

**USAID GLOBAL HEALTH
SUPPLY CHAIN PROGRAM**

Procurement and Supply Management

Lessons Learned
to Guide Countries'
Supply Chain
Information System
Assessment Using
the SCISMM Tool

October 2024

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Contents

Acronyms 4

Executive Summary 5

Introduction 6

1. Overview of the SCISMM Tool 7

1.1 Features of the SCISMM Tool 8

1.2 Maturity Levels 8

1.3 Supply Chain Maturity Score and Maturity Level 9

2. Process of Assessment 11

2.1 Pre-Assessment Activities 11

2.2 In-Country Assessment Activities 12

2.3 Post-Assessment Activities 12

3. Lessons Learned from the Assessment Phases 13

3.1 Pre-Assessment Phase Lessons Learned 13

3.2 In-country Assessment Phase Lessons Learned 14

3.3 Post-Assessment Phase Lessons Learned 15

4. Recommendations for Improving the SCISMM Tool 16

References 17



Acronyms

APQC	American Productivity & Quality Center
GHSC-PSM	Global Health Supply Chain Program-Procurement and Supply Management
HIV	Human Immunodeficiency Virus
KPI	Key Performance Indicator
MIS	Management Information System
MoH	Ministry of Health
PC	Personal Computer
SCIS	Supply Chain Information System
SCISMM	Supply Chain Information System Maturity Model
SCOR	Supply Chain Operations Reference Model
SOP	Standard Operating Procedure
USAID	United States Agency for International Development

Executive Summary

Global health supply chains are growing in complexity as they respond to changing patterns of commodity flows and demands for more accurate information in an increasingly digitized world. Inadequate information systems can hinder effective response to supply chain exceptions, such as stockouts and expiries, as well as efficient procurement and distribution of health commodities.

The first version of the Supply Chain Information System Maturity Model (SCISMM) tool was developed by the USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project in collaboration with USAID to be leveraged as a rapid information system assessment tool to evaluate the maturity level of in-country supply chain information management systems. An improved second version was developed in collaboration with the Digital Square project.

This document provides an overview of the tool enumerating the essential features of supply chain operations, detailing the eight functions, sub-functions, and associated questionnaires to be used for assessment in a country. Since 2019, the SCISMM tool has been used for supply chain information system (SCIS) assessments in Guinea, Malawi, Namibia, Nepal, Pakistan, and Rwanda. Management information system (MIS) improvement recommendations were provided after the assessments to help the Ministry of Health (MoH) prioritize investments that will advance data quality for decision-making and strengthen its supply chain operation in the country. Finally, the general experience from assessments, lessons learned, and recommendations for tool improvement were captured in this document for reference.

In conclusion, the objective of this document is to guide interested parties to take advantage of the lessons learned from the SCISMM tool to assess the maturity of its MIS on a routine basis to help define, prioritize, and update implementable roadmap, as well as establish trackable key performance indicators (KPIs) for continuous improvement.





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Introduction

Global health supply chains are growing in complexity as they respond to changing patterns of commodity flows and demands for more accurate information in an increasingly digitized world. Information systems, which form the backbone of today's supply chains, must mature to manage the growing complexity.

As physical commodities move through supply chains, information systems enable the flow of commodity data, ensuring that medicines move from manufacturers to national warehouses to health facilities and, finally, to end users. Inadequate information systems and human resources can hinder effective responses to supply chain exceptions, such as stockouts and expiries, and efficient procurement and distribution of health commodities.

Traditional approaches to improving SCIs tend to have a narrow scope. They might focus on one health area, such as HIV, or a specific operational component, such as warehousing. On the other hand, a holistic approach enables informed decision-making by government, donors, and implementing partners to improve overall SCIS functionalities in a coordinated way.

In pursuit of the above approach, the USAID GHSC-PSM project developed the first version of SCISMM to help countries analyze their current supply chain systems holistically and plan their SCIS investments. GHSC-PSM collaborated

with the Carolina Population Center of the University of North Carolina under the Digital Square project to further refine the first version. The Maturity Model Sub-group of the Digital Health and Interoperability Working Group

conducted the revision and harmonization efforts, reviewing other health information system maturity models and aligning SCISMM appropriately to generate the second version.

The SCISMM assessment activity helps countries evaluate their supply chain systems' capabilities holistically, enabling informed decision-making. A more mature SCIS that enhances the interoperability and data exchange across various SCISs can reduce costs, improve efficiency, and increase the timely delivery and availability of commodities to patients.



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01.



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Overview of the SCISMM Tool

While this section intends to provide an overview of the SCISMM tool, it does not cover all the information required to fully understand how it operates. Detailed information is contained in the “[Guideline for Achieving Supply Chain Information Systems Maturity Model](#)” and the “[Supply Chains Information System Maturity Model](#).”

In the tool, SCISMM functionalities have been organized based on the Supply Chain Operations Reference (SCOR) model and the American Productivity & Quality Center (APQC) process classification framework. The tool also details information system capabilities in public health supply chains based on the SCOR model and provides a framework for adopting a progressive implementation for SCISs.

It is strongly suggested to leverage the SCISMM as a quick assessment tool to evaluate the maturity status of information systems implemented in the country as a routine and scalable approach to strengthening its supply chain operation.



THE OUTCOME OF THE ASSESSMENT WILL:

1. Provide maturity analysis of current “As-Is” information systems implemented.
2. Outline the strengths, weaknesses, and opportunities for improvement.
3. Propose a SCIS improvement roadmap and prioritize activities.
4. Define KPIs for continuous improvement.



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1.1 Features of the SCISMM Tool

The SCISMM was developed in Microsoft Excel. The SCISMM tool consists of eight supply chain operation key function categories. Each functional category includes sub-functions and associated activities that can serve as an interview questionnaire. The function category and associated sub-functions are as follows:

Forecasting & Supply Planning

- Demand/Consumption Planning
- Supply Planning

Procurement Management

- Procurement Processing
- Fulfillment Visibility

Supplier & Contract Management

- Sourcing
- Tender Management
- Supplier Information Management

Order Management

- Requisitioning
- Requisition Fulfillment

Warehouse Management

- Inbound Processing
- Inventory Management
- Outbound Processing

Transportation Management

- Route Management
- Transportation Execution
- Freight Audit and Payment

Track and Trace

- Commodity Tracking
- Commodity Tracing
- Authentication / Verification

Data Exchange and Management

- Data Exchange
- Product Master Data Management
- Facility Master Data Management
- Supplier Master Data Management

1.2 Maturity Levels

Five maturity levels are defined for each function category, including:

Level 1: Reporting-Based: Manually driven processes using paper-based or stand-alone reporting-based tools.

Level 2: Transactional: Basic automation of processes through transactional systems.

Level 3: Advanced Digitization: Advanced digitization of most processes with integration of workflows across critical supply chain functions.

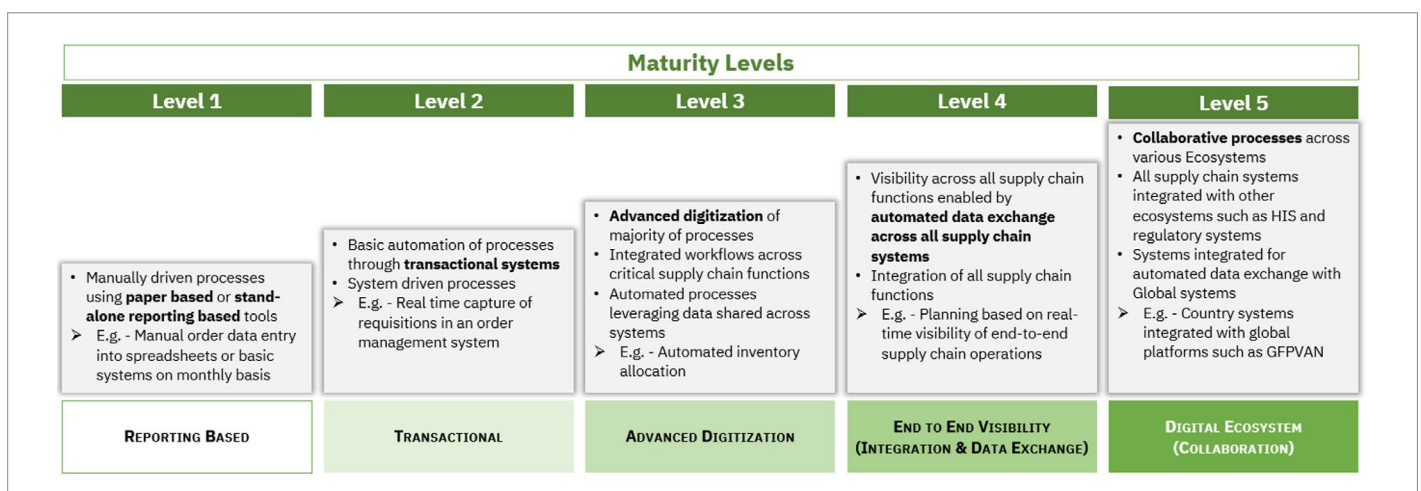
Level 4: End-to-End Visibility (Integration & Data Exchange): Visibility across all supply chain functions enabled by automated data exchange across all supply chain systems.

Level 5: Digital Ecosystem (Collaboration): Collaborative processes across various ecosystems.

Figure 1 below provides the definition of each maturity level.

FIGURE 1

Definition of SCISMM Maturity Level



1.3 Supply Chain Maturity Score and Maturity Level

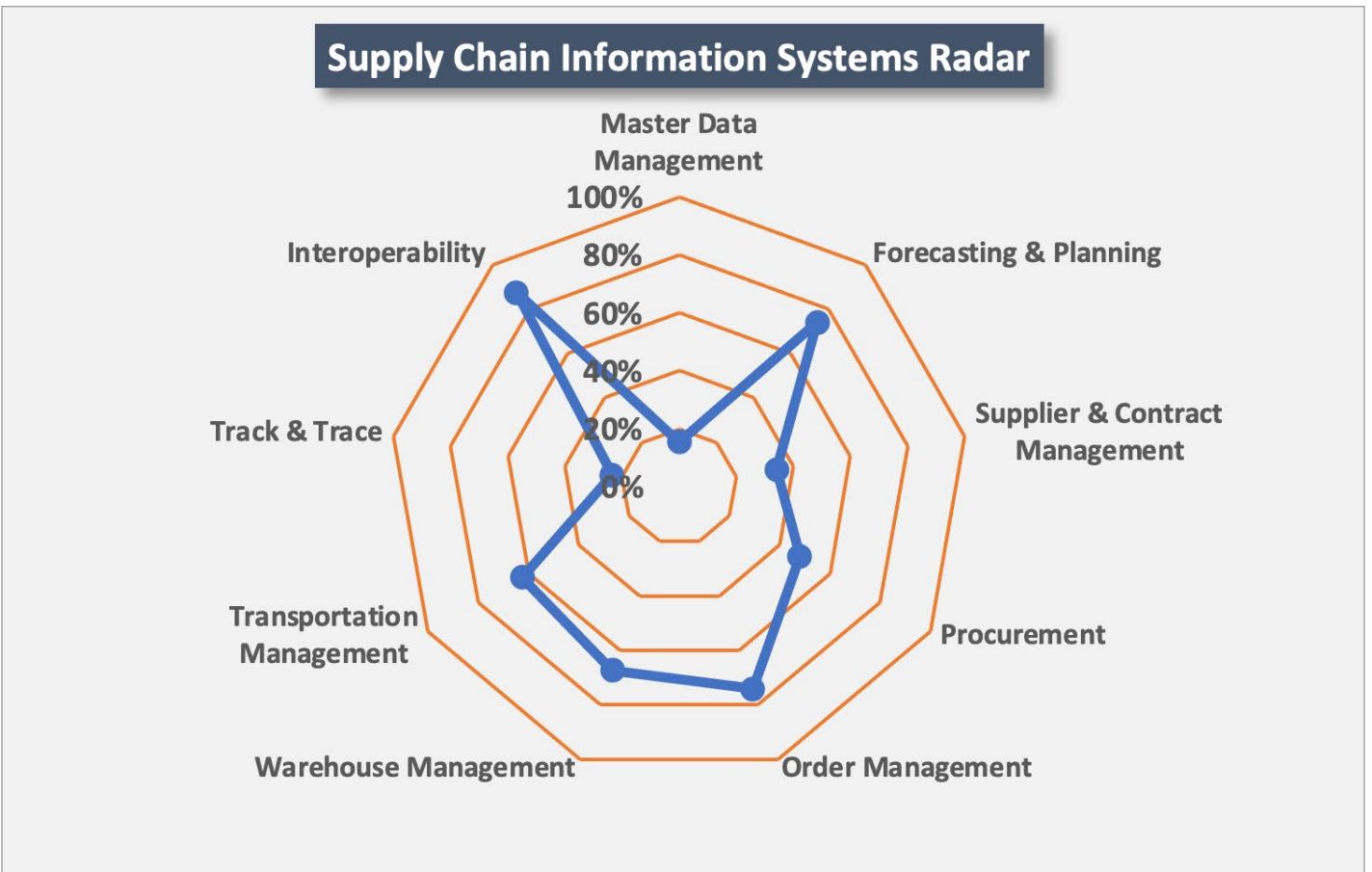
Two dashboards are generated based on the answers received (e.g., Yes, No, and N/A for each question): the SCISMM Radar dashboard and the SCIS maturity level chart of each supply chain functional category.

SCIS Radar – This chart provides the percentage of activities performed in relation to the total number of questions asked for all five maturity levels within each category.

It calculates the ratio of the total number of questionnaires answered with “Yes” to the total number of questionnaires in the category, excluding the N/A responses. For example, the total number of “Yes” responses for the Forecasting and Planning category was 55, and the total number of questionnaires for the Forecasting and Planning was 75. Thus, 55/75 equals 74 percent. Figure 2 shows a typical SCIS Radar.

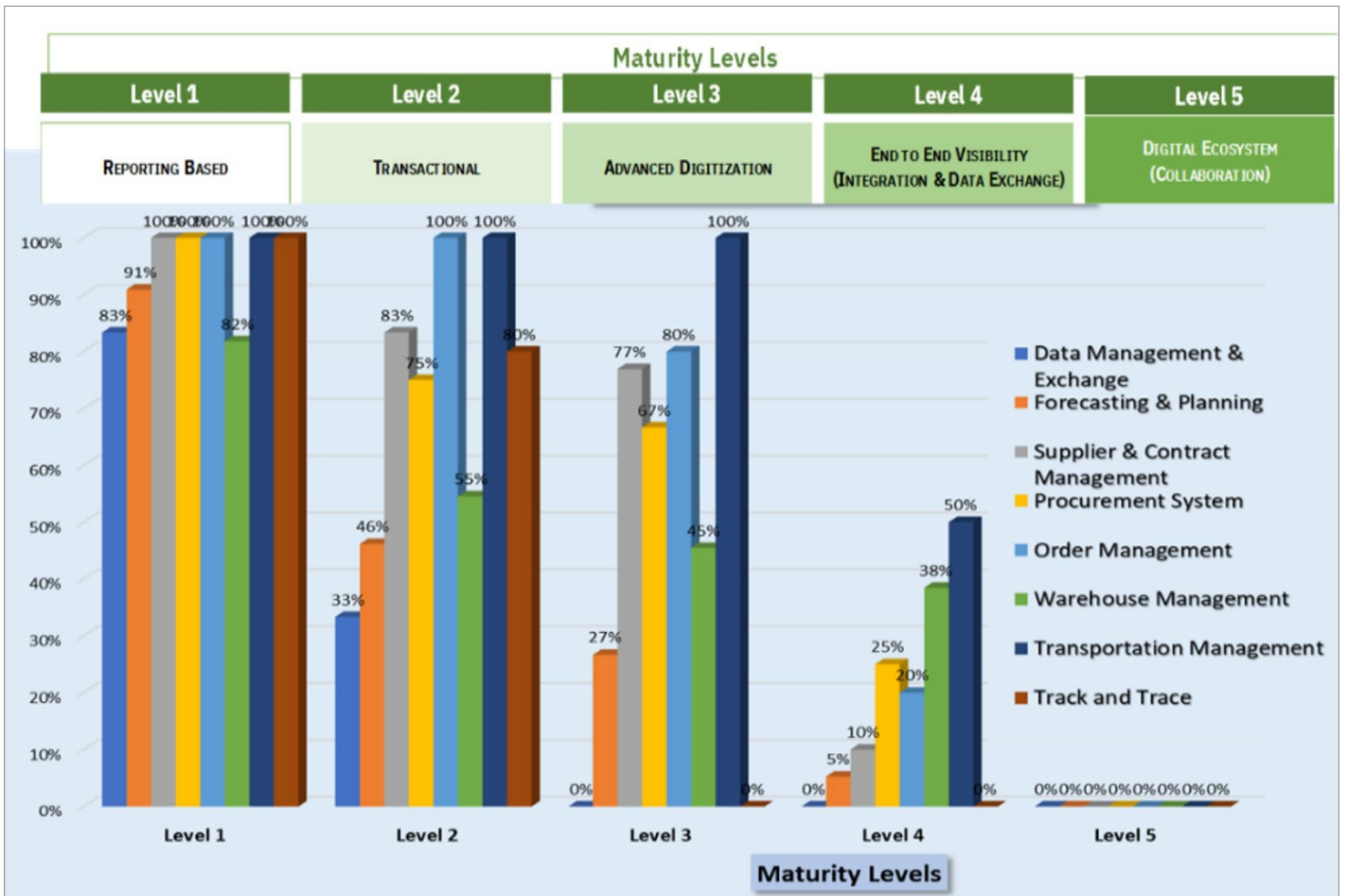
FIGURE 2

Sample SCIS Radar



SCIS Maturity Level – Figure 3 below shows the SCIS maturity level chart. This chart illustrates the percentage of performed activities (e.g., those answered with “Yes”) within each maturity level. The chart demonstrates the maturity levels of each function. A functional area can have multiple maturity levels depending on the operation. The findings illustrated in this diagram are used as a reference to prioritize the critical activities for short-term and long-term improvements and to support the MoH in budgeting and planning resources accordingly.

FIGURE 3
Sample SCIS Maturity Level Chart



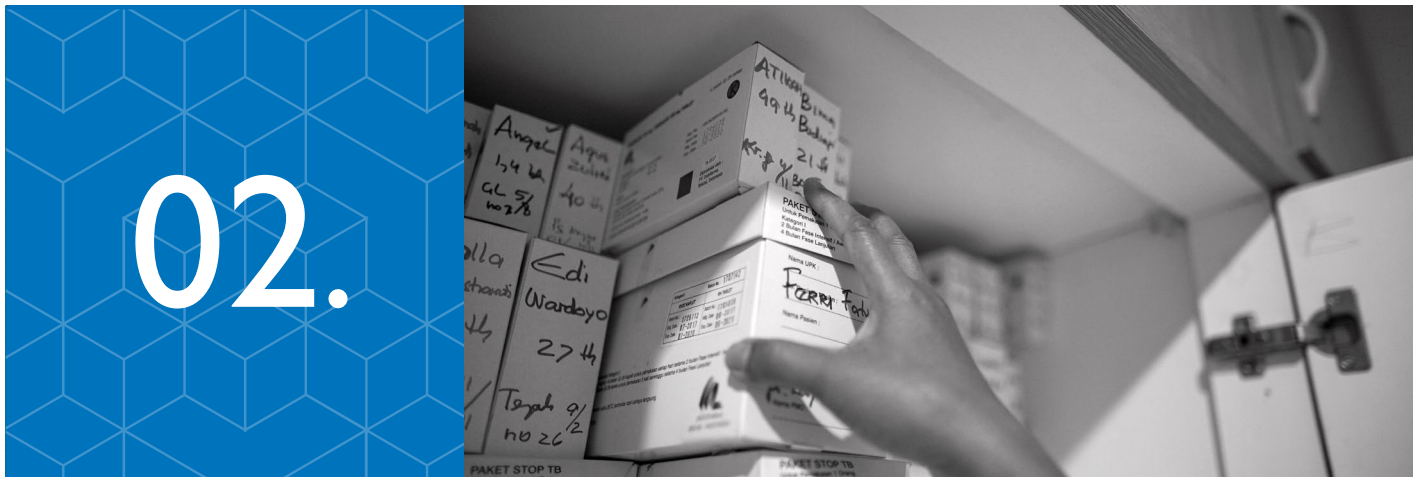


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Process of Assessment

A country's SCIS assessment is executed in three phases:

1. Pre-trip assessment activities,
2. In-country assessment activities, and
3. Post-assessment activities.

2.1 Pre-Assessment Activities

The process flow in Figure 4 describes the key activities of the preparation stage. Detailed explanations and the actual progress of activities are summarized below.

FIGURE 4
Pre-Trip Assessment Activities

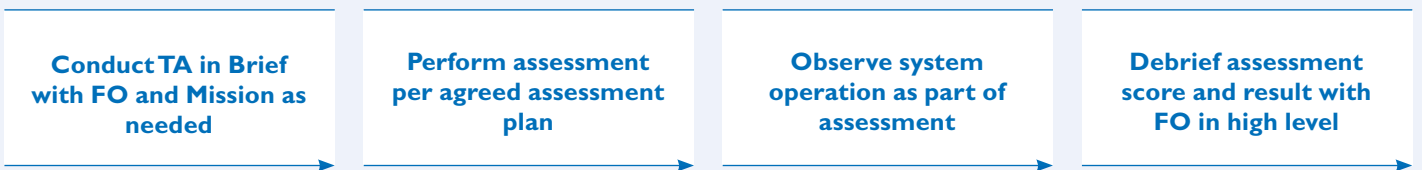


2.2 In-Country Assessment Activities

The process flow in Figure 5 describes the key activities of the in-country stage. Detailed explanations and the actual progress of these activities are summarized below.

FIGURE 5

In-Country Assessment Activities

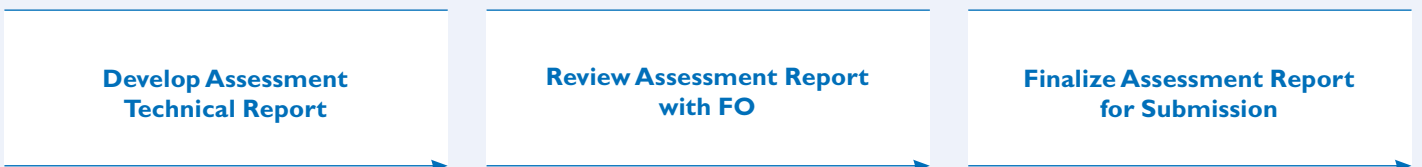


2.3 Post-Assessment Activities

The process flow in Figure 6 describes the key activities of the post-trip stage. Detailed explanations and the actual progress of activities are summarized below.

FIGURE 6

Post-Trip Assessment Activities





Lessons Learned from the Assessment Phases

3.1 Pre-Assessment Phase Lessons Learned

No one embarks on a venture without first planning for it. The pre-assessment phase is the planning stage, and it comprises tasks outlined and undertaken before the assessment phase. The success of the entire assessment depends on the planning stage, as it helps identify possible areas that require more attention and focus. How successful or difficult the entire exercise will be depends on the pre-assessment phase tasks and accompanying challenges, which the MoH can mostly resolve, and they include:

1. Awareness creation of SCISMM for acceptance: Acceptance by the MoH is needed and achieved when there is a willingness to support and participate in the assessment activity because of the benefits to the country. In this regard, GHSC-PSM offices in-country are positioned to engage the MoH and other government departments, agencies, and stakeholders to secure their support and acceptance to conduct the exercise collectively. Awareness creation is a continuous activity through the exercise.

2. Engaging different coordinating bodies for the SCISMM assessment: In some countries, the MoH is able to coordinate the facilities planned for visiting during

an assessment, including Central Medical Stores and District Stores. However, in some countries, certain facilities operate as stand-alone or parallel entities and are not under the MoH. These arrangements may require coordination with one or multiple entities to obtain approval for access to facilities and their information systems for assessment.

3. Understand the supply chain management background and mapping the information system tools in the country:

The information flow of health commodities often depends on the national supply chain management system, which outlines existing facility types at different levels of the country, and it could be a four- or three-layer or leveled system. For example, the bottom-up information flow description will start from the service delivery level, move to the district level, then to the provincial level, and finally to the central level. As much information as possible on the locations and managers of the supply chain information management tools, which generate and manage information for decision-making in the country, is required before going to sites. There are scenarios where different information systems and software are used within one facility and across different system levels. Background information can be found in the National Management Information System

Strategy or the National Supply Chain Operation Strategy.

4. Understand and define the scope of the assessment. After securing the support of the MoH and other stakeholders, the extent to which the assessment will be conducted will need to be defined. Although the assessment is expected to be at the national level to capture the holistic view and operations of national SCIS maturity, the scope of the SCIS assessment is collectively defined. The scope can also be national or regional, depending on a collective decision among stakeholders.

5. Identify information system operators/users and confirm interview dates: Users and knowledgeable people in countries must be reached in advance to confirm feasible dates, times, and location of interviews within the assessment time frame for on-site assessments. Remote assessments are difficult to conduct due to limitations and constraints in internet stability and staff availability. Both on-site and remote interview sessions face challenges, including the need for rescheduling or outright cancellation of scheduled interviews.

6. Develop an overview of stakeholders' tasks, responsibilities, and expectations: The overview clarifies

the specific activities to be completed during the assessment period and how they will be carried out. It ensures that the MoH and other involved stakeholders are well-informed and confident in their roles and responsibilities. Additionally, the overview presentation serves as a tool for continuous awareness about the benefits of the assessment.

3.2 In-country Assessment Phase Lessons Learned

The lessons learned from the assessment phase are divided into three (3) parts. The first part arises from the outlined assessment procedures for conducting interviews and observations on-site. It begins with in-brief sessions with MoH leadership and the USAID Mission, followed by working with the MoH to reconfirm and adjust the tasks planned for identified departments, agencies, and candidates. The second part captures experiences and qualitative observations from using the SCISMM tool in a particular location and context at a point in time. Finally, the third part details lessons learned from assessors' experience using the SCISMM tool during an assessment, as listed below:

– Part 1: Lessons learned from outlined assessment procedures

1. Conduct an in-brief presentation/meeting to provide an overview of the SCISMM assessment and manage expectations. This is the first in-person meeting with the MoH and other stakeholders to make sure everyone involved in coordinating the exercise is aligned, following the developed outline of the planning phase. It helps to communicate what is required by whom and when, in a manner that the message can be best received. The platform also provides the opportunity to clarify any pending issues.

2. Conduct the SCISMM assessment with the MoH staff: The acceptance and willingness of the MoH to support and participate in the assessment is crucial; however, ensuring country ownership of the entire assessment process is equally im-



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portant. To this end, designated government personnel are expected and requested to join and lead the exercise. Their presence facilitates access to government building and helps secure the necessary attention for conducting the assessment.

3. Collection of information via structured and semi-structured interviews:

Following the confirmed schedule, identified candidates are interviewed. Both structured and semi-structured interview types are used to evaluate supply chain MISs. Interviews are interactions between the assessor and a candidate, where the candidate responds to a set of standard questions aimed at assessing the country's SCIS capabilities in various areas. An average interview session takes 1 to 2 hours, and the responses are typically a "Yes" or a "No" per question. These standard questions can be asked of the same or different candidates over a period of months or years to track progression in capabilities. Although the interview questions are standard, if respondents do not fully understand them, the interviewer or assessor can provide explanations and engage in brief discussions to help clarify and ensure accurate responses.

4. Direct and indirect observations:

This is where the assessors watch users

interact with SCISs and processes at confirmed and scheduled locations as they occur. It involves collecting information using human senses and documenting activities of information flow without relying on users' willingness and ability to respond to questions accurately. It is also a way to check and validate interview responses. The interaction between the users and the SCISs often reveals that users are knowledgeable of the existing standard operating procedures (SOPs) but have limited knowledge of operating the systems in practice.

5. Conduct an out-brief of immediate findings of the SCISMM assessment with the MoH: Immediate gains and outputs of the SCISMM assessment should be communicated to the MoH and other stakeholders to get inputs and priorities that may not have been visible to the assessor.

– Part 2: Lessons learned regarding country supply chain information systems

1. Use of SCISMM to reveal inconsistent system design and development of SCIS in country: The use of SCISMM for assessment will reveal the multiple information systems being implemented by various donors to support their health supply chain operation within a country. Using SCISMM assessment procedures will reveal

inconsistencies in design and development approaches, as evidenced by the fact that some health information system programs do not have well-defined SOPs compared to others.

2. Use of SCISMM to reveal siloed information systems: The use of SCISMM for assessment will reveal information systems implemented in silos by different donors. This results in overlapping functionalities that do not consider standardization for data exchange, thereby leading to an increase in resource burden, duplicated data entry, and the need for data consolidation for reporting.

3. Use of SCISMM to reveal resources and knowledge limitations: The use of SCISMM for assessment often shows that resource and knowledge limitations contribute to situations where the functionalities of the information systems are not fully utilized to properly complete business processes, leading to poor data quality for analysis and decision-making. The lack of standard methodologies, including SOPs and dedicated resources and tools for managing the integrity of master data (product, facility, and supplier), poses additional challenges. Standard master data is a critical requirement to increase data accuracy, quality, visibility, and system interoperability.

4. Use of SCISMM to reveal insufficient infrastructure: The use of SCISMM for assessment can also reveal that facilities lack sufficient infrastructure (internet, mobile devices, etc.) to support systems operation. In some cases, multiple electronic devices (PCs and mobile) are distributed separately by implementing partners to facilities without consolidation or coordination, leading to duplication of efforts.

5. Use of SCISMM to reveal lack of a governing strategy for information systems: The use of SCISMM for assessment can reveal the lack of a National Digital Strategy in place to govern, standardize, and guide SCIS implementation across the MoH. This impacts the development of SOPs and the identification of compatibility requirements and interoperability.

When a strategy is in place, the assessment procedure will generate challenges with the enforcement of the strategy.

6. Use of SCISMM to reveal lack of coordination: The use of SCISMM for assessment can reveal a lack of coordination among MoH entities and implementing partners when implementing new or upgrading/enhancing existing systems. This creates significant gaps in data sharing and potential integration.

– Part 3: Lessons learned from the SCISMM tool

1. An experienced SCISMM assessor is needed to handle SCISMM capability measurement replicability: A challenge with the tool is ensuring consistent outputs from different respondents, even if they are knowledgeable about the country's SCIS. Since responses are based on individual opinions, they can vary from one interviewee to another. Additionally, ambiguous questions can be interpreted in different ways and used to determine what the correct answers should be. This may lead to slight inconsistencies. All these inconsistencies can be detected and corrected by an experienced assessor because the structured questions in SCISMM are logically related to each other.

2. An experienced SCISMM assessor is needed to handle interviewee bias: Most interviewees tend to provide favorable responses during interview sessions, which may result in inaccurate information about their systems. Most interviewees assume that having sophisticated information system software translates into the system's maturity and may not consider the use or capacity of the available software. This is why the assessor needs to observe how systems are used in action to minimize or eliminate possible biases.

3.3 Post-Assessment Phase Lessons Learned

This phase comprises analysis and reporting to ascertain if the objectives of the SCIS assessment were achieved.

1. Generating results: The SCISMM tool has a built-in analysis that automatically generates information describing the maturity phase of a country's SCIS. The results are displayed logically and visually to facilitate understanding, highlighting the capabilities with more significant challenges compared to others, categorized by maturity level. Low percentages of score numbers shown on the SCISMM dashboards represent capabilities with challenges and, therefore, requiring attention and intervention.

2. Generating recommendations: The assessor uses a combination of the outcome of the result and the mapped MIS by function and levels (administrative level within the supply chain operation, e.g., national, province, district, etc.) and, in addition to the observations, generates a roadmap of recommendations for the country based on the country's priorities.

3. Reporting: This is a written account of the assessment conducted and its outcomes. It specifically details the scope and objectives of the assessment, candidates, and organizations engaged for data collection and analysis of findings. The report also outlines recommendations of actions that will guide progress in the immediate-, short-, and long-terms toward level 5 digital ecosystem maturity, presented in an organized, clear, and concise manner. This is an outcome that is most desirable for any country.

4. Executing recommendations: High-priority recommendations following an assessment are the product of an agreement between stakeholders and should be aligned to the country's available resources and existing government strategic plans. The alignment ensures there will not be delays in implementing these priority recommendations.

5. Follow-up plan to use SCISMM for continued evaluation for improvement: The value of the SCISMM tool lies in its continuous use in evaluating progress made by implementing recommendations after the initial baseline assessment output. It is essential to develop a plan for continued follow-up of improvements.

04.



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Recommendations for Improving the SCISMM Tool

Lessons learned were identified during the interview session and discussions with users after the assessment. Recommendations from feedback are important considerations for incorporation in future versions of SCISMM to ensure continuous improvement in future assessments.

1. Expanding the SCISMM tool to other languages: The tool is currently available in English and French. Expanding the tool to different languages, such as Portuguese, Spanish, etc. could benefit other language-speaking nations and help gain broader acceptance for the tool.

2. Fine-tuning ambiguous language: Some questions in the questionnaires were not completely clear or precise and could therefore be interpreted and understood in different ways. This means that additional explanation and adjustment are required to remove ambiguities and ensure that the questionnaire fits the country's operation process. A guide that explains all the questions would be helpful.

3. Allocation of milestones graduation: The SCISMM score per level is a maximum of 100 percent. The investment required to move a country from one level to the next may be huge, so it may be helpful to allocate milestone percentages, i.e., 25, 50, and 75 percent, within the 100

percent of a level as essential and "must have" to encourage investment from a lower proportion to a higher proportion within the 100 percent.

4. Incorporate last-mile delivery into the scope of the SCISMM tool: The capabilities and processes of the last mile (e.g., dispensing units and community level) are not included in the current version. Various donors and countries aim to implement their digital ecosystem so that healthcare and supply chain operations are integrated across the public and private sectors. The last mile, where patients are treated, would be a critical milestone within the digital eHealth spectrum.

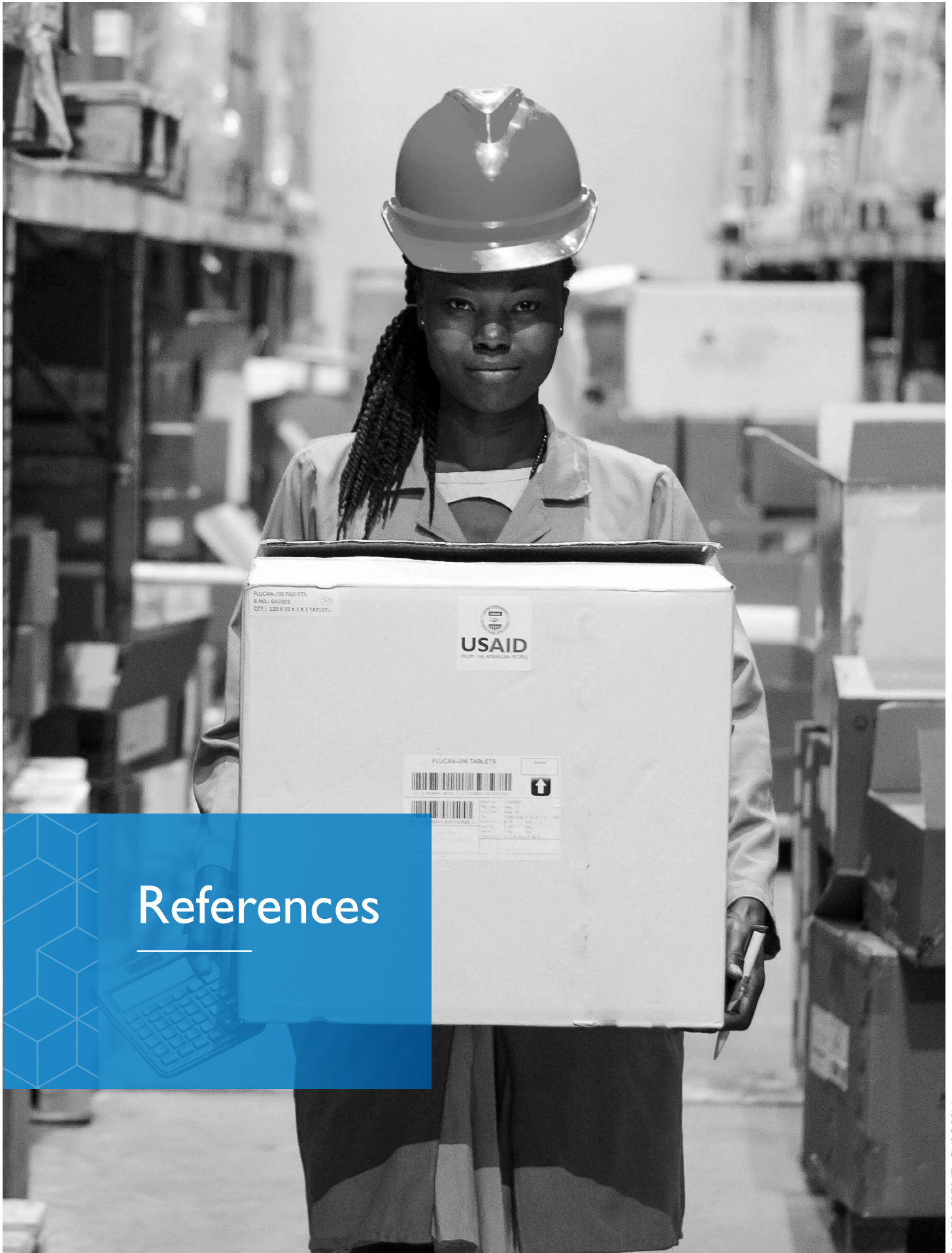
5. Post-assessment events: Post-assessment events require the selection of KPIs to track the progress and challenges of country capabilities at the different maturity levels by the respective stakeholders to complement the assessment recommendations. It is advisable that an assessor with a knowledgeable background in MISs

and supply chain operations conducts or leads the assessment exercise. This is because the qualitative observation phase, which follows the quantitative outcome of the SCISMM assessment, requires in-depth knowledge of various MIS tools and supply chain operations in the public health domain to guide the prioritization of recommendations for a country.

6. System communication: The SCISMM could benefit from including the evaluation of the level of maturity of system communications, specifically regarding data transfer and connectivity. This aspect is a significant contributing factor to the overall SCIS efficiency, yet it is currently overlooked.



PHOTO CREDIT: GHSC-PSM



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