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Topic (i): Developing common high-level architectures

**National Enterprise-Wide Statistical System
The Paradigm Shift to
Department of Statistics Malaysia**

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I. Introduction

1. The Department of Statistics, Malaysia (DOSM), as the official provider of statistical information in the country, has embarked on a journey to transform itself “To become a leading statistical organization internationally”. Central to this vision is the development of an intelligence information technology solution, namely the National Enterprise-Wide Statistical System (NEWSS) to enhance the operational and management efficiency in delivering the quality statistics.

2. NEWSS is a by-product from the ICT (Information and Communication Technologies) projects identified in DOSM’s ICT Strategic Planning (ISP) - A process for developing a strategy and plans for aligning enterprise level information systems with the business strategies of DOSM.

II. Objective of NEWSS

3. NEWSS strikes to achieve the following objectives:

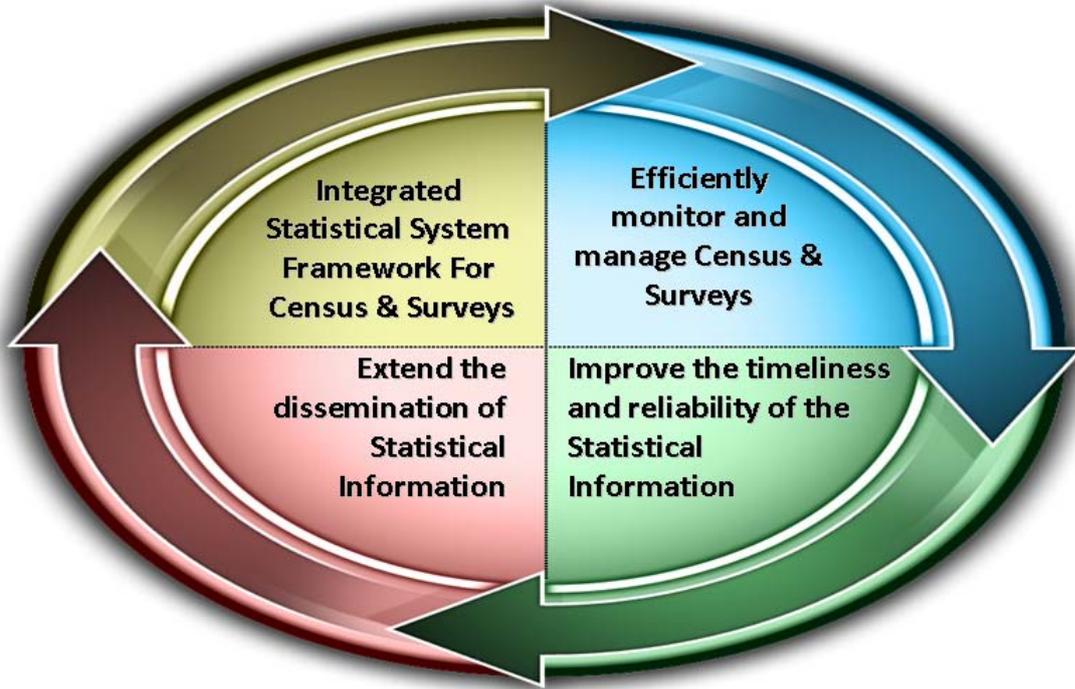


Diagram 1: Objective of NEWSS

A. Integrated Statistical Systems Framework

4. NEWSS is developed around an Integrated Statistical Systems Framework (ISSF) that focuses on reusable processes and data across different type of census or surveys, it provides the main business functionalities of DOSM on pre-collection, collection, processing, analysis and dissemination within a single platform that reduce tremendously on the time required in producing the quality statistics.

5. Currently DOSM has approximately 95 application systems which are operational and maintained. However in NEWSS (phase 1), six major applications are revamped. The development of these applications is guided by the Integrated Statistical Systems Framework.

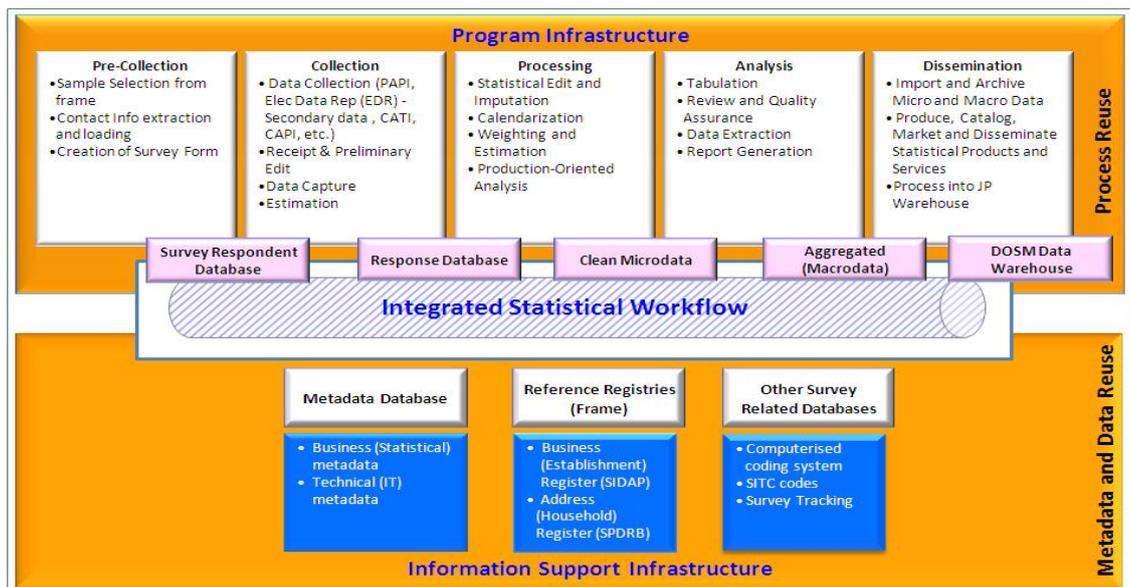


Diagram 2: Integrated Statistical Framework

6. This Integrated Statistical Framework is to ensure the development of application produces quality statistic using standards mechanism that shall increase efficiency and shorten the process of developing the census / surveys on the same platform.

B. Efficiently monitor and manage Census and Survey

7. NEWSS provide tracking of individual activities carries out in a surveys. This ensure individual visualizing the involvement in the surveys and allow the Subject Matter Division to monitor the progress of the activities and proactively identify the issue that could arise in a surveys process.

C. Develop central data repository

8. In order to improve the timeliness and reliability of the statistical information, NEWSS project will develop central data repository to:

- (a) Stored all the data/information in centralized repository that prevents the lost on historical data.
- (b) Provide quality frame information for sampling process that indirectly improves reliability of Statistic produced.
- (c) Provide the access of data in centralized data repository to serve the stakeholder and requester.
- (d) Provide standard metadata that describes the definition, classification, standard, terminology, code and concept used in the data repository, it provide the interest parties a better understanding of the data used within DOSM.
- (e) With data kept centrally, it provide single version of truth in the data kept and allow time series analysis and cross analysis of data within one type of survey or among multiple surveys.

D. Extend the dissemination of Statistical Information (Method of data dissemination)

9. The data dissemination method consists of the following:

- (a) Focus on proactive notifying the interest parties on the publication produced
- (b) Provide multiple dissemination methods that allow statistical information to outreach to wider group of users
- (c) Streamline the process of preparing the custom data requested with the vision of serving the information in quick response time.

III. Information Support Systems

10. Complementing the ISSF on assisting the user in performing the effective and efficient process is the **ISS (information support systems)**. ISS enrichment the capability of governance, digital mapping analysis, advance analysis and create the knowledge sharing environment within the department.

A. Performance Management

11. In the area of governance, NEWSS has put in place the assessment of qualitative achievement via quantitative measurement. The DOSM's vision and mission statements with all the DOSM's objectives have been built into a strategy map with proper correlation of the objectives being defined. Individual objective will has a set of Key Performance Indicators (KPIs) defined that carry specific performance target.

12. Periodically the automation engine will feed the required data to report the performance on KPIs and accordingly the achievement of the objectives could be obtained. From time to time, the management group can visualize at one glance on the total achievement of these objectives and perform the cause-effect analysis across multiple objectives, they are able to zoom down to the details to obtain the details problem area of certain objective that does not meet the performance requirement, the solution has assisted the management group in

the process of making informed decision and making sure that all level of officers is moving toward the vision and objectives of the department.

B. Geographic Information

13. Complementing numerical analysis that serves the analysis via the digital map. Multiple layer of map e.g. Based Map with State, Enumeration Block etc. could be used to analysis the exact boundary and location on individual analysis subject and assist the proper frame management. In fact it helps in performing the proper assignment of individual field enumerator to relevant sample case. For example, Field enumerator assign to multiple EB that shouldn't be geographic disperse on the map to reduce the cost of travelling.

C. Business Intelligence

14. Business Intelligence (BI) is a process for increasing the competitive advantage of a business by intelligent use of available data in decision making. BI systems provide historical, current, and predictive views of business operations, using data that has been gathered into a data warehouse.

15. Provide the dynamic analysis and produce of analysis result without needing the help from IT division. This allow the generation of information or data from central repository in very short timeframe, and response quickly to the requester (stakeholder or public) when data is requested, directly improve the image of DOSM.

D. Knowledge Management

16. The total solution is not only focuses on operational and management processes but also create an collaboration environment that allow officers to work in more effective and efficient manner, it provide a platform for DOSM's officers to exchange information and idea with capabilities and functionalities to encourage knowledge sharing.

E. Enterprise Portal

17. With lot of process, functionalities and information hosted within NEWSS, effective access to these resources are critical to ensure the full utilization of the system, Enterprise Portal provide a single access door to reach these resources with single login. With proper segregation of the internal user (DOSM's user) and external user (public, stakeholder), it ease the user in performing operational and management activity on the system and facility the retrieval of relevant information that authorized to be accessed by every individual.

IV. Impact of NEWSS

18. The implementation of NEWSS based on the DOSM ICT Architecture will definitely move DOSM forward leveraging on the use of emerging technology. The impact of NEWSS on DOSM can be categorized into the following areas:

A. Stakeholders

19. The direct beneficiaries of NEWSS are the stakeholders. All requirements of the stakeholders can be fulfilled in a shorter period with a better frame for sampling. In this context, NEWSS with provide the interface to accept data from selected organizations to update the enterprise and establishment frames. In this phase, organizations such as Companies Commission of Malaysia (CCM), Construction Industry Development Board (CIDB) and Employee Provident Fund (EPF) have indicated their willingness to share data with DOSM. This approach will enable DOSM to update its frame for better sampling.

20. Besides this, NEWSS will facilitate the data tapping from other government agencies (OGAs). Through mutual understanding, these OGAs will provide their softcopy data to DOSM. However, direct integration with their systems through web-based application or other means, will be planned later on.

21. Computing facilities provided by NEWSS enable DOSM to customize the request from stakeholders. Dynamic analysis tools such as Business Intelligence (BI) and Extensible Business Reporting Language (XBRL) allow DOSM to analyze data easily and prepare various types of reports with the look and feel of the stakeholders.

B. Subject Matter Divisions

22. Efficient and effective application systems designed using Java and workflow, allow SMDs to do weighted sampling. Besides that, preparation of the sampling will be well organized and verified using the business rules set up in the applications. This will ensure the accuracy and consistency of the sampling.

23. SMDs can easily view the gradual changes in tabulation based on the generated sets of data. This feature facilitates the SMDs to trace and rectify errors that surfaced during tabulation.

24. Performance Management System enables top management to monitor the progress of all activities pertaining to censuses and surveys. The status can be updated by the SMDs and retrieved by top management or supervisors for monitoring purposes. With such facilities more responses can be gathered and that ensures the timing and the achievement of designated milestones.

C. Frame

25. The direct of impact of NEWSS on frame is the improvement in sampling method. Pre requisite data obtained from OGAs such as CCM, CIDB and EPF, as well as from GIS, provide DOSM with a consolidated view of all frames and statistics of each census and survey area. These updated and timeliness data help DOSM to formulate the right and accurate sampling.

26. The use of workflow in the system enables check and balance of data that are updated. The outcome is that data are better quality and more accurate.

27. Sampling methods such as Dalenius Hodges Method can be used to determine the optimum point of stratification. This essentially reduces the manual process and human judgment. Besides that, other methods such as Neyman Method, Equal Method, Proportional Method and Optimum Method can be used for stratified sampling.

D. Central Repository

28. The Central Repository Database facilities will elevate the level of data management in providing services to all customers. It will off load SMDs from serving customers and as a result SMDs can concentrate fully on surveys.

29. Eventually the Central Repository will become the “National Statistics Repository” to serve the country as the leading statistics organization and business intelligence users.

E. Dissemination of Statistics

30. Dissemination of statistics to external users by means of publications and data request, are served through an enterprise portal.

31. The enterprise portal is a framework for integrating information, people and process across organizational boundaries. It provides a secure unified access point in the form of a web-based user interface.

Customer management will become easy and service-oriented with the provision of on-line request and on-line payment, embedded in the enterprise portal.

F. System Development Skill Sets

32. The adoption of Fujitsu Framework-software components enables the system developers to leverage on the new emerging enterprise-wide Java technology. The Framework is a presentation tier for the http servers; business logic tier for portal framework; service tier for application framework and ISS; interface tier for Java EE platform; and resource tier for central repository and metadata.

33. It can run on different operating system platforms and is upward scalability. It has a lot of readily available library for the developers to use and share.

G. ICT Infrastructure and Software

34. The ICT infrastructure and software are designed to sustain reliability, availability and serviceability (RAS) of the equipment twenty-four by seven. It has the capabilities of vertical upgrade and horizontal upgrade in the form of clustering and consolidation.

V. Conclusion

35. NEWSS is the new ICT initiative that facilitates the automated processes that interact with the services within DOSM as well as external services. The implementation of NEWSS definitely has the impact on the stakeholders; SMDs; Frame and the use of sampling methods; central repository with its intelligence; dissemination of statistics via enterprise portal; human capital expertise in system development; and ICT infrastructure and software. Its impact provides the baseline for DOSM to move forward. Beyond this, NEWSS will continue to expand in realizing the vision and mission of DOMS.
