# Modernisation Maturity Model (v0.9)

Under the High-Level Group project on Implementing ModernStats Standards, a Modernisation Maturity Model (MMM) has been developed. There are multiple aspects of Maturity in the context of Modernisation, and as such the model that has been developed has a number of distinct ***dimensions***. Within each dimension, different organisations may have different ***levels*** of maturity. It is highly recommended that the maturity self-assessment be performed by a cross-cutting group involving members of the Business, Information, Methods, Applications and Technology functions within the statistical organisation in order to solicit diverse and complete input from within the organisation.

These ***dimensions*** and ***levels*** are described in the tables below in general terms. However, a set of self-assessment criteria has been formulated that is specific to each ***dimension*** x ***level*** combination, as well as to each of the following *HLG-MOS standards:* [GAMSO](http://www1.unece.org/stat/platform/display/GAMSO/Generic+Activity+Model+for+Statistical+Organizations), [GSBPM](http://www1.unece.org/stat/platform/display/GSBPM/Generic+Statistical+Business+Process+Model), [GSIM](http://www1.unece.org/stat/platform/display/gsim/Generic+Statistical+Information+Model), [CSPA](http://www1.unece.org/stat/platform/display/CSPA/Common+Statistical+Production+Architecture).

As shown in this diagram, there are relationships between the standards. When evaluating the maturity level each standard should be evaluated on its own merits, recognizing that there are synergies between the standards. For example the GAMSO itself should be evaluated (knowing that the GSBPM is embedded within it), and CSPA is connected to both GSIM and GSBPM.



The MMM has been designed so as to be applicable even if small changes are made to the standards. When completing the self-assessment, it will be important for future reference to document the version number(s) of the standard(s) being assessed at the time.

## Description of Maturity Levels

| **Number** | **Level Name** | **Level Description** |
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| 1 | Initial awareness | A few individuals are becoming interested in the potential value of the standard.  The organisation as a whole is unaware of the standard. |
| 2 | Pre-implementation | Use of the standard is basic and limited to a few individuals.  Parts of the organisation are becoming interested in the potential value of the standard. |
| 3 | Early implementation | Use of the standard is spreading, but it is used in an inconsistent manner by individuals and single business units.  A corporate-wide programme/strategy for use of the standard is being prepared. |
| 4 | Corporate implementation | A corporate-wide programme/strategy for use of the standard is in place.  There is a widespread awareness of the standard and it is used in a consistent manner across the organisation. |
| 5 | Mature implementation | The standard is perceived as an important part of business operations/management, delivering value across the organisation.  The standard is well understood, integrated into business processes and practices and used in a consistent manner across the organisation. |

## Description of Dimensions

**Dimensions** (Architecture is implicit)

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| **Name** | **Description** |
| Business | This dimension focuses on the business activity domain i.e. the organisation's core business practices and policies. |
| Methods | This dimension focuses on methods i.e. how methods are designed, structured, implemented and executed. It includes statistical methodology, quality, IT methods, data collection methods, process methods and any other methods needed to support the business. |
| Information | This dimension focuses on how information and/or metadata are structured and integrated, how information is modelled, abstraction of the data access from the functional aspects, data characteristics, service and process definitions, handling of identifiers and the information model. |
| Applications | This dimension focuses on the structure and interaction of applications to provide business functionality using the methods and information/data assets needed to deliver this functionality. |
| Technology | This dimension focuses on the logical software and hardware capabilities that are required to support the deployment of business, methods, information, and application services. This includes IT infrastructure, middleware, networks, etc. |

## GAMSO Self-Assessment Criteria

The three activity areas Strategy and leadership, Corporate support and Capability development are assessed here, but the activity area Production should be covered by the GSBPM and assessed separately for that standard.

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| **Levels**  **Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate**  **implementation** | **Mature**  **implementation** |
| Business | A few individuals are becoming interested in the potential business value of using GAMSO.  The organisation as a whole is unaware of the potential business value of GAMSO. | Use of GAMSO is basic and limited to a few individuals.  Parts of the organisation are becoming interested in the potential business value of GAMSO. | Use of GAMSO is spreading, but practise varies between individuals and across business units.  Some individuals and business units are referring to the overarching phases in GSBPM. | A corporate-wide programme/strategy for use of GAMSO is in place.  There is a widespread awareness of GAMSO and a consistent approach to its use across the organisation. | GAMSO is perceived as an important part of business operations/management, delivering business value.  GAMSO is well understood, integrated into nearly all business processes and practices and used in a consistent manner across the organisation. |
| Methods | Methods are developed on an “as needed” basis for a particular activity area / product/ process.  A few individuals are becoming interested in the potential value of planning, developing, monitoring and supporting methods for more than one activity area/ product/ process,  The organisation as a whole is unaware of the potential value of managing methods for more than one activity area/ product/ process. | Individuals are developing methods to be used in some activity areas/ products/ processes.  Some business units are becoming interested in the potential value of managing methods.  There is some corporate support for managing methods. | Methods are being developed and used in more than one activity area/ product/ process, but consistent implementation is lacking.  There is some awareness that methods can be part of capability development.  There is corporate support for managing methods. | A corporate strategy for managing methods (statistical methodology, quality, IT methods, data collection methods, process methods and any other methods needed to support the business) as corporate capability elements is in place. | Management of methods is an integral part of the corporate policy, is performed systematically, efficiently and effectively, regularly assessed and improved. |
| Information | Information is managed on an "as needed" basis for a particular activity area / product/ process.  A few individuals are becoming interested in the potential value of planning, developing, monitoring and supporting information for more than one activity area / product /process.  The organisation as a whole is unaware of the potential value of managing information for more than one activity area/ product/ process. | Individuals are developing information resources to be shared and used in some activity areas/ products /processes.  Some business units are becoming interested in the potential value of managing activity area/ product / process information as corporate capability elements.  There is some corporate support for managing shared product/process information. | Information resources are being developed and used in more than one activity area / product/ process, but practice varies across the organisation.  There is some awareness that information can be part of capability development.  There is corporate support for standardised management of information across activity areas/ products/ phases. | A corporate strategy for managing information as corporate capability elements is in place.  GSIM is used to describe and manage most information objects in statistical processes. | Management of information is performed systematically, efficiently, effectively, regularly assessed and improved. |
| **Levels Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate**  **implementation** | **Mature**  **implementation** |
| Applications | A few individuals are becoming interested in the potential value of planning, developing, monitoring and supporting applications to be used in more than one activity area, product or process.  The organisation as a whole is unaware of the potential value of managing applications for more than one activity area/ product/ process.  There is little corporate support for managing the use of applications. | Some business units are becoming interested in the potential value of managing applications as corporate capability elements.  There is some corporate support for managing the use of applications. | Common and shared applications are being developed and used in more than one activity area / product/ process, but in an inconsistent manner across the organisation.  There is some awareness that applications can be part of capability development.  There is corporate support for managing the use of applications. | A corporate strategy for managing the use of applications as corporate capability elements exists and is in fully adopted. | Management of applications is performed systematically, efficiently, effectively, regularly assessed and improved according to the corporate strategy. |
| Technology | A few individuals are becoming interested in the potential value of managing technology as a corporate capability element.  The organisation as a whole is unaware of the potential value of managing technology for more than one activity area/ product/ process.  There is little corporate support for managing technology. | Some business units are becoming interested in the potential value of managing technology as a corporate capability element.  There is some corporate support for managing technology. | Technology is being used in more than one activity area / product/ process, but practise varies across the organisation.  There is awareness that technology can be part of capability development  There is corporate support for managing technology. | A corporate strategy for managing technology as a corporate capability element exists and is fully adopted. | Technology, as a corporate capability element, is seen as an important part of business operations/ management, delivering value across the organisation.  Technology, as a corporate capability element, is well integrated into business processes & practices. |

## GSBPM Self-Assessment Criteria

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| **Levels**  **Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate implementation** | **Mature**  **implementation** |
| Business | No standard business process descriptions/ definitions are in use across the organisation’s statistical programs.  Different business processes are followed by different individuals/ business units undertaking the same tasks.  Projects/statistical programs exist in isolation. There is little or no business process coordination.  A few individuals are becoming interested in the potential business value of the GSBPM, but the organisation as a whole is unaware of the GSBPM. | Use of GSBPM is basic and limited to a few individuals.  Some business units are becoming interested in the potential business value of GSBPM and investigate how adopting the GSBPM as a reference standard could assist standardisation activities.  Communication activities are carried out in some business units to demonstrate the benefits of using the model. | Use of GSBPM is spreading, but practice varies between  individuals and between business units  Some business units are documenting/ defining existing statistical production processes using the GSBPM phases/sub-processes.  GSBPM phases/ sub-processes are being used for generic project/ statistical program scoping and planning. | A corporate-wide programme/strategy for use of GSBPM for managing statistical production processes is in place.  Management uses GSBPM as a framework for all planning of statistical production and for standardisation of production processes.  The organisation standardises and describes procedures for all GSBPM phases and sub-processes in a consistent manner. | Management uses GSBPM systematically and regularly for managing and improving business capabilities and standardisation.  The organisation has widespread expertise and familiarity with the use and application of the GSBPM. It is the reference framework for all statistical production.  GSBPM-based responsibilities are shared between job positions and are described in job descriptions. |
| Methods | No common approaches regarding the development and use of methods.  Methods are identified and defined with no reference to GSBPM.  A few individuals are becoming interested in the potential value of mapping/documenting methods per GSPBM phase. | A few individuals are mapping/ documenting existing methods per GSPBM phase/sub-process.  Some business units are becoming interested in the potential value of mapping/ documenting existing methods per GSPBM phase in order to improve coherence and consistency.  New methods are developed with reference to GSBPM phases. | Individuals and business units are mapping/ documenting new and existing methods per GSPBM phase/sub-process, but the practice varies.  A corporate-wide strategy for the use of GSBPM to map/document methods per phase/sub-process is not yet in place. | A corporate-wide strategy for the use of GSBPM to map/document methods per phase/sub-process is in place.  There is a widespread awareness of the use of GSBPM to map/ document new and relevant existing methods per phase/sub-process and a consistent approach is adopted across the organisation to carry this out. | Methods are standardised and optimised within the GSBPM and extensively re-used.  This standardization facilitates inter-institutional collaboration efforts.  The use of GSBPM to map/document methods per phase/process is an important part of methods management and delivers value by identifying duplication and potential for reuse.  Mapping/ documenting methods to GSBPM phases/sub-processes is well understood and applied in a consistent manner. |
| **Levels Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate**  **implementation** | **Mature**  **implementation** |
| Information | No standardised way of defining information objects (data and metadata) with reference to their use in GSBPM.  No integration of information. | Identification and classification of information objects by GSBPM phase carried out for one or two statistical programs in order to improve consistency in information objects being used/referred to in the different sub-processes. | New projects adopt standard methods of classifying information object use and terminology by GSBPM phase/ sub-process.  Existing applications have a varied practise regarding mapping of information objects by GSBPM phase/ sub-process. | Information objects used within the organisation are mapped to the GSBPM sub-processes, and the changes to information objects through the sub-processes, are well defined. | Information object usage and nomenclature is harmonised/standardised across the organisation, with GSIM in routine use as the basis for describing and defining information objects.  The reuse of information objects is maximised wherever possible. |
| Applications | Applications are developed without reference to GSBPM.  Applications are developed stand-alone, at silo level, without reference to common statistical processes across the organisation.  Every statistical program has its own production system, with little coordination between the programs.  Common problems are solved in different ways. | As a first step toward standardization, existing applications are roughly mapped to (one or more) GSBPM phases. The mapping is generally not applicable to GSBPM sub-processes. | Specification of scope for new applications start to be defined by GSBPM phases / sub-processes.  An overarching plan setting priorities for improvement, standardization and development of applications has been adopted.  Applications and services are mapped to GSBPM phases /sub-processes. | Using GSBPM to define statistical functions and system developments for all relevant existing applications, and as a basis for all new application development.  Monitoring and coordination of the GSBPM implementation plan for applications.  A comprehensive list of IT services (Service Catalogue) is in place to manage the use of services. | All relevant applications are mapped at component level to GSBPM sub-processes (or lower).  A comprehensive list of IT services (Service Catalogue) is used across the organisation to monitor/maintain all the components of the statistical production systems. |

## GSIM Self-Assessment Criteria

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| **Levels**  **Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate implementation** | **Mature**  **implementation** |
| Business | Business drivers for the implementation of GSIM are being identified and discussed by experts and subject-matter business units.  Senior management are largely unaware of, or uninterested in, GSIM. | Parts of the organisation are becoming aware of GSIM and recognise its potential business value. The organisation might be involved in international development projects using GSIM as a conceptual model. There is limited definition and documentation of the organisation’s business drivers and processes in which GSIM will be involved.  Guidance from other organisations implementing GSIM needed. | GSIM is used to describe some information objects mainly in the description of business processes in individual development projects.  Considerable efforts are being made to develop skills to learn GSIM, including its role to help to describe GSBPM sub-processes by defining the information objects that flow between them, that are created in them, and that are used by them to produce official statistics.  Corporate-wide strategy for the use of GSIM is being prepared, | GSIM is used by the organisation to describe information objects in its own business processes and to compare them inside the organisation as well as with other organisations. GSIM has become a common every-day language for requirements analysts, architects and system developers.  Corporate-wide strategy to use GSIM is in place. | GSIM has been fully adopted by the organisation to describe information used in its business processes and their improvements. |
| Methods | A few individuals are becoming interested in the potential value of using GSIM to support the design, specification and implementation of harmonized methods. | A few individuals are using GSIM to support the design, specification and implementation of harmonized methods.  Some business units are becoming interested in the potential value of using GSIM to support the design, specification and implementation of harmonized methods. | Individuals and business units are using GSIM to support the design, specification and implementation of harmonized methods, but practice varies. | There is a widespread awareness of the use of GSIM to support the design, specification and implementation of harmonized methods and this is used in a consistent way across the organisation.  A corporate wide strategy to use GSIM to support the design, specification and implementation of harmonized methods exists and is in place. | The use of GSIM to support the design, specification and implementation of harmonized methods is an important part of methods management and delivers value. |
| **Levels Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate**  **implementation** | **Mature**  **implementation** |
| Information | A few information experts are introduced to GSIM and interested in its use related to organising data and metadata. | Some information experts know the model. GSIM implementation has been attempted in specific areas which are often related to international collaboration efforts. | GSIM is recognized as a conceptual model for sharing ideas and determining common concepts inside organisation. Some case-specific models are introduced. The GSIM information objects might be used a bit differently in different parts of the organisation. | The organisation has officially adopted GSIM to describe its information assets.  The information architecture of the organisation is described in terms of GSIM information objects. There exist common repositories of certain instances of GSIM information objects that can be reused in the whole organisation. | GSIM-based information architecture is a reality and implemented throughout the organisation consistently. Optimized GSIM-based information management is a reality.  A catalogue of GSIM information objects (e.g. unit type) has been agreed on at the international level and the organisation is using this catalogue. |
| Applications | A few experts are aware of GSIM and also interested in using it. | Some physical datamodels or CSPA services are created and tested using GSIM or CSPA LIM as the conceptual model in the planning phase. | GSIM-based physical datamodels are implemented in separate applications or some CSPA services are described in terms of GSIM information objects. | GSIM is used at the conceptual level to describe new and relevant applications related to the statistical processes that are developed by the organisation.  The organisation has an internal CSPA Service Catalogue including coherent Statistical Service Descriptions describing input and output objects of the services as GSIM information objects. | There is a whole platform of CSPA-compliant applications for all domains described in terms of GSIM information objects. The organisation has adopted GSIM as part of the set of standards to describe its applications. |

## CSPA Self-Assessment Criteria

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| **Levels**  **Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate implementation** | **Mature**  **implementation** |
| Business | Each area designs and develops its own solutions. Budget and staff is located in each area. | Although each area continues designing its own solution they try to make them modular and share the code. The IT budget and staff are still located at each area but central coordination creating some general guidelines exists. | There is analysis of the business processes. Statistical Services are defined following the principles of the CSPA, their granularity is large enough for the business to understand, and are not low-level services used by IT. Some of the roles defined by CSPA start being recognized and informally mapped by the IT areas. | A unique services environment running on a common IT platform to attend all organisational needs is part of the organisation’s long term plans. All services are defined following an agreed granularity level. IT resources (people, budget, skills, etc.) are mainly oriented to build and maintain the common platform. CSPA roles and responsibilities are clearly defined and mapped to areas in the organisation. | Statisticians are able to make specific orchestrations of services to respond to their projects and new user’s requests. A specialized IT cross-organisation group is in charge of the maintenance and expansion of the services platform. There is a planned evolution of the IT services based in long term institutional goals, historic performance indicators and external changes. |
| Methods | Methods are not standardized. | There are some attempts to use common methodologies, mainly related to codification standards and APIs definition but under the interpretation of each area. | CSPA and other standards start to be implemented as a concern of the whole organisation, but the implementation is partial and aligns to internal needs. First attempts to develop Service Oriented / CSPA-based services. | CSPA has been implemented, and the organisation adheres it. Reuse and sharing of services developed by other NSOs is feasible. | A basic set of skills shared by all NSOs is defined making it easier to find trained people able to implement CSPA Services and collaborate with other institutions. |
| Information | Information is duplicated and each application uses its own structure. | Separated information structures in separated systems are common. Some applications share information but in the form of views or other similar mechanisms. Separation of development and production databases starts to being made. | Integrated databases covering some domains exist and services use these shared information sources. Early attempts to apply the principles for the information architecture contained in CSPA are being made. | The common services platform accesses an integrated information environment. The information environment follows the CSPA LIM so shared services can be configured by each organisation to cover its own needs. | There is an information architecture for the whole statistical office which applies the reference frameworks identified in the CSPA. There is a coherent and consistent definition of information assets at an enterprise level to the information needs of specific business processes and IT systems in practice. |
| **Levels Dimensions** | **Initial**  **awareness** | **Pre-**  **implementation** | **Early**  **implementation** | **Corporate**  **implementation** | **Mature**  **implementation** |
| Applications | Applications run as separated instances. It is very difficult to make them interoperable, manual work is inevitably required. | Some common component libraries start to appear. The components are difficult to integrate in practice and therefore often rejected.  Some commercial components start to be integrated. | Some early service oriented systems making use of services expecting common activities start to appear.  Services orchestration is still an issue that is mainly carried out for each system. | All applications are developed as an orchestration of services following the CSPA guidelines and principles. Services are developed to be independent of specific IT configurations. The CSPA catalog is used to complement the organisation's own one. | Main statistical services in the statistical organisation follow the guidelines and principles contained in CSPA so it is possible to share them and to stablish collaborative efforts to develop new ones. |
| Technology | Technological implementations are carried out on demand satisfying individual, isolated, requirements and generating heterogeneity of hardware, software, languages, protocols, etc.  Management and support of technology ranges from absent to very basic. | There is a definition of a set of core technologies supported by the organisation which is mostly used as a guideline, but each area still deciding how to fulfill the needs of each project so the integration, reuse and support of technologies is very limited. Support to implement CSPA services is made by special request. | There is a standardized IT platform which is supported by the organisation. Interaction of IT solutions is a common practice because all areas share the same set of technologies. It is possible to support the CSPA services using the existing resources. | IT platform fully supports the requirements for the CSPA services platform. | There is a consolidated corporate CSPA platform of statistical services to support information production integrated to the IT platform of the institution. In some cases, IT resources used to support the CSPA services may be shared by some subscribed organisations. |

## Definitions

**Applications:**

Applications are software components or programs which provide specific functionality for end users. Web browsers, email programs, and word processors are examples of generic desktop applications, but the term 'applications' also encompasses enterprise-level components providing functionality specific to the business.

**Business unit:**

The smallest organisational unit.

**Capability:**

An ability that an organisation, person, or system possesses. Capabilities are typically expressed in general and high-level terms and typically require a combination of organisation, people, processes, and technology to achieve. Source: The Open Group Architecture Framework (TOGAF).

**Capability element:**

Capabilities provide the agency with the ability to undertake a specific activity. A capability is only achieved through the integration of all relevant capability elements (e.g. methods, processes, standards and frameworks, IT systems and people skills).

**Corporate capability element:**

A corporate capability element is a capability element that is managed at the corporate level for use across the entire organisation.

**Common Services Platform:**

An infrastructural environment in which the generic services can be combined and configured to run as element of organisation specific processes. This environment is not part of the CSPA. The CSPA assumes that each organisation has such an environment and makes statements about the characteristics and capabilities that such a platform must have in order to be able to accept and run statistical services that comply with CSPA.

**Senior Management:**

The most senior staff of the organisation, including the heads of various divisions or departments led by the chief executive.Includes top management.

**Service Catalogue:**

A service catalog is a comprehensive list of IT services that an organisation offers to its employees or customers. It is published and provided as a support to the sale or delivery of offered IT services.

The catalog includes:

* The service name and its description
* All services listed by category
* All supporting services to the main services
* Service level agreements and fulfillment time frames for the services
* Contacts and escalation points (owner and representative)
* Service costs

## Abbreviations

* IT – Information Technology
* CSPA – Common Statistical Production Architecture
* CSPA LIM – CSPA Logical Information Model
* GAMSO – Generic Activity Model for Statistical Organisations
* GSBPM – Generic Statistical Business Process Model
* GSIM – Generic Statistical Information Model
* HLG-MOS – High-Level Group for the Modernisation of Official Statistics
* SLA - Service Level Agreement
* API- Application Program Interface