MTI MINISTRY OF TRADE AND INDUSTRY SINGAPORE

ECONOMIC SURVEY OF SINGAPORE

FIRST QUARTER 2023

May 2023

Ministry of Trade and Industry
Republic of Singapore

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MAIN INDICATORS OF THE SINGAPORE ECONOMY

OVERALL ECONOMY

	4Q22	1Q23
Real Gross Domestic Product (Year-on-Year-Growth)	+2.1%	+0.4%
Gross Domestic Product at Current Market Prices	$160.7 billion	$158.1 billion

PRICES

	4Q22	1Q23
Consumer Price Index — All Items	+6.6%	+6.1%
Domestic Supply Price Index	+5.7%	-6.0%

LABOUR MARKET

	4Q22	1Q23
Change in Employment (Quarter-on-Quarter)	+48.1 thousand	+40.1 thousand
Overall Unemployment Rate	Dec22 2.0%	Mar23 1.8%
Value-Added per Actual Hour Worked	-4.9%	-6.6%

COSTS

	4Q22	1Q23
Unit Labour Cost of Overall Economy	+9.3%	+9.3%
Unit Business Cost of Manufacturing	+11.1%	+8.1%
Unit Labour Cost of Manufacturing	+10.3%	+13.5%

MERCHANDISE TRADE

	4Q22	1Q23
Merchandise Exports	$165,739 million -2.3%	$158,921 million -6.5%
Merchandise Imports	$153,707 million +0.5%	$138,968 million -9.2%

SERVICES TRADE

	4Q22	1Q23
Services Exports	$101,906 million +8.2%	$97,007 million +0.4%
Services Imports	$89,826 million +5.7%	$89,101 million +3.3%

CHAPTER

1

THE SINGAPORE ECONOMY

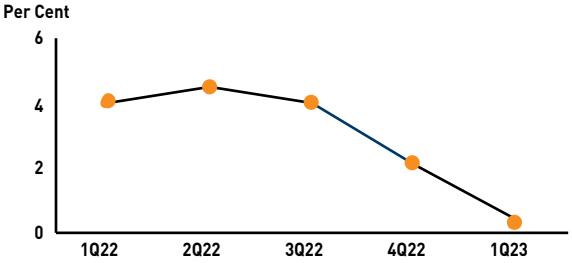
Chapter 1

THE SINGAPORE ECONOMY

ECONOMIC PERFORMANCE

Real GDP grew by **0.4%** in 1Q23

Quarterly Growth (Year-on-Year)



Main Drivers of Growth in 1Q23

Other Services Industries

0.5%-point contribution

Adminstrative & Support Services

0.3%-point contribution

LABOUR MARKET

Resident Unemployment Rate

2.5% in March 23

Employment (Q-O-Q Change)

+40,100 employed in 1Q23

Sectors with the Highest Employment Growth in 1Q23

+12,900 employed

Other Services Industries

+9,200 employed

Construction

+3,400 employed

Finance & Insurance

PRODUCTIVITY

Value-Added per Actual Hour Worked decreased by

6.6% in 1Q23

Sectors with the Highest Growth in Value-Added per Actual Hour Worked in 1Q23

13.5%

Administrative & Support Services

7.6%

Accommodation

5.6%

Food & Beverage Services

COSTS

Overall Unit Labour Cost increased by

9.3% in 1Q23

Within the Manufacturing Sector

8.1%	13.5%
Unit Business Cost	Unit Labour Cost

PRICES

The Consumer Price Index (CPI) rose by

6.1% in 1Q23

Categories with Price Increases

9.2%	8.0%	6.8%
Transport	Food	Clothing & Footwear

INTERNATIONAL TRADE

Total Merchandise Exports decreased by

6.5% in 1Q23

8.5%	-5.2%	-16.2%
Oil Domestic Exports	Re-Exports	Non-Oil Domestic Exports

Total Services Exports grew by

0.4% in 1Q23

Services Exports Increase was led by...

3.9%-pt	1.3%-pt	1.2%-pt
Travel	Financial Services	Other Business Services

OVERVIEW

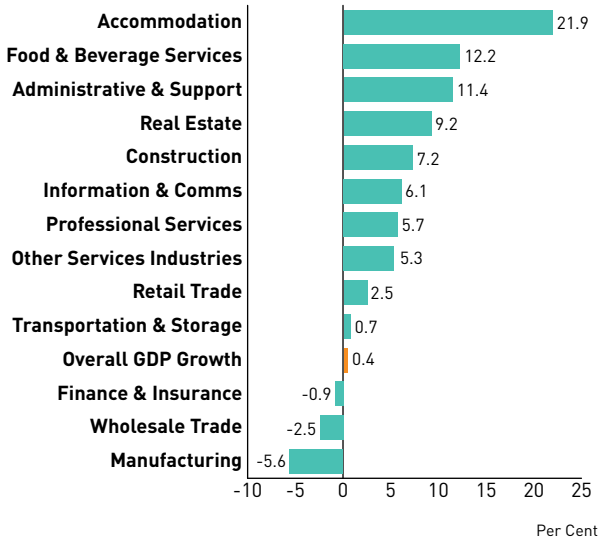
In the first quarter of 2023,

- The Singapore economy grew by 0.4 per cent on a year-on-year basis. The sectors that contributed the most to GDP growth during the quarter were other services, administrative & support services and information & communications.
- The seasonally-adjusted overall, resident and citizen unemployment rates declined notwithstanding an uptick in the number of retrenchments over the same period.
- Total employment rose by 40,100 on a quarter-on-quarter basis, extending the gains in the preceding quarter. Excluding Migrant Domestic Workers (MDWs), total employment increased by 34,500, on the back of employment gains for both residents and non-residents.
- The Consumer Price Index-All Items (CPI-All Items) rose by 6.1 per cent on a year-on-year basis in the first quarter of 2023, moderating from the 6.6 per cent increase in the preceding quarter.

OVERALL PERFORMANCE

The Singapore economy grew by 0.4 per cent on a year-on-year basis in the first quarter of 2023, easing from the 2.1 per cent growth in the previous quarter (Exhibit 1.1). On a quarter-on-quarter seasonally-adjusted basis, the economy contracted by 0.4 per cent, a reversal from the 0.1 per cent growth in the preceding quarter.

Exhibit 1.1: GDP and Sectoral Growth Rates in 1Q 2023



The manufacturing sector shrank by 5.6 per cent year-on-year, worsening from the 2.6 per cent contraction recorded in the previous quarter. The weak performance of the sector came on the back of output declines in all clusters, except for the transport engineering cluster which expanded by 17.7 per cent. Among the clusters that contracted, chemicals (-13.1 per cent) and electronics (-8.0 per cent) saw the largest declines.

The services producing industries grew by 2.0 per cent year-on-year, moderating from the 4.0 per cent growth registered in the previous quarter. Growth was supported by expansions in all services sectors except for the wholesale trade and finance & insurance sectors, which contracted by 2.5 per cent and 0.9 per cent respectively. Among the services sectors that expanded, the accommodation (21.9 per cent), food & beverage services (12.2 per cent) and administrative & support services (11.4 per cent) sectors saw the fastest expansions.

The construction sector grew by 7.2 per cent year-on-year, extending the 10.0 per cent growth in the previous quarter. The sector's growth came on the back of expansions in both public and private sector construction output.

The top three positive contributors to GDP growth in the first quarter were the other services, administrative & support services and information & communications sectors (Exhibit 1.2).

Exhibit 1.2: Percentage-Point Contribution to Growth in Real GDP in 1Q 2023 (By Sector)

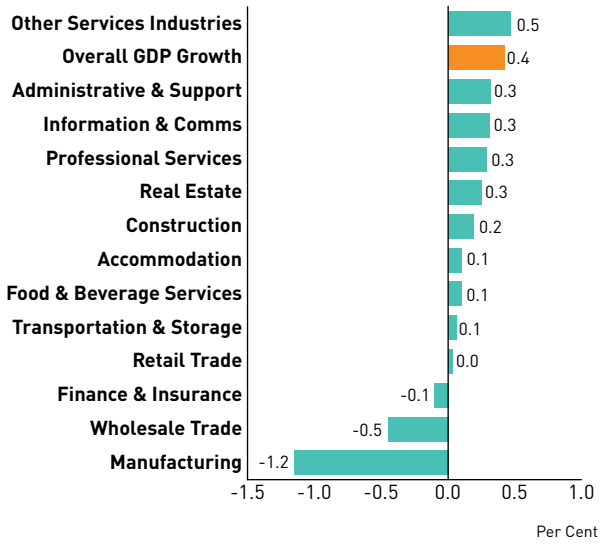


Exhibit 1.3: Changes in Total Demand*

	2022				2023
	I	II	III	IV	I
Total Demand	-0.8	2.4	3.1	-4.1	**0.9**
External Demand	-1.8	0.7	3.2	-7.0	**1.8**
Total Domestic Demand	2.4	7.5	2.8	4.6	**-1.7**
Consumption Expenditure	1.6	10.1	7.9	6.7	**5.8**
Public	-3.6	-0.1	-3.6	-1.5	**5.4**
Private	3.9	13.4	12.0	9.5	**5.8**
Gross Fixed Capital Formation	2.0	2.1	3.4	-1.2	**0.1**
Changes in Inventories	0.5	0.3	-2.1	0.4	**-3.4**

** For inventories, this refers to the contribution to GDP growth.*

SOURCES OF GROWTH

Total demand increased by 0.9 per cent year-on-year in the first quarter of 2023, a reversal from the 4.1 per cent decrease in the previous quarter (Exhibit 1.3). The growth in total demand during the quarter was led by the increase in external demand, which more than offset the decrease in domestic demand.

External demand rose by 1.8 per cent year-on-year, rebounding from the 7.0 per cent decline in the previous quarter. Meanwhile, domestic demand contracted by 1.7 per cent year-on-year, a pullback from the 4.6 per cent growth in the preceding quarter.

Within domestic demand, consumption expenditure rose by 5.8 per cent year-on-year, extending from the 6.7 per cent increase in the preceding quarter. The increase in consumption expenditure was supported by higher private (5.8 per cent) and public consumption expenditure (5.4 per cent).

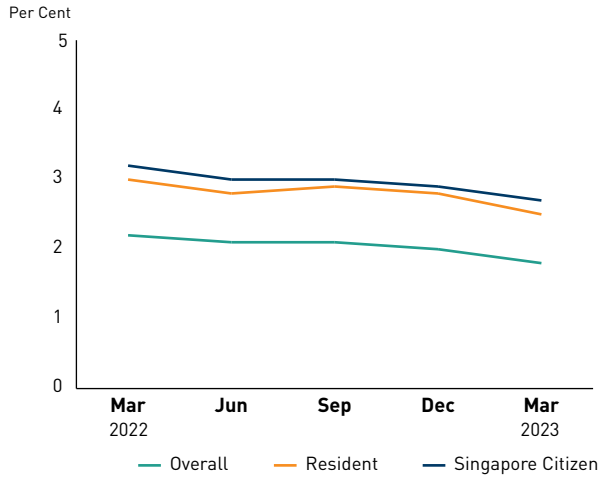
Meanwhile, gross fixed capital formation (GFCF) increased slightly by 0.1 per cent year-on-year, an improvement from 1.2 per cent decline in the previous quarter. The increase in GFCF during the quarter was due to higher public sector GFCF (0.7 per cent), which outweighed a slight decline in private sector GFCF (-0.2 per cent). Public sector GFCF rose due to higher investments in public construction & works and intellectual property products, even as investments in public transport equipment and machinery & equipment declined. Meanwhile, private sector GFCF decreased on the back of a drop in investments in private machinery & equipment, which more than offset the increase in investments in private transport equipment, construction & works and intellectual property products.

LABOUR MARKET

Unemployment and Retrenchment[1]

Compared to December 2022, the seasonally-adjusted unemployment rates in March 2023 decreased at the overall level (from 2.0 per cent to 1.8 per cent), and for residents (from 2.8 per cent to 2.5 per cent) and citizens (2.9 per cent to 2.7 per cent) (Exhibit 1.4). As of March 2023, all three unemployment rates remained firmly below their respective pre-pandemic levels.[2]

Exhibit 1.4: Unemployment Rate (Seasonally-Adjusted)

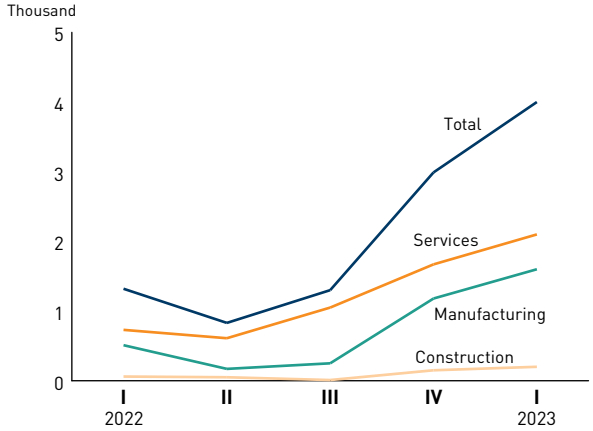


1 *Retrenchment figures pertain to private sector establishments with at least 25 employees and the public sector.*
2 *The average pre-pandemic (i.e., 2018 and 2019) overall, resident and citizen unemployment rates were 2.2 per cent, 3.0 per cent and 3.2 per cent respectively.*

In March 2023, an estimated 61,500 residents, including 54,900 Singapore citizens, were unemployed. These were lower than the number of unemployed residents (67,100) and citizens (59,500) in December 2022.[3]

Total retrenchments rose to 4,000 in the first quarter of 2023, from 2,990 in the preceding quarter (Exhibit 1.5). The increase in retrenchments was seen across sectors, with retrenchments rising in the services (from 1,670 to 2,100), manufacturing (from 1,180 to 1,600), and construction (from 150 to 200) sectors.

Exhibit 1.5: Retrenchments



Employment[4]

Total employment expanded for the sixth consecutive quarter (+40,100) in the first quarter of 2023, albeit at a slower pace than in the preceding quarter (+48,100) (Exhibit 1.6). Excluding MDWs, total employment rose by 34,500.

Total employment growth was largely driven by the services sector (+27,500; or +21,800 excluding MDWs), supported by employment gains in the other services (+12,900), finance & insurance (+3,400), and professional services (+3,200) sectors (Exhibit 1.7). Over the same period, the construction (+9,200) and manufacturing (+3,200) sectors also registered employment gains.

Exhibit 1.6: Change in Total Employment, Quarter-on-Quarter

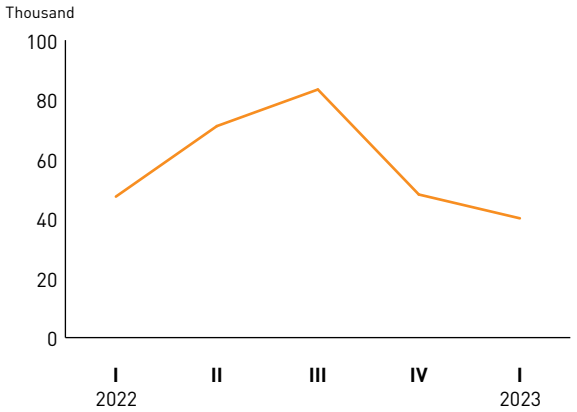
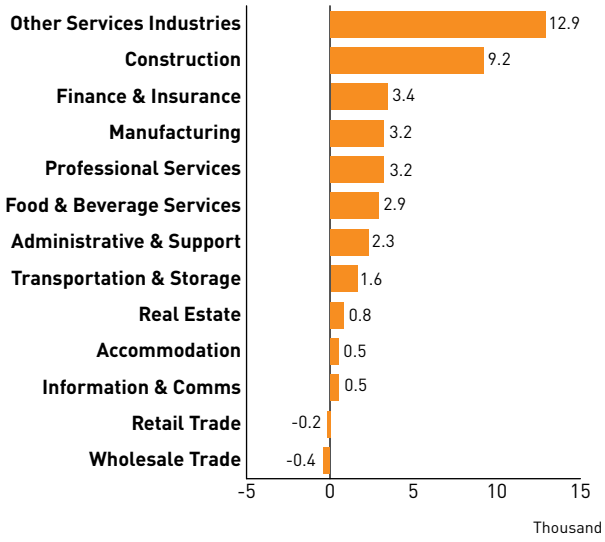


Exhibit 1.7: Changes in Employment by Sector in 1Q 2023



3 *Based on seasonally-adjusted data on the number of unemployed persons.*
4 *Based on preliminary estimates.*

Hiring Expectations

According to EDB's latest Business Expectations Survey for the Manufacturing Sector, hiring expectations in the sector were neutral. Specifically, a net weighted balance of 0 per cent of manufacturers expected to increase hiring in the second quarter of 2023 as compared to the first quarter. Firms in the marine & offshore engineering segment of the transport engineering cluster were the most optimistic, with a net weighted balance of 46 per cent of firms expecting to increase hiring in the second quarter. By contrast, firms in the computer peripherals & data storage segment of the electronics cluster were the most pessimistic, with a net weighted balance of 48 per cent of firms expecting a lower level of hiring in the second quarter.

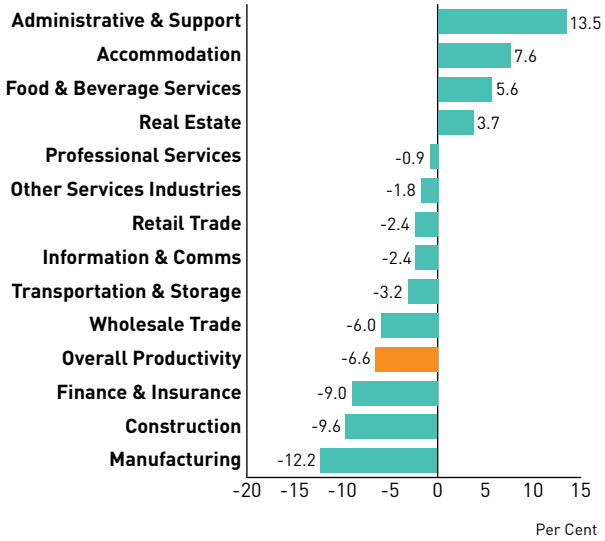
Meanwhile, hiring expectations for services firms remained positive. According to DOS' latest Business Expectations Survey for the Services Sector, a net weighted balance of 6 per cent of services firms expected to increase hiring in the second quarter of 2023 as compared to the first quarter. Among the services sectors, firms in the accommodation sector had the strongest hiring sentiments, with a net weighted balance of 36 per cent of firms expecting to increase hiring in the second quarter. On the other hand, firms in the retail trade sector were the most pessimistic, with a net weighted balance of 14 per cent of firms expecting to hire fewer workers in the second quarter.

COMPETITIVENESS

Productivity

Overall labour productivity, as measured by real value-added per actual hour worked, fell by 6.6 per cent year-on-year in the first quarter of 2023, extending the 4.9 per cent decline in the previous quarter (Exhibit 1.8).[5]

Exhibit 1.8: Changes in Value-Added per Actual Hour Worked for the Overall Economy and Sectors in 1Q 2023



Among the sectors, the administrative & support services (13.5 per cent) and accommodation (7.6 per cent) sectors recorded the strongest productivity gains in the first quarter. The food & beverage services (5.6 per cent) and real estate (3.7 per cent) sectors also saw productivity improvements. By contrast, productivity declines were observed in the manufacturing (-12.2 per cent), construction (-9.6 per cent), finance & insurance (-9.0 per cent), wholesale trade (-6.0 per cent), transportation & storage (-3.2 per cent), information & communications (-2.4 per cent), retail trade (-2.4 per cent), other services (-1.8 per cent) and professional services (-0.9 per cent) sectors.

In the first quarter, the productivity of outward-oriented sectors as a whole fell by 7.4 per cent year-on-year, extending the 4.3 per cent decline in the previous quarter.[6] Meanwhile, the productivity of domestically-oriented sectors as a whole fell by 1.0 per cent year-on-year, extending the 0.1 per cent decline in the preceding quarter.

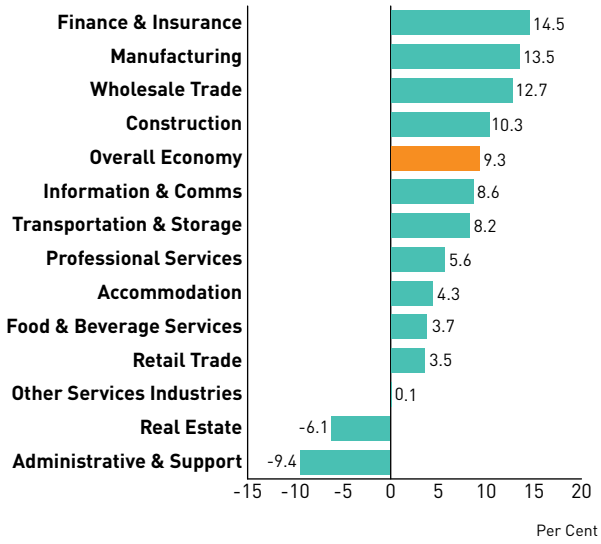
5 *Similarly, overall labour productivity as measured by real value-added per worker, fell by 5.9 per cent in the first quarter of 2023, extending the 4.9 per cent decline in the preceding quarter.*

6 *Outward-oriented sectors refer to manufacturing, wholesale trade, transportation & storage, accommodation, information & communications, finance & insurance and professional services. Domestically-oriented sectors refer to construction, retail trade, food & beverage services, real estate, administrative & support services and other services industries.*

Unit Labour Cost and Unit Business Cost

Overall unit labour cost (ULC) for the economy rose by 9.3 per cent on a year-on-year basis in the first quarter of 2023 (Exhibit 1.9), extending the increase of 9.3 per cent in the preceding quarter. The rise in overall ULC during the quarter was due to an increase in total labour cost per worker along with a fall in labour productivity as measured by real value-added per worker.

Exhibit 1.9: Changes in Unit Labour Cost in 1Q 2023



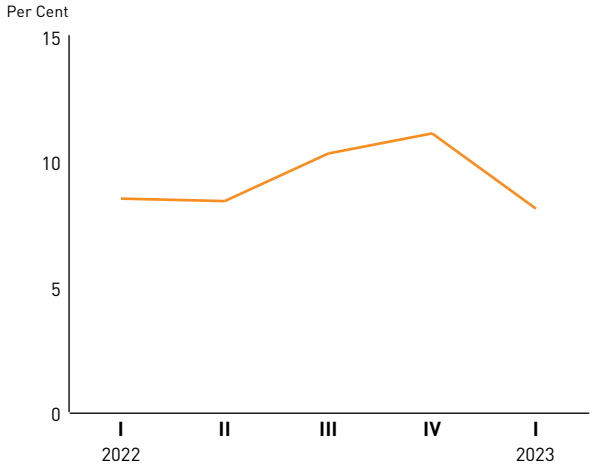
By sectors, the ULC for the construction sector was 10.3 per cent higher year-on-year in the first quarter as a decline in total labour cost per worker was more than offset by a fall in labour productivity.

The ULC for services producing industries rose by 7.4 per cent year-on-year. Among the services sectors, ULC increased the most in the finance & insurance sector (14.5 per cent), reflecting a pickup in total labour cost per worker alongside a decline in productivity. Meanwhile, ULC fell in the administrative & support services (-9.4 per cent) and real estate (-6.1 per cent) sectors. In these sectors, productivity gains surpassed an increase in total labour cost per worker.

Over the same period, the ULC for the manufacturing sector picked up by 13.5 per cent year-on-year. The rise in the sector's ULC occurred on the back of a fall in labour productivity while total labour cost per worker rose slightly.

Unit business cost (UBC) for the manufacturing sector rose by 8.1 per cent on a year-on-year basis in the first quarter of 2023, easing from the 11.1 per cent increase in the previous quarter (Exhibit 1.10). The rise in UBC during the quarter was due to the increase in unit services costs (6.2 per cent), manufacturing ULC (13.5 per cent) and unit non-labour production taxes (20.0 per cent).

Exhibit 1.10: Changes in the Manufacturing Unit Business Cost

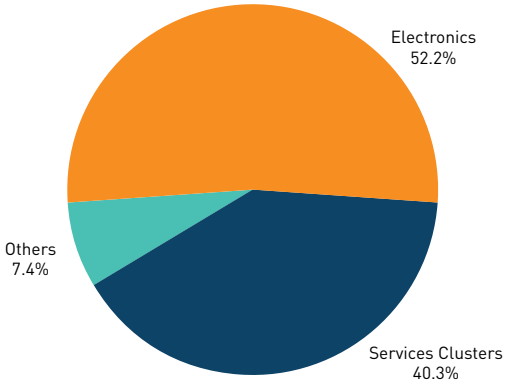


Investment Commitments

Investment commitments garnered by the Economic Development Board (EDB) in terms of Fixed Asset Investments (FAI) and Total Business Expenditure (TBE) amounted to $2.0 billion and $741 million respectively in the first quarter of 2023 (Exhibit 1.11 and Exhibit 1.12).

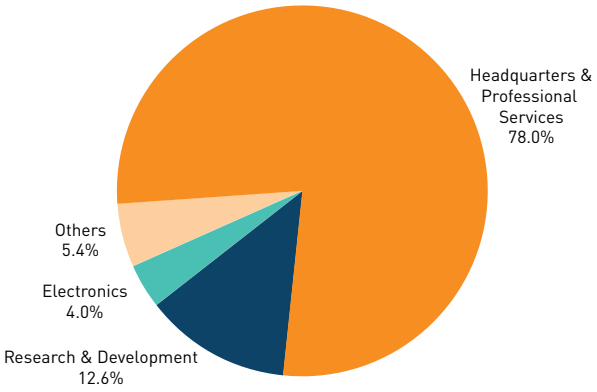
For FAI, the largest contribution came from the manufacturing sector, which attracted $1.2 billion worth of commitments. Within the manufacturing sector, the electronics and biomedical manufacturing clusters garnered the largest amounts of commitments, at $1.0 billion and $105 million respectively. Meanwhile, the headquarters & professional services cluster attracted the most FAI commitments within the services sector, at $742 million. Investors from the United States contributed the most to total FAI, at $1.1 billion (53.6 per cent).

Exhibit 1.11: Fixed Asset Investments by Industry Cluster in 1Q 2023



For TBE, the services sector attracted the highest amount of commitments, at $672 million. Within the sector, the headquarters & professional services and research & development clusters garnered the most TBE commitments, at $578 million and $93.3 million respectively. Among the manufacturing clusters, the electronics and biomedical manufacturing clusters attracted the largest amounts of TBE commitments, at $29.8 million and $23.7 million respectively. Investors from the United States were the largest source of TBE commitments, with commitments of $268 million (36.2 per cent).

Exhibit 1.12: Total Business Expenditure by Industry Cluster in 1Q 2023



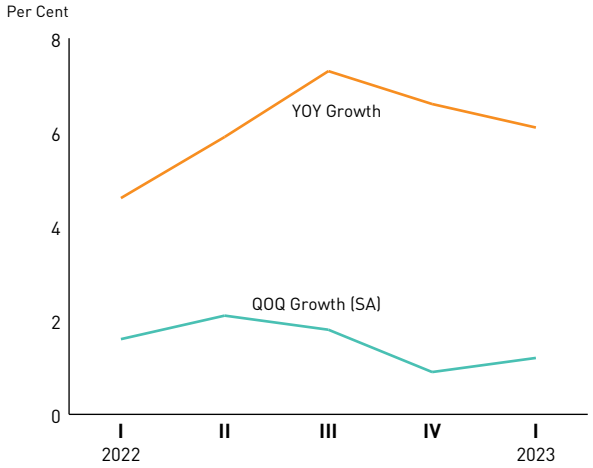
When these projects are fully implemented in the coming years, they are expected to generate $3.5 billion of value-added and create more than 1,800 jobs.

PRICES

Consumer Price Index

The Consumer Price Index-All Items (CPI-All Items) rose by 6.1 per cent on a year-on-year basis in the first quarter of 2023, moderating from the 6.6 per cent increase in the preceding quarter (Exhibit 1.13). On a quarter-on-quarter seasonally-adjusted basis, CPI-All Items inflation came in at 1.2 per cent, up from the 0.9 per cent recorded in the previous quarter.

Exhibit 1.13: Changes in CPI



All CPI categories saw price increases on a year-on-year basis in the first quarter, thus contributing positively to CPI-All Items inflation in the first quarter (Exhibit 1.14). Food prices rose by 8.0 per cent on the back of an increase in the costs of food serving services like hawker food and restaurant meals, as well as non-cooked food items such as meat, bread & cereals, and fish & seafood. Clothing & footwear prices picked up by 6.8 per cent due to more expensive ready-made garments and footwear. Housing & utilities costs increased by 5.3 per cent because of a rise in the costs of accommodation and electricity. Prices of household durables & services went up by 2.6 per cent as the prices of household durables and domestic & household services increased. Healthcare costs rose by 4.0 per cent on account of the higher costs of outpatient and hospital services. Transport costs climbed by 9.2 per cent due to an increase in the costs of cars and point-to-point transport services, as well as higher road tax and bus & train fares. Communication costs picked up by 2.1 per cent on the back of a rise in the prices of telecommunication services. Recreation & culture prices increased by 6.8 per cent as a result of the higher costs of holiday travel[7] and recreational & cultural services. Education costs rose by 3.0 per cent

7 *As overseas travel had not fully recovered in the first quarter of 2023, a portion of the CPI for holiday expenses remained imputed using the overall change in CPI-All Items.*

because of higher fees at commercial institutions and universities. Prices of miscellaneous goods & services edged up by 2.6 per cent on account of a rise in the costs of personal care items and alcoholic drinks & tobacco.

Exhibit 1.14: Percentage Changes in CPI over Corresponding Quarter of Previous Year

Per Cent

	2022				2023
	I	II	III	IV	I
All items	4.6	5.9	7.3	6.6	**6.1**
Food	2.7	4.7	6.5	7.3	**8.0**
Clothing & Footwear	-3.5	2.8	7.1	5.2	**6.8**
Housing & Utilities	4.2	5.1	6.0	5.7	**5.3**
Housing Durables & Services	1.7	2.1	2.1	2.3	**2.6**
Healthcare	1.5	1.6	2.7	2.8	**4.0**
Transport	15.4	16.6	19.4	14.3	**9.2**
Communication	-2.6	-0.9	-0.8	-0.5	**2.1**
Recreation & Culture	1.4	3.8	5.6	6.3	**6.8**
Education	2.1	2.2	2.2	2.0	**3.0**
Miscellaneous Goods & Services	0.1	0.2	0.5	1.1	**2.6**

INTERNATIONAL TRADE

Merchandise Trade

Singapore's total merchandise trade declined by 7.8 per cent on a year-on-year basis in the first quarter, following the 1.0 per cent decrease in the preceding quarter (Exhibit 1.15). The decline in total merchandise trade was due to the decrease in non-oil trade (-9.5 per cent) while oil trade saw a flat performance (0.0 per cent).

Exhibit 1.15: Growth Rates of Total Merchandise Trade, Merchandise Exports and Merchandise Imports (In Nominal Terms)

Per Cent

	2022					2023
	I	II	III	IV	ANN	I
Merchandise Trade	20.8	28.0	25.7	-1.0	17.7	**-7.8**
Merchandise Exports	18.8	24.9	23.4	-2.3	15.6	**-6.5**
Domestic Exports	20.8	28.5	27.9	-2.1	18.2	**-8.0**
Oil	45.4	72.9	75.2	21.6	52.4	**8.5**
Non-Oil	11.4	8.9	7.1	-14.0	3.0	**-16.2**
Re-Exports	17.2	21.7	19.8	-2.4	13.5	**-5.2**
Merchandise Imports	23.1	31.6	28.1	0.5	20.1	**-9.2**
Oil	50.7	66.7	58.8	8.2	43.9	**-7.4**
Non-Oil	17.4	23.5	21.2	-1.4	14.6	**-9.7**

Total merchandise exports declined by 6.5 per cent in the first quarter, following the 2.3 per cent decrease in the preceding quarter. This was due to the decrease in both domestic exports (-8.0 per cent) and re-exports (-5.2 per cent).

The decline in domestic exports was due to the decrease in non-oil domestic exports (NODX) (-16.2 per cent) which outweighed the growth in oil domestic exports (8.5 per cent). In volume terms, oil domestic exports expanded by 21.3 per cent.

Meanwhile, NODX contracted by 16.2 per cent in the first quarter, following the 14.0 per cent decline in the previous quarter. The decline in NODX was due to the decrease in both electronics and non-electronics domestic exports.

Total merchandise imports declined by 9.2 per cent in the first quarter, after the 0.5 per cent growth in the previous quarter. The decline in imports was due to the decrease in both oil and non-oil imports. Specifically, oil imports decreased by 7.4 per cent, while non-oil imports declined by 9.7 per cent due to lower electronics and non-electronics imports.

Services Trade

Total services trade expanded by 1.7 per cent on a year-on-year basis in the first quarter, moderating from the 7.0 per cent increase in the previous quarter (Exhibit 1.16). Both the exports and imports of services saw positive year-on-year growth during the quarter.

Exhibit 1.16: Growth Rates of Total Services Trade, Services Exports and Services Imports (In Nominal Terms)

Per Cent

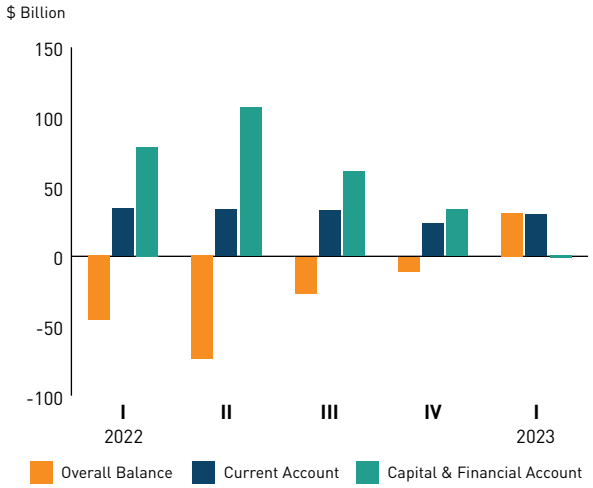
	2022					2023
	I	II	III	IV	ANN	I
Total Services Trade	10.7	13.1	12.5	7.0	10.8	**1.7**
Services Exports	12.2	14.3	14.1	8.2	12.1	**0.4**
Services Imports	9.2	11.8	10.6	5.7	9.3	**3.3**

Services exports rose by 0.4 per cent in the first quarter, slower than the 8.2 per cent increase in the preceding quarter. The slight increase in services exports was largely attributable to a pickup in the exports of travel services, financial services and other business services, even as the exports of transport services fell. Meanwhile, services imports expanded by 3.3 per cent, easing from the 5.7 per cent increase in the previous quarter. The rise in services imports was mainly due to an increase in the imports of travel services, which outweighed a decline in the imports of transport services.

BALANCE OF PAYMENTS

Singapore recorded an overall balance of payments surplus of $31.3 billion in the first quarter of 2023, reversing a deficit of $10.7 billion in the preceding quarter (Exhibit 1.17).

Exhibit 1.17: Balance of Payments



Current Account

The current account surplus increased to $29.5 billion in the first quarter of 2023, from $23.5 billion in the previous quarter. This was due to an increase in the goods trade surplus and a narrowing of the primary income deficit, which more than offset a narrowing of the services trade surplus and a slight widening of the secondary income deficit.

The surplus in the goods balance increased by $4.4 billion to $46.1 billion in the first quarter, as goods imports declined by more than goods exports.

By contrast, the surplus in the services balance fell by $4.2 billion to $7.9 billion in the first quarter. Transport services recorded net payments in the first quarter, a reversal from net receipts in the preceding quarter, while net receipts for other business services declined. On the other hand, travel services as well as charges for the use of intellectual property saw lower net payments.

At the same time, the primary income deficit narrowed by $5.9 billion to $23.0 billion in the first quarter, as primary income receipts rose while payments fell slightly.

The secondary income deficit widened to $1.6 billion from $1.4 billion on the back of a larger increase in secondary income payments as compared to receipts.

Capital and Financial Account[8]

The capital and financial account registered a net inflow of $1.5 billion in the first quarter of 2023, from a net outflow of $33.5 billion recorded in the preceding quarter. This was mainly due to the "other investment" account which recorded net inflows compared to the net outflows in the preceding quarter. This more than offset the increase in net outflows from portfolio investment and the decrease in net inflows of direct investment and financial derivatives.

"Other investment" recorded net inflows of $8.3 billion in the first quarter, from net outflows of $51.5 billion in the previous quarter. This was driven in part by the switch in the non-bank private sector from a net outflow to a net inflow position.

Net inflows of direct investment fell to $26.2 billion in the first quarter, from $34.2 billion in the preceding quarter, as foreign direct investments into Singapore declined to a greater extent than residents' direct investments abroad.

Net inflows of financial derivatives also edged down from $2.4 billion to $2.0 billion in the first quarter.

Meanwhile, net outflows of portfolio investment increased to $35.0 billion in the first quarter, from $18.6 billion in the preceding three months. Resident deposit-taking corporations shifted to a net outflow position from a net inflow position in the preceding quarter, while net outflows from the non-bank private sector picked up.

8 *Net inflows in net balances are indicated by a minus (-) sign. For more details regarding the change in sign convention to the financial account, please refer to DOS's information paper on "Singapore's International Accounts: Methodological Updates and Recent Developments".*

CHAPTER

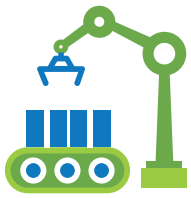
2

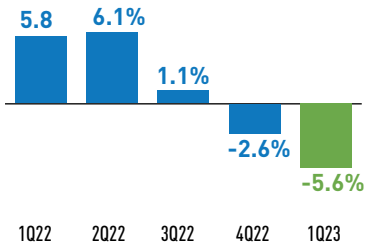
SECTORAL PERFORMANCE

Chapter 2

SECTORAL PERFORMANCE

MANUFACTURING





CLUSTERS IN MANUFACTURING SECTOR

17.7%
Transport Engineering

-1.8%
Biomedical Manufacturing

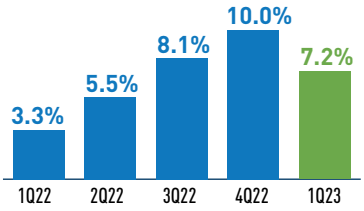
-5.8%
Precision Engineering

-7.6%
General Manufacturing Industries

-8.0%
Electronics

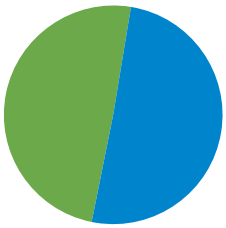
-13.1%
Chemicals

CONSTRUCTION



CERTIFIED PAYMENTS

50.8%
Public



49.2%
Private

CONTRACTS AWARDED

72.6%
Institutional & Others

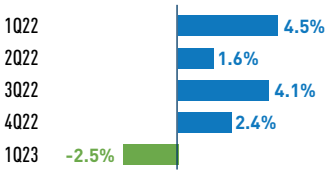
54.6%
Commercial

14.6%
Residential

-56.1%
Civil Engineering

-87.9%
Industrial

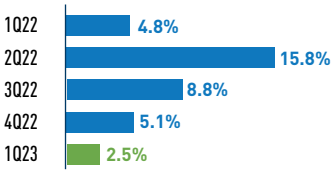
WHOLESALE TRADE



Domestic Wholesale Trade Index Growth 10.3%

Foreign Wholesale Trade Index Growth -1.2%

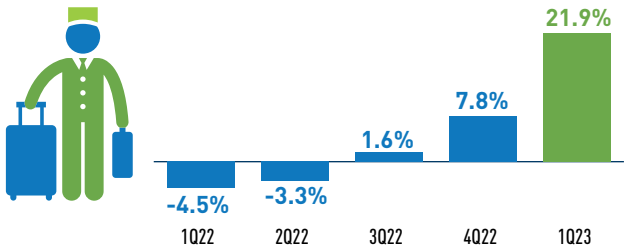
RETAIL TRADE



Retail Sales Index Growth (Non-Motor Vehicles) 2.7%

Retail Sales Index Growth (Motor Vehicles) -7.7%

ACCOMMODATION



OCCUPANCY RATES OF HOTELS (Y-O-Y CHANGE)

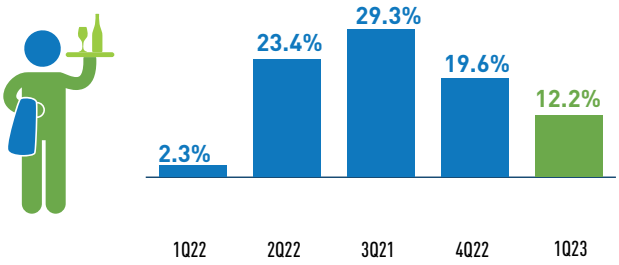
Luxury
19.3%-pt

Upscale
20.9%-pt

Mid-Tier
18.2%-pt

Economy
9.8%-pt

FOOD & BEVERAGE SERVICES



FOOD & BEVERAGE SALES INDEX GROWTH

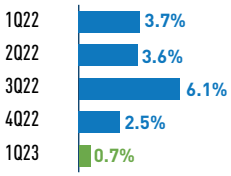
Food Caterers
81.4%

Restaurants
9.5%

Others
5.9%

Fast Food Outlets
4.1%

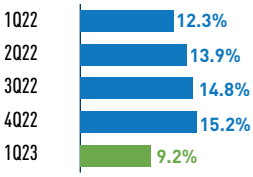
TRANSPORTATION & STORAGE



Total Sea Cargo Handled Growth -1.4%

Air Passengers Handled Growth 405%

REAL ESTATE

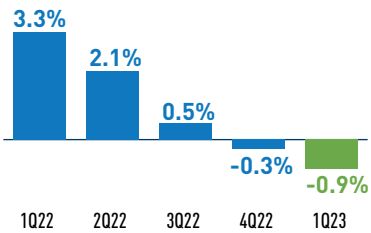


PRIVATE RESIDENTIAL REAL ESTATE

Units Transacted (Y-O-Y Change) -22.8%

Price Index (Q-O-Q Change) 3.3%

FINANCE & INSURANCE



OVERVIEW

In the first quarter of 2023,

- The manufacturing sector contracted by 5.6 per cent year-on-year, following the 2.6 per cent decline in the preceding quarter. All clusters saw a fall in output except for the transport engineering cluster.
- The construction sector expanded by 7.2 per cent year-on-year, easing from the 10.0 per cent expansion in the previous quarter.
- The wholesale trade sector contracted by 2.5 per cent year-on-year, reversing the 2.4 per cent growth recorded in the preceding quarter.
- The retail trade sector expanded by 2.5 per cent year-on-year, moderating from the 5.1 per cent recorded in the fourth quarter of 2022.
- The transportation & storage sector posted growth of 0.7 per cent year-on-year, slowing from the 2.5 per cent growth recorded in the previous quarter.
- The accommodation sector expanded by 21.9 per cent year-on-year, extending the 7.8 per cent growth in the preceding quarter.
- Growth in the food & beverage services sector moderated to 12.2 per cent year-on-year, from the 19.6 per cent in the fourth quarter of 2022.
- The finance & insurance sector contracted by 0.9 per cent year-on-year, extending the 0.3 per cent decline in the preceding quarter.
- The real estate sector expanded by 9.2 per cent year-on-year, easing from the 15.2 per cent growth in the previous quarter.
- The professional services sector expanded by 5.7 per cent year-on-year, following the 6.1 per cent expansion in the preceding quarter.

MANUFACTURING

The manufacturing sector contracted by 5.6 per cent on a year-on-year basis in the first quarter of 2023, following the 2.6 per cent decline in the previous quarter (Exhibit 2.1). The decline in the first quarter of 2023 was due to output contractions in all clusters except for the transport engineering cluster (Exhibit 2.2).

Exhibit 2.1: Manufacturing Sector's Growth Rate

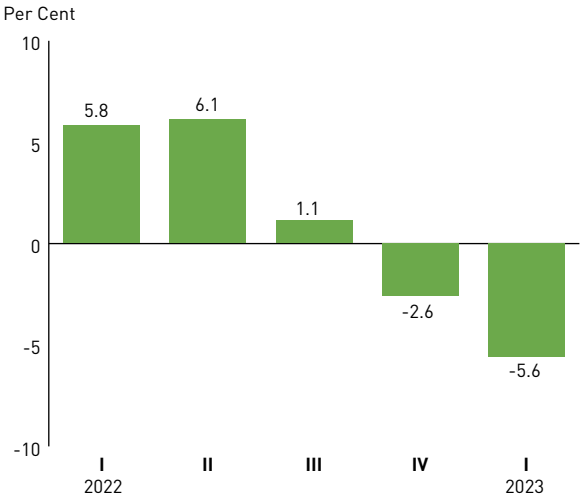
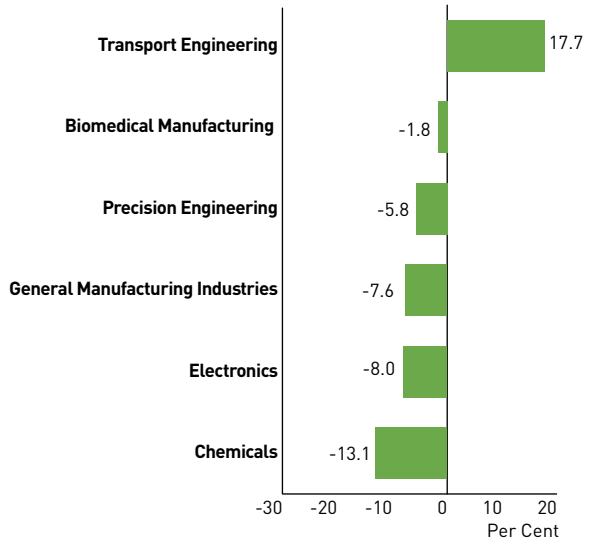


Exhibit 2.2: Manufacturing Clusters' Growth Rates in 1Q 2023



Output in the transport engineering cluster expanded by 17.7 per cent year-on-year in the first quarter, supported by expansions in the marine & offshore engineering (M&OE) and aerospace segments. The M&OE segment grew by 40.0 per cent, supported by a higher level of activity in the shipyards as well as an increase in production of oilfield & gasfield equipment. Meanwhile, output in the aerospace segment expanded by 16.1 per cent driven by stronger demand for maintenance, repair & overhaul (MRO) works from commercial airlines, on the back of increased global air traffic. By contrast, the land segment contracted by 22.5 per cent.

The biomedical manufacturing cluster contracted by 1.8 per cent year-on-year on the back of a 11.3 per cent decline in the output of the pharmaceuticals segment. The latter was due to a different mix of active pharmaceutical ingredients (APIs) produced. On the other hand, output in the medical technology segment rose by 12.2 per cent due to higher export demand for medical devices.

Output in the precision engineering cluster fell by 5.8 per cent year-on-year, on the back of a 17.7 per cent decline in the precision modules & components segment due to a lower level of production of (i) plastic and metal precision components, (ii) optical instruments and (iii) dies, moulds, tools, jigs and fixtures. Meanwhile, the machinery & systems (M&S) segment contracted by 0.9 per cent on account of a lower output of back-end semiconductor equipment as well as refrigeration and air-conditioning compressors.

The general manufacturing cluster contracted by 7.6 per cent year-on-year, driven by output contractions across all segments. Output in the miscellaneous industries and printing segments fell by 14.7 per cent and 10.5 per cent respectively, with the former recording a lower level of production of batteries and structural metal products. Meanwhile, the food, beverages & tobacco segment declined by 1.9 per cent due to a lower output of dairy, bread and bakery products.

The electronics cluster fell by 8.0 per cent year-on-year, with output declines across all segments on the back of weak external demand. Output in the other electronic modules & components, infocomms & consumer electronics, computer peripherals & data storage and semiconductors segments fell by 23.3 per cent, 17.1 per cent, 8.8 per cent and 7.5 per cent respectively.

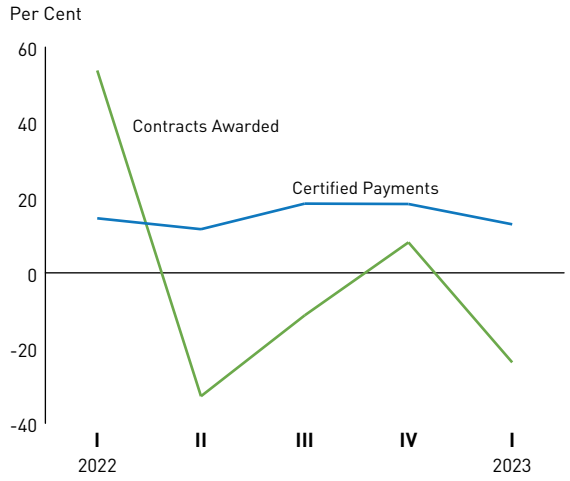
Output in the chemicals cluster shrank by 13.1 per cent year-on-year, driven by a fall in the output of the petrochemicals (-26.1 per cent), specialty chemicals (-8.3 per cent) and other chemicals (-7.9 per cent) segments. The petrochemicals segment recorded a lower level of output amidst plant maintenance shutdowns and weak market demand, while the specialties segment recorded lower production of mineral oil and food additives. Meanwhile, the other chemicals segment reported a drop in production due to a decline in the output of fragrances.On the other hand, output of the petroleum segment grew by 8.4 per cent on account of higher demand for jet fuel driven by greater global air travel demand.

CONSTRUCTION

The construction sector grew by 7.2 per cent year-on-year in the first quarter of 2023, easing from the 10.0 per cent expansion in the previous quarter.

In the first quarter, nominal certified progress payments (a proxy for construction output) rose by 12.9 per cent year-on-year, moderating from the 18.3 per cent increase recorded in the previous quarter (Exhibit 2.3). Higher certified progress payments were seen in both the public (9.5 per cent) and private (16.5 per cent) sectors. The growth in public certified progress payments was largely driven by higher outturns in public institutional & others building (26.5 per cent) and civil engineering (6.9 per cent) works. Meanwhile, the increase in private certified progress payments was led by expansions in private commercial (56.6 per cent) and industrial (12.8 per cent) building works.

Exhibit 2.3: Changes in Contracts Awarded and Certified Payments



On the other hand, construction demand in terms of contracts awarded fell by 23.8 per cent year-on-year in the first quarter, reversing the 8.1 per cent expansion in the previous quarter (Exhibit 2.3). The fall in contracts awarded during the quarter was on account of lower public (-25.2 per cent) and private (-21.0 per cent) sector construction demand. The former was led by a fall in contracts awarded for public civil engineering (-57.7 per cent) and industrial building (-97.3 per cent) works, while the latter was driven by a decline in contracts awarded for private industrial (-86.2 per cent) and institutional & others (-69.2 per cent) building works.

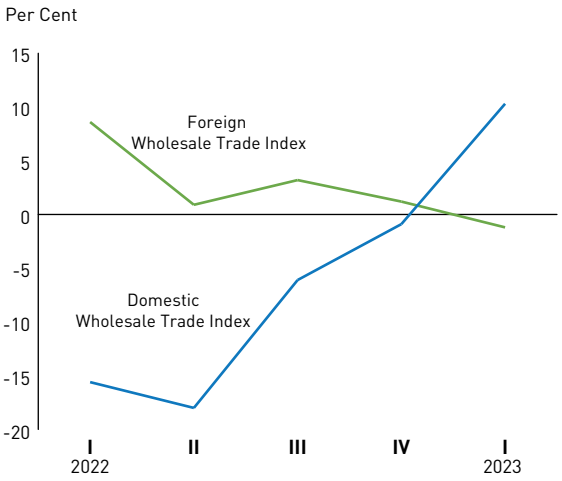
WHOLESALE TRADE

The wholesale trade sector shrank by 2.5 per cent year-on-year in the first quarter of 2023, reversing the 2.4 per cent expansion in the previous quarter.

The contraction in the sector was led by a 1.2 per cent year-on-year decline in foreign wholesale trade sales volume over the same period (Exhibit 2.4), reversing the 1.2 per cent expansion recorded in the previous quarter. This decrease was led by declines in the sales volumes of other wholesale trade[1] (-17.9 per cent), general wholesale trade (-14.9 per cent), chemicals & chemical products (-14.8 per cent) and metals, timber & construction materials (-10.7 per cent).

On the other hand, the domestic wholesale trade sales volume expanded by 10.3 per cent year-on-year, reversing the 0.9 per cent contraction in the previous quarter. The expansion was primarily due to growth in the sales volumes of ship chandlers & bunkering (35.0 per cent) and petroleum & petroleum products (27.8 per cent). Meanwhile, there were large declines in the sales volumes of other wholesale trade (-19.7 per cent) and telecommunications & computers (-15.9 per cent).

Exhibit 2.4: Changes in Wholesale Trade Index in Chained Volume Terms



1 *The "other wholesale trade" segment consists of a diverse range of products that include agricultural raw materials and live animals, tropical produce, personal effects and medicinal and pharmaceutical products, among others.*

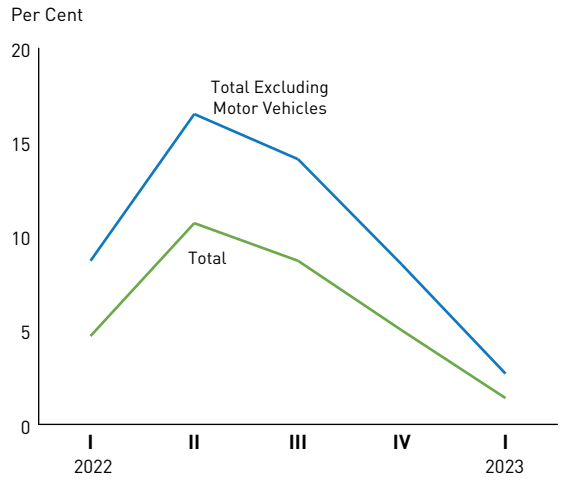
RETAIL TRADE

The retail trade sector posted growth of 2.5 per cent year-on-year in the first quarter of 2023, extending the 5.1 per cent expansion in the previous quarter.

In the first quarter, overall retail sales volume increased by 1.4 per cent year-on-year, following the 5.0 per cent growth in the preceding quarter (Exhibit 2.5). Growth in overall retail sales volume in the first quarter of 2023 could be attributed to non-motor vehicular sales (2.7 per cent), as motor vehicular sales saw a decline (-7.7 per cent) due to a reduction in Certificate of Entitlement (COE) quotas.

Among the non-motor vehicle segments, the sales volumes of food & alcohol (39.1 per cent), wearing apparel & footwear (20.9 per cent), optical goods & books (9.2 per cent), department stores (8.8 per cent) and computer & telecommunications equipment (8.5 per cent) rose. By contrast, the sales volumes of furniture & household equipment (-8.5 per cent), supermarket & hypermarkets (-8.4 per cent) and mini-marts & convenience stores (-5.3 per cent) fell.

Exhibit 2.5: Changes in Retail Sales Index in Chained Volume Terms

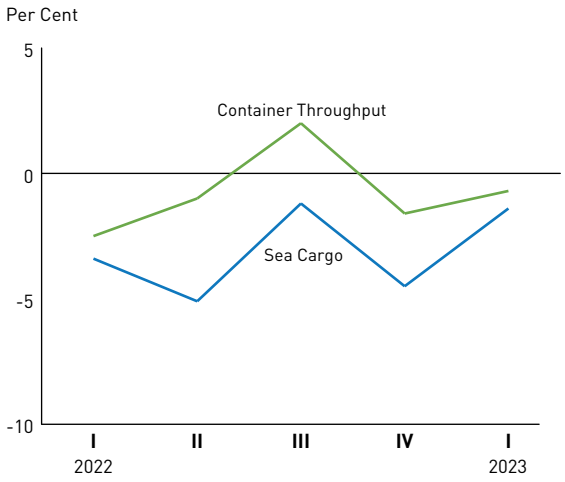


TRANSPORTATION & STORAGE

The transportation & storage sector expanded by 0.7 per cent year-on-year in the first quarter of 2023, moderating from the 2.5 per cent growth in the previous quarter. While the air transport and land transport segments expanded during the quarter, the water transport segment contracted.

In the water transport segment, the volume of sea cargo handled fell by 1.4 per cent year-on-year in the first quarter, improving from the 4.5 per cent decline in the previous quarter (Exhibit 2.6). The drop in sea cargo volume handled was due to lower general cargo volume (-4.4 per cent), even as oil-in-bulk cargo volume grew (2.9 per cent). At the same time, container throughput contracted by 0.7 per cent during the quarter.

Exhibit 2.6: Changes in Container Throughput and Sea Cargo Handled

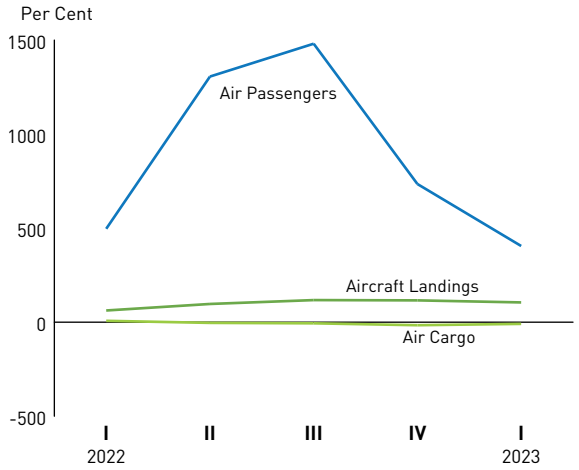


By contrast, the air transport segment saw robust growth in the first quarter. In particular, the volume of air passenger traffic (less transit) handled at Changi Airport surged by 405 per cent year-on-year in the first quarter, following the 735 per cent increase in the previous quarter (Exhibit 2.7). The high growth rates in both quarters were due to the low bases in the first quarter of 2022 and fourth quarter of 2021, when the volume of air passenger traffic was weak due to travel restrictions[2]. While air passenger traffic volume saw a sharp rebound in the first quarter, it remained 20.8 per cent below its pre-COVID level (i.e., first quarter of 2019) in absolute terms.

2 *For instance, the volume of air passenger traffic in the first quarter was 84.3 per cent below its pre-COVID level (i.e., the first quarter of 2019). The Vaccinated Travel Framework was only rolled out in the second quarter of 2022 (i.e., from 1 April 2022).*

Reflecting the recovery in air travel, the number of aircraft landings climbed by 105 per cent year-on-year to reach 37,064 in the first quarter of 2023, extending the 116 per cent increase in the preceding quarter. On the other hand, total air cargo shipments handled at Changi Airport declined by 9.0 per cent year-on-year in the first quarter, albeit an improvement from the 16.1 per cent contraction in the previous quarter.

Exhibit 2.7: Changes in Air Transport

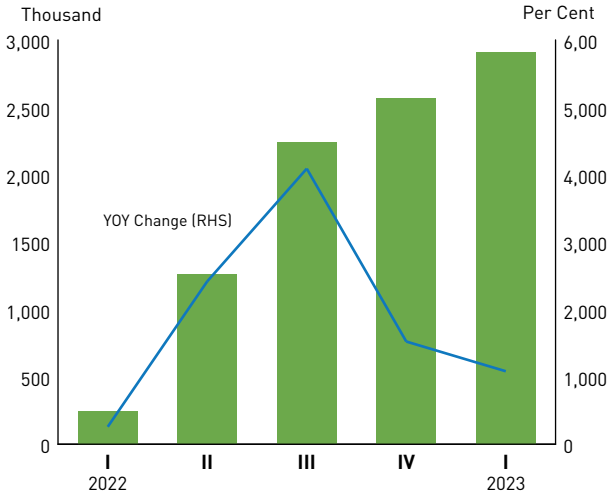


ACCOMMODATION

The accommodation sector expanded robustly by 21.9 per cent year-on-year in the first quarter of 2023, accelerating from the 7.8 per cent growth in the preceding quarter.

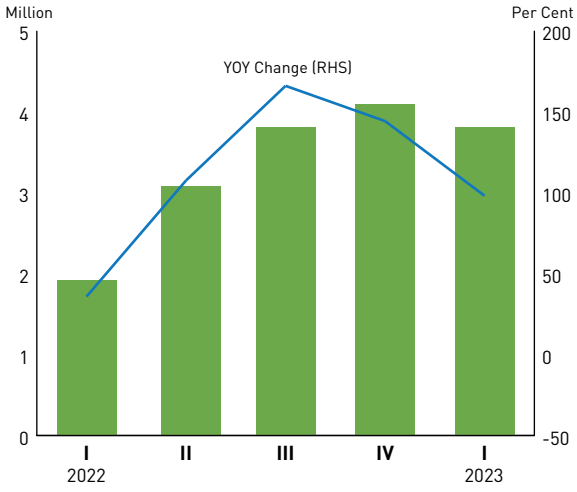
In the first quarter, total visitor arrivals surged by 1,082 per cent year-on-year, extending the 1,523 per cent growth in the previous quarter (Exhibit 2.8). The strong growth in both quarters was on account of low base effects. In level terms, the number of visitor arrivals in the first quarter of 2023 was around 2.9 million, reaching 62.1 per cent of the 4.7 million visitor arrivals recorded in the first quarter of 2019 (i.e., pre-COVID level).

Exhibit 2.8: Visitor Arrivals



Reflecting the recovery in visitor arrivals, gross lettings at gazetted hotels climbed by 98.2 per cent year-on-year in the first quarter, extending the 144 per cent increase in the previous quarter (Exhibit 2.9). At the same time, the average occupancy rate of gazetted hotels rose by 16.7 percentage-points year-on-year to reach 77.7 per cent in the first quarter of 2023. This was a moderation from the 82.7 per cent recorded in the previous quarter.

Exhibit 2.9: Gross Lettings at Gazetted Hotels

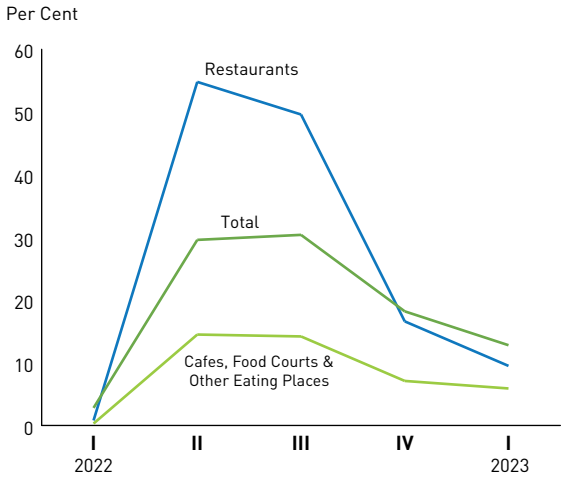


FOOD & BEVERAGE SERVICES

The food & beverage services sector expanded by 12.2 per cent year-on-year in the first quarter of 2023, extending the 19.6 per cent growth in the previous quarter.

Overall food & beverage sales volume rose by 12.8 per cent year-on-year in the first quarter, extending the 18.2 per cent growth in the previous quarter (Exhibit 2.10). The increase in food & beverage sales volume was broad-based, led by the food caterers (81.4 per cent) segment, followed by the restaurants (9.5 per cent), cafes, food courts & other eating places (5.9 per cent) and fast food outlets (4.1 per cent) segments.

Exhibit 2.10: Changes in Food & Beverage Services Index in Chained Volume Terms



FINANCE & INSURANCE

The finance & insurance sector contracted by 0.9 per cent year-on-year in the first quarter of 2023, extending the 0.3 per cent decline in the previous quarter. The poor performance was led by the banks segment, which weakened further amidst a decline in both net fees & commissions and credit intermediation. Non-bank loans to residents fell by 4.0 per cent, weighed down by loans to the general commerce sector (Exhibit 2.11). Likewise, loans to non-residents shrank by 6.7 per cent, reflecting a contraction in lending to East Asia and the Americas amid the global manufacturing downturn (Exhibit 2.12).

Similarly, the performance of the insurance segment remained lacklustre. Sales of single-premium life insurance products fell as investors pivoted to other products such as treasury bills. In comparison, the other auxiliary activities segment (comprising mainly payments processing players) continued to benefit from firm growth in card fees amidst the continued uptick in travel spending. Meanwhile, the fund management segment posted a small expansion, as net fees & commissions earned by fund managers held up despite some weakness in global equities.

Exhibit 2.11: Growth of Bank Loans & Advances to Non-Bank Residents by Industry in 1Q 2023

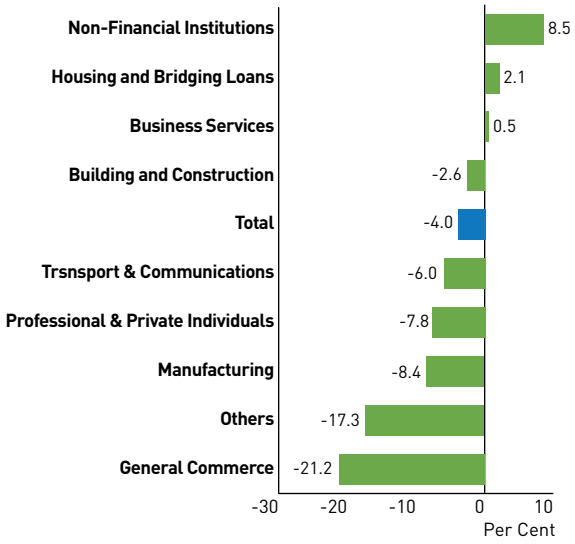
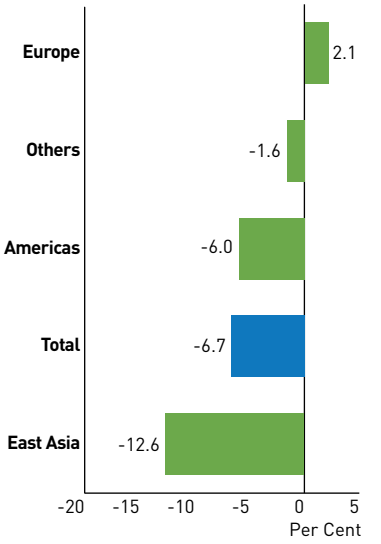


Exhibit 2.12: Growth of Bank Loans & Advances to Non-Bank Non-Residents by Region in 1Q 2023

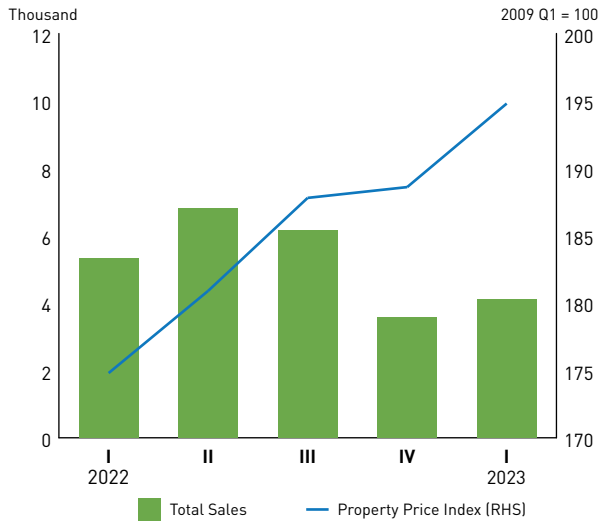


REAL ESTATE

The real estate sector expanded by 9.2 per cent year-on-year in the first quarter of 2023, slowing from the 15.2 per cent growth in the preceding quarter. The growth of the sector could be attributed to the private residential property segment, as well as the commercial office and industrial property segments. In particular, prices of private residential properties rose by 11.4 per cent year-on-year. Meanwhile, the rentals of commercial office and industrial space saw increases of 15.5 per cent and 8.8 per cent respectively.

Within the sector, the number of private residential property sales transactions fell by 22.8 per cent on a year-on-year basis in the first quarter, moderating from the 54.7 per cent decrease in the previous quarter. Meanwhile, private residential property prices rose by 3.3 per cent on a quarter-on-quarter basis, following the 0.4 per cent increase seen in the previous quarter (Exhibit 2.13).

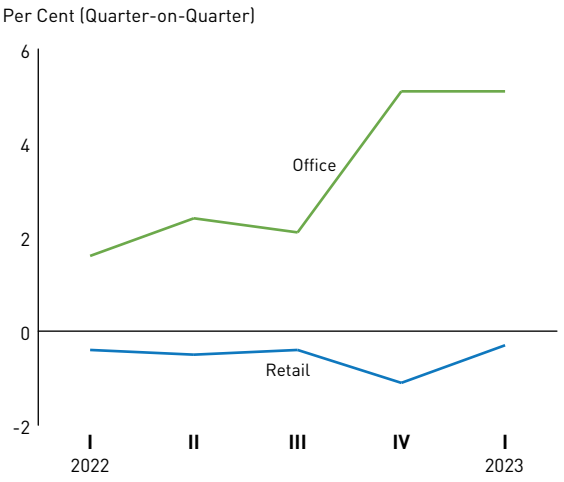
Exhibit 2.13: Total Sales Transactions for Private Residential Units and Private Residential Property Price Index



Conditions in the commercial space markets were mixed. For the private retail space market, rentals edged down by 0.3 per cent on a quarter-on-quarter basis in the first quarter of 2023, extending the 1.1 per cent decline in the previous quarter (Exhibit 2.14). The average occupancy rate of private retail space came in at 91.5 per cent during the quarter, lower than the 92.2 per cent registered in the preceding quarter.

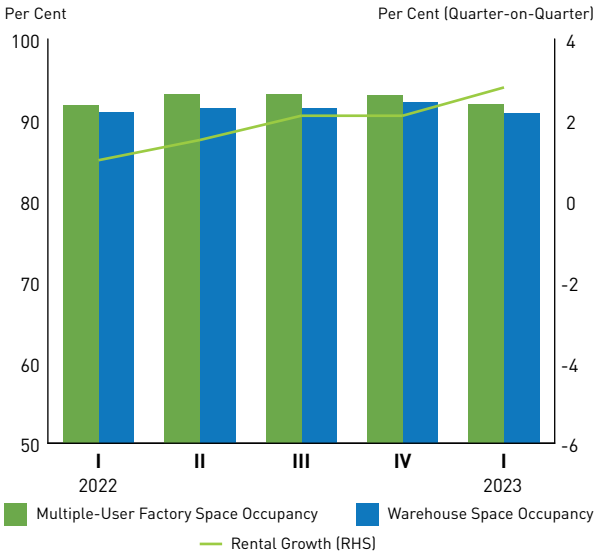
By contrast, rentals for private office space rose by 5.1 per cent on a quarter-on-quarter basis in the first quarter, extending the 5.1 per cent increase in the preceding quarter. The average occupancy rate of private office space rose to 88.1 per cent, higher than the 87.8 per cent recorded in the preceding quarter.

Exhibit 2.14: Changes in Rentals of Private Sector Office and Retail Spaces



Similarly, private industrial rentals rose by 2.8 per cent on a quarter-on-quarter basis in the first quarter, following the 2.1 per cent increase in the preceding quarter. The occupancy rates of private sector multiple-user factory and warehouse spaces stood at 91.9 per cent and 90.8 per cent respectively, declining from that seen in the previous quarter (93.0 per cent and 92.2 per cent respectively) (Exhibit 2.15).

Exhibit 2.15: Occupancy Rate and Rental Growth of Private Sector Industrial Space



PROFESSIONAL SERVICES

In the first quarter of 2023, the professional services sector grew by 5.7 per cent year-on-year, following the 6.1 per cent growth in the previous quarter. Growth of the sector was mainly driven by expansions in the architectural & engineering, technical testing & analysis and the other professional, scientific & technical services segments, which outweighed a contraction in the head offices & business representative offices segment.

Box Article 2.1

EXTERNAL DEMAND RELIANCE OF SECTORS IN SINGAPORE'S ECONOMY

Singapore is a small open economy that is highly dependent on external demand. Over the period of 2015 to 2019, external demand contributed to around 67 per cent to 72 per cent of Singapore's GDP.

This article examines the external demand reliance of the various sectors of the Singapore economy over time, using DOS' Input-Output (IO) tables for 2015, 2016, 2017 and 2019.[1]

The external demand reliance of Singapore's sectors can be measured by the sector's total export share of output

The external demand reliance of each sector of the Singapore economy can be measured by the total export share of its output (see Annex for the computation methodology). Sectors with higher total export shares are relatively more affected by external economic developments due to their larger reliance on external demand, whereas sectors with lower total export shares are relatively more affected by domestic economic developments (e.g., domestic labour market conditions and local property asset prices) due to their greater reliance on domestic demand.

For each sector, we further distinguish between (i) direct exports (i.e., exports produced by the sector) and (ii) indirect exports (i.e., sale of intermediate goods by the sector to support the production of exports in other sectors). This distinction allows us to assess whether a sector is affected by changes in external demand conditions directly or through its linkages to other sectors. For instance, a sector that only supplies to exporters in other sectors (e.g., no direct exports but high indirect exports) will still be indirectly affected by external demand changes.

Between 2015 and 2019, the total export share of most of the sectors in the Singapore economy remained broadly unchanged

Between 2015 and 2019, the total export share of most of the sectors in the Singapore economy remained broadly unchanged [Exhibit 1]. Throughout this period, the wholesale trade, manufacturing and transportation & storage sectors consistently had the largest total export share of output, reflecting their high reliance on external demand. By contrast, the construction, other services and retail trade sectors consistently had the smallest total export share of output, indicating that they primarily served domestic demand.

Among the sectors that are more reliant on external demand, the information & communications and finance & insurance sectors saw the largest increases in total export share from 2015 to 2019

Between 2015 and 2019, the information & communications and finance & insurance sectors saw the largest increases in total export share among the sectors that are more reliant on external demand[2] [Exhibit 1].

The increase in the total export share of the information & communications sector was primarily driven by an increase in both the direct and indirect exports of the computer programming, consultancy & information services segment, as well as the direct exports of the media entertainment and telecommunications segments. Drivers of this trend include increasing external demand for the digital tools (e.g., business administration software and e-commerce platform service) and games (e.g., development of mobile phone games) produced by the sector.

Meanwhile, the rise in the total export share of the finance & insurance sector was mainly due to an increase in the direct exports of the banking & finance segment and the indirect exports of the financial services (except insurance & pension funding) segment.

1 *At the time of writing, the latest available IO tables were for 2019. There were no IO tables for 2018. We have mapped IO industries to sectors reported in the Economic Survey of Singapore publication using the Singapore Standard Industrial Classification (SSIC) codes.*
2 *Broadly defined as those with total export share of output of more than 50 per cent.*

Exhibit 1: Total Export Share of Sectors from 2015 to 2019 (Per Cent)

Sector	2015	2016	2017	2019	Change between 2015 and 2019 (percentage-point)
Wholesale Trade	91.8	91.4	91.5	91.5	-0.3
Manufacturing	89.1	88.9	88.5	89.3	+0.2
Transportation & Storage	87.8	86.5	87.0	89.5	+1.7
Accommodation	72.7	74.4	73.7	73.8	+1.1
Administrative & Support Services	72.3	69.7	71.6	70.3	-2.0
Information & Communications	68.7	71.5	75.6	78.3	+9.6
Finance & Insurance	67.3	67.3	68.4	70.3	+3.0
Professional Services	66.6	66.4	67.7	69.4	+2.8
Food & Beverage Services	37.3	39.2	38.3	38.7	+1.4
Real Estate	29.4	32.4	35.4	39.6	+10.2
Retail Trade	23.0	25.5	26.2	25.5	+2.5
Other Services^	15.2	15.4	15.6	16.8	+1.6
Construction	5.4	5.8	6.6	8.4	+3.0

Source: Department of Statistics, Authors' estimates. Sectors ordered by largest to smallest total export share in 2015.
^ The other services sector comprises the education, health & social services and arts, entertainment & recreation segments.

Among the sectors that are more reliant on domestic demand, the real estate and construction sectors saw the largest increases in total export share from 2015 to 2019

Between 2015 and 2019, the real estate and construction sectors saw the largest increases in total export share among the sectors that are more reliant on domestic demand[3] [Exhibit 1]. In particular, the total export share of the real estate sector rose by 10.2 percentage-point (pp) over this period. This was driven primarily by an increase in its indirect exports (e.g., rental of properties to firms in external demand reliant sectors such as the finance & insurance sector). Meanwhile, the 3.0pp increase in the total export share of the construction sector between 2015 and 2019 was mainly on account of an increase in the indirect exports of the building construction segment (e.g., supply of building materials to firms in external demand reliant sectors such as the manufacturing sector).

The contribution of direct and indirect exports to total export share varied across sectors

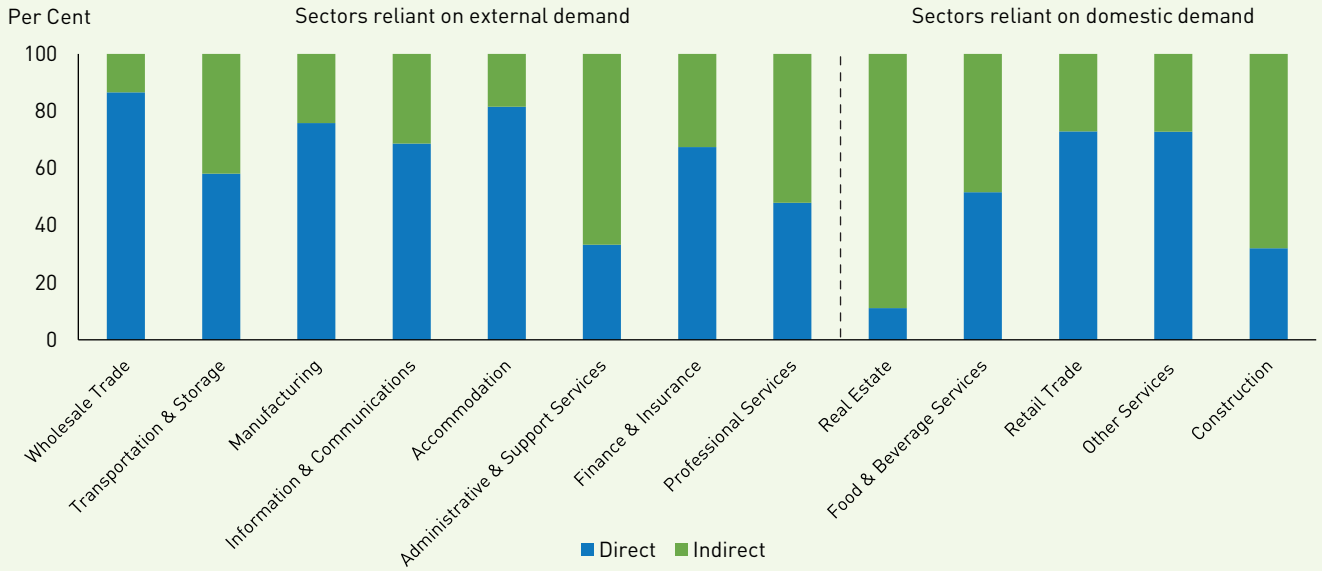
Among the sectors that are more reliant on external demand, the contribution of direct exports to total export share was the highest for the wholesale trade, accommodation and manufacturing sectors, at more than three-quarters [Exhibit 2]. This suggests that firms in these sectors would be highly exposed to changes in external demand conditions. For instance, the output contraction in the manufacturing sector in the first quarter of 2023 was due to weaker external demand, such as for semiconductors and semiconductor equipment amidst the global electronics downturn, and for chemicals due to sluggish industrial demand from China.

3 *Broadly defined as those with total export share of output of less than 50 per cent.*

On the other hand, more than half of the total export share of the administrative & support services and professional services sectors were accounted for by indirect exports, highlighting the important role that these sectors play in facilitating the exports of other sectors. Hence, while firms in these sectors are still susceptible to changes in external demand conditions, their exposure would come largely from their linkages to other sectors that are reliant on external demand. For instance, the real value-added of the administrative & support services sector in the first quarter of 2023 remained below its pre-COVID (i.e., first quarter of 2019) level partly because external demand for the air transport sector, and hence its demand for the rental of air transport equipment from the administrative & support services sector, had not returned to pre-COVID levels.

Among the sectors that are more reliant on domestic demand, the contribution of direct exports to total export share was the highest in the retail trade and other services sectors, at more than two-thirds [Exhibit 2]. By contrast, more than half of the total export shares of the construction and real estate sectors came from indirect exports, driven by intermediate demand from external demand reliant sectors such as manufacturing and finance & insurance.

Exhibit 2: Direct and Indirect Export Composition of Sectors in 2019



Source: Authors' estimates.
Note: Sectors are ordered by their total export share of output in 2019, with wholesale trade having the highest total export share and construction having the lowest share.

Conclusion

The total export share of the output of each sector of the Singapore economy shows the extent to which the sector is reliant on external demand, either directly or indirectly. Between 2015 and 2019, the total export share of most sectors of the economy remained broadly unchanged. Consistently, the wholesale trade, manufacturing and transportation & storage sectors were the most reliant on external demand, whereas the construction, other services and retail trade sectors were the least.

In turn, this analysis allows us to better understand how changes in external and domestic economic conditions are likely to affect the performance of the various sectors of the Singapore economy. For instance, the 2023 performance of sectors that are more externally reliant, such as the manufacturing and wholesale trade sectors, is expected to be dampened by weak external demand due to the global economic slowdown. On the other hand, the performance of sectors that are more reliant on domestic demand is likely to be more resilient in 2023. For example, construction output in 2023 is expected to be supported by major ongoing and upcoming public sector projects (e.g., BTO flats and MRT rail and associated works) as well as some remaining backlogs of construction works that were disrupted by the COVID-19 pandemic.

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Annex A: Methodology to Compute Total Export Share of Output by Sector

In this article, the extent of external demand reliance of each sector is based on the sector's total export share of output (comprising both direct and indirect export channels), computed based on standard Input-Output (IO) table analysis.

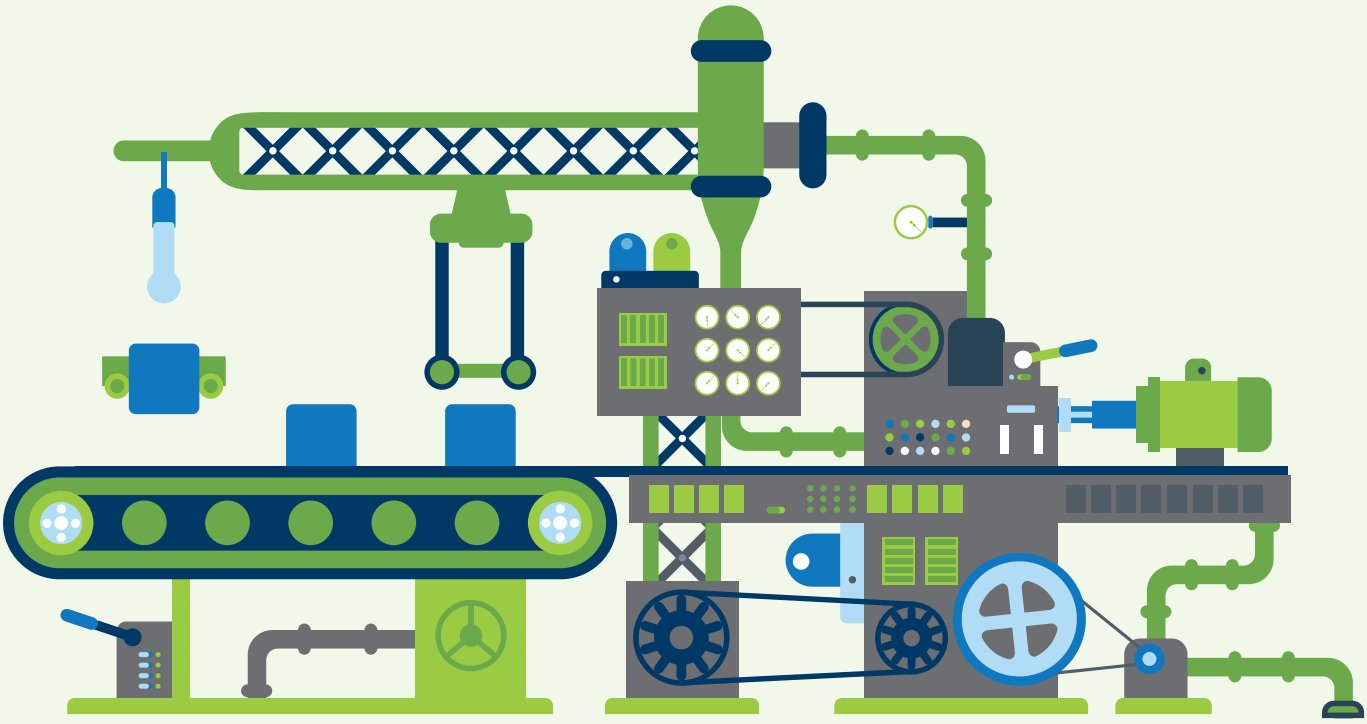
Consider n number of sectors in the economy. The output of each sector r can be expressed as $X_r = X_{r1} + \cdots + X_{rn} + F_r$, where X_r is the value of gross output of sector r, X_{rc} is the value of intermediate goods sold by sector r to sector c and F_r is the value of final demand met by sector r.

X_{rc}, the value of intermediate goods sold by sector r to sector c can be divided by the gross output of sector c, X_c, to give the direct requirement coefficient, $a_{rc} = \frac{X_{rc}}{X_c}$. This coefficient captures the amount of input from sector r required to produce one unit of output in sector c. Using the direct requirement coefficient, the value of the gross output of sector r can be expressed as:

$$X_r = a_{r1}X_1 + \cdots + a_{rn}X_n + F_r$$

Stacking the equations across all sectors into a matrix, we have $\boldsymbol{x}_{n\times 1} = \boldsymbol{A}_{n\times n}\boldsymbol{x}_{n\times 1} + \boldsymbol{f}_{n\times 1}$, where $\boldsymbol{x}_{n\times 1}$ is a column vector of gross output, $\boldsymbol{A}_{n\times n}$ is a square matrix of the direct requirement coefficients and $\boldsymbol{f}_{n\times 1}$ is a column vector of final demand. Solving for $\boldsymbol{x}_{n\times 1}$ gives $\boldsymbol{x}_{n\times 1} = (\boldsymbol{I}_{n\times n} - \boldsymbol{A}_{n\times n})^{-1}\boldsymbol{f}_{n\times 1} = \boldsymbol{B}_{n\times n}\boldsymbol{f}_{n\times 1}$, where $\boldsymbol{B}_{n\times n} = (\boldsymbol{I}_{n\times n} - \boldsymbol{A}_{n\times n})^{-1}$ is known as the Leontief inverse matrix. The Leontief inverse contains the total requirement coefficients (also known as the output multipliers) b_{rc}, which considers the total output (considering both direct and indirect channels) of sector r required to fulfil a unit of final demand for sector c.

The column vector of total output exported (considering both direct and indirect channels) $\boldsymbol{e}_{n\times 1}$, can be expressed as $\boldsymbol{e}_{n\times 1} = \boldsymbol{B}_{n\times n}\boldsymbol{fe}_{n\times 1}$, where $\boldsymbol{fe}_{n\times 1}$ is a column vector of exports final demand in the IO tables. The total export share of sector r ($Share_r$) can then be calculated using $Share_r = \frac{E_r}{X_r}$, where E_r is the total output exported for sector r (i.e., element r in the column vector $\boldsymbol{e}_{n\times 1}$). We can also decompose this share into direct export ($\frac{FE_r}{X_r}$) and indirect export ($\frac{E_r - FE_r}{X_r}$) shares.



CHAPTER

3

ECONOMIC OUTLOOK

Chapter 3

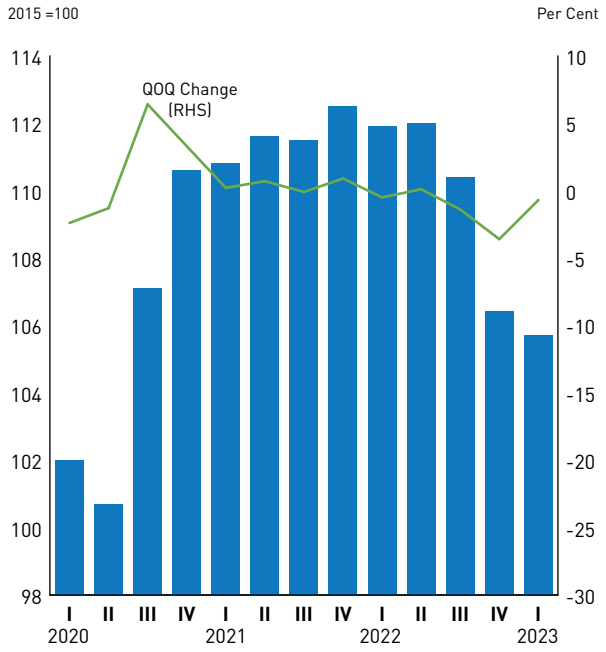
ECONOMIC OUTLOOK

LEADING INDICATORS

On a quarter-on-quarter basis, the composite leading index (CLI) declined by 0.7 per cent in the first quarter of 2023, less than the 3.6 per cent decrease in the previous quarter (Exhibit 3.1).

Of the nine components of the CLI, four components fell on a quarter-on-quarter basis, namely wholesale trade, US Purchasing Managers' Index, stock of finished goods and non-oil retained imports. By contrast, new companies formed, non-oil sea cargo handled, domestic liquidity and stock price increased, while money supply remained unchanged from the previous quarter.

Exhibit 3.1: Composite Leading Index Levels and Growth Rate



OUTLOOK FOR 2023

Since the Economic Survey of Singapore released in February, the performance of advanced economies such as the US and Eurozone has been more resilient than expected, supported by domestic services demand. Nonetheless, their growth outlook for the rest of the year remains weak.

In particular, US' GDP growth is projected to decelerate more significantly in the second half of the year as personal consumption and investment growth slows due to the lagged effects of monetary policy tightening, including on the labour market. Similarly, GDP growth in the Eurozone is forecast to slow significantly as elevated inflation amidst tight labour market conditions is likely to lead to further monetary policy tightening, which will weigh on domestic demand.

In Asia, China's economic recovery is likely to be stronger than earlier expected, driven by a pickup in domestic services consumption following the lifting of its COVID-19 restrictions. However, continued stresses in its property market, as well as weakness in its industrial sector amidst subdued external demand conditions, will continue to weigh on its recovery. Meanwhile, despite weaker external demand for their merchandise goods and commodities, the growth prospects of key Southeast Asian economies such as Malaysia, Indonesia and Thailand remain positive, supported by resilient domestic demand as well as the continued recovery in tourism demand.

Against this backdrop, MTI's assessment is that Singapore's external demand outlook for the rest of the year has weakened. Apart from the expected slowdown in the advanced economies, the electronics downcycle is likely to be deeper and more prolonged than earlier projected. Spillovers from China's services-led recovery are also expected to remain weak given that services activities are less import-intensive than industrial activities.

At the same time, downside risks in the global economy have risen. First, recent banking sector stresses abroad have increased the risk of a sharper-than-expected tightening in global financial conditions, which could weigh more heavily on consumption and business investments and lead to a broader retraction in global growth beyond the manufacturing downturn. Second, escalations in the war in Ukraine and geopolitical tensions among major global powers could lead to renewed supply disruptions, dampen consumer and business confidence, as well as weigh on global trade.

Domestically, the growth outlook for the aviation- and tourism-related sectors of the Singapore economy remains positive given the ongoing recovery in international air travel and inbound tourism. These include the air transport, accommodation and arts, entertainment & recreation sectors, as well as the aerospace segment of the transport engineering cluster.

On the other hand, the outlook for the manufacturing and other trade-related sectors of the economy has weakened. In particular, the manufacturing sector is projected to see a deeper downturn, led by output contractions in the electronics and precision engineering clusters in tandem with weaker global semiconductor demand, as well as the chemicals cluster due to sluggish demand from China. Meanwhile, growth in the water transport and finance & insurance sectors is likely to be dampened by the broader slowdown in the global economy.

Taking into account the performance of the Singapore economy in the first quarter, as well as the latest global and domestic economic developments, MTI expects the economy to expand by **"0.5 to 2.5 per cent"** in 2023, **with growth likely to come in at around the mid-point of the range**.

FEATURE ARTICLE

IMPACT EVALUATION OF SMES GO DIGITAL PROGRAMME

HSBC

Feature Article

IMPACT EVALUATION OF SMES GO DIGITAL PROGRAMME

OVERVIEW

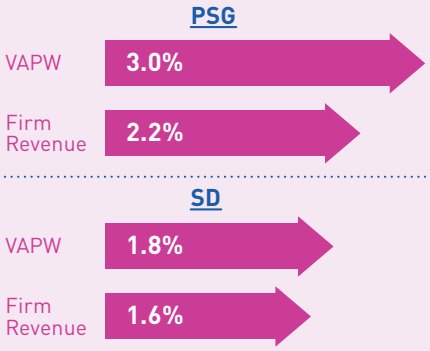
The SMEs Go Digital programme helps SMEs build digital capabilities to seize opportunities in the digital economy by curating digital solutions that are appropriate for firms' stage of digitalisation and co-funding the adoption of these solutions. Under the programme, the Start Digital (SD) grant provides new firms or firms that have yet to digitalise with foundational and easy-to-deploy digital solutions such as accounting and HR software, while the Productivity Solutions (PSG) grant supports the adoption of curated digital solutions that improve firms' productivity.

FINDINGS

This article examines the impact of SMEs Go Digital grants (i.e., PSG and SD) on firm-level outcomes such as value-added per worker (VAPW) and revenue, using annual firm-level data from 2017 to 2020.

Finding 1:

PSG and SD grants led to increases in firm VAPW of 3.0 per cent and 1.8 per cent respectively, as well as increases in firm revenue of 2.2 per cent and 1.6 per cent respectively.



Finding 2:

Smaller firms saw the largest improvements in firm outcomes. Tailored solutions for specific sectors, for example, onsite surveillance and analytics solutions for the security sector, resulted in better outcomes than generic solutions.

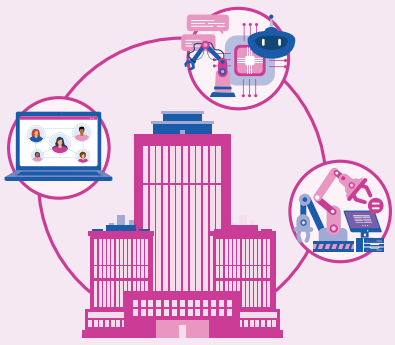
Finding 3:

The grants also resulted in larger improvements in firm outcomes during the COVID-19 period as compared to the pre-COVID-19 period.

Digital solutions such as online collaboration tools for remote working helped firms operate during the pandemic

POLICY TAKEAWAY

To continue reaping the benefits of digitalisation, firms that have adopted basic digital solutions should consider investing in more advanced digital solutions. As technology improves and the business environment evolves, the Government will continue to curate effective relevant digital solutions for firms and support firms in their digitalisation journey.



EXECUTIVE SUMMARY

- This article examines the impact of SMEs Go Digital grants (i.e., Productivity Solutions Grant (PSG) and Start Digital (SD)) on firm-level outcomes using annual firm-level data from 2017 to 2020.
- Our findings show that SMEs Go Digital grants led to improvements in firms' outcomes. In particular, the take-up of PSG and SD grants led to an increase in firms' productivity of 3.0 per cent and 1.8 per cent respectively, as well as an increase in firms' revenue of 2.2 per cent and 1.6 per cent respectively.
- Further heterogeneity analyses highlight the following. First, smaller firms saw the largest improvement in outcomes from the take-up of PSG and SD grants. Second, tailored solutions resulted in better outcomes. Specifically, sector-specific PSG solutions were almost twice as effective in improving firms' productivity and revenue as compared to generic PSG solutions. Among the SD solutions, digital transaction solutions led to the largest improvement in firms' productivity. Third, both PSG and SD grants resulted in larger improvements in firms' outcomes during the COVID-19 pandemic as compared to before the pandemic.
- Amidst rapid technological advancements and constant changes in the business environment, the Government remains committed to curating relevant and effective digital solutions for firms, and supporting firms in their digitalisation journey.

The views expressed in this paper are solely those of the authors and do not necessarily reflect those of the Ministry of Trade and Industry or the Government of Singapore.[1]

INTRODUCTION

The SMEs Go Digital programme helps small- and medium-sized enterprises (SMEs) build digital capabilities by curating digital solutions that are appropriate for enterprises at different stages of their digitalisation journey, and co-funding the adoption of these solutions [Exhibit 1].[2] For instance, firms that are new to digital tools are encouraged to adopt foundational tools such as accounting, HR and payroll software, before progressing to more advanced tools. By developing their digital capabilities, firms will be better able to seize emerging opportunities in the digital economy. During the COVID-19 pandemic, the SMEs Go Digital programme was also enhanced to help firms operate digitally (e.g., coordinate work using cloud software) so that they can cope with the safe distancing measures imposed and grow their businesses.[3]

Exhibit 1: SMEs Go Digital Grants

Basic Digitalisation <----------**Digitalisation Stage**----------> Advanced Digitalisation

	Start Digital (SD)	Productivity Solutions Grant (PSG)[4]	Grow Digital (GD)	Advanced Digital Solutions (ADS)
Introduced	October 2018	April 2018[5]	February 2019	September 2020
Intent of scheme	To provide new firms or firms that have yet to digitalise with foundational and easy-to-deploy digital solutions	To support the adoption of curated digital solutions that improve firms' productivity	To support firms' participation in business-to-business (B2B) and business-to-consumer (B2C) e-commerce platforms to sell overseas without the need for physical presence	To support firms' adoption of curated advanced or integrated digital solutions to deepen their capabilities, strengthen business continuity measures and build longer-term resilience

1 *We would like to thank Ms Yong Yik Wei, Dr Andy Feng, Dr Tan Di Song and Mr Koh Wen Jie for their useful suggestions and comments. We are also grateful to the Department of Statistics (DOS) for their assistance in accessing firm-level data of a longitudinal nature as well as the SMEs Go Digital team from Infocomm Media Development Authority (IMDA) for their inputs to this study. All errors belong to the authors.*

2 *Refer to Annex A for details of the SMEs Go Digital grants.*

3 *To help firms during the pandemic, SMEs Go Digital funding was enhanced (e.g., the maximum funding support for PSG was raised to 80 per cent), COVID-specific PSG solutions (e.g., remote working solutions and visitor/crowd management systems) were rolled out, and new grants (Advanced Digital Solutions) were made available to help firms build longer-term resilience.*

4 *For PSG, we only analysed digital solutions (which exclude equipment and consultancy services). These digital solutions accounted for around 88 per cent of all PSG applications approved.*

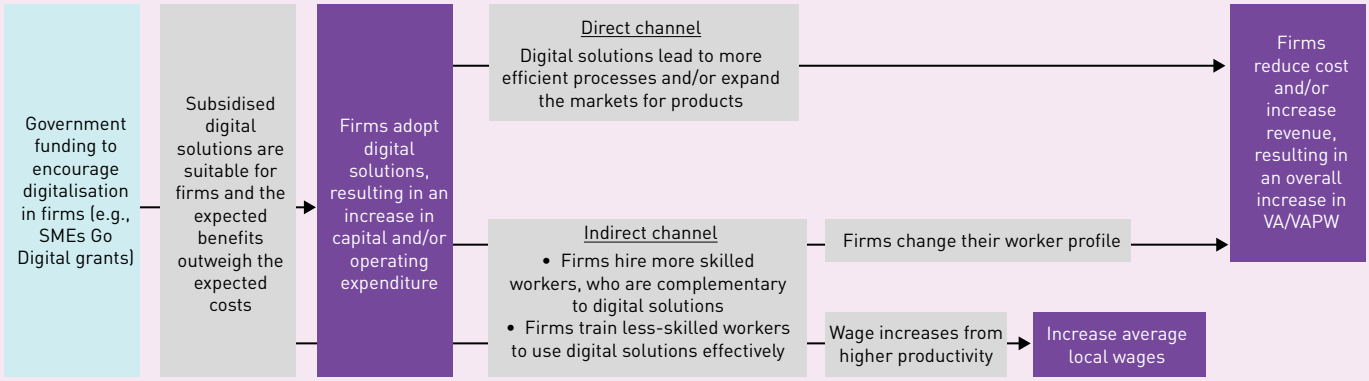
5 *Even though PSG was officially launched in April 2018, it was formed from the merging of three grants (i.e., IMDA's iSPRINT, EnterpriseSG's (formerly SPRING) Innovation & Capability Voucher, and NParks' Landscape Productivity Grant). We included iSPRINT grants from April 2017 in the analysis of the PSG as it covered digital solutions.*

The SMEs Go Digital programme is designed to address two key challenges that SMEs face in their digitalisation efforts. First, it reduces the search costs that SMEs would have to incur to identify suitable digital solutions by curating a list of appropriate solutions for SMEs based on their stage of digitalisation. Second, it eases the financial constraints that SMEs may face in investing in digital technologies[6] by co-funding the adoption of the digital solutions.

By tackling these challenges, the SMEs Go Digital programme seeks to encourage firms' adoption of digital tools, which could in turn lead to more efficient processes and expand end-markets for their products. As firms adopt these digital tools, they may also restructure their workforce to complement the use of the tools (e.g., upskilling of workers to enable them to take up better-paying job roles). These changes could then result in improvements in firms' revenue and productivity[7], as well as the wages of their employees. Exhibit 2 shows a schematic description of the channels through which the SMEs Go Digital programme (specifically, the SMEs Go Digital grants) could affect the key outcomes of firms.

We also hypothesise that (i) the SMEs Go Digital grants would have a bigger impact on smaller firms, given that such firms are likely to face larger search costs and have tighter financial constraints; (ii) sector-specific solutions (e.g., tools tailored to specific sectors) would lead to more favourable outcomes as these would directly address sectors' needs; and (iii) the SMEs Go Digital grants would have a greater impact during the COVID-19 pandemic given that the safe distancing measures in place would have made the adoption of digital solutions more salient for firms while new COVID-specific digital solutions were also introduced to help firms cope with these measures.

Exhibit 2: Channels of Causal Impact on Firms' Outcomes



Note: Grey boxes refer to the steps that need to occur for the outcomes in the purple boxes to come about.

In this study, we examined whether and how SMEs Go Digital grants have supported firms by studying the impact of the Productivity Solutions Grant (PSG) and Start Digital (SD) on firms' outcomes (e.g., value-added per worker (VAPW) and revenue) using annual firm-level data from 2017 to 2020. We focused on PSG and SD as these grants were introduced earlier and had more recipients than the other SMEs Go Digital grants (i.e., Grow Digital (GD) and Advanced Digital Solutions (ADS)). We also conducted heterogeneity analyses by firm size and solution type, as well as examined the impact of the grants before and during the COVID-19 pandemic. By providing insights on the impact of the grants on the different types of firms and across solution types, policy makers will be better able to consider ways to enhance the effectiveness of the grants.

LITERATURE REVIEW

Studies in the literature have generally found that firms' adoption of digital technologies led to higher productivity by enabling them to improve business processes, automate routine tasks and reduce the costs of interacting with stakeholders. In particular, international and local empirical studies (Gaggl and Wright (2017), Tan and Ng (2019)) have found that the adoption of digital technologies resulted in higher firm-level productivity, average wages and employment. Digitally-enabled firms were also observed to have better outcomes (e.g., a lower decline in sales compared to digitally-constrained firms) during the COVID-19 pandemic (Abidi et. al., (2022))

6 *The cost of adoption was cited as the top challenge for digital adoption by firms, especially SMEs, based on an annual survey by IMDA in 2019.*
7 *We used value-added per worker (VAPW) as a measure firms' productivity.*

At the same time, the literature suggests that the benefits of digital adoption may vary across sectors and firms, with some studies (Gal et. al. (2019), Acemoglu et. al. (2014)) finding greater productivity gains for sectors with more routine activities (e.g., operating machines and assembling parts) and firms that are better organised (e.g., better management and worker training).

The literature also highlights that notwithstanding the benefits of digital adoption, firms could under-invest in digital technologies due to the high cost of funding such investments, especially in the case of SMEs which are more likely to face credit constraints. Firms may also underestimate the expected private returns from digital adoption due to imperfect information or may ignore the positive externalities of such investments (Stoneman and Diederen (1994)). Given these factors, there may thus be a need for government intervention to encourage digital adoption among firms. Indeed, studies have found that government tax incentives and subsidies have a positive impact on ICT investment and digital adoption at the firm level (Atzeni and Carboni (2008)).

DATA AND METHODOLOGY

We constructed the dataset for this study by merging a longitudinal firm-level dataset from the Department of Statistics, containing annual data from 2017 to 2020, with firm-level SMEs Go Digital grants data from the Infocomm Media Development Authority (IMDA). The dataset contains firm-level outcomes such as VAPW, revenue, total employees and average annual wages paid to local employees. We excluded firms that might have ceased operations between 2017 and 2020 (i.e., defined as those with no VAPW or revenue data in any of the years after the earliest observed year from 2017 onwards) to rule out the impact of firm exit on our estimates.

Summary statistics from the dataset showed that most PSG and SD recipients were micro and small firms[8], with the wholesale trade, construction and other services sectors being the top three sectors that they came from [Exhibit 3]. The data also showed that the number of PSG recipients surged in 2020, possibly due to the enhanced funding support provided during the COVID-19 period[9], the roll-out of COVID-specific PSG solutions[10], as well as an increase in the number of sectors with specific solutions[11] [Exhibit 4]. Meanwhile, the number of SD recipients rose in 2019 following its launch in end-2018, but dipped in 2020. The latter could have occurred as many SMEs might have already adopted foundational digital solutions prior to 2020 or they could have prioritised the adoption of COVID-specific PSG solutions in 2020.

Exhibit 3: Distribution of SMEs Go Digital Grant Recipients in Sample by Firm Size and Sector

	Firm size	Sector (Top 3)
PSG	1. Micro (45%) 2. Small (45%) 3. Medium (10%) 4. Large (0%)	1. Wholesale trade (18%) 2. Construction (13%) 3. Other services (13%)
SD	1. Micro (59%) 2. Small (35%) 3. Medium (5%) 4. Large (1%)	1. Wholesale trade (18%) 2. Other services (16%) 3. Construction (13%)

Source: Authors' estimates, DOS, IMDA

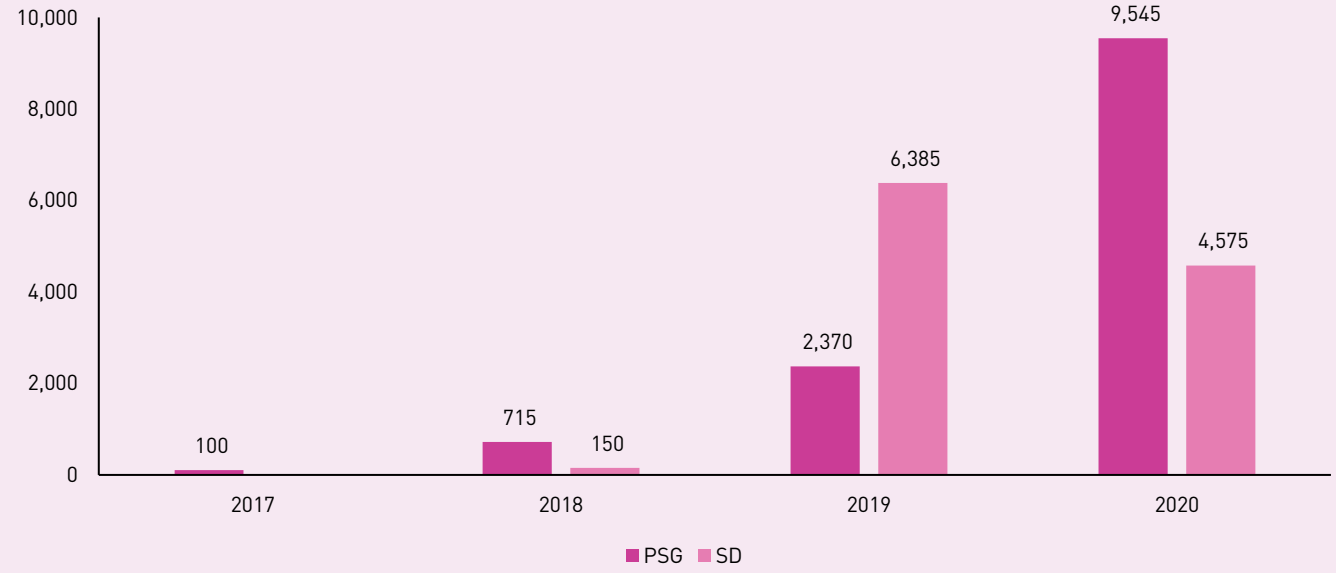
8 Firm recipients were classified into revenue size bands using revenue data in the year prior to the year in which the firm first received the SMEs Go Digital grant. Micro firms refer to those with annual revenue below S$1 million, while small firms were those with annual revenue between S$1 million and S$10 million; medium firms had revenue between S$10 million and S$100 million, and large firms had revenue above S$100 million.

9 The maximum funding support for PSG rose to 80 per cent (for April 2020 – March 2022) from 70 per cent (before March 2020).

10 Examples of COVID-specific PSG solutions include remote working solutions and visitor/crowd management systems.

11 The number of sectors with sector-specific PSG solutions increased from 11 sectors in 2019 to 15 sectors in 2020.

Exhibit 4: Number of Unique PSG and SD Recipients by Year They First Took Up the Grant



Source: Authors' estimates, DOS, IMDA

An important consideration when evaluating the causal impact of SMEs Go Digital grants on firm-level outcomes is that firms that received the grants might differ from those that did not (i.e., selection bias). Indeed, in the year before receiving the grant, PSG and SD recipients generally had lower VAPW, VA, revenue and average annual local wages when compared to non-recipient firms.[12] This suggests that recipient firms were in a worse financial position than non-recipients. However, by total employment and local workforce sizes, PSG and SD recipients were generally similar to non-recipient firms.

To mitigate potential selection biases, we used a two-way fixed effects regression model to estimate the effects of the grants by comparing (i) grant recipients (i.e., treated firms) with non-recipients (i.e., control firms), and (ii) recipients that received higher grant amounts with those that received lower amounts. The model included sector-specific time trends to account for factors that affected all firms in a sector over time (e.g., COVID-19 restrictions for the construction sector), as well as firm fixed effects to account for unique firm characteristics (including those not observed in the dataset) that did not change during the period of study (e.g., firm managerial culture). To further isolate the direct incremental impact of the PSG and SD grants, we accounted for the receipt of other SMEs Go Digital grants (i.e., GD and ADS) in the model. In addition, we controlled for government cash support grants (e.g., Foreign Worker Levy Rebate, Wage Credit Scheme) that were provided to firms as these could be confounders in our model (i.e., higher cashflow support could have provided firms with more financial leeway to adopt digital solutions, as well as led to improved firm outcomes).

Our main regression specification[13] is as follows:

$$asinh(Y_{it}) = \beta_1\, asinh(c\_psg\_grant_{it}) + \beta_2\, asinh(c\_sd\_grant_{it}) + \theta' X_{it} + \gamma_i + \theta_t + \mu_{jt} + \varepsilon_{it}$$

where:

- $asinh$ refers to the inverse hyperbolic sine transformation, which is applied to transform right-skewed variables that may include zero or negative values;
- Y_{it} refers to firm-level outcomes (i.e., VAPW, VA, revenue, total number of employees, average annual wages paid to local employees, and number of local employees) for firm i in year t;
- $c\_psg\_grant_{it}$ and $c\_sd\_grant_{it}$ refer to the cumulative PSG and SD grant amounts received by firm i in and prior to year t;
- X_{it} refers to a vector of cumulative GD, ADS and government cash support grants for firm i in and prior to year t;
- γ_i refers to firm fixed effects;

12 Non-recipient firms refer to firms that did not take up any SMEs Go Digital grant over the period of 2017 – 2020.
13 We used the inverse hyperbolic sine (asinh) transformation on key firm variables so that zero and negative values would not be dropped.

- θ_t refers to time fixed effects;
- μ_{jt} refers to sector-time fixed effects;
- ε_{it} is the error term assumed to be uncorrelated with the independent variables in all time periods.

The coefficients of interest, $\boldsymbol{\beta_1}$ and $\boldsymbol{\beta_2}$, measure the causal impact of PSG and SD grants on the outcomes of firms.

We also conducted heterogeneity analyses to examine if the SMEs Go Digital grants had differential impact (i) by firm size, (ii) by solution type, and (iii) during the COVID-19 period:

Firm size		1) $asinh(Y_{it}) = \beta_1\ asinh(c\_psg\_grant_{it}) \times firm\ size_i + \beta_2\ asinh(c\_sd\_grant_{it}) \times firm\ size_i + \theta' X_{it} + \gamma_i + \theta_t + \mu_{jt} + \varepsilon_{it}$
Solution type	**PSG**	2) $asinh(Y_{it}) = \beta_1\ asinh(c\_psg\_generic\_grant_{it}) + \sum_k^n \beta_k\ asinh(c\_psg\_sector\_specific\_grant_{ikt}) + \beta_2\ asinh(c\_sd\_grant_{it}) + \theta' X_{it} + \gamma_i + \theta_t + \mu_{jt} + \varepsilon_{it}$
	SD	3) $asinh(Y_{it}) = \beta_1\ asinh(c\_psg\_grant_{it}) + \sum_k^n \beta_k\ asinh(c\_sd\_solution\_type_{ikt}) + \theta' X_{it} + \gamma_i + \theta_t + \mu_{jt} + \varepsilon_{it}$
COVID-19 period		4) $asinh(Y_{it}) = \beta_1\ asinh(c\_psg\_grant_{it}) \times COVID_t + \beta_2\ asinh(c\_sd\_grant_{it}) \times COVID_t + \theta' X_{it} + \gamma_i + \theta_t + \mu_{jt} + \varepsilon_{it}$

where:

- $firm\ size_i$ is based on the revenue of firm i in the earliest observed year from 2017 onwards for non-grant recipients, and year prior to the year in which the firm first received the SMEs Go Digital grant for grant recipients;
- $c\_psg\_generic\_grant_{it}$, $c\_psg\_sector\_specific\_grant_{ikt}$ and $c\_sd\_solution\_type_{ikt}$ refer to the cumulative grant amounts received by firm i in and prior to year t for the respective PSG and SD solution types supported;
- $COVID_t = 1$ for year 2020 and 0 otherwise;
- All other terms are defined as per the main regression specification.

In specification (1), $\boldsymbol{\beta_1}$ and $\boldsymbol{\beta_2}$ measure the causal impact of PSG and SD grants on the outcomes of firms by firm size, respectively. In specification (2), $\boldsymbol{\beta_1}$ and $\boldsymbol{\beta_k}$ measure the causal impact of PSG generic solutions and PSG sector-specific solutions on firms' outcomes, respectively. In specification (3), $\boldsymbol{\beta_k}$ measures the casual impact of SD solution types on firms' outcomes. Finally, in specification (4), $\boldsymbol{\beta_1}$ and $\boldsymbol{\beta_2}$ measure the causal impact of PSG and SD grants on firms' outcomes during the COVID-19 period as compared to the pre-COVID-19 period, respectively.

RESULTS

(i) PSG

Our findings suggest that receiving a PSG grant of an average amount improved firms' VAPW and revenue by 3.0 per cent and 2.2 per cent respectively. The higher VAPW was driven by an increase in VA, rather than a reduction in the number of workers as total employment rose by 1.0 per cent [Exhibit 5]. PSG also led to an increase in average local wages.

Furthermore, we found that smaller firms benefited more from taking up PSG, while tailored solutions had a bigger impact on firms' outcomes. Specifically, micro firms that took up PSG saw the largest improvement in VAPW (i.e., 6.4 per cent); and sector-specific solutions[14] were almost twice as effective in improving firms' outcomes (4.0 per cent for both VAPW and revenue) as compared to generic solutions[15] (2.4 per cent and 1.6 per cent for VAPW and revenue respectively). We also found that sector-specific solutions for the security (10.3 per cent), food services (5.8 per cent) and retail (3.7 per cent) sectors were the most effective in raising VAPW. For example, onsite surveillance and analytics solutions for the security sector offered under the PSG could have made security operations more efficient and reduced firms' reliance on manpower.

14 *Examples of sector-specific solutions include digital ordering and payment for the food services sector, and enhanced Point-of-Sales (POS)/Retail Management System for the retail sector.*
15 *Examples of generic solutions include Enterprise Resource Planning and Human Resource Management.*

In addition, PSG was found to be more effective in improving firms' outcomes during the COVID-19 period (i.e., 2020). Firms that took up PSG during the pandemic saw an increase in VAPW and revenue of 3.9 per cent and 2.2 per cent respectively in comparison to firms that did not. The greater effectiveness of the PSG during the pandemic could have been due to firms being more forthcoming in adopting digital solutions to cope with the safe distancing measures that were imposed during this period, the introduction of new solutions (e.g., online collaboration tools for remote working and visitor/crowd management system) which were essential in helping firms to operate during the pandemic, as well as an increase in the number of curated sector-specific solutions over time.[16]

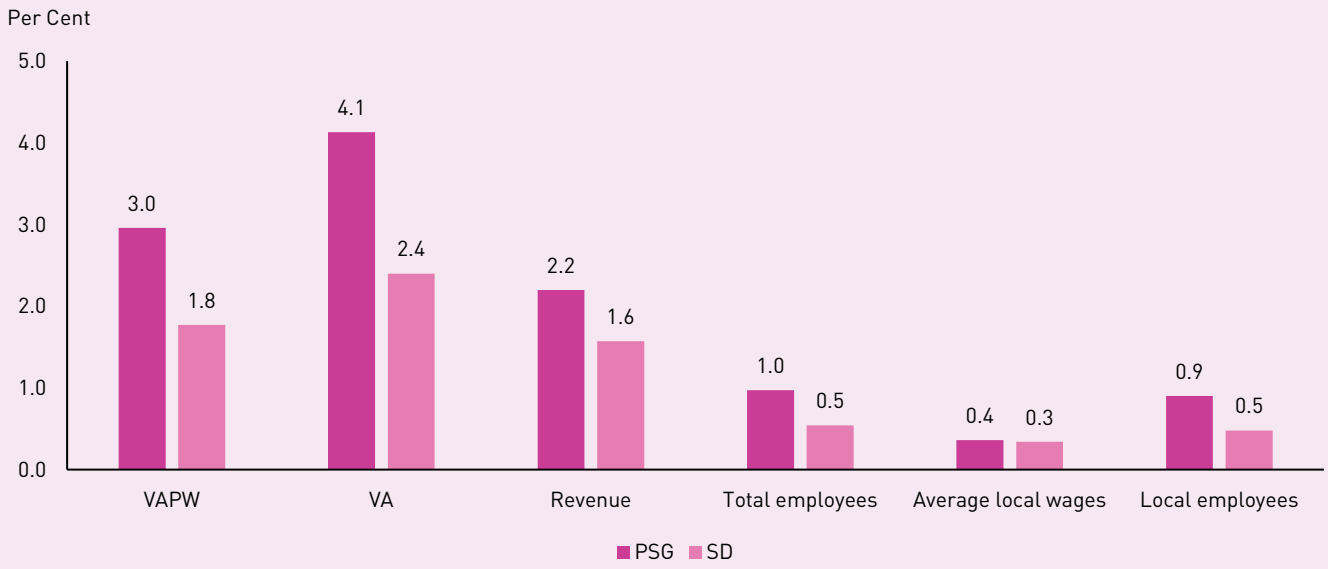
(ii) SD

SD grants also had a positive effect on firms' outcomes, with the take-up of SD grants improving the VAPW and revenue of firms by 1.8 per cent and 1.6 per cent respectively on average [Exhibit 5]. These effects were smaller in magnitude than the impact of PSG, possibly because the digital tools supported by SD were more basic. Like PSG, the increase in VAPW due to the take-up of SD grant was driven by an increase in VA, and was also accompanied by an increase in average local wages.

Furthermore, similar to PSG, the positive impact of SD was the largest for micro firms (4.4 per cent and 3.8 per cent increase in VAPW and revenue respectively). Firms that took up digital transaction solutions experienced the largest increase in both VAPW and revenue (7.5 per cent and 2.6 per cent respectively), as solutions such as e-payments and business-to-business e-commerce could have helped firms to expand their customer base.

As with the PSG, SD was more effective during the pandemic. Firms that took up the SD grant during the pandemic had higher VAPW (2.1 per cent) and revenue (2.3 per cent) than firms that did not.

Exhibit 5: Impact of Average PSG and SD Grant on Firm Outcomes



Source: Authors' estimates
Note: All results were statistically significant at the 5% level.

16 *However, since we only have data up to 2020, we could not ascertain whether the pronounced impact during the COVID-19 period was one-off (i.e., digital tools helped firms to thrive during the pandemic) or would continue post-COVID-19 (i.e., whether the pandemic accelerated digital transformation and hence PSG solutions have become more crucial in the digital economy).*

CONCLUSION

This study found that the take-up of PSG and SD grants led to improvements in firms' outcomes, with the largest improvements seen for smaller firms. Furthermore, curated sector-specific solutions for PSG and digital transaction solutions for SD were found to be more effective. This finding suggests that as IMDA rolls out industry digital plans for more sectors, more firms would be able to benefit from adopting relevant sector-specific solutions.

To continue reaping the benefits of digitalisation, firms that have adopted basic digital solutions, such as those supported by the SD grant, should consider investing in more advanced digital solutions, such as those supported by the PSG. Amidst rapid technological advancements and constant changes in the business environment, the Government remains committed to curating relevant and effective digital solutions for firms, and supporting firms in their digitalisation journey.

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ANNEX A

Basic Digitalisation <----------**Digitalisation Stage**----------> Advanced Digitalisation

	Start Digital (SD)	Productivity Solutions Grant (PSG)	Grow Digital (GD)	Advanced Digital Solutions (ADS)
Introduced	October 2018	April 2018	February 2019	September 2020
Intent of scheme	To provide new firms or firms that have yet to digitalise with foundational and easy-to-deploy digital solutions	To support the adoption of curated digital solutions that improve firms' productivity	To support firms' participation in business-to-business (B2B) and business-to-consumer (B2C) e-commerce platforms to sell overseas without the need for physical presence	To support firms' adoption of curated advanced or integrated digital solutions to deepen their capabilities, strengthen business continuity measures and build longer term resilience
Solution types	• Digital marketing • Digital transaction • Digital collaboration • Accounting • HRM System & Payroll • Cybersecurity	More than 100 generic and sector-specific solutions (based on industry digital plans (IDP)) Examples include: **Generic** • Enterprise Resource Planning (ERP) • Human Resource Management **Sector-specific** • [Construction] Quantity surveying and valuation • [Food services] Digital ordering and payment • [Retail] Enhanced Point-of-Sales (POS)/Retail Management System	**Platforms** • Bizmann System (fnbMarket Global) • CombineSell • Dodoca International (RenRenShop Solution for Singapore Pavilion Marketplace) • Innovative Hub • SellinAll • Trustana • Eezee.sg	More than 30 generic and sector-specific solutions (based on IDP) Examples include: **Generic** • SME Microsoft Dynamics Navision / Business Central based ERP system integrated with InvoiceNow and PayNow Corporate **Sector-specific** • [Construction] Drone inspection system • [Facilities Management] AI-powered building facade inspection • [Security] Advanced video analytics for building security & operations
Funding support	• $500	• 70% (for April 2017 – March 2020) • 80% (for April 2020 – March 2022)	• Varies according to platform	• 70%

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