



TRANSFORMING THE SINGAPORE ECONOMY

TECHNICAL ANNEX

Annex A:

Further Information on ITM Efforts

1. The Industry Transformation Maps (ITMs) were introduced progressively from 2016 to position Singapore's industries for the future, and build workers' capabilities to seize opportunities.
2. By 2018, a total of 23 ITMs, covering a large share of Singapore's economy, had been launched ([Table A-1](#)). Each ITM integrates 5-year plans for the sector in the areas of productivity, innovation and technology, trade and internationalisation, and jobs and skills into a coherent whole.

Table A-1: Summary of ITM Sectors*

S/N	ITM Sector	Lead Agency	FEC Cluster (These were co-chaired by private and public sector representatives)
1.	Aerospace	Economic Development Board (EDB)	Advanced Manufacturing & Trade Cluster (Secretariat Support: EDB, MTI)
2.	Energy & Chemicals	EDB	
3.	Electronics	EDB	
4.	Precision Engineering	EDB	
5.	Marine & Offshore Engineering	(From 2024) Enterprise Singapore (EnterpriseSG)	
6.	Food Manufacturing	EnterpriseSG	
7.	Logistics	EDB	
8.	Wholesale Trade	EnterpriseSG	
9.	Air Transport	Civil Aviation Authority of Singapore (CAAS)	Connectivity Cluster (Secretariat Support: Ministry of Transport (MOT))
10.	Land Transport	Land Transport Authority (LTA)	
11.	Sea Transport	Maritime & Port Authority of Singapore (MPA)	
12.	Healthcare	Ministry of Health (MOH)	Human Health & Potential Cluster (Secretariat Support: MOH, MOE)
13.	Education (Early Childhood and Training & Adult Education)	Ministry of Education (MOE), Early Childhood Development Agency (ECDA), SkillsFuture Singapore (SSG)	
14.	Built Environment (Previously Construction ITM)	Building and Construction Authority (BCA)	Urban Systems Cluster (Secretariat Support: BCA, Ministry of National Development (MND))
15.	Real Estate	Council for Estate Agencies (CEA)/BCA	
16.	Security	Ministry of Home Affairs (MHA)	

* Table A-1 shows the latest list of ITMs, which was refreshed in 2021 and progressively rolled out from 2022 as part of the ITM 2025 exercise. Adjustments were made to (i) merge the facilities management sub-sector, which was previously part of the Real Estate ITM, with the Construction ITM, renaming it as the Built Environment ITM; and (ii) sharpen the focus of the Infocomm Media ITM to prevent overlaps with other ITMs in areas such as wholesale/retail IT hardware, and rename it as the Information & Communications (I&C) ITM.

17.	Environmental Services	National Environment Agency (NEA)	Resource & Environmental Sustainability Cluster (Secretariat Support: Ministry of Sustainability and the Environment (MSE), MTI)
18.	Information & Communications (Previously Infocomm Media ITM)	Ministry of Trade and Industry (MTI)	Modern Services Cluster (Secretariat Support: MTI)
19.	Financial Services	Monetary Authority of Singapore (MAS)	
20.	Professional Services	EDB	
21.	Food Services	EnterpriseSG	Lifestyle Cluster (Secretariat Support: Enterprise SG)
22.	Retail	EnterpriseSG	
23.	Hotels	Singapore Tourism Board (STB)	

3. Each ITM was co-created by the Government, industry stakeholders, labour unions, and academia. Subsequently, the ITMs were discussed and endorsed within their respective clusters, which were chaired by a Minister of State/Senior Minister of State and a private sector leader, and comprised representatives from related sectors. As part of the process, the lead agencies for the respective horizontal enablers (e.g. jobs and skills) provided their input to the ITMs (Table A-2). Finally, the FEC, chaired by Mr Heng Swee Keat (Deputy Prime Minister and Chairman of the Future Economy Advisory Panel) and comprising private sector leaders from a range of industries, unions, academia, and Government representatives, endorsed the ITMs.

Figure A-1: ITM Workflow

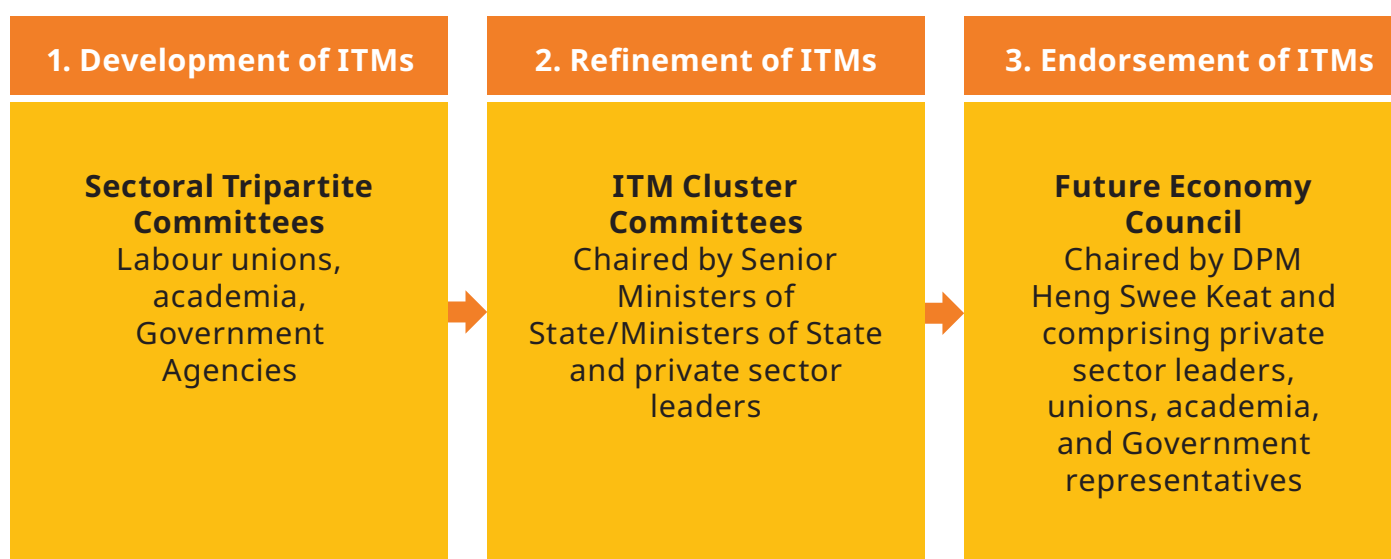


Table A-2: Summary of Horizontals and Lead Agencies

S/N	ITM Horizontals	Lead Horizontal Agencies
1.	Enterprise Development and Internationalisation	MTI / EnterpriseSG
2.	Smart Nation and Digital Economy	Ministry of Digital Development and Information (MDDI) ¹ / Infocomm Media Development Authority (IMDA)
3.	Jobs and Skills	Ministry of Manpower (MOM) / MOE / Workforce Singapore (WSG) / SSG
4.	Innovation	MTI / EDB / EnterpriseSG / National Research Foundation (NRF)

4. In the first round of ITMs, some sector agencies set projections for value-added and labour productivity growth, as well as jobs. The time horizon for most of these projections was 2020. However, as the COVID-19 pandemic severely disrupted the global and domestic economies, the sector outcomes presented in Annex B should not be compared against these initial projections, which were set prior to the pandemic.
5. Work on transformation, forging partnerships, and enhancing economic coordination and planning is an ongoing process. There will always be room for improvement. Nonetheless, the progress made by the ITMs in these areas will position Singapore well for the future.

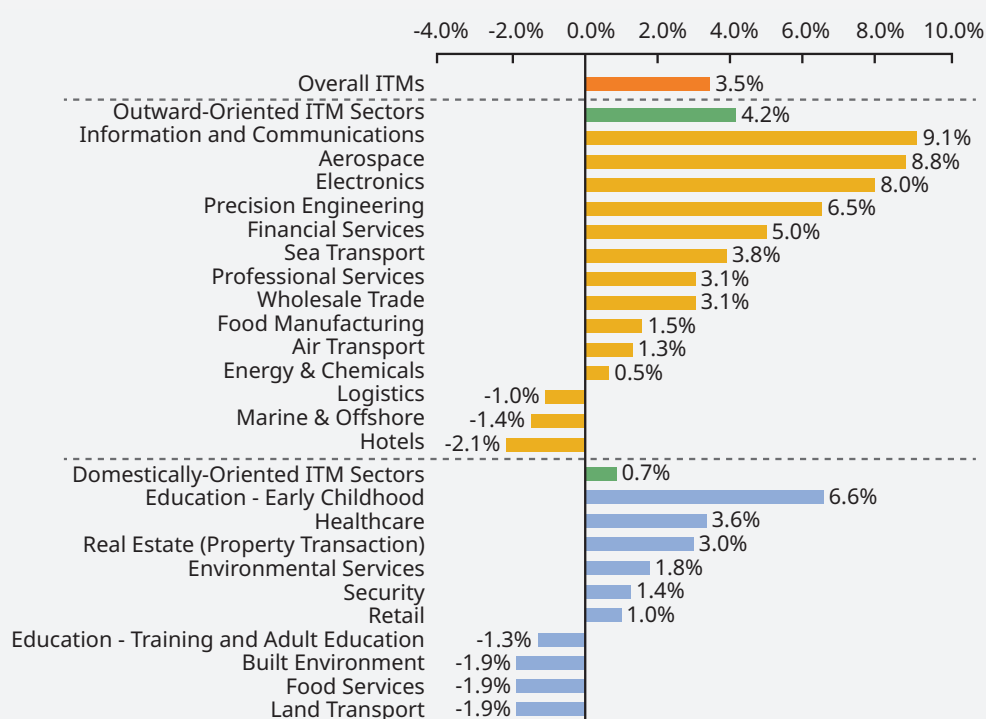
¹ The Ministry of Communications and Information (MCI) has been renamed as the Ministry of Digital Development and Information (MDDI) with effect from 8 Jul 2024.

Annex B:

Outcomes of Individual ITM Sectors from 2016 to 2023 (Real Value-Added (VA), Labour Productivity, and Income for Full-Time Employed Residents)

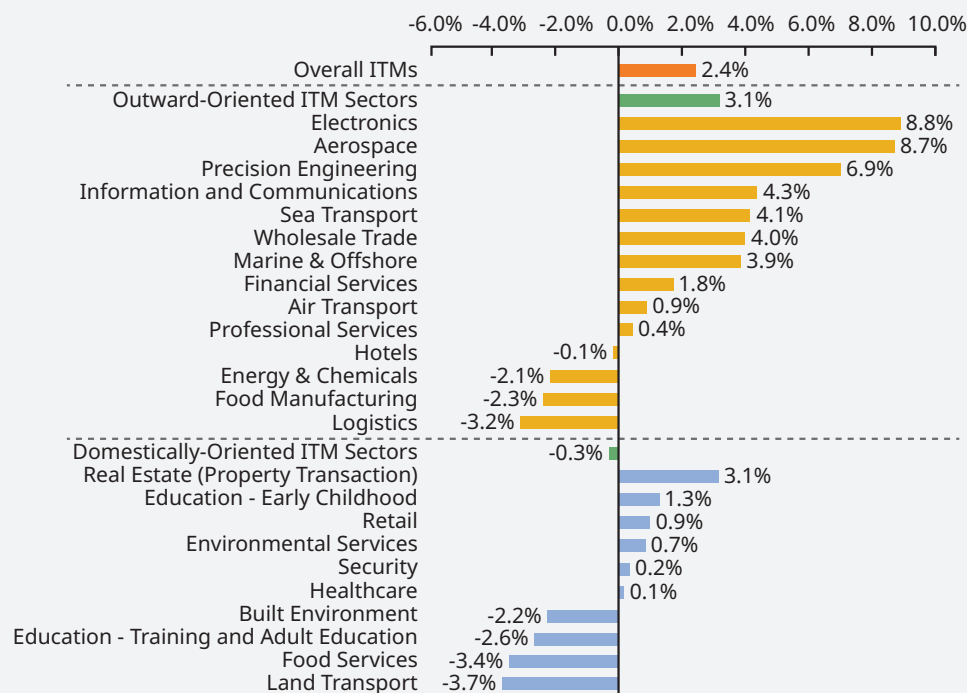
1. This annex presents the real VA, labour productivity (hereafter referred to as real value-added per worker (VAPW)), and wage outcomes of individual ITM sectors, along with additional information on the context of these sectors. (Refer to [Annex B - Appendix 1](#) for data on real value-added per actual hour worked (VAPAHW) of the ITM sectors and [Annex B - Appendix 2](#) for definitions of key terms.)
2. Our economy is simultaneously affected by numerous factors, including industry transformation and macroeconomic factors such as external demand and global trade structures. These macroeconomic factors can impact real VA, real VAPW, and real median gross monthly income growth.
3. Sector-level dynamics are also important. For instance, different industry structures and cost pressures influence firms' ability to raise prices and wages. Firms in outward-oriented sectors are more affected by global economic trends and geopolitical developments, needing to maintain their cost competitiveness in global markets. Meanwhile, policy efforts to uplift the wages of lower-wage workers, such as through the Workfare Income Supplement (WIS) scheme and Progressive Wage Model (PWM), have contributed to real wage growth in some domestically-oriented sectors (e.g. Security, Environmental Services).

Figure B-1: Real VA Growth of Overall ITMs, Outward- and Domestically-Oriented ITM Sectors (% p.a.), 2016-2023



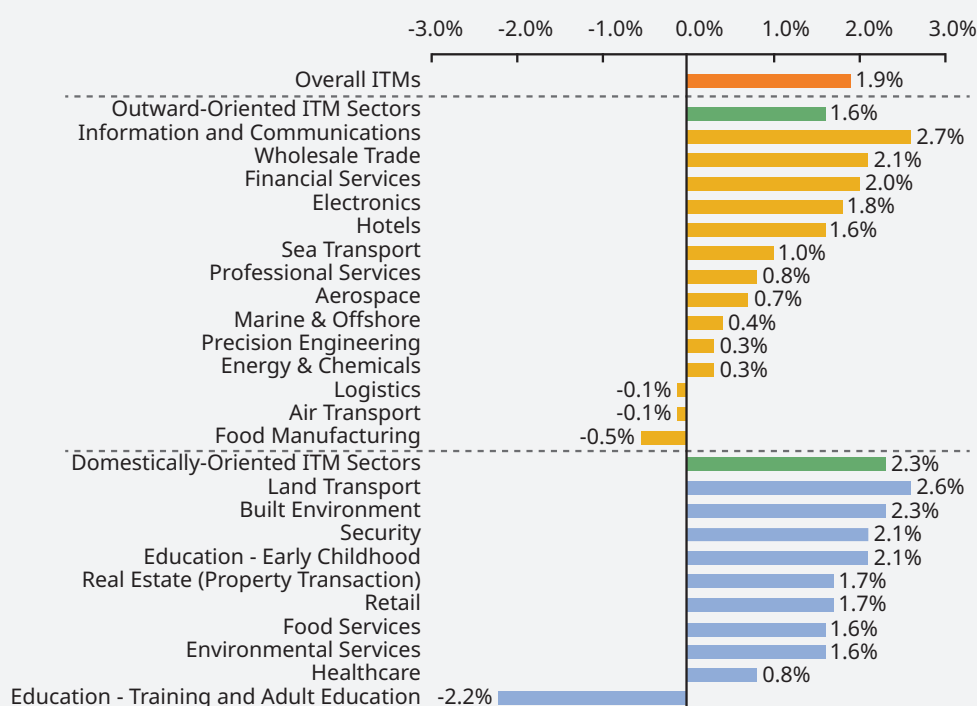
Source: Singapore Department of Statistics (DOS) and EDB

Figure B-2: Real VA per Worker Growth of Overall ITMs, Outward- and Domestically-Oriented ITM Sectors (% p.a.), 2016-2023



Source: MTI estimates based on data from DOS, EDB, and MOM

Figure B-3: Annualised Change in Real Median Gross Monthly Income From Work (Including Employer CPF) of Full-Time Employed Residents of ITM Sectors (% p.a.), 2016-2023



Source: MOM

4. This report groups the ITM sectors into four broad categories, based on their performance and key common factors contributing to their outcomes. We do not cover all the factors affecting every single one of the 23 ITM sectors in detail, as these can be found in the sectors' ITM 2025 plans. The four categories are:
 - a. Sectors that **remained resilient during COVID-19 and amidst geopolitical trends**, including those that benefitted from shifts accelerated by COVID-19 (e.g. Electronics, Precision Engineering, Information & Communications, Financial Services, Real Estate (Property Transaction Services (PTS)), Wholesale Trade, and Sea Transport).
 - b. Sectors that experienced **disruptions to their growth and transformation efforts during COVID-19, and have either recovered or are still recovering from the COVID-19 effects** as of 2023 (e.g. Hotels, Built Environment, Air Transport, Aerospace, Environmental Services, Professional Services, Retail, and Food Manufacturing).
 - c. Sectors facing **structural headwinds to growth, either domestic or external**, compounded in some instances by COVID-19 (e.g. Food Services, Security, Logistics, Energy & Chemicals, and Marine & Offshore Engineering).
 - d. Sectors that **fulfil important social objectives**, aside from growth and productivity, and whose performance is therefore driven by social policy (e.g. Healthcare, Early Childhood, Land Transport, and Training & Adult Education).

Sectors that remained resilient during COVID-19 and amidst geopolitical trends

Electronics and Precision Engineering

5. Some large outward-oriented sectors, which drove real VAPW growth for the ITM sectors as a whole, benefitted from a strong upcycle in recent years. In particular, the **Electronics and Precision Engineering** (PE) advanced manufacturing sectors – which collectively accounted for 10.0% of Singapore's GDP in 2023 – saw a strong surge in demand.
6. Demand in the Electronics sector surged in 2020 and 2021, driven by a remote work environment and greater consumption of digital goods and services during the COVID-19 pandemic. This, in turn, fuelled robust demand for PE companies producing complex equipment such as semiconductor equipment and associated components and modules. Consequently, both the Electronics and PE sectors registered robust real VA growth of 8.0% p.a. and 6.5% p.a. respectively from 2016 to 2023, which in turn contributed to strong real VAPW gains of 8.8% p.a. and 6.9% p.a. respectively over the same period. In tandem with improvements in productivity, the Electronics and PE sectors registered positive real median gross monthly income growth of 1.8% p.a. and 0.3% p.a. respectively between 2016 and 2023.
7. While global electronics demand slowed in 2023 given macroeconomic uncertainties, the medium-and long-term growth prospects of the Electronics sector remain strong, supported by the megatrends of AI, 5G, and electrification². The PE sector is also expected to grow strongly in the medium term as it provides critical support to industries such as Semiconductors (within the Electronics sector), MedTech, Marine & Offshore, and Aerospace.

² Electrification means replacing technologies or processes that use fossil fuels, such as internal combustion and gas boilers, with electrically-powered equivalents, such as electric vehicles and heat pumps (Source: International Energy Agency).

Information & Communications and Financial Services

8. The **Information & Communications (ICT)** sector registered positive real VA and real VAPW growth of 9.1% p.a. and 4.3% p.a. from 2016 to 2023, with real median gross monthly income growing in tandem at 2.7% p.a. during this period. Similarly, the **Financial Services** sector experienced positive real VA and real VAPW growth of 5.0% p.a. and 1.8% p.a. respectively from 2016 to 2023, with real median gross monthly income growing in tandem at 2.0% p.a. during this period. Both sectors play to our advantage as a technology and financial services hub. Demand in both sectors remained resilient amidst COVID-19, bolstered by our investments in digital connectivity and infrastructure.
9. Looking ahead, the ICT sector will continue to benefit from new growth areas. One such area is Generative AI, where there are many opportunities for innovation and deployment of AI solutions across multiple domains. For Financial Services, the sector can support the flow of finance to support regional growth, including in infrastructure and sustainable development. The financial sector can also serve international investors seeking to tap on investment opportunities in the region and catalyse growth for the region by attracting foreign capital.

Real Estate

10. The **Real Estate** sector recorded positive real VA and real VAPW growth of 3.0% p.a. and 3.1% p.a. respectively from 2016 to 2023, while real median gross monthly income grew in tandem by 1.7% p.a. during this period.
11. The sector's growth was to a large extent due to an increase in property transaction volumes and transaction prices. The sector had also embarked on digitalisation initiatives and promoted stronger technology adoption by property agencies, which contributed to productivity improvements. In addition to digitalisation, there have also been efforts made towards the continual upskilling and professional development of workers in the sector.

Wholesale Trade

12. The **Wholesale Trade (WST)** sector is the largest and most diverse ITM sector with over 50,000 companies across several sub-segments (machinery & equipment, fuels & chemicals, household goods etc.) and trading activities.
13. The sector remained resilient despite a global trade slowdown due to the COVID-19 pandemic and geopolitical tensions, recording positive real VA and real VAPW growth of 3.1% p.a. and 4.0% p.a. respectively from 2016 to 2023. Its strong performance also led to real median gross monthly income growth of 2.1% p.a. during this period.
14. One of the reasons why the sector performed well over this period was Singapore's rise in significance as a global trade hub, with 35 new global traders³ setting up operations in Singapore from 2021 to 2023, adding to a pool of about 400 global traders. Digitalisation has also been a key driver of growth and productivity for the sector. Since the launch of the WST Industry Digital Plan (IDP) in 2018, more than 12,000 WST enterprises have adopted at least one digital solution.

³ These include companies from emerging markets such as Ecopetrol, the national oil company from Colombia, and MEGlobal, a leading petrochemical producer from Kuwait.

15. The sector will continue to grow its re-export of strategic and high-value products such as pharmaceuticals and chemicals and enhance its regional distribution centre services including product processing and accreditation. The sector will also expand trade in new areas such as emerging commodities linked to the energy transition (e.g. biofuels and carbon credits). These moves will enable Singapore to remain a valued trading partner to all, even amidst geopolitical and supply chain shifts.

Sea Transport

16. The **Sea Transport** sector registered real VA and real VAPW growth of 3.8% p.a. and 4.1% p.a. respectively from 2016 to 2023, with real median gross monthly income growth of 1.0% p.a. over this period. The shipping industry experienced a cyclical downturn from 2016 to 2019, with global seaborne trade growth slowing due to weak demand and trade tensions. Coupled with a glut in vessel capacity, shipping freight rates hit multi-year lows, affecting shipping companies' profits and resulting in job losses.
17. From 2020 to 2023, the industry remained resilient throughout the pandemic and recovered strongly post-pandemic. The Port of Singapore continued to strengthen its connectivity and efficiency⁴, enhancing its position as a trusted catch-up port⁵ and bolstering our value-add as an international maritime centre. Singapore's container throughput reached a new record-high of 39.0 million TEUs in 2023, surpassing our previous record of 37.6 million TEUs in 2021. Singapore remains well-connected to the rest of the world despite supply chain disruptions.

Sectors that experienced disruptions to their growth and transformation efforts during COVID-19, and have either recovered or are still recovering from the COVID-19 effects

Environmental Services

18. From 2016 to 2023, the **Environmental Services** sector (comprising cleaning, waste management and pest management) registered positive real VA and real VAPW growth of 1.8% p.a. and 0.7% p.a. respectively. At the same time, real median gross monthly income grew by 1.6% p.a., contributed by productivity improvements and wage increments under the PWM for cleaners⁶.
19. Growth in the sector was disrupted by the COVID-19 pandemic. The sector's real VA contracted by 1.7% p.a. from 2019 to 2021, potentially due to higher business costs and falling profits for overall environmental services despite heightened demand for disinfection services in high-risk areas (e.g., healthcare premises) during the pandemic. Nevertheless, the sector subsequently saw moderate recovery from 2021 to 2023 with real VA growth of 3.6% p.a., led by the waste management subsector, as demand recovered with the resumption of economic activities.
20. While the sector has recovered to pre-pandemic levels, it continues to face issues such as low productivity due to a heavy reliance on foreign manpower and an ageing local workforce. To improve productivity, the sector has implemented various automation and innovation strategies under its ITM 2025 plans.

⁴ The Port of Singapore also registered a record 3.09 billion Gross Tonnage (GT) in annual vessel arrivals comprising primarily bulk carriers, tankers and containerships, in 2023, and set a new high for total registered bunker sales at 51.8 million tonnes.

⁵ Offering shorter transit times, enabling vessels to make up for delays upstream.

⁶ The PWM for cleaners was introduced through licensing conditions in 2014, and involves a minimum monthly wage for cleaners, accompanied by a pathway for wages to increase in tandem with skills upgrading.

Professional Services

21. The **Professional Services** sector registered positive real VA growth and real VAPW growth of 3.1% p.a. and 0.4% p.a. respectively between 2016 and 2023. Meanwhile, real median gross monthly income grew by 0.8% p.a. over the same period.
22. While the sector contracted during the COVID-19 pandemic, with real VA growth of -2.8% p.a. between 2019 and 2021, it subsequently saw a strong recovery from 2021 to 2023 with real VA growth of 5.9% p.a. As the sector supports broader economic activities, its real VA growth closely followed economic trends. In particular, its recovery from 2021 to 2023 was in tandem with the resumption of overall business activities post-pandemic.
23. Similar to real VA, the sector's productivity was adversely affected by COVID-19, with real VAPW growth of -3.4% p.a. between 2019 and 2021. The sector registered real VAPW growth recovery of 0.5% p.a. between 2021 and 2023. The recovery of real VAPW was slower than real VA post-pandemic. This was largely attributable to efforts in retaining and securing talent amidst the sector's recovery, which led to employment growing faster than real VA.
24. To boost productivity, companies in the sector are actively pursuing digitalisation and transformation efforts. Companies are also looking at leveraging AI to transform work processes and boost productivity within the sector.

Retail

25. The **Retail** sector registered positive real VA and real VAPW growth of 1.0% p.a. and 0.9% p.a. respectively from 2016 to 2023, with real median gross monthly income growth of 1.7% p.a. over the same period. The sector experienced real VA and real VAPW growth of 1.5% p.a. and 1.9% respectively between 2016 and 2018 but recorded slight declines for both real VA and real VAPW in 2019 due to a drop in retail sales given weaker macroeconomic conditions. The sector was further impacted during the pandemic⁷ due to travel restrictions and safe distancing measures which dampened domestic economic activities and had a significant impact on retailers, especially during the Circuit Breaker period⁸.
26. However, the sector has rebounded strongly, with real VA growing at 9.1% p.a. between 2020 and 2023, exceeding pre-pandemic performance. This was due to an increase in retail sales arising from pent-up consumer demand and domestic consumers redirecting expenditure for travel⁹ towards retail purchases in 2021 and 2022, and the return of international visitors in 2023.
27. The increase in productivity in the sector was partly driven by efforts to increase digital adoption. For instance, from 2018 to 2023, over 9,000 retail small and medium-sized enterprises (SMEs) embarked on productivity improvement projects¹⁰. As of 2021, 9 in 10 SMEs have adopted at least one digital solution such as digital payment¹¹.

⁷ Real VA fell by 18.1% in 2020 compared to 2019, with a 15% drop in retail sales during this period.

⁸ The Circuit Breaker was an elevated set of safe distancing measures implemented between April and June 2020 to stem the spread of the COVID-19 virus at the height of the pandemic.

⁹ Travel restrictions were still in place in 2021 and at least for the first quarter of 2022 before they were progressively lifted.

¹⁰ Figures based on Productivity Solutions Grant projects for retail companies.

¹¹ Figures based on IMDA's annual survey conducted in 2021. Such solutions exclude COVID-19 related solutions such as Safe Entry.

Food Manufacturing

28. The **Food Manufacturing** sector saw real VA and real VAPW growth of 1.5% p.a. and -2.3% p.a. from 2016 to 2023. Real median gross monthly income saw a slight decline of 0.5% p.a. over the same period, with some companies holding back on wage increases due to eroding profit margins from increased business costs. Real VA growth was driven by a demand surge¹² post COVID-19 despite narrowing profit margins due to high business costs and inflation. While there was a dip in the sector's real VAPW, plans are in place to improve the sector's productivity through automation and job redesign, and to push for supply chain restructuring to reduce business costs and improve global competitiveness. Alongside the IDP launched in 2021, the Government has provided support for over 600 productivity improvement projects¹³.
29. The sector is expected to see further growth by leveraging global trends, including stratified nutrition and the conscious consumer, and by riding on the rising demand from Asia, Europe, and America for Singapore-packaged foods.

Hotels

30. The **Hotels** sector's real VA and real VAPW growth declined by 2.1% p.a. and 0.1% p.a. respectively from 2016 to 2023. This was due to the severe impact of international travel restrictions imposed on tourism demand during the COVID-19 pandemic. Over the same period, real median gross monthly income grew by 1.6% p.a., notwithstanding the impact of the pandemic.
31. Nevertheless, tourism performance is recovering strongly. In 2023, Singapore received 13.6 million visitor arrivals, within the forecast for 12 to 14 million visitor arrivals. Tourism receipts reached \$27.2 billion, marking almost a full recovery to 2019's level. For 2024, STB forecasts 15 to 16.5 million visitor arrivals and \$27.5 to \$29 billion in tourism receipts. In line with this, the Hotels sector is expected to continue to recover.

Air Transport and Aerospace

32. The **Air Transport** and **Aerospace** sectors had positive real VA and real VAPW growth before the COVID-19 pandemic. However, they suffered a setback during the pandemic due to the drastic fall in air travel, which had knock-on effects on aircraft production and maintenance.
33. The Air Transport sector was badly affected by the pandemic, registering a lower real VA growth of 1.3% p.a. from 2016 to 2023, compared to the 5.4% p.a. growth from 2016 to 2019. Real VAPW similarly rose at a slower pace of 0.9% p.a. for the period from 2016 to 2023 compared to 2.6% p.a. from 2016 to 2019. In tandem with weaker real VAPW performance, real gross monthly income declined by 0.1% p.a. for the period of 2016 to 2023. Post-pandemic, the Air Transport sector has shown strong signs of recovery and will continue to forge ahead with industry transformation. Passenger traffic volumes have surpassed pre-pandemic levels in the first quarter of 2024.

¹² Direct exports growth rate for the Food Manufacturing sector during COVID-19 was 0.73% p.a. between 2019 and 2021, but rose rapidly to 16% p.a. post-COVID-19 (from 2021-2022). Direct exports data for 2023 is not yet available at the time of the writing of this report.

¹³ Based on projects supported via Enterprise Development Grant.

34. The Aerospace sector register positive real VA and real VAPW growth of 8.8% p.a. and 8.7% p.a. respectively from 2016 to 2023, with positive real median gross monthly income growth of 0.7% p.a. over this period. During this period, the sector recorded strong real VA and VAPW growth of 14.8% p.a. and 12.7% p.a. respectively from 2016 to 2019, before slumping to negative real VA and VAPW growth of -10.3% p.a. and -2.8% p.a. respectively between 2019 to 2021. The latter was attributable to the knock-on effect on aircraft production and maintenance, repair & overhaul works caused by the plunge in air travel during the pandemic. As demand fell, Aerospace companies adopted cost-cutting measures, including cutting overtime pay and reducing bonuses. This in turn contributed to the decline in real median gross monthly income of 2.2% p.a. from 2019 to 2021. Post-pandemic, the Aerospace sector showed strong signs of recovery between 2021 and 2023, in line with the pickup in demand for air travel.

Built Environment

35. The **Built Environment**¹⁴ sector registered negative real VA and real VAPW growth of -1.9% p.a. and -2.2% p.a. respectively from 2016 to 2023, while real median gross monthly income growth remained positive at 2.3% p.a. over this period. The negative real VA and real VAPW growth of the sector during this period was largely the result of Safe Management Measures and tightened border measures during COVID-19, which led to extensive work slowdowns and delays in construction projects. After border measures were relaxed, firms had to bring in new workers as many existing foreign workers had returned home, in order to catch up on delayed projects while embarking on new ones, thus posing a drag on productivity.

36. Another productivity indicator for the Built Environment sector is site productivity, which improved from 10% in 2016 (compared to 2010 levels) to 17.6% in 2019¹⁵. Through the ITM, BCA facilitated the adoption of Design for Manufacturing and Assembly technologies to shift on-site construction works to more productive factory-like off-site facilities. In addition, BCA encouraged digitalisation and collaboration by promoting Integrated Digital Delivery, a process that links project stakeholders across the building lifecycle digitally. Nonetheless, site productivity dipped to -23.3% (compared to 2010 levels) in 2023¹⁶ in the aftermath of the pandemic.

37. Construction demand is expected to remain stable over the next few years¹⁷. Against this backdrop, BCA will continue to partner the Built Environment sector to uplift the sector's productivity and resilience, and achieve deeper transformation across its value chain. In particular, the refreshed Built Environment ITM will bring stakeholders together to transform the design, construction, and maintenance of buildings. This will be achieved through several initiatives. For example, the progressive implementation of CORENET X to provide an integrated digital shopfront for regulatory submissions from end-2023, adoption of robotics/automation during construction, and the implementation of the Growth and Transformation Scheme (GTS) to help alliances of developers, builders, consultants, and other stakeholders build deep and long-term capabilities.

¹⁴Prior to April 2022, the Built Environment ITM was tracked under the Construction ITM and part of the Real Estate ITM (specifically for the facilities management sub-sector).

¹⁵Site productivity is measured by the floor area constructed per man-day.

¹⁶Site productivity improvement (compared to 2010 levels) was 19.4% in 2020, and 18.4% in 2021. Given that site productivity is computed when projects are completed, projects completed in 2022 were more affected by COVID-19 (i.e., two full years of COVID-19) than projects completed earlier.

¹⁷Construction demand is projected to remain steady between S\$31-S\$38 billion p.a. in nominal terms from 2025 to 2028.

Sectors facing structural headwinds to growth, either domestic or external, compounded in some instances by COVID-19

Energy & Chemicals

38. The **Energy & Chemicals** (E&C) sector registered real VA and real VAPW growth of 0.5% p.a. and -2.1% p.a. respectively from 2016 to 2023. There was positive real median gross monthly income growth of 0.3% p.a. during this period.
39. Specifically, the sector contracted post-pandemic from 2021 to 2023, registering real VA and real VAPW growth of -6.1% p.a. and -17.6% p.a. respectively. Despite the post-pandemic rebound in refining margins in Southeast Asia amidst the energy crisis caused by geopolitical tensions such as the Russia-Ukraine war, real VA growth was tempered by the downcycle in the global chemicals industry due to oversupply and a slower-than-expected demand recovery post-pandemic. Similarly, real VAPW contracted, particularly in the Process Construction and Maintenance subsector, as companies stepped up their hiring of workers to catch up with the backlog of maintenance works that had been disrupted by COVID-19, resulting in a temporary increase in employment.
40. Despite the headwinds, the E&C sector continues to present growth opportunities. The climate ambitions of E&C companies, alongside the call for energy efficiency and greener products, have resulted in a pivot towards low-carbon ventures and the pursuit of high-value opportunities in sustainable products such as sustainable aviation fuels and biofuels. Companies are also pursuing R&D in low-carbon technologies in preparation for the transition to a low-carbon economy.

Food Services

41. The **Food Services** sector registered real VA and real VAPW growth of -1.9% p.a. and -3.4% p.a. respectively from 2016 to 2023, while its real median gross monthly income grew by 1.6% p.a. during this period. The sector faced market saturation prior to the pandemic. While there was a small number of larger enterprises that reaped significant productivity savings from economies of scale, the sector's real VA stayed relatively flat (at 0.1% growth p.a.) and real VAPW growth was negative (at -2.0% p.a.), from 2016 to 2019. This was because a majority of the sector comprised Micro and Small Enterprises (MSEs), many of which entered the market due to the increased availability of commercial space and low barriers to entry but faced challenges in scaling and generating profits.
42. The COVID-19 pandemic further adversely affected the sector's growth and productivity, as restrictions in economic activities and supply chain disruptions led to a significant drop in catering and dining-in demand. In addition, with more entrants into the sector in the last four years (8.0% p.a. growth from 2020 to 2023) compared to the previous period (0.2% p.a. growth from 2016 to 2019), Food Services enterprises also faced stiffer competition and depressed earnings. This led to a further fall in real VA and real VAPW from 2019 to 2023.
43. Despite these challenging circumstances, many Food Services enterprises have gone digital and innovated. In 2023, more than 90% of Food Services SMEs have adopted at least one digital solution following the launch of the Food Services IDP in 2018, and the proportion of online sales grew by more than three times from 9% in 2019 to 23% in 2023. Some enterprises also achieved economies of scale from leveraging centralised kitchens coupled with automation and venturing into less manpower-intensive formats such as ready-to-eat meals. The Food Services ITM 2025 will continue to build on this momentum.

44. On the jobs and skills front, more than 2,600 individuals have been upskilled and reskilled through various initiatives launched by SSG and WSG as part of the first iteration of the Food Services ITM. This is supported by the Food Services Skills Framework and other efforts to guide the sector in redesigning jobs.
45. Overall, the Food Services sector plays an important role in contributing to Singapore's vibrancy and appeal as a global lifestyle and business hub, for locals, visitors, and businesses. The wide diversity of food offerings has enabled Singapore to gain top rankings as a global and liveable city. The Food Services sector also provides a variety of career pathways for Singaporeans, including those seeking to fulfil their entrepreneurial aspirations.

Security

46. The **Security** sector registered real VA and VAPW growth of 1.4% p.a. and 0.2% p.a. respectively from 2016 to 2023. Over this period, real median gross monthly income also rose by 2.1% p.a., partly due to the implementation of the PWM for security officers¹⁸.
47. Under the ITM efforts, the sector has seen significant adoption of technology. The MHA 2022 Security Industry survey findings showed that the proportion of security agencies with at least one Security IDP security solution in their operations has held steady at 96%. In addition, there has been business model transformation across the industry, with Outcome Based Contracting (OBC) (where buyers do not buy services in terms of manhours, but security outcomes). This was complemented by support for job redesign and upskilling efforts for security officers to boost productivity levels. Looking ahead, the Security IDP 2.0 will guide the industry in adopting more advanced and integrated technological solutions, to further streamline security operations and reduce manpower-reliant processes such as patrols and surveillance.
48. The sector is currently made up of diverse players, with a few large security agencies and many smaller ones. While the larger agencies have made progress in transitioning to OBC and adopted technological solutions in their operations, smaller agencies may require more time and assistance to integrate advanced technological solutions into their operations and transition to the OBC model. The security tripartite community has identified several initiatives to support these agencies, including the OBC tender generator and one-stop tripartite-led consultancy services (comprising security assessments, technology installations, funding support, and training recommendations). The Government will continue to work with industry stakeholders to identify more ways to raise productivity and improve security outcomes.

Logistics

49. The **Logistics** sector registered real VA and real VAPW growth of -1.0% p.a. and -3.2% p.a. respectively from 2016 to 2023. Real median gross monthly income growth was -0.1% p.a. over the same period. This sector is a key supporting industry that moves and warehouses goods within and outside of Singapore¹⁹ for key economic sectors like trade, manufacturing, and retail. Its outcomes are thus heavily dependent on demand from these other sectors. As some of these sectors were adversely affected by COVID-19 during this period, the performance of the Logistics sector was similarly negatively affected.

¹⁸The PWM for security officers was introduced through licensing conditions in 2016 and involves a minimum monthly wage for security officers, accompanied by a pathway for wages to increase in tandem with skills upgrading.

¹⁹It encompasses activities such as contract logistics, freight forwarding, and land freight transportation, closely interfacing with the sea and air transport of goods.

50. Almost 95% of the 6,100 companies in the Logistics sector are micro- or small-sized enterprises, and many are subcontractors providing delivery services for larger firms. Productivity growth has been slower than expected as certain manpower-intensive job roles (e.g. drivers) have limited automation potential in the near term. Looking ahead, with 20% of the logistics workforce above the age of 55 and expected to retire by 2030, transformation is critical and urgent.
51. To overcome these challenges, the Government will work with ecosystem partners and trade associations and chambers to encourage more extensive digital adoption, transformation, and job redesign amongst companies in the sector²⁰. The Government will also anchor best-in-class warehouses and develop higher-value capabilities in Singapore²¹.

Marine & Offshore Engineering

52. The **Marine & Offshore Engineering** (M&OE) sector registered real VA and real VAPW growth of -1.4% p.a. and 3.9% p.a. respectively from 2016 to 2023. The drop in real VA during this period was due to a slowdown in ship and rig construction, driven in turn by a sharp decline in oil prices in 2015/2016 and an accelerated shift towards greener energy sources. The COVID-19 pandemic further exacerbated the slowdown. Real median gross monthly income growth was marginal at 0.4% p.a. from 2016 to 2023 as wage growth lagged behind the broader M&OE recovery after the 2015 oil crash and also post-COVID.
53. The Government is working closely with industry partners to transform the sector and leverage new growth opportunities amidst the global energy transition. The Government will help companies transit towards higher-value and resource-light activities while pursuing new areas of growth such as maritime decarbonisation and offshore renewables. At the same time, the Government will support companies to transform their workforce so that they can be equipped with the necessary skills and capabilities to stay relevant and competitive.

Sectors that fulfil important social objectives, aside from growth and productivity

Healthcare and Early Childhood

54. The **Healthcare** sector registered real VA and real VAPW growth of 3.6% p.a. and 0.1% p.a. respectively from 2016 to 2023. In tandem, real median gross monthly income grew by 0.8% p.a. for the period. The **Early Childhood** sector registered real VA and real VAPW growth of 6.6% p.a. and 1.3% p.a. respectively from 2016 to 2023. This contributed to real median gross monthly income growth of 2.1% p.a. over the same period.
55. The two sectors have grown strongly given social needs and provide many good and meaningful jobs. Both sectors will continue to use technology to improve productivity by reducing manual work and administrative tasks.

²⁰ The goDCE (Distribution Centre Excellence) warehouse assessment programme developed by Republic Polytechnic is an example of an initiative that helps companies identify productivity solutions. PSA Singapore (PSA) is also developing a dynamic job allocation module, "OptETruck", to enable job sharing amongst PSA's haulier trucking community.

²¹ For example, DB Schenker's "Red Lion 2" integrated logistics warehouse hub in Singapore will feature autonomous guided vehicles (driverless) and intelligent conveyor systems. Meanwhile, local company Chasen Logistics Services' logistics hub will provide cleanroom facilities for sensitive semiconductor equipment.

56. In response to increasing demand for preschool services, the Early Childhood workforce has seen a significant expansion of more than 5,000 educators since 2018 and aims to grow its workforce by 10% from 2023 to 2025²². The Healthcare sector, on the other hand, aims to grow its workforce by about 5% p.a. from 2021 to 2025. The sector onboarded more than 4,000 new nurses in 2023 and will continue to require administrative, ancillary, and support care staff. These roles have been transformed to provide better career progression opportunities and to raise manpower productivity.
57. Both sectors have a strong domestic focus and are supported by significant investments made through government-supported preschools²³ for the Early Childhood sector and the Government in the public healthcare system for the Healthcare sector. The social outcomes to be achieved go beyond traditional economic indicators such as VA, productivity, and jobs, with both sectors contributing significantly to the community²⁴.

Land Transport

58. The **Land Transport** sector recorded negative real VA and real VAPW growth of -1.9% p.a. and -3.7% p.a. respectively from 2016 to 2023, which reflected lower public transport ridership due to changes in commuting patterns during and after the COVID-19 pandemic. Notwithstanding this, real median gross monthly income rose by 2.6% p.a. during this period. Beyond these metrics, the sector's key outcomes are better reflected in the improved accessibility and reliability of public transport. In this regard, the Government has made significant investments towards meeting these outcomes, and closely tracks and reports them²⁵.

Training and Adult Education

59. The **Training and Adult Education** (TAE) sector registered negative real VA and real VAPW growth of -1.3% p.a. and -2.6% p.a. respectively from 2016 to 2023, while real median gross monthly income growth was similarly negative, at -2.2% p.a., during this period. These were primarily the result of disruptions caused by the COVID-19 pandemic. In particular, training activity and hence sectoral output and productivity fell during the pandemic due to the cessation of in-person training. While some training providers were able to adapt their offerings, such as by pivoting to virtual learning, others faced barriers due to a lack of access to relevant technologies or digital skills. In addition, the prevalence of SMEs in the TAE sector meant that companies were less able to cushion the impact of the decline in their revenues on the income of Adult Educators (AEs). Wages of freelancers, who formed approximately 25% of AEs, were also more sensitive to downward adjustments.
60. Nonetheless, with sustained national focus on upskilling and reskilling, the TAE sector is in a strong position to grow and reinvent itself to support the transformation of other sectors. Its key priorities are to link adult learning closely with employability outcomes, and to raise training quality and learner experience. To do so, efforts to catalyse innovation, digitalisation, and trainer professionalisation in the TAE sector are underway.

²²Salaries of early childhood educators and leaders in Anchor Operator preschools have increased by 20-30% on average since 2018, and the Government will continue to support salary improvements in government-supported preschools.

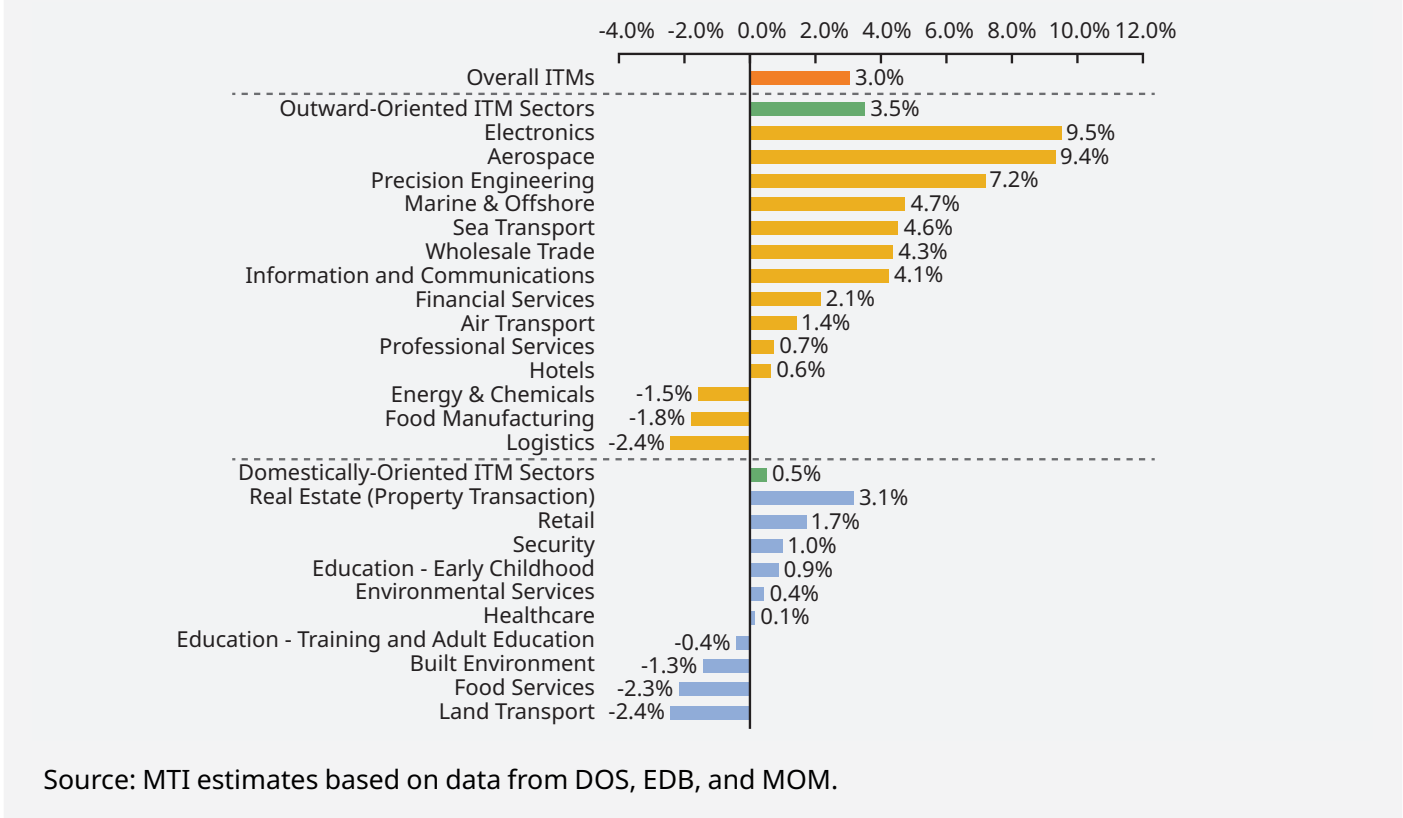
²³Beyond uplifting salaries, the Early Childhood Development Agency (ECDA) is focusing on professional development to deepen expertise and the long-term career advancement of early childhood educators and has introduced more flexible training pathways for educators to deepen their skills.

²⁴For example, a key focus of the Early Childhood sector is to increase access to affordable and quality early childhood services to meet parents' caregiving needs and support children's development. For the Healthcare sector, a key focus is to transform Singapore's healthcare system to enhance population health and anchor care in the community.

²⁵These include expansions to the rail network, increased frequency of bus services during peak hours, and improved Mean Kilometres Between Failures (MKBF) for train services. The Government subsidises public transport services by more than \$2 billion annually to defray the higher costs of providing public transport services.

Annex B - Appendix 1: ITM Sectors' Performance 2016-2023

Figure B-A1: Real VA per Actual Hour Worked Growth of Overall ITMs, Outward- and Domestically-Oriented ITM Sectors (% p.a.), 2016-2023



Annex B - Appendix 2: Glossary of Key Terms and Notes

S/N	Key Economic Indicators	Explanation of Indicators
1.	Value-added (VA)	<p>Gross VA is derived by the output or income approach.</p> <p>The output approach measures VA as output less intermediate consumption. Output refers to the value of goods and services produced, while intermediate consumption is the value of goods and services consumed as inputs during the process of production, e.g. materials, utilities, fuel, rental paid for premises and equipment, banking and financial charges, and other operating costs.</p> <p>The income approach derives VA as the sum of incomes generated from the domestic production of goods and services, which comprise gross operating surplus, remuneration, and taxes (less subsidies) on production.</p> <p>VA in real terms is compiled in chained (2015) dollars.</p>
2.	Labour Productivity: (a) Value-added per actual hour worked (VAPAHW) (b) Value-added per worker (VAPW)	<p>Labour productivity measures output per unit of labour input. VA is generally used as the measure of output, while labour input may be measured by the number of employed persons or hours worked per worker.</p>
3.	Median Gross Monthly Income from Work (Including Employer CPF) of Full-Time Employed Residents	<p>Gross monthly income refers to income earned from employment. For employees, it refers to the gross monthly wages or salaries before deduction of employee CPF contributions and personal income tax. It comprises basic wages, overtime pay, commissions, tips, other allowances, and one-twelfth of annual bonuses. For self-employed persons, gross monthly income refers to the average monthly profits from their business, trade, or profession (i.e. total receipts less business expenses incurred) before deduction of income tax.</p> <p>Full-time employment refers to employment where the normal hours of work are 35 hours or more in a week.</p> <p>Residents refer to Singapore Citizens and Permanent Residents.</p> <p>Data exclude Full-Time National Servicemen.</p> <p>Gross monthly income in real terms is obtained by deflating by the Consumer Price Index for All Items at 2019 prices (2019=100).</p> <p>Between 2016 and 2023, there were significant changes to the cluster of industries within the Training and Adult Education ITM sector, which may affect the comparability of the median GMI growth data for 2016 and 2023 for this sector.</p> <p>Data are from the Comprehensive Labour Force Survey conducted by the Manpower Research & Statistics Department, Ministry of Manpower.</p>