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**METHODOLOGY ARCHITECTURE**

**Template V0.06 filled by:**

**<*name of the statistical agency*>**

**Documented under the auspices of the**

**High-Level Group for the Modernisation of Official Statistics**

**<*name of author*>**

**Released date: 30 October 2016**

**Version 0.06**

**Document revision control**

This section serves to control the revisions to the National Methodology Architecture (the content).

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| --- | --- | --- | --- |
| **Revision no.** | **Date of issue**  **[dd-mm-yyyy]** | **Author(s)** | **Brief description of change** |
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**Template revision control (do not remove)**

**Updates to be managed by the High-Level Group for the Modernisation of Official Statistics**

This section serves to control the development of the Methodology Architecture template (the structure).

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| **Revision no.** | **Date of issue**  **[dd-mm-yyyy]** | **Author(s)** | **Brief description of change** |
| V0.01 | September 2014 | Statistics New Zealand  - Allyson Seyb  - Jeni Darnbroughlaude | Released as the New Zealand Methodology Architecture V3.0 |
| V0.02 | January 2015 | Australian Bureau of Statistics | Released as the Australian Methodology Architecture (25 unconsolidated chapters) |
| V0.03 | May 2016 | Statistics Canada  - Claude Poirier | Initial HLG-MCPM version |
| V0.04 | July 2016 | Statistics Canada  - Claude Poirier | CSPA Offer (Section C);  GSIM Input/Output (Section C);  Cross-cutting proc ( Section C.9) |
| V0.05 | Sept 2016 | Statistics Canada  - Claude Poirier | Write-in boxes (Section C)  Consolidation of sections E and C  Consolidation of sections F and C |
| V0.06 | Oct 2016 | Statistics New Zealand  - Vince Galvin  Statistics Canada  - Claude Poirier | Documenting the context of Methodology Architecture  Adding maturity of methods (building blocks) Section C |

**Section A) INTRODUCTION**

**A.1. CONTEXT**

In recent years, many national and international statistical organisations have initiated programmes to restructure statistical production processes. Transformational change reshapes the people, processes, capabilities, technology and culture of an organisation by aligning with the new strategic direction. The Methodology Architecture’s purpose is to support decision making and promote effective investment by ensuring statistical methods and tools used in the production of statistics support the organisation’s vision.

Traditional planning and funding models viewed the business as a collection of many surveys, each with a distinct set of needs, projects and budgets to meet those needs. Methodology Architecture provides a common strategy, vocabulary and vision for business capability across the organisation. Centring on capability and stakeholder utility allows the organisation to move away from silo-orientated funding models and to move to funding models aligned to organisation strategies with cross-functional visibility.

The Methodological Architecture is an essential component of an NSO’s Enterprise Architecture, and complements the business and applications architectures. The Methodological Architecture defines the complex statistical algorithms and statistical practice which is embedded in the NSO’s software and implemented in business processes. The Enterprise Architecture presents a holistic view of the NSO’s directions, business practices and strategies for improvement and growth.

**A.2. A TEMPLATE**

This document is a template to document the building blocks of a National Methodology Architecture which complements the Business Architecture and the IT Architecture.

Methodology architectures were initiated by Statistics New Zealand (StatNZ) and the Australian Bureau of Statistics (ABS). In its early version, StatNZ (2014) described what a methodology architecture is and how useful it is for a National Statistical Office (NSO). Its definition can be extended with governance principles that ensure its correct use, as follows.

Methodology Architecture is defined as:

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| * The structure of the methodology components of an enterprise, with their interrelationships and principles that govern their design and evolution over time; | StatNZ |
| * The relation of these components with the business processes and IT systems (Business Architecture and System Architecture); | StatNZ |
| * The principles that govern its use by the statistical programs within the NSO, and that manages exceptions within the same programs. | New |

The benefits of the Methodology Architecture include:

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| * Enabling the sharing, reuse, integration and transformation of statistical methods; | StatNZ |
| * Supporting decision making about these methods; | StatNZ |
| * Promoting effective investment; | StatNZ |
| * Describing a) the conceptual and contextual representations, and b) the logical and physical representations of all statistical methods used by the NSO. | StatNZ |
| * Facilitating communication between methodologists, IT specialists and program managers; | New |
| * Offering a training resource for methodologists, IT specialists and program managers. | New |

**Section B) – GOVERNANCE PRINCIPLES**

In order to stay relevant and not obsolete, an architecture must describe how its components are governed, how its maintenance is planned, and how its use is monitored. This section describes principles that govern the design, the evolution and the relevant use of methods over time. Please describe in this section how the corporate mechanisms enable an efficient methodology architecture.

**B.1. GOVERNANCE OF METHODS**

Methods must be governed to make sure they are sound and they meet the needs they were intended to meet. Describe here the various levels of governance in your organisation that make sure the architecture satisfies the needs of the statistical programs.

Several levels of governance are in place to ensure relevance of methods across the agency.

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| **A) TECHNICAL COMMITTEES:** The Methodology Branch has put in place two technical committees, the first one dealing with methods for business surveys, the second dealing with methods for social surveys. |
| **Mandate:** The Business Survey Technical Committee and the Social Survey Technical Committee are responsible for monitoring the development of methodology applications in their respective area of expertise. They make sure chosen methods are sound to produce fit-for-purpose statistical output. They may also review methodology research projects, recommend additional works on that matter, or support presentation at higher levels.  EXAMPLE |
| **Membership:** The two committees include methodology section chiefs responsible for business surveys (the first committee) and for social surveys (the second committee). Then, both committees include the six Assistant-Directors and the four Directors from the Methodology Branch. |
| **Frequency of meetings:**  Monthly |

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| **B) GENERALIZED SYSTEMS STEERING COMMITTEE:** This steering committee governs the integration of generalized methods into the suite of corporate systems.  EXAMPLE |
| **Mandate:** The Generalized Systems Steering Committee is responsible for the development and extension of corporate systems supporting Sampling, Edit and imputation, Estimation, Tabulation, Time Series Analysis, Disclosure control, and Record linkage. The committee monitors investment initiatives as well as maintenance initiatives. It relies on technical committees to prioritize the development activities and to govern their scope, schedule and budget. |
| **Membership:**  This steering committee is chaired by the Director General of the Methodology Branch and includes Directors of the methodology divisions, Director of the System engineering division, and directors of two subject matter divisions (one from economic statistics, one from social statistics). |
| **Frequency of meetings:**  Bi-monthly |

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| **C) METHODOLOGY RESEARCH AND DEVELOPMENT COMMITTEE:** This committee provides research and development expertise to look for state-of-the-art solutions to statistical issues. |
| **Mandate:** The Methodology Research and Development Committee coordinates and stimulates research and development activities in areas related to survey methodology, encourages the use of the research results, and promotes the interaction with related efforts within and outside the agency. It focuses on applied research, developmental research, and prospective research. |
| **Membership:**  Managers representing various methodology areas, including collection, sampling, editing, imputation, estimation, record linkage, confidentiality,  EXAMPLE |
| **Frequency of meetings:**  Bi-monthly |

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| **D) METHODS AND STANDARDS COMMITTEE:** This committee ensures sound statistical methods are available to the statistical programs. |
| **Mandate:** The Methods and Standards Committee assists and advises on the development and application of statistical standards and metadata within the Agency’s programs; approves the adoption of statistical concepts, variables and classifications as departmental standards; approves exemptions to the departmental standards where appropriate; advises on the development and use of sound statistical methods; provides guidance on priorities for statistical research and innovation; and acts as the focal point for the review and monitoring of corporate data quality practices and issues. |
| **Membership:**  Directors General and Directors of various areas, including standards, methodology, economic statistics, social statistics, collection, systems |
| **Frequency of meetings:**  Monthly |

EXAMPLE

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| **E) ADVISORY COMMITTEE ON STATISTICAL METHODS:** This committee provides advises on various methodology aspects. |
| **Mandate:** This Advisory Committee on Statistical Methods advises the Chief Statistician on matters relating to the utilization of efficient statistical methods in the Agency’s program, and on its program of research and development in statistical methods. |
| **Membership:**  Statistics and methodology experts representing methodology departments of recognize statistical institutes, research institutes, universities, etc. |
| **Frequency of meetings:**  Semi-annual |

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| **F) GOVERNANCE ENTITY:** <*details …*> |
| **Mandate:** <*details …*> |
| **Membership:**  <*details …*> |
| **Frequency of meetings:**  <*details …*> |

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| **G) GOVERNANCE ENTITY:** <*details …*> |
| **Mandate:** <*details …*> |
| **Membership:**  <*details …*> |
| **Frequency of meetings:**  <*details …*> |

**B.2. MAINTENANCE OF METHODS**

Methods must evolve with the evolving needs. Research works must be entertained in order to develop the blocks ahead of time, in preparation for the, as yet unknown, future needs. Describe here how the methods (not the related systems) are being maintained in your statistical office.

Several levels of governance are in place to monitor the maintenance of methods across the agency.

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| **A) METHODOLOGY RESEARCH AND DEVELOPMENT COMMITTEE:** This committee enables the exploration of new areas which would be beneficial to the agency in the medium to long term. |
| **Governance activities:** This committee develops and/or identifies sound theoretical frameworks for methods, develops methods for current and new statistical problems for which no solution exists, explores new areas which would be beneficial to the agency in the medium to long term, connects with researchers from other organizations to improve current methods and/or suggest innovative ones.  EXAMPLE |

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| **B) METHODS AND STANDARD COMMITTEE:** <*details …*> |
| **Governance activities:** <*details …*> |

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| **C) ADVISORY COMMITTEE ON STATISTICAL METHODS:** <*details …*> |
| **Governance activities:** <*details …*> |

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| **D) CORPORATE PLANNING COMMITTEE:** <*details …*> |
| **Governance activities:** <*details …*> |

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| **E) GOVERNANCE ENTITY:** <*details …*> |
| **Governance activities:** <*details …*> |

**B.3. MONITORING THE USE**

A sound Methodology Architecture would show no benefits if it is not used by the statistical programs. Therefore, the use should be monitored on a continuous basis. Such a monitoring will avoid duplicating global solutions with local solutions. Describe here how sound methods (not necessarily the related systems) are being used and reused in your statistical office.

Several levels of governance are in place to monitor the use of methods across the agency.

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| **A) TECHNICAL COMMITTEES:** <*details …*> |
| **Governance activities:** <*details …*> |

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| **B) DIVISIONAL REVIEW:** <*details …*> |
| **Governance activities:** <*details …*> |

EXAMPLE

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| **C) CORPORATE BUSINESS ARCHITECTURE MANAGEMENT COMMITTEE:** <*details …*> |
| **Governance activities:** <*details …*> |

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| **D) GOVERNANCE ENTITY:** <*details …*> |
| **Governance activities:** <*details …*> |

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| **E) GOVERNANCE ENTITY:** <*details …*> |
| **Governance activities:** <*details …*> |

**Section C) - METHODOLOGY COMPONENTS**

This section describes the methodology components of a statistical organisation, with their interrelationships. The components are listed according to the eight phases of the statistical business process, as defined by UNECE (Dec 2003) in its Generic Statistical Business Process Model GSBPM v5.0.

The **methods** (methodology components) should simply be named in the first column rather than being described since their descriptions are most often available in other scientific documents. In the context of the methodology architecture, the methods represent the theoretical building blocks.

The **maturity** of the method reflects its status, whether "emerging", "under investigation", "recommended", "declining", "obsolete". In its life cycle, a method would first emerge, then its performance would be investigated in a few environments (economic statistics, social statistics, administrative data, etc.) before to be recommended for any of these. The recommendation of new methods may result in the obsolescence of former ones.

The **systems** (IT components) that offer the respective methods within the organization for the benefit of the statistical programs must be specified in the second column. The systems represent the practical building blocks that ensure the accessibility of methods through corporately supported tools. In this context corporate support means technical assistance, with maintenance activities as well as user documentation.

The **CSPA offer** (common standardized components) lists the IT implementations that are available from the international CSPA Service Catalogue (2016), if any, that offer an implementation of the respective methods, even if these components are not used by the statistical office. The CSPA offer may differ from the systems that are run in production. For most agencies, such a discrepancy would be a motivation to question the benefit of maintaining local solutions.

The **environment** defines the context in which the method is most frequently used, namely a) social statistics, b) economic statistics, c) censuses, d) administrative data. There may exist less frequent or even exceptional applications of each methods and listing them would add no real value to the architecture.

The **GSIM inputs/outputs** define the type of information that is required to use the method. For instance, in order to select a sample, a typical selection method would require a Survey frame, the stratification information and a Sample size for each stratum.

# SPECIFY NEEDS

## Identify Needs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Consult and Confirm Needs

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Establish output objectives

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Identify concepts

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Check data availability

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Prepare business case

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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# DESIGN

## Design outputs

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Design variable descriptions

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
|  |  |  | Retrieve Statistical Classifications |  |  |
|  |  |  | List Statistical Classifications |  |  |
|  |  |  |  |  |  |

## Design collection

EXAMPLE

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| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| PRIMARY DATA |  |  |  |  |  |
| - Administrative data |  |  |  |  |  |
| - Individuals |  |  |  |  |  |
| - Households |  |  |  |  |  |
| - Businesses |  |  |  |  |  |
| - Transactions |  |  |  |  |  |
| SECONDARY DATA |  |  |  |  |  |
| - Administrative data |  |  |  |  |  |
| - Individuals |  |  |  |  |  |
| - Households |  |  |  |  |  |
| - Businesses |  |  |  |  |  |
| - Transactions |  |  |  |  |  |

## Design frame and sample

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| FRAMES |  |  |  |  |  |
| - Address Register |  |  |  |  |  |
| - Building Register |  |  |  |  |  |
| - Business Register |  |  |  |  |  |
| - Population Register |  |  |  |  |  |
| - Telephone Register |  |  |  |  |  |
| - Area Frame |  |  |  |  |  |
| SAMPLING |  |  |  |  |  |
| - Censuses |  |  |  |  |  |
| - Probabilistic sampling |  |  |  |  |  |
| - Non-probabilistic sampling |  |  |  |  |  |

## Design processing and analysis

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Design production systems and workflow

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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# BUILD

## Build collection instrument

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| PRIMARY DATA |  |  |  |  |  |
| - Computer Assisted  Paper Interview | Recommended | ICOS |  | Social statistics  Economic statistics |  |
| - Computer Assisted  Telephone Interview | Recommended | ICOS |  | Social statistics  Economic statistics  Census of Population  Census of Agriculture |  |
| - Drop-off / Mail-back | Recommended |  |  | Census of Population  Census of Agriculture |  |
| - Mail-out / Mail-back | Recommended |  |  | Census of Population |  |
| - Electronic Collection | Recommended | ICOS | EXAMPLE | Social statistics  Economic statistics  Census of Population  Census of Agriculture |  |
| - Personal Interview | Declining |  |  | Questionnaire Development |  |
| SECONDARY DATA |  |  |  |  |  |
| - Administrative data | Recommended |  |  |  |  |
| - Individuals | Recommended |  |  |  |  |
| - Households | Recommended |  |  |  |  |
| - Businesses | Recommended |  |  |  |  |
| - Transactions | Under investigation |  |  |  |  |

## Build or enhance process components

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Build or enhance dissemination components

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Paper dissemination | Declining | Printing |  | Social statistics  Economic statistics  Census of Population  Census of Agriculture | CANSIM  Survey highlights  Survey methodology |
| - Electronic dissemination | Recommended | CANSIM  The DAILY  Smart DAILY | EXAMPLE | Social statistics  Economic statistics  Census of Population  Census of Agriculture  Social statistics  Economic statistics  Census of Population  Census of Agriculture  Social statistics  Economic statistics  Census of Population  Census of Agriculture | Tabular data  Survey methodology  Tabular data  Survey highlights  Survey methodology  Documentation  Tabular data |
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## Configure workflows

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Test production system

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Test statistical business process

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Finalise production system

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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# COLLECT

## Create frame and select sample

|  |  |  |  |  |  |
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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| FRAMES |  |  |  |  |  |
| - Address Register | Recommended | AR |  | Social statistics  Census of Population | Postal Code data  Taxation data  Census of Population |
| - Building Register | Under investigation | Prototype |  | Economic statistics | Address Register  Satellite images |
| - Business Register | Recommended | BR | EXAMPLE | Economic statistics  Census of Agriculture | Taxation data  Survey feedback  External sources |
| - Population Register | Recommended | HSFS |  | Social statistics  Census of Population | Census of Population  Birth records  Death records  Taxation data |
| - Telephone Register | Recommended |  |  | Social statistics  Census of Population | Census of Population  Telephone Service providers |
| - Area Frame | Recommended |  |  | Social statistics | Census geography  Geomatics |
| STRATIFICATION |  |  |  |  |  |
| - Cumulative Square Root f | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Unit sizes  Classification |
| - Optimal stratification (LH) | Recommended | G-SAM (LH) |  |  | Survey frame  Classification  Unit sizes  Sample size |
| - Deterministic Stratification | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Classification  Unit sizes |
| - Clustering | Under investigation |  |  | Economic statistics  Social statistics | Survey frame  Classification  Unit sizes |
| SAMPLE ALLOCATION |  |  |  |  |  |
| - Proportional Allocation | Recommended | G-SAM | EXAMPLE | Economic statistics  Social statistics | Survey frame  Stratification  Sample size |
| - Equal Allocation | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Stratification  Sample size |
| - Optimal Allocation | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Stratification  Sample size or CV |
| - Neyman Allocation | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Stratification  Sample size or CV |
| - Power Allocation | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Stratification  Sample size or CV |
| SAMPLE SELECTION |  |  |  |  |  |
| - Two-phase Sampling | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Stratification  Sample sizes |
| - Two-stage Sampling | Recommended |  |  | Social statistics | Survey frame  Stratification  Sample sizes |
| - Simple Random Sampling | Recommended | G-SAM | Sample Selection | Economic statistics  Social statistics | Survey frame  Stratification  Sample sizes |
| - Systematic Sampling | Recommended |  | EXAMPLE | Economic statistics  Social statistics | Survey frame  Stratification  Sample sizes |
| - Bernoulli Sampling | Recommended | G-SAM |  | Economic statistics | Survey frame  Stratification  Sampling fraction |
| - Poisson Sampling | Recommended | G-SAM |  | Economic statistics | Survey frame  Stratification  Sampling fractions |
| - PPT Sampling | Recommended |  |  | Economic statistics  Social statistics | Survey frame  Stratification  Sample sizes  Unit sizes |
| SAMPLE COORDINATION |  |  |  |  |  |
| - Cotton & Hesse | Recommended | G-SAM |  | Economic statistics  Social statistics | Survey frame  Stratification  Survey history  Sample sizes |
| - Microstrate  (cumulated burden) | Recommended | Microstrate |  | Economic statistics | Survey frame  Stratification  Survey history  Sample size |
| - Panel Sampling | Recommended |  |  | Longitudinal statistics | Survey frame  Stratification  Sample size |
| - Synchronize Sampling | Under investigation |  |  |  | Survey frame  Stratification  Sampling fractions |
|  |  |  |  |  |  |

## Set up collection

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Web Collection |  | ICOS |  | Social statistics  Census of Population  Census of Agriculture | Sample |
| - Web Collection |  | BCP |  | Economic statistics | Sample |
| - Computer Assisted Telephone Interview |  | ICOS | EXAMPLE | Social statistics  Census of Population  Census of Agriculture | Sample |
| - Computer Assisted Personal Interview |  | ICOS |  | Social statistics | Sample |
| - Drop-off / Pick-up |  |  |  | Census of Population | Sample |
| - Electronic Collection |  | BCP |  | Economic statistics | Sample |
| - Mail-out / Mail-back |  |  |  | Economic statistics  Social statistics  Census of Population  Census of Agriculture | Sample |
| - Personal Interview |  |  |  | Questionnaire testing | Sample |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

## Run collection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Active collection |  | IBSP |  | Economic statistics |  |
| - Follow-up |  | IBSP; CT | EXAMPLE | Economic statistics  Social statistics  Census of Population  Census of Agriculture |  |
| - Collection monitoring |  |  |  | Economic statistics  Social statistics  Census of Population  Census of Agriculture |  |

## Finalise collection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Data Capture |  |  |  |  |  |
| - Paradata Management |  |  |  |  |  |
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# PROCESS

## Integrate data

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Record Linkage  Exact matching  (non-probabilistic) | Recommended | SAS; SQL |  | Economic statistics  Social statistics  Administrative data  Census of Population  Census of Agriculture | Unmatched files |
| - Record Linkage  Probabilistic Linkage | Recommended | G-LINK |  | Economic statistics  Social statistics  Administrative data  Census of Population  Census of Agriculture | Unlinked files |
|  |  |  |  |  |  |

## Classify and code

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| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
|  |  |  | Data Set Re-code |  |  |
| - Product Coding  (NAPCS 2012) | Recommended | NAPCS  CCE  G-CODE | EXAMPLE | Economic statistics Social statistics |  |
| - Occupation Coding  (NOC 2011) | Recommended | NOCS  CCE  G-CODE |  | Economic statistics Social statistics |  |
| - Industry Coding  (NAICS 2012) | Recommended | NAICS 2012  CCE  G-CODE |  | Economic statistics Administrative data |  |
| - Industry Coding  (NAICS 2007) | Declining | NAICS 2007  CCE  G-CODE |  | Economic statistics Administrative data |  |
| - Industry Coding  (NAICS 2002) | Obsolete |  |  |  |  |
| - Geographical Coding  (SGC 2011) |  | SGC 2011 CCE  G-CODE | EXAMPLE | Economic statistics Social statistics Administrative data |  |
| - Geographical Coding  (SGC 2006) | Declining | SGC 2011 CCE  G-CODE |  | Economic statistics Social statistics Administrative data |  |
| - Geographical Coding  (SGC 2001) | Obsolete |  |  |  |  |
| - Instructional Coding  (CIP 2011) | Recommended | CIP 2011 CCE  G-CODE |  | Social statistics |  |
| - Instructional Coding  (CIP 2000) | Obsolete |  |  |  |  |
| - Manual Coding | Recommended | CCE |  |  |  |
| - Quality Control | Recommended | CCE  QCDAP |  | Economic statistics Social statistics |  |
|  |  |  |  |  |  |
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## Review and validate

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| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Validity Checks | Recommended  Recommended | BANFF  CANCEIS | Linear Rule Checking | Economic statistics  Social statistics  Census of Agriculture  Social statistics  Census of Population |  |
| - Consistency Checks | Recommended  Recommended | BANFF  CANCEIS | Linear Rule Checking | Economic statistics  Social statistics  Census of Agriculture  Census of Population  Social statistics |  |
| - Distribution Checks  - Boundaries  - Ratio Edits  - Trend Edits  - Regression Edits  - Distance to Center  - Sigma-Gap  - Distribution Checks  - Boundaries  - Ratio Edits | Recommended  Recommended  Recommended  Recommended  Recommended  Recommended  Recommended  Recommended | BANFF  BANFF  BANFF  BANFF  BANFF  BANFF  CANCEIS  CANCEIS | EXAMPLE  Linear Rule Checking  Linear Rule Checking  Linear Rule Checking | Economic statistics  Social statistics  Census of Agriculture  Census of Population  Social statistics |  |
| - Selective Editing | Recommended |  |  |  |  |
| - Machine Learning | Emerging |  |  |  |  |
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## Edit and impute

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| ERROR LOCALISATION |  |  |  |  |  |
| - Minimum Change (linear) | Recommended  Recommended | BANFF  CANCEIS | Linear Error Localisation | Economic statistics  Social statistics  Census of Agriculture  Census of population  Social statistics |  |
| IMPUTATION |  |  |  |  |  |
| - Deterministic Imputation | Recommended | BANFF | Error Correction | Economic statistics  Social statistics  Census of Agriculture |  |
| - Model Imputation | Recommended | BANFF | Error Correction  EXAMPLE | Economic statistics  Social statistics  Census of Agriculture |  |
| - Historical Imputation | Recommended | BANFF |  | Economic statistics  Social statistics  Census of Agriculture |  |
| - Trend Imputation | Recommended | BANFF |  | Economic statistics  Social statistics  Census of Agriculture |  |
| - Donor Imputation  - Nearest neighbour  - Random Donor  - Donor Imputation  - Nearest neighbour  - Random Donor  - Minimum Change  - Decision Logic Tables | Recommended  Recommended  Recommended  Recommended  Recommended | BANFF  BANFF  CANCEIS  CANCEIS  CANCEIS |  | Economic statistics  Social statistics  Census of Agriculture  Social statistics  Census of Population |  |
|  |  |  |  |  |  |
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## Derive new variables and units

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| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Calculate weights

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Design Weighting | Recommended | G-EST |  | Economic statistics  Social statistics | Sample information  Strata definition |
| - Hajek Weighting | Recommended | G-EST |  | Economic statistics  Social statistics | Sample information  Strata definition |
| - Calibration Weighting | Recommended | G-EST | EXAMPLE | Economic statistics  Social statistics | Sample information  Calibration groups  Calibration totals |
| - Regression Weighting | Recommended | G-EST |  | Economic statistics  Social statistics | Sample information  Regression group |
| - Non-Response Adjustment | Recommended | G-EST |  | Social statistics | Sample information  Non-response groups |
| - Bootstrap Weighting | Recommended | G-EST |  | Social statistics | Sample information  Raw estimation weight |
| - Weight Share Method | Recommended |  |  | Economic statistics  Social statistics | Sample information  Grouping definition  Probability of selections |
|  |  |  |  |  |  |

## Calculate aggregates

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - HT Estimation  - One-phase design  - Two-phase design  - SRS design  - Poisson design | Recommended  Recommended  Recommended  Recommended | G-EST  G-EST  G-EST  G-EST |  | Economic statistics  Social statistics | Sample information  Domain definition  Edited survey data |
| - Variance (sampling) | Recommended | G-EST | EXAMPLE | Economic statistics  Social statistics | Sample information  Domain definition  Edited survey data |
| - Variance (due to imputation) | Recommended | SEVANI / G-EST |  | Economic statistics  Social statistics | Edited survey data  Editing flags |
| - Bootstrap Estimation  - Rao-Wu | Recommended | G-EST |  | Economic statistics  Social statistics | Sample information  Domain definition  Edited survey data |
| - Jackknife Estimation | Obsolete |  |  |  |  |
| - Small Area Estimation | Recommended | SAE / G-EST |  | Economic statistics  Social statistics | Sample information  Domain definition  Edited survey data  Secondary data |
|  |  |  |  |  |  |

## Finalise data files

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| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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# ANALYSE

## Prepare draft outputs

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Times Series Adjustment | Recommended | G-SERIES | Seasonal Adjustment | Economic statistics  Social statistics |  |
| - Seasonal Adjustment | Recommended | G-SERIES | Seasonal Adjustment  EXAMPLE | Economic statistics  Social statistics |  |
| - Benchmarking | Recommended | G-SERIES | Seasonal Adjustment | Economic statistics  Social statistics |  |

## Validate outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Data Confrontation | Recommended |  |  | Economic statistics  Social statistics  Census of Population  Census of Agriculture | Tabular data  Historical data  Alternative sources |
| - Data Certification | Recommended |  |  | Economic statistics  Social statistics  Census of Population  Census of Agriculture | Tabular data  Historical data  Alternative sources |
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## Interpret and explain outputs

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| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Data Analysis |  |  | Statistical Chart Generator | Economic statistics  Social statistics | Statistical data |
|  |  |  |  |  |  |
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## Apply disclosure control

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Disclosure Control  - Sensitivity Checks  - Cell Suppression  - Controlled Rounding  - Interval Dissemination | Recommended  Recommended  Recommended  Recommended | G-CONFID  G-CONFID  G-CONFID  G-CONFID | Confidentialized Analysis  EXAMPLE | Economic statistics  Social statistics | Non-confidentialized data |
| - Real time Disclosure Control | Recommended | Confid-on-the-fly | Confid-on-the-fly | Economic statistics  Social statistics | Non-confidentialized data |
|  |  |  |  |  |  |

## Finalise outputs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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# DISSEMINATE

## Update output systems

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Produce dissemination products

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Manage release of dissemination products

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Promote dissemination products

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| --- | --- | --- | --- | --- | --- |
| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Web highlights |  | The DAILY |  |  |  |
| - New Dissemination Model | Under investigation | NDM |  |  |  |
|  |  |  |  |  |  |

## Manage user support

|  |  |  |  |  |  |
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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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# EVALUATE

## Gather evaluation inputs

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Conduct evaluation

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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## Agree an action plan

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
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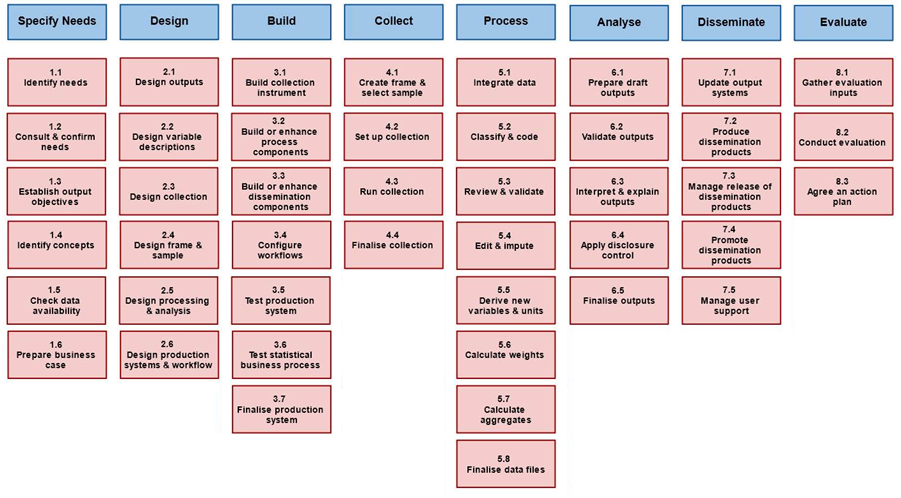
# CROSS-CUTTING PROCESSES

## Data Manipulation

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| **Methods** | **Maturity** | **Corporate Systems** | **CSPA offer** | **Environment** | **GSIM inputs/outputs** |
| - Transformation | Recommended | SAS; SQL | EXAMPLE | Economic statistics  Social statistics  Administrative data  Census of Population  Census of Agriculture | Raw data |
| - Consolidation | Recommended | SAS; SQL |  | Economic statistics  Social statistics  Administrative data  Census of Population  Census of Agriculture | Raw data |
| - Aggregation | Recommended | SAS; SQL |  | Economic statistics  Social statistics  Administrative data  Census of Population  Census of Agriculture | Raw data |

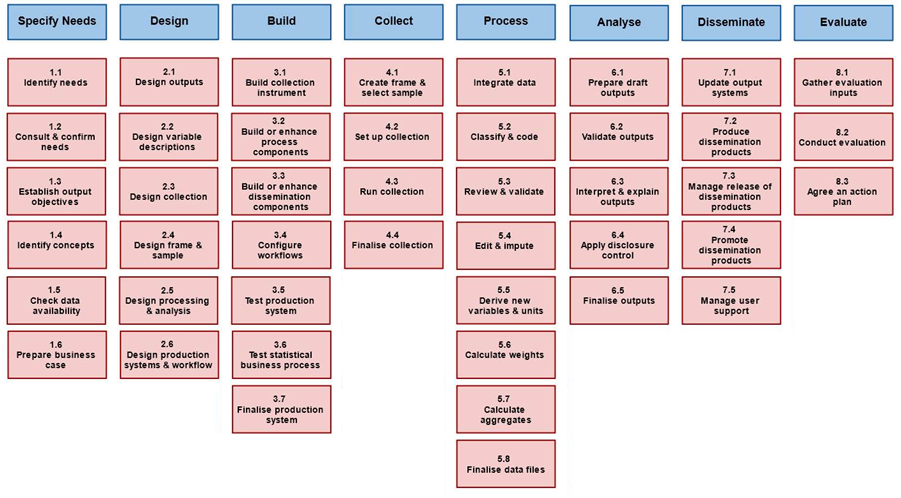
# Section D) - GRAPHICAL REPRESENTATION

## 1. Business Surveys

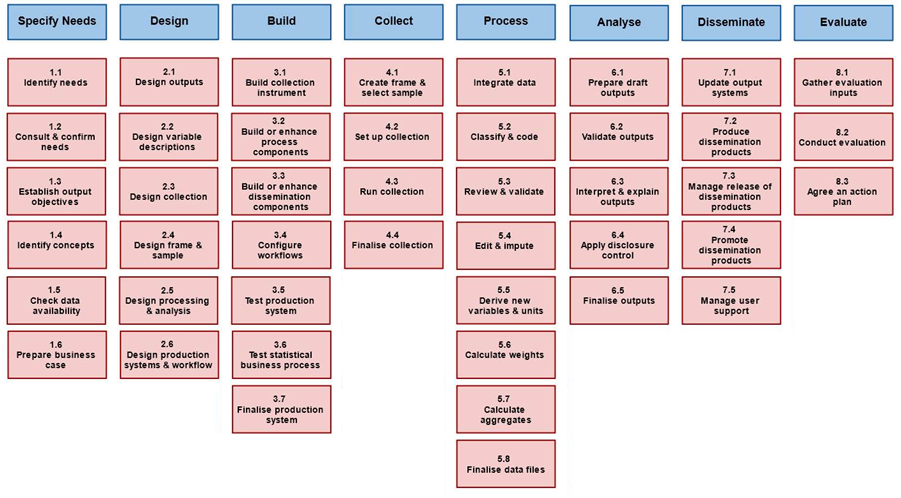


EXAMPLE

## 2. Social Surveys



## 3. Administrative Data



**GLOSSARY**

|  |  |
| --- | --- |
| ABS | Australian Bureau of Statistics |
| AR | Address Register |
| BA | Business Architecture |
| BANFF  BCP | Generalized Edit and Imputation System  Business Collection Platform |
| BR | Business Register |
| CANCEIS | CANadian Census Edit and Imputation System |
| CANSIM | CANadian survey database |
| CIP | Classification of Instructional Programs |
| CCE | Common Coding Environment |
| CSPA | Common Statistical Production Architecture |
| DAILY (The) | Statistics Canada release communication tool |
| GSBPM | Generic Statistical Business Process Model |
| G-CODE | Generalized auto-Coding System |
| G-CONFID | Generalized Disclosure Control System |
| GCP | Generic Commodity Processor |
| G-EST | Generalized Estimation System |
| G-LINK | Generalized Linkage System |
| G-SAM | Generalized Sampling System |
| G-SERIES | Generalized Time Series System |
| HLG | High-Level Group for the Modernisation of Official Statistics |
| HLG-MCPM | An HLG sub-committee – Modernisation Committee on Production and Methods |
| HSFS | Household Survey Frame System |
| HT | Horvitz-Thompson estimation |
| IBSP | Integrated Business Surveys Project |
| ICOS | Integrated Collection and Operation System |
| IA | Information Architecture |
| MA | Methodology Architecture |
| NAICS | North American Industry Classification System |
| NAPCS | North American Product Classification System |
| NDM | Statistics Canada New Dissemination Model |
| NOC | National Occupational Classification |
| QCDAP | Quality Control Data Analysis Platform |
| SAE | Small Area Estimation system |
| SGC | Standard Geographical Classification |
| SRS | Simple Random Sampling |
| StatCan | Statistics Canada |
| StatNZ | Statistics New Zealand |
| UNECE | United Nations Economic Commission for Europe |

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