

# Data Quality Model for Statistical System of Abu Dhabi

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## **Abstract:**

Statistic Centre – Abu Dhabi (SCAD) developed a Statistical Quality Model (SQM) to monitor, assess and develop the quality of the official statistics whether the statistics produced by SCAD alone or with contribution with other governmental entities part of Statistical System of Abu Dhabi (SSAD). The aim of this model (SQM-SSAD) is to recognize the implementation of quality actions and procedures and the impact of the implementation on the quality of the statistics produced. By this model, SCAD can determine the areas where improvement could be made.

A Quality Manual was developed and training provided to related teams as a first step of implementing the SQM. In addition, direct supervision from the quality team is in place. Survey teams are required to complete a quality self-reporting template, which acts as a checklist of the quality actions generated from the Quality Manual. This check occurs after each phase of the survey as per the General Statistical Business Process Model (GSBPM). At the end of a survey, a consolidated quality report is produced. Based on the report, a quality action plan and quality statement are generated.

This paper will explain in some details about the Statistical Quality Model and its implementations. This paper will also cover some of the challenges faced during the implementation.

**Key words:** SCAD, Quality Framework, Survey, Administrative Records

## **1. Introduction**

### **1.1 Abu Dhabi**

Abu Dhabi is the federal capital of the United Arab Emirates (UAE) and the largest of the seven emirates. Geographically, Abu Dhabi lies on the borders with the Kingdom of Saudi Arabia, the Sultanate of Oman, and the Arabian Gulf. Over the past 40 years, Abu Dhabi has experienced significant population growth and economic development.

To manage the growth and prosperity of the Emirate, the Government of Abu Dhabi required an official agency that could provide statistics for decision-making and policy setting.

## **1.2 Statistics Centre – Abu Dhabi**

Statistics Centre – Abu Dhabi (SCAD) was established in accordance with Law #7 for the year 2008. SCAD is responsible for the collection, classification, storage, analysis and dissemination of official statistics covering social, demographic, economic, environmental and cultural indicators.

As a young statistical office, SCAD is in the fortunate position of being able to implement best practices from international bodies and leading National Statistical Organisations (NSOs). SCAD is aiming to be a world leader in innovative and efficient methods for data collection, analysis and dissemination.

### **2. Statistical Quality Model for Statistical System of Abu Dhabi (SQM-SSAD)**

SCAD developed Statistical Quality Model to monitor, assess and develop the quality of official statistics whether they are produced by SCAD alone or with the contribution with governmental entities part of the SSAD. SCAD intend to implement this model in the whole Statistical System of Abu Dhabi (SSAD)

SQM-SSAD is a simplified chart, which shows the high-level key components of quality that exist. Figure (1) shows the SQM-SSAD, which displays the main components. It consists of four components namely:

1. Statistical System of Abu Dhabi
2. Institutional arrangements that support quality with the entities
3. Statistical processes used to prepare the statistics
4. Statistical Output

In the next section, we will explain the ways to manage these components

### **3. Data Quality Framework for the statistical system of Abu Dhabi (DQF-SSAD)**

The ways of organizing and structuring statistical quality frameworks in national statistics offices vary for different reasons. Despite the variation in ways of organizing and structuring statistical quality frameworks, there are notable overlapping between them across national statistics offices.

Based on (SQM-SSAD), SCAD has developed Data Quality Framework to be the main reference for preparing statistical quality tools and manuals to produce high quality statistics for different areas of interest, whether the source of the data is survey or administrative records.

This framework aims to acquaint statistical data producers and users with the concept, dimensions and main procedures to produce high quality statistics. (DQF-SSAD) also helps to prepare an efficient mechanism for monitoring, assessing and development quality of official statistics in the Emirate of Abu Dhabi. The (DQF-SSAD) is determined by a range of main quality dimensions, standards, and procedures, which SCAD seeks, along with its strategic stakeholders and data producers, to apply to all statistical products issued by the SSAD. (DQF-SSAD) relies on many accredited references that are recognized locally and internationally like Data Quality Assessment Framework by IMF <sup>[1]</sup>, Quality Assurance Framework of the European Statistical System <sup>[2]</sup>, and Guidelines for the Template for a Generic National Quality Assurance Framework <sup>[3]</sup>.

The quality dimensions, quality standards in this framework emanate from the concept of Total Quality Management. They cover all aspects that can affect the quality of statistics whether related to inputs, processes, and outputs to meet users' requirements and the achievement of

recognized statistical standards that are approved internationally and regionally, which makes these statistics “fit for use”. (DQF-SSAD) is about How to manage the four components of the (SQM-SSAD) as mentioned above in order to assure the quality of statistics. DQF-SSAD discusses in details the following components:

1. Managing Statistical System
2. Management of Institutional arrangements with the entities that support quality of the data
3. Statistical process management
4. Managing Statistical Output

SCAD has already started the development most of the quality tools and manuals required to promote, monitor and assess the quality of data based on the SSAD Data Quality Assessment Model. These tools includes for example quality manuals, quality training programs, self-assessment templates, quality indicators formulas, and quality reports structure,...etc. for both surveys and administrative records.

#### **4. Monitoring and Assessing Statistical Data Quality in the SSAD**

The quality of statistical products should be monitored, assessed regularly by SCAD. The assessment shall cover the items of quality that mentioned in the (DQF-SSAD). Figure (2) shows the quality assessment components, which are corresponding, with the Statistical Quality Model components mentioned above. The Data Quality Assessment Model for SSAD consists of two major parts one is the “(1) Enablers” which consists of two element (1.1) Capacities and (1.2) Procedures. Capacities are the basic arrangements and requirements needed to enable the statistical system and statistical entity/ies to carry out the statistical production professionally and capably. While Procedures element consists of actions that should exist to carry out the statistical activities in a scientific and efficient way in order to provide the customers with high quality statistics. Part (2) “Results and Impacts” of the model is about the evidences and impact of implementing the quality procedures and actions. This part addresses the main quality indicators that are able to measure the impact of quality actions and the documents that are used as evidences of the implementation of the quality actions and procedures. “Result” part has three components, which are quality metrics, customer satisfaction indicators, and survey documents.

The structure of SSAD Data Quality Assessment Model is consistent with the high-level structure of the European Foundation for Quality Management (EFQM) standards <sup>[4]</sup> and the high-level structure for the fourth generation of government excellence system adopted by Abu Dhabi government <sup>[5]</sup>.

Data Quality Assessment Model for SSAD statistics will cover the following areas:

- Evaluating the quality of managing the statistical system
- Evaluating the quality of managing the institutional arrangements within SCAD and governmental entities that support quality of the data.
- Evaluating the quality of managing the statistical processes and methodologies.
- Evaluating the quality of managing the statistical output using the quality dimensions adopted in the data quality framework namely Relevance, Accuracy & Reliability, Coherence, Accessibility & Clarity, and Timeliness & Punctuality.
- Calculating and analysing quality indicators and metrics.
- Measuring customer satisfaction,
- Reviewing and evaluating quality related documents.

## **5. Data Quality Activities in SCAD**

SCAD has already started implementing parts of the data quality assessment model. In the following subsection, we will review the main data quality assessment activities implemented by SCAD

### **5.1 Statistical Surveys**

SCAD adopted a methodology to monitor the quality procedures implemented in the statistical surveys for determining the quality level in these surveys and to give some suggestions for potential future improvement. The main objective of this methodology is monitoring, assessing and, developing the quality of the data of statistical surveys.

#### **5.1.1 Pre- Monitoring process**

This step starts with reviewing and listing out the main operational surveys in SCAD and their schedules. The previous Correction Action Plan for previous survey (if available) sent to survey managers and team members for review.

#### **5.1.2 Monitoring process**

Survey team members are requested to fill the Quality Self Reporting Template by answering the quality questions after completing each phase of the survey phases as per the Statistical System of Operational Procedures adopted in SCAD. These questions cover the necessary survey's elements, statistical procedures that are linked to the main quality dimensions.

After filling the self-reported template by the assigned team members, the quality team in SCAD evaluates it in accordance with quality framework and manuals along with reviewing the quality indicators and documents.

#### **5.1.3 Preparing Quality Reports and Action Plan**

After completing the monitoring stage, quality team gathered and combined all the stage-wise quality reports and issue the final quality report that identifies quality actions that were in place and quality issues grouped by survey phases. The report includes list of available main survey documents for each phase in the share folder of the survey as well as list of quality indicators. The evaluation action plan prepared by listing all improvement actions as per phases mentioned in the quality report. The users for this report are the survey managers and survey team members. Last report is the quality statement for the external users. This report is generated and uploaded with the final statistical survey products in SCAD's website.

### **5.2 Statistical Administrative Records**

Since the preparation of the administrative records data is not supervised by SCAD so the assessment of data quality of this type of data will be interactive between SCAD and the corresponding governmental entities. SCAD started to list the main administrative datasets related to the official statistics.

#### **5.2.1 Pre- Monitoring process**

As part of statistical capacity building program SCAD conducted so far more than 25 workshop on Statistical Quality for Administrative Records. Attendees were trained on the statistical quality concept, quality dimensions, standards and quality-self assessment.

## **5.2.2 Monitoring process**

Monitoring statistical quality for administrative records includes, SCAD internal quality assessment where the statistician focal point in SCAD assesses part of the quality from the user point of view. Governmental entities will be required to self-assess the quality of their data as per the Statistical Quality for Administrative Records Manual[5]. Afterwards peer-to-peer review with governmental entities on quality will be conducted by relevant statisticians and Quality Assurance Team from SCAD

## **5.2.3 Preparing Quality Reports and Action Plan**

After completing the monitoring stage, quality team supposed to prepare technical quality report to identify the main quality actions implemented by the governmental entity and proposal actions for improvement. The improvement action plan should be prepared by and listing all improvement actions by the quality dimensions. Quality statement might be produced as well at the dataset level.

## **5.3 Lessons learned and way forward**

During the implementation of quality assessment, Quality Assurance Team has faced some challenges. These challenges did not stop us from moving forward in monitoring, assessing and improving the quality. In this part we will present the main challenges:

### **5.3.1 Cooperation**

The aim was from the beginning to gain the acceptance from the people for the assessment activities and to get their positive involvement in the process. We found some slow in the process and less contribution in documentation the improvement opportunities.

Quality Assurance Team has conducted several sessions with survey teams to clarify their roles in the assessment process and encourage them to provide accurate information with transparency. These sessions had positive impact on getting more cooperative and we got more information from the relevant teams.

### **5.3.2 Documentation**

One of the main sources of the information for assessing the quality is the survey documents. SCAD has good practice in this regard, in which each survey should have shared folder where the related documents uploaded in it. Although this practice was useful but some survey's shared folders were poor of documents. This led to inability to find evidences for implementing some quality actions. Quality Assurance Team works hard to improve the contents of the current survey's shared folders by following up and encouraging survey teams to enrich the shared folders with core documents.

### **5.3.3 Survey's error indicators**

As mentioned above survey error metrics play vital role in understanding the quality of the survey data specially the accuracy dimension. SCAD also has experience in calculating the survey errors metrics for some but not all surveys and for little number of indicators and variables. So quality statements were poor of these metrics for some surveys. SCAD's processing team were able to automate the calculations for most of these metrics to make them available easily and on time. For administrative data there was no standard method to generate data errors and assess the accuracy. We have provided the entities with quality manual where we have mentioned set of measurements for data errors.

### **5.3.4 Actions for improvement**

The main aim of the survey quality assessment is to recognize the strength action were in place and the improvement opportunities. Action plans were prepared for each survey. Some of these actions were considered and notable improvements in the next survey cycle. Having said that some improvement actions were not considered and request for implementation were repeated several times. Quality Assurance Team issued “quality surveys harvest” report. This report summarizes the main actions for improving the surveys quality and determines the role of each administrative department in SCAD in implementing these actions. Department’s manager were involved in the approving these action to give support to implement these actions For administrative data it is even more difficult for forcing the entities to make notable changes in their processes. We are cooperating with the entities to convince and to help them in making some efficient and effective changes to support producing high quality data.

## **6. Conclusion**

Data Quality Model for Statistical System of Abu Dhabi is not just a theoretical model be displayed but it is a structured assessment for quality of statistics aims to identify the strengths in the implementation quality standards and procedures and to identify potential opportunities for improvement and development. The model also helps Statistics Offices centers to prepare quality manuals and assessment templates and tools required to evaluate the quality of the statistics. This Model looks to all angels and aspects that might affect the quality of the data directly and indirectly. Nevertheless there are some obstacles expected during the implementation stage which need relevant solutions

The remaining question that needs open discussion and more research is if we can we agree on a mathematical formula to calculate the overall quality score of the data that can efficiently reflect the trend of data quality and to be used worldwide for comparability purpose?

## **7. References**

[1] Data Quality Assessment Framework, International Monetary Fund, 2003.

[2] European Statistical System Quality Assurance Framework, version 1, 2011.

[3] Guidelines for the Template for a Generic National Quality Assurance Framework (NQAF),Expert Group on NQAF, United Nation Statistical Division, 2012.

[4] Chris Hakes, The EFQM Excellence Model to Assess Organizational Performance - A Management Guide (Best Practice) 1st Edition, 2007.

[5] Mohammad bin Rashid Government Excellence Award Handbook – Fourth Cycle, Fourth Edition, 2015.

8. Figures

Figure 1: Statistical Quality Components for Statistical System of Abu Dhabi (SQM-SSAD)

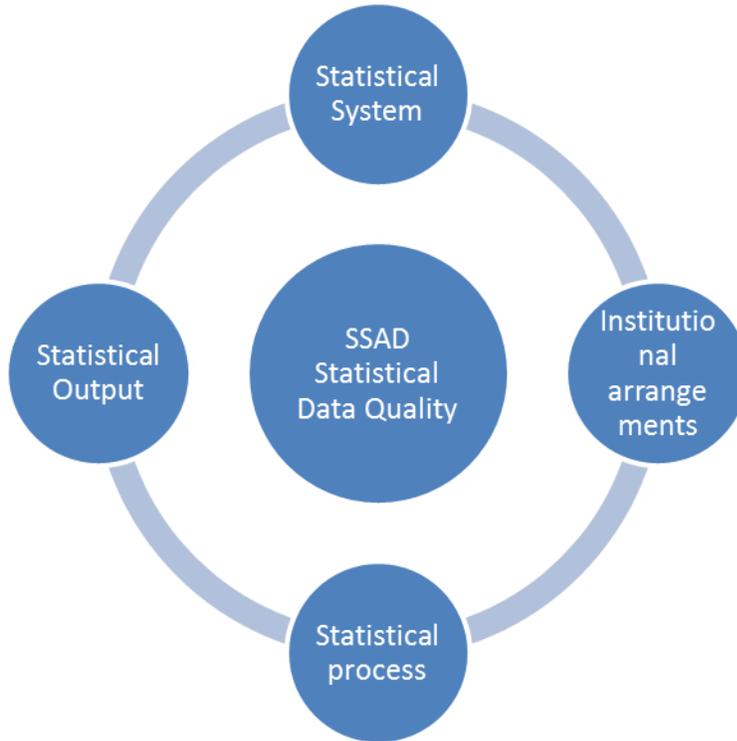


Figure (2): Data Quality Assessment Model for SSAD (DQAM-SSAD)

