SURVEY METHODOLOGY NOTE

The South African Business Innovation Survey (BIS) is based on the Organisation for Economic Co-operation and Development's Oslo Manual 2018 Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition.

More specifically, the survey uses the methodological recommendations for the Community Innovation Survey (CIS) series of European Union (EU) countries, provided by Eurostat, the Statistical Office of the European Commission. Indicators that are both relevant for South Africa and internationally comparable were produced using these guidelines.

The results of the BIS for the three-year reference 2019 to 2021 are contained in the report, Innovation in South African Businesses, 2019 – 2021: Activities, Practices and Capabilities, March 2024.

Sampling and response

The survey design was informed by the structure of the national Business Register maintained by Statistics South Africa (Stats SA), from which a suitable stratified random sample for the survey was drawn. The Oslo Manual recommends size cut-offs based on employment, including only businesses with ten or more employees. The Stats SA Business Register has insufficient information on employment, and hence the size classes are, of necessity, based on turnover. The relationship between turnover and the number of full-time employees is prescribed by a schedule contained in the National Small Business Amendment Act (No. 26 of 2003). Businesses are divided into four size classes and the criteria used to differentiate between these are also sector specific. To draw the sample for the BIS 2019-2021, lower and upper bounds of each turnover-based size class were multiplied by a factor of 4.5 to adjust for inflation. Table 1 shows the criteria used to group the businesses into their respective size classes, based on their sector and turnover.

Table 1: Statistics South Africa size class (turnover Rands)

Sector	SIC* code	Large (1)	Medium (2)	Small (3)	Very Small (4)
Mining and quarrying	21-29	turnover > 175,500,000	45,000,000 < turnover <= 175,500,000	18,000,000 < turnover <= 45,000,000	0 <= turnover <= 18,000,000
Manufacturing	30-39	turnover > 229,500,000	58,500,000 < turnover <= 229,500,000	22,500,000 < turnover <= 58,500,000	0 <= turnover <= 22,500,000
Electricity, gas and water supply	41-42	turnover > 229,500,000	58,500,000 < turnover <= 229,500,000	22,950,000 < turnover <= 58,500,000	0 <= turnover <= 22,950,000
Wholesale trade	61	turnover > 288,000,000	144,000,000 < turnover <= 288,000,000	27,000,000 < turnover <= 144,000,000	0 <= turnover <= 27,000,000
Retail trade	62	turnover > 175,500,000	85,500,000 < turnover <= 175,500,000	18,000,000 < turnover <= 85,500,000	0 <= turnover <= 18,000,000
Transport, storage and communication	71-75	turnover > 117,000,000	58,500,000 < turnover <= 117,000,000	13,500,000 < turnover <= 58,500,000	0 <= turnover <= 13,500,000
Financial intermediation	81	turnover > 117,000,000	58,500,000 < turnover <= 117,000,000	13,500,000 < turnover <= 58,500,000	0 <= turnover <= 13,500,000
Computer and related activities	86	turnover > 117,000,000	58,500,000 < turnover <= 117,000,000	13,500,000 < turnover <= 58,500,000	0 <= turnover <= 13,500,000
Research and development	87	turnover > 117,000,000	58,500,000 < turnover <= 117,000,000	13,500,000 < turnover <= 58,500,000	0 <= turnover <= 13,500,000
Architectural and engineering activities	8821	turnover > 117,000,000	58,500,000 < turnover <= 117,000,000	13,500,000 < turnover <= 58,500,000	0 <= turnover <= 13,500,000
Technical testing and analysis	8822	turnover > 117,000,000	58,500,000 < turnover <= 117,000,000	13,500,000 < turnover <= 58,500,000	0 <= turnover <= 13,500,000

*SIC = Standard Industrial Classification

The sample frame had 30 Standard Industrial Classification (SIC) codes, representing industry and services subsectors within six main sectors, and four size classes per subsector, which gave a total of 30 x 4 = 120 strata. Industry covered the sectors: mining and quarrying, manufacturing, and electricity, gas and water supply. The services sectors covered: wholesale and retail trade, transport, storage and communication, financial intermediation, computer and related activities, R&D, architectural and engineering activities, and technical testing and analysis.

The initial sample obtained from Stats SA contained 5 497 businesses. The list of businesses, including contact information from the Stats SA Business Register, was provided to the contracted fieldwork service provider (GeoScope South Africa), appointed to collect the data. During fieldwork, 495 of the original sample of businesses were classified as invalid. In particular, these were businesses that were: not identifiable or traceable through several methods (365), duplicates (4), inactive businesses (121), 100% foreign (1) or out of scope (i.e. ineligible activity) (4). The final survey sample therefore contained 5 002 valid businesses.

The data was collected primarily via Computer Assisted Telephone Interviewing (CATI), while a small number of businesses self-completed the questionnaire using an online questionnaire. In a difficult business climate, particularly amid Covid-19 restrictions, and despite an extensive advocacy strategy prior to and as part of the fieldwork, 1 661 businesses responded to the survey. On this basis, the survey achieved an overall response rate of 33.2%. Limitations of the survey associated with this low response rate were addressed as outlined below.

Non-response survey

As recommended by the Oslo Manual 2018 for surveys that achieve response rates of less than 70%, a non-response survey of a simple random sample of non-responding businesses was conducted. The purpose of the non-response survey was to correct for any bias that might have arisen due to businesses that did not respond to the survey being less or more innovation-active than those businesses that did respond. The non-response survey covered 518 or 15% of the businesses that did not respond to the original survey, and a response rate of 59.3% was achieved. The correction for bias due to non-response was implemented by adjusting the design weights used to project the sample results to the target population of businesses (see Methodology Note on the Calculation of Statistical Weights).

Imputations in final survey data

Missing turnover, employment and R&D expenditure values were imputed by estimating them using their corresponding arithmetic means. These were calculated based on the values reported by responding businesses in the strata where these missing values occured. However, it was noted that in certain subsectors some businesses reported turnover values that were either below the lower bound or above the upper bound of the turnover size class to which they were assigned in the original sample from Stats SA. For the purpose of imputation only, these businesses were re-assigned to the size classes (within their subsectors) suggested by the sizes of their reported turnover values. Once this re-assignment of businesses was completed, missing values for turnover, employment and R&D expenditure for all businesses were imputed using the arithmetic means of the revised size classes. No imputation was performed for missing responses to other items/questions of the survey questionnaire.

Projection of the results

The results from the survey were projected to the target population of South African businesses in the sectors listed above using design weights, which were adjusted for potential bias in the innovation rate using the results of the non-response survey and for invalid businesses. Applying the weights to the data resulted in a target population of 57 025 businesses.

A great deal of effort was made during fieldwork to ensure that at least one response was received per stratum, to allow for weighting. For an ideal weighting, at least one innovation-active response and at least one non-innovation active response must be realised per stratum, for stratum level weights to be calculable. However, this condition was only met for business size classes in the two sub-sectors of the wholesale and retail trade sector. For all the other sectors, either no innovation-active responses or non-innovation active responses or both (only two strata) were realised in certain size classes in some subsectors. Therefore, for these sectors, size class level weights were used, after adjusting the target population sizes within the sector to account for the zero responses in the two strata in Sector 2 (mining and quarrying), where neither innovation-active nor non-innovation active responses were realised. This was achieved by equally dividing and re-assigning the portion of the target population size of the affected strata to the remaining strata of the same size-class within the sector. Details of the weighting strategy may be found in a separate note Methodology Note on the Calculation of Statistical Weights that accompanies this methodology document and the Innovation in South African Businesses, 2019 – 2021: Activities, Practices and Capabilities report.

To assess generalisability from the sample to the population, error margins of the proportion of businesses that engaged in specific innovation activities were calculated. This quality indicator ranged between 0.01 and 0.02 percentage points, which was sufficiently low for the proportion estimates to be deemed good.

To further assess the validity of the data, the survey results were triangulated and found to be consistent with corresponding results from other national surveys, for similar reference periods and sectors. These were:

- Turnover, consistent with Stats SA's annual financial statistics data; and
- Employment, consistent with Stats SA's quarterly employment statistics (QES).