scheme. Similarly, an impact evaluation study in 2016 found that IMDA's iSPRINT scheme was effective in helping firms raise their revenue through the automation of business functions. The study found that the median firm (based on revenue size) saw a 3.1% increase in revenue after adopting solutions under IMDA's iSPRINT grant. Apart from CDG and iSPRINT, businesses also raised productivity by tapping on other schemes. For example, the Workforce Advancement Federation (WAF) spearheaded the development and deployment of the 3D-Scan Visualiser with support from SPRING's Local Enterprise and Association Development (LEAD) programme. Consisting of bespoke software and a hand-held 3D scanning device, the 3D-Scan Visualiser was able to convert scanned data of interior spaces into 2D and 3D floor plans almost instantly. The system had allowed SMEs in the Design Services, Construction, MICE and Hospitality sectors to minimise human errors, overcome manpower constraints and improve productivity by around 50%.

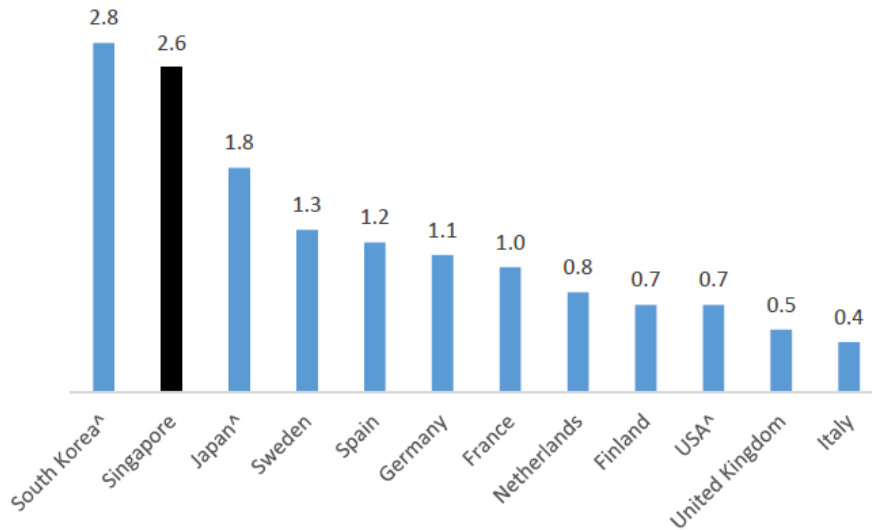
Singapore's Productivity Growth

89 Taking note that Singapore's labour productivity, as measured by real value-added (VA) per actual hour worked (AHW), grew by 2.6% per annum in Singapore between 2009 and 2016, the Committee asked MOF how this compared with developed countries that had also undertaken initiatives to promote productivity.

90 MOF informed the Committee that this labour productivity growth in Singapore of 2.6% per annum was higher than, or comparable to other advanced economies⁶ in the same period as indicated in Exhibit 1. MOF further shared that in terms of productivity growth in the Manufacturing and Services sectors, Singapore's performance was generally comparable or better than other advanced economies (see Exhibit 2 and Exhibit 3). For instance, from 2009 to 2016, Singapore's Manufacturing sector's productivity growth (6.4%) was higher than other developed economies', such as Sweden (4.0%), Germany (3.3%) and France (3.3%). Similarly, productivity growth in the Services sector (2.8%) was also higher than that in Sweden (2.4%), Germany (1.2%) and France (1.2%).

⁶ These economies were selected to benchmark against Singapore because they have also implemented initiatives to improve productivity either at the national or sectoral level.

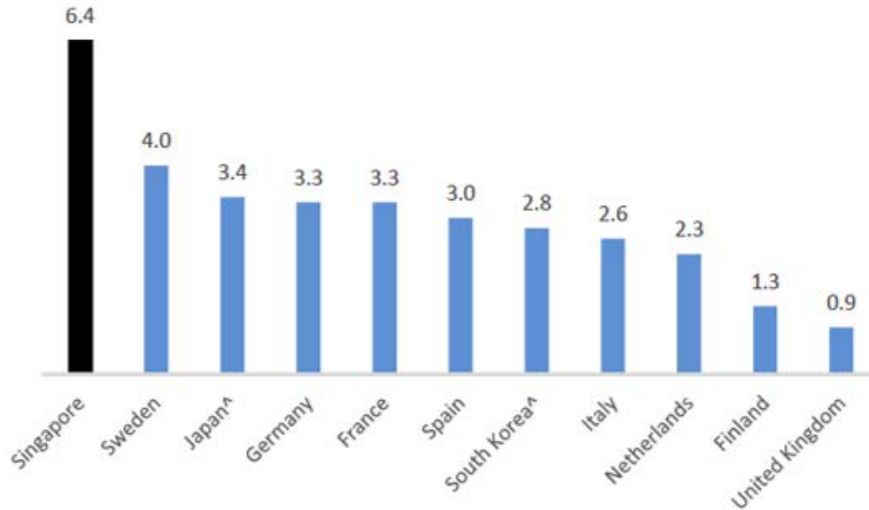
Exhibit 1 – Growth in Real VA per Hour Worked (% p.a., 2009-2016)



Note: ^Data for USA, Japan and South Korea based on 2009-2015 as data for 2016 is not yet available.

Source: MTI estimates, OECD

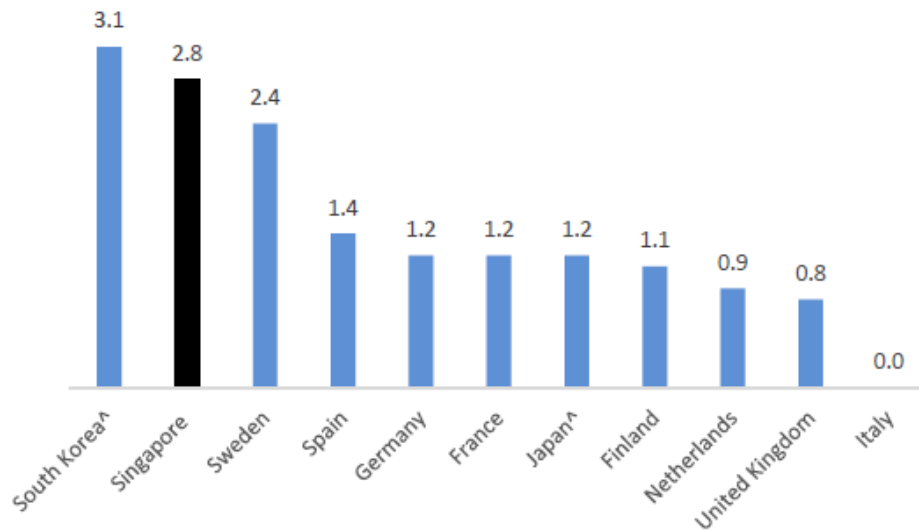
Exhibit 2 – Growth in Real VA per Hour Worked in Manufacturing (% p.a., 2009-2016)



Note: ^Data for Japan and South Korea based on 2009-2015 as data on VA per hour worked for 2016 is not yet available. Data on VA per hour worked in the manufacturing sector is not available for USA.

Source: MTI estimates based on data from national statistical agencies and OECD

Exhibit 3 – Growth in Real VA per Hour Worked in Services (% p.a.,2009-2016)

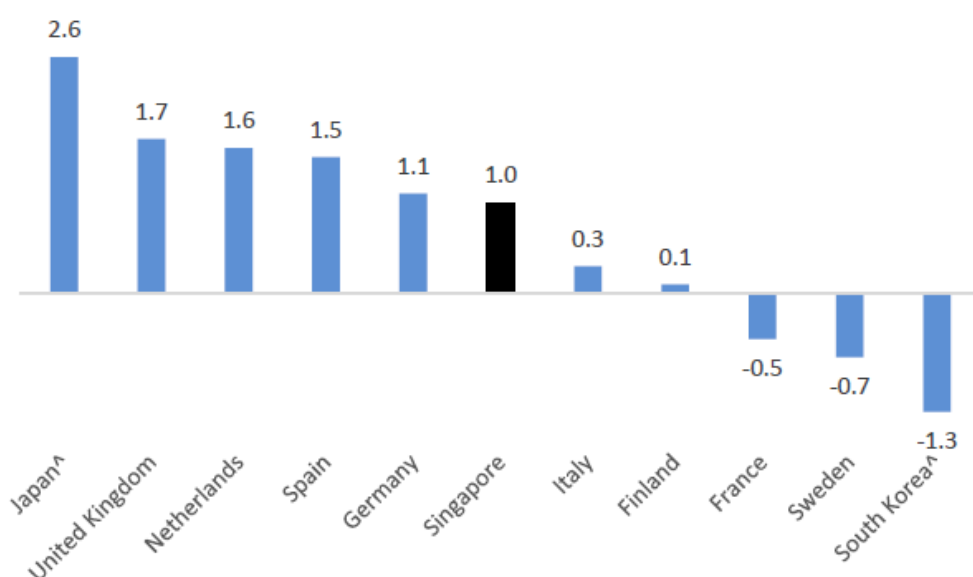


Notes: Services exclude real estate services and other services industries, to align with OECD's definitions. For Japan, services also exclude administrative and support services. ^Data for Japan and South Korea based on 2009-2015 as data for 2016 is not yet available. Data on VA per hour worked in the services sector is not available for USA.

Source: MTI estimates based on data from national statistical agencies and OECD

91 It was also noted that Singapore's productivity growth in the Construction sector (1.0%) was in the range of growth rates seen for other economies. Productivity growth in the Construction sector in the United Kingdom (1.7%) and Spain (1.5%) was higher; other economies such as Italy (0.3%) and Finland (0.1%) saw weaker productivity growth (see Exhibit 4).

Exhibit 4 – Growth in Real VA per Hour Worked in Construction (% p.a.,2009-2016)



Note: ^Data for Japan and South Korea based on 2009-2015 as data for 2016 is not yet available. Data on VA per hour worked in the construction sector is not available for USA.

Source: MTI estimates based on data from national statistical agencies and OECD

Observations and Recommendations

92 The Committee was encouraged by the various schemes in the national push for productivity growth. Singapore fared well in productivity growth in real value-added per hour worked in the Manufacturing and Services sectors as compared to other developed nations. The Committee noted that more could be done in the Construction sector. The Committee urged MOF to continue sharing achievements and progress made in Singapore's productivity growth, success cases and using the ITMs to galvanise and move the industries.

Productivity and Innovation Credit (PIC) Scheme

93 Following up on the Third Report of the Estimates Committee [Parl. 1 of 2015] presented to Parliament on 27 January 2015 which looked into the PIC Scheme and fraud cases, the Committee asked for updates to the PIC Scheme in terms of the yearly amount dispensed to businesses since its inception and how many businesses benefitted from this scheme.

94 MOF informed the Committee that the Government made parallel efforts to promote productivity and innovation, including broader-based and targeted measures that complement one another in supporting industries and businesses. The Productivity and Innovation Credit (PIC) scheme was an example of broad-based measures. At the beginning of the productivity journey, PIC was introduced to raise awareness, in particular, among the SMEs, about productivity and to get businesses to undertake basic productivity efforts such as the purchase of automation equipment.

95 MOF shared that PIC had largely met its objectives. As at 31 January 2017, the PIC scheme had benefitted 148,000 businesses (which comprise companies, partnerships as well as sole-proprietorships). The average yearly amount of PIC benefits⁷ (i.e. cash payout, tax savings from enhanced tax deductions/allowances and PIC bonus) that had been granted to businesses was \$1,097 million, on a Year of Assessment (“YA”) basis.

96 Based on a survey conducted by the Singapore Chinese Chamber of Commerce & Industry in 2015, around 90% of SMEs took steps to increase their productivity. As there had been a good level of interest and take-up of productivity initiatives, it was timely to refocus efforts, and move on to the next phase of restructuring, through more targeted measures under the Industry Transformation Programme.

97 The Committee enquired whether the Government had been productive in restricting PIC and other support schemes to legitimate claims. The Committee also wanted to know how many cases of fraudulent PIC claims had been investigated since 2010 and what safeguards had been put in place to prevent such fraudulent claims.

98 As PIC was designed to be a simple broad-based measure, MOF explained that there was a delicate balance between keeping a scheme simple while trying to restrict non-legitimate claims. A “three local employees” requirement was put in place for the PIC cash payout and PIC bonus components to reduce the risk of abuse of a broad-based cash scheme. At the same time, PIC was designed to be business-friendly to access, with timely disbursements of cash payouts, to support businesses in the productivity drive. For a scheme with such a wide reach, it was not unexpected that a minority of taxpayers would try to game the system through artificial or contrived arrangements, even as the majority of claims were genuine.

⁷ PIC benefits take the form of cash payout, and enhanced tax deductions and allowances.

99 MOF assured the Committee that the Government took a serious stance on abuse of all support schemes, including PIC. The Inland Revenue Authority of Singapore (IRAS) conducted rigorous compliance programmes and adopts a risk-based approach audit, using analytics, risk-profiling as well as experiences of IRAS auditors/investigators, to sieve out high risk cases for audits. Such an approach ensured that IRAS obtained reasonable assurances that claims approved were genuine while not overburdening taxpayers and making the payouts too difficult to claim.

100 Under this approach, IRAS had audited about 98,000 claims made from Years of Assessment 2011 to 2016 out of the 313,000 claims received for PIC cash payouts. Of these 98,000 claims, about 63,000 or 64%, were rejected upfront even before any cash was disbursed. 3,300 of these claims audited required clawback and 29,400 were bona fide claims. The remaining 2,300 cases were undergoing audit or investigation.

101 Further, IRAS had not hesitated to take stern enforcement and legal actions against businesses abusing the scheme and intermediaries helping them to do so. Offenders convicted of PIC fraud may face a penalty of up to four times the amount of cash payout fraudulently obtained, and a fine of up to \$50,000 and/or imprisonment of up to five years. To date, IRAS had prosecuted 11 cases for fraud under the PIC scheme. MOF further assured the Committee that IRAS would continue to conduct its rigorous compliances programmes to review and audit PIC claims, as well as publicity efforts to educate taxpayers on abusive PIC arrangements, including a whistle-blowing platform.

102 The Committee asked MOF for assurances that the other PIC cash payouts were legitimate claims and asked for updates on the outcomes of the cases prosecuted by IRAS for fraud under the PIC scheme.

103 It was shared with the Committee that all 313,000 PIC cash payout applications submitted by taxpayers were checked upfront against a set of pre-determined criteria/rules in the system as part of IRAS processing of the claims. The 98,000 claims were selected for further audit and investigation based on a risk-based approach. The remaining 215,000 PIC cash payout claims may be selected for review based on other factors.

104 For all wrongful cases, IRAS would deny the cash disbursement or clawback the monies from the claimants. IRAS also clarified that wrongful claims might not be fraudulent in nature as there could be instances of inadvertent and negligent breaches. For the 3,300 cases requiring clawback, IRAS had recovered \$20.6 million from 2,200 cases as at June 2017. The recovery process was underway for the remaining cases. For fraudulent cases which generally involved taxpayers providing false information to IRAS with a wilful intent to obtain the PIC cash payout, IRAS had successfully prosecuted 13 cases involving 37 claims amounting to \$804,756 of PIC cash payout, and the penalties and fine imposed amounted to \$2,808,919.40.

Observations and Recommendations

105 The Committee noted the risk-based approach for audits for PIC and supported this approach which was also common in the private sector for efficient deployment of resources to focus on risky segments. The Committee endorsed the efforts by MOF and IRAS to recover the monies from cases requiring clawback and taking prosecutorial action to send a strong message against making fraudulent claims.

Annex A: List of 19 Endowment Funds and Trust Funds

Fund Name	Purpose
Edusave Endowment Fund	<ul style="list-style-type: none"> - Provide grants to educational institutions to enable them to enhance their quality of teaching - Provide for scholarships, bursaries and awards, and contribute to Edusave Pupils Fund
Lifelong Learning Endowment Fund	<p>Provide grants to:</p> <ul style="list-style-type: none"> - Encourage or assist persons to acquire, develop or upgrade skills and expertise to enhance their employability - Research/develop learning methods and technology to enhance the acquisition, development or upgrading of such skills and expertise - Establish, expand or maintain facilities for promoting the acquisition, development or upgrading of such skills and expertise
Medical Endowment Fund	Provide grants for defraying hospital charges, fees and other expenses incurred by patients with financial difficulties
ElderCare Fund	Provide subventions for defraying recurrent costs in providing step-down care
Community Care Endowment Fund	Provide assistance to enable citizens and permanent residents of Singapore with financial difficulties to attain sufficient income for basic needs, address children developmental issues and integrate into society
Goods and Services Tax Voucher Fund	Provide financial assistance to persons who are in need of relief from goods and services tax as prescribed under the GSTV Fund Act
National Research Fund	Provide funding for research and development activities
Pioneer Generation Fund	Provide assistance in the form of financial benefits or other support to Singapore's Pioneers to meet their healthcare costs, and other costs of living in Singapore
Bus Service Enhancement Fund	Provide grants/loans or acquire property (movable or immovable) to improve and expand the range and reliability of bus services
National Productivity Fund	Provide financing and incentives for productivity enhancement and continuing education
Changi Airport Development Fund	Provide for the development of Changi Airport
Special Employment Credit (SEC) Fund	To encourage employers to hire older Singaporean workers and to boost the employability of these older Singaporean worker

Fund Name	Purpose
Deferment Bonus Fund	To fund the Deferment Bonus which is paid to affected CPF members to help them cope with the increase in the draw down age; and to fund the Voluntary Deferment Bonus which is paid to older CPF members who voluntarily defer their CPF Minimum Sum draw down age to age 65.
CPF Life Bonus Fund	To encourage Singaporeans to enroll in CPF Life by providing a bonus.
Singapore Universities Trust	Provide matching grants for donations to universities' endowment funds
Community Silver Trust	Encourage donations and provide additional resources for the service providers in the Intermediate and Long-Term Care sector to enhance their capabilities, provide value-added services to achieve higher quality care, and enhance the affordability of step-down care for service users and patients.
Trust fund for the Workfare Special Bonus (WSB) Scheme	Provide funding for the WSB, a [payment to older low-wage Singaporeans residing in Lower Value Properties as a bonus for engaging in regular and productive work
Cultural Matching Fund	To benefit the community through the advancement of arts and heritage in Singapore by (i) encouraging donations to eligible persons in the cultural sector; (ii) developing capabilities for the long-term sustainability of eligible persons in the cultural sector and the cultural sector as a whole, through the provision of matching grants
National Youth Fund	Provide resources to any eligible youth or youth body to encourage and support youth development and youth sector development

Annex B: List of Programmes supported by the NR Fund

S/N	Scheme	Description
1	Research Centres of Excellence (RCE)	<p>The RCE scheme aims to:</p> <ul style="list-style-type: none"> • Bring and retain top international research talent to build up peaks of excellence in the universities; • Enhance graduate education in Singapore universities and train quality research manpower for Singapore; • Create new knowledge on selected areas that are of academic significance and strategic relevance to Singapore.
2	Medium Sized Centres (MSC)	<p>The MSC scheme aims to consolidate research activities to create a critical mass of leading researchers in strategic research areas for Singapore.</p>
3	Competitive Research Programme (CRP)	<p>The CRP scheme aims to foster the formation of multidisciplinary teams to conduct cutting-edge research that are of relevance to Singapore.</p>
4	Campus for Research Excellence and Technological Enterprise (CREATE)	<p>CREATE was formed to expand the research base in Singapore through establishing institutional partnerships with world class universities (e.g. MIT, Berkeley, ETH, Cambridge). These universities set up research centres in CREATE and collaborate with our local researchers on research in strategic areas of interest to Singapore.</p>
5	NRF Fellowship and Investigatorship	<p>These initiatives aim to attract and retain top scientists so as to build a strong research manpower base in Singapore.</p>
6	Returning Singaporean Scientist Scheme (RSSS)	<p>This scheme aims to bring back established overseas-based Singaporean scientists to continue their research careers in Singapore and eventually take up leadership positions here.</p>
7	Strategic Research Programmes (SRP)	<p>The SRPs were set up to support investments in areas of research to create new industries and enable high growth. These are in the areas of:</p> <ul style="list-style-type: none"> • Biomedical Sciences Translational & Clinical Research • Environment & Water Technologies • Interactive & Digital Media • Marine & Offshore • Satellite & Space

S/N	Scheme	Description
8	National Innovation Challenge (NIC)	<p>The NICs aims to harness our research capabilities to develop impactful solutions that address our national challenges and also have potential have commercial spinoff both in Singapore and abroad. We have launched three NICs in the areas of:</p> <ul style="list-style-type: none"> • Energy • Land & Liveability • Ageing
9	Corp Lab @ University Programme	The scheme aims to encourage public-industry R&D collaborations and ensures that universities achieve impact by developing cutting edge solutions for problems faced by industry.
10	Innovation Clusters	The aim of this fund is to strengthen partnerships across companies, universities, public research institutes and government agencies to grow particular technology sectors.
11	Early Stage Venture Fund (ESVF)	This aims to encourage LLEs and local VCs to invest in Singapore-based tech startups, and provide mentorship, networks and resources for these startups to scale.

Annex C: Key Schemes to support firms in improving productivity

S/N	Scheme	Administering Agency	Description
Funding Support (broad-based)			
1	Capability Development Grant	SPRING	To support SMEs to build up business capabilities by defraying the costs incurred for areas such as training, certification and equipment costs.
2	Innovation and Capability Voucher	SPRING	To support SMEs to upgrade and strengthen their core business operations through consultancy and in the adoption and implementation of simple solutions to improve business efficiency and productivity
3	Productivity and Innovation Credit Scheme	IRAS	To encourage businesses to invest in productivity and innovation activities in Singapore
4	iSPRINT-ICT for Productivity and Growth (iSPRINT-IPG)	IMDA	Helps to defray the costs incurred in adoption of simple ICT solutions by SMEs
Funding Support (sector-specific)			
5	Mechanisation Credit	BCA	Helps to defray the costs incurred in technology adoption by companies to improve productivity for their construction projects
6	Landscape Productivity Grant	NParks	Supports landscape companies in the adoption of mechanisation and innovation.
7	Business Improvement Fund	STB	To encourage technology innovation and adoption, redesign of business model and processes in the tourism sector to improve productivity and competitiveness.
8	Agriculture Productivity Fund	AVA	Help local farms to upgrade capability, increase yield, land intensification and increase productivity
9	FAST Fund	CAAS	To support airlines' adoption of self-service initiatives

S/N	Scheme	Administering Agency	Description
In-person Advice			
10	SME Centres	SPRING	Provides SMEs with easy access to business advisory to help them start, sustain and grow their businesses. SME Centres offer a comprehensive range of services to SMEs, from one-to-one advisory sessions with Business Advisors, briefing on government assistance, to capability workshops.
11	Productivity Centres	SPRING/ STB	One-stop competency centres that help SMEs improve productivity in their businesses. The PCs provide sector specific productivity expertise and assistance to SMEs by helping them diagnose areas for improvement and supporting their implementation of productivity solutions.

MINUTES OF PROCEEDINGS

6th Meeting

Tuesday, 2nd May 2017

12 noon

PRESENT

Ms Foo Mee Har (*in the Chair*)
Miss Cheng Li Hui
Mr Darryl David
Mr Christopher de Souza
Mr Lee Yi Shyan
Mr Pritam Singh
Dr Tan Wu Meng

ABSENT

Mr Zaqy Mohamad

1. The Committee deliberated.

Adjourned to a date to be fixed.

7th Meeting

Tuesday, 11th July 2017

12 noon

PRESENT

Ms Foo Mee Har (*in the Chair*)
Mr Christopher de Souza
Mr Pritam Singh
Dr Tan Wu Meng
Mr Zaqy Mohamad

ABSENT

Miss Cheng Li Hui
Mr Darryl David
Mr Lee Yi Shyan

-
1. The Committee deliberated.
 2. The Committee considered a memorandum submitted by the Ministry of Finance (MOF) in respect of (a) monitoring the implementations of recommendations by Committee on the Future Economy; (b) monitoring of programs and schemes to help Singapore workers; (c) monitoring of Government Funds; and (d) effectiveness of productivity schemes in helping businesses.
 3. The Committee further deliberated.

Adjourned to a date to be fixed.

8th Meeting

Tuesday, 19th September 2017

11.30 am

PRESENT

Ms Foo Mee Har (*in the Chair*)
Miss Cheng Li Hui
Mr Christopher de Souza
Mr Pritam Singh
Mr Zaqy Mohamad

ABSENT

Mr Darryl David
Mr Lee Yi Shyan
Dr Tan Wu Meng

-
1. The Committee deliberated.
 2. The Committee considered a further Memorandum submitted by the Ministry of Finance in respect of (a) monitoring the implementations of recommendations by Committee on the Future Economy; (b) monitoring of programs and schemes to help Singapore workers; (c) monitoring of Government Funds; and (d) effectiveness of productivity schemes in helping businesses.
 3. The following officials were examined on matters contained in the Memorandum:

Ministry of Finance

- (a) Mrs Tan Ching Yee, Permanent Secretary (Finance)
 - (b) Mr Yee Ping Yi, Deputy Secretary (Policy)
 - (c) Mr Han Neng Hsiu (Deputy Secretary (Development))
 - (d) Ms Jamie Ang, Director (Fiscal Policy)
 - (e) Ms Yeo Wenshan (Director (Economic Programmes))
 - (f) Ms Doreen Tan (Chief Tax Policy Officer)
 - (g) Dr Yip Chun Seng (Director (Economic and Fiscal Analysis))
 - (h) Ms Esther Wee (Director, (Performance and Evaluation))
 - (i) Mr Mark Tan (Director (Land and Infrastructure Programmes))
 - (j) Mr Chia Ser Huei, Director (Resource Management)
 - (k) Mr John Koh (Deputy Director (Fiscal and Strategic Planning))
 - (l) Ms Chia Pei Xian, Associate (Fiscal and Strategic Planning)
 - (m) Ms Felicia Choo (Associate (Fiscal and Strategic Planning))
4. The Committee further deliberated.

Adjourned to a date to be fixed.

9th Meeting

Tuesday, 14th November 2017

12 noon

PRESENT

Ms Foo Mee Har (*in the Chair*)
Mr Darryl David
Mr Christopher de Souza
Mr Lee Yi Shyan
Mr Pritam Singh
Mr Zaqy Mohamad

ABSENT

Miss Cheng Li Hui
Dr Tan Wu Meng

-
1. The Committee deliberated.

Report

2. The Chairman's report brought up and read the first time.
3. Resolved, "That the Chairman's report be read a second time paragraph by paragraph."
Paragraphs 1 to 105 inclusive read and agreed to.
4. Resolved, "That this report be the report of the Committee to Parliament."
5. Agreed that the Chairman do present the Report to Parliament when copies are available for distribution to Members of Parliament.

Adjourned sine die.
