



### I. Administrative Set-Up

The Department of Statistics (DOS) was the implementing agency for collecting, validating, and coordinating with various agencies to submit the required data for the 2021 ICP. As with past ICP rounds, the national and deputy national coordinators and officers from the sections of consumer price indices, producer price indices, and national accounts were involved in the 2021 ICP. For construction, the Building and Construction Agency (BCA) assisted in compiling and validating the required data.

### II. Use of Existing Infrastructure in Collecting International Comparison Program Data

DOS has integrated household consumption items selected for the ICP into the consumer price index (CPI) basket where appropriate. For items in the 2021 household consumption list, about three-fifths of the price data for the ICP survey were obtained from CPI regular price surveys. Significant effort was exerted on item specification consistency to ensure consistency with the 2021 ICP product list and data comparability with other economies. For items not included in the CPI regular price surveys, additional resources were deployed by the consumer price section to collect detailed specifications and relevant price data. To minimize effort in data entry for selected items in the CPI and ICP price surveys, an ICP module was specifically developed in the CPI computerized system to process ICP required prices and compile relevant statistics. System functions of the ICP module were presented at the 22nd Technical Evaluation and Review Regional Workshop for the session on the economies' experience in integrating ICP in CPI.

The DOS ICP team used housing rental and volume data from relevant government agencies such as the Housing and Development Board, the Urban Redevelopment Authority, and the Ministry of Manpower's Comprehensive Labor Force Survey. The DOS and BCA regular surveys did not include most items and products required for construction and machinery and equipment. Therefore, special surveys had to be conducted, requiring significant resources to collect the price data for these items. Data were collated from the Public Services Division and other agencies from the education and healthcare sectors for government compensation.

### III. Survey Framework

Price surveys for household and non-household components covered the entire economy of Singapore, a city-state with no rural population. The existing survey frameworks of the CPI, producer price index, and the BCA were used for household consumption, machinery and equipment, and construction components. Administrative data for government compensation and housing rental were obtained from the relevant agencies.

### IV. Gross Domestic Product Expenditure Values

Most GDP expenditure by basic headings was available from the national accounts. Data on the ICEH and GFCF were mainly compiled based on the supply and use balancing, with the key data sources from external trade statistics, the Census of Manufacturing Activities, the Survey of Services, and administrative data.

While individual consumption expenditure by nonprofit institutions serving households is not reported separately in the national accounts, the DOS ICP team generated separate estimates of the GDP expenditures for the main aggregates and their components for ICP purposes.

Estimates on government final consumption expenditure were compiled using the cost of production approach, with data from government financial statements. Data on exports and imports of goods and services were obtained from the balance of payments statistics. Statistical discrepancy was distributed across all basic headings.



### V. Data Validation and Quality Control

For all sectors, product specifications of the priced items were thoroughly examined to ensure that they fulfilled the requirements of the ICP. All prices obtained were checked and verified with respondents before submission to the Asian Development Bank (ADB). Intraeconomy data validation based on ADB's guidelines—such as minimum-to-maximum price ratio and coefficient of variation—was conducted to ensure the plausibility of prices and to identify possible outliers. References were also made to similar price data previously submitted in the 2017 ICP round.

Regional data workshops were beneficial in addressing data issues and concerns faced by the participating economies. The workshops provided a platform for in-depth discussions and knowledge sharing among the economies. The data validation guidelines provided by ADB were used as a reference to further check the submitted price data to ensure that the intraeconomy and intereconomy variabilities were within acceptable limits.

For household consumption items, the price ratios of 2021 over 2017 were compared, which showed that most items had comparable price movements between the CPI and PPP. Differences observed were mainly because of different product specifications between the 2017 and 2021 ICP cycles, such as different brands, varieties, or establishments where prices were collected. This was also a result of the phasing out of old products and changes in the CPI basket over time.

Prices for machinery and equipment items were obtained from official distributors and dealers whenever possible to ensure representativeness. If the specific model of the required machinery and equipment item was unavailable, the price of a comparable replacement model was collected. Any deviations in specifications between the replacement and the required model were documented in detail and included in the submission to ADB for further evaluation. All prices obtained were scrutinized, and clarifications were made with respondents before submission to ADB. Clear guidelines on machinery and equipment data collection and validation were established during regional data validation workshops. These workshops were also useful for clarifying and resolving common issues faced by the participating economies during machinery and equipment price collection.

Prices for construction were obtained from large and active construction firms to ensure data reliability. Based on assessments, Singapore's data were representative of the industry. References were also made to similar price data submitted for the 2017 ICP. The construction survey does not differentiate geographical areas, as Singapore is a city-state where location is not a factor in price variations.

### VI. Challenges in the International Comparison Program Implementation

Because of the coronavirus disease (COVID-19), travel restrictions made prices for international airfares and package tours unavailable. Price collection activities had to be adjusted because of increased safe management measures in Singapore to manage COVID-19 during various periods in 2021. For example, during the Phase 2 Heightened Alert and the closure of wet markets because of the outbreak of COVID-19 clusters, ICP field collection activities were scaled back or halted temporarily.

Where available and deemed representative, alternative data collection methods, such as online prices and email surveys, were adopted instead of ICP field collections. Web scraping proved to be an efficient method for collecting online prices, minimizing the survey burden while allowing for automated extraction of more data points at a higher frequency. The use of web scraping mitigated some of the price collection challenges when physical price collection was impeded.



Most items required for machinery and equipment were not included in the regular DOS surveys because they were uncommon. Special surveys were conducted to increase data comparability for cross-economy comparison. Many specified models were unavailable, and respondents had to suggest comparable replacement models, which might not have the same specifications as the ICP items. Extensive online research was conducted to collect information and establish details to facilitate a separate survey.

Similar issues were faced for construction. The BCA had difficulties pricing some items because of strict specifications and their unavailability in Singapore. These items are highly likely to continue to be unavailable. The BCA deployed additional resources to collect prices for items required through special price surveys. When specific items or models were unavailable, prices for comparable items were collected, and any deviations in specifications between the available and the required items were documented in detail for ADB's further evaluation. The unit price converter tool was also used where necessary. However, comparing construction prices across economies based on a single specification (i.e., using the same list of items) may be subject to data limitations and distortions. Given that building specifications could vary significantly across economies, this raises questions about the usefulness of such price comparisons.

### VII. Lessons Learned and Future Directions

Participation in the ICP rounds helped enhance officers' understanding of PPP methodology and estimates. Various regional workshops were useful in raising awareness and understanding of issues and challenges encountered by different statistical offices of the participating economies in price collection and national accounts compilation.

As the ICP has become a permanent element of the global statistical program and is to be conducted more frequently, more ICP items may be introduced into the CPI basket where appropriate to improve the overlap between the CPI and ICP price surveys. On reviewing the 2024 ICP household consumption item product list, the DOS ICP team proposed changes to specifications for some items, considering the standard specifications available in Singapore. This will significantly reduce the need for DOS to collect additional prices through special efforts or to perform pro-rating to meet the required quantity for the ICP.

Non-household surveys, like machinery and equipment, have already been integrated into the relevant agencies' work plan.

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### Annex 2: List of Members of Core International Comparison Program Team (Department of Statistics)

Name	Title	Responsibility
Wendy Low	Senior Assistant Director	National Coordinator
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