USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM

PROCUREMENT AND SUPPLY MANAGEMENT

Guideline for Achieving Supply Chain Information Systems Maturity Model (SCISMM V2.0) Level 3

DRAFT Version 1

Sep 2022

Contents

Background

Health supply chains play a critical role in ensuring availability of medicines to patients. A well-coordinated supply chain is vital to saving lives. Given the number and diversity of partners involved in today's highly networked world, the complexity of managing health supply chains has grown exponentially. Timely access to information is essential to ensure an uninterrupted distribution of medicines through these complex supply chains.

A streamlined flow of information across the entire supply chain is necessary to ensure consistent delivery of medicines on time. The ability to act based on the information enables supply chain leaders to respond to emergencies rapidly, while adopting technologies holistically can ensure relevant information is available at the right time to the right people, who then can respond to supply chain needs proactively.

However, supply chains in low- and middle-incomes countries (LMIC) have adopted technology in a fragmented pattern. Investments in supply chain information systems (SCIS) have focused on a specific process without considering the impacts or interdependencies on other processes and systems. Consequently, multiple, overlapping systems have been deployed, burdening supply chain personnel with duplicative processes.

SCIS functions such as warehouse management and order management have been misrepresented as logistics management, resulting in systems that don't adequately support warehouse operations or order management. This contributes to system capabilities that deviate from benchmarked and standardized supply chain functions.

While countries race to adopt digital supply chain capabilities, it is important to establish a standardized approach to digitalization. Such an approach should derive system features and functional requirements from benchmarked industry frameworks. Functional requirements should incorporate standardized representation of supply chain functions while being grounded in the countries' contexts.

Introduction

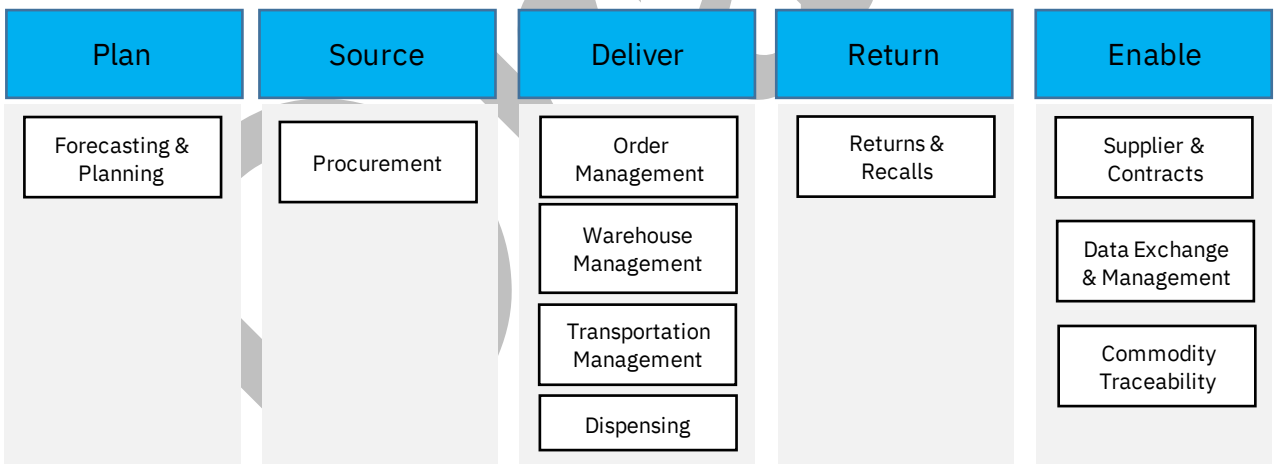
The purpose of this guidance document is to provide LMICs with standardized SCIS functional requirements that leverage industry best practices and benchmark frameworks. The document is an effort to help countries adopt a holistic approach to investing in and implementing SCIS. The SCIS functional requirements provided here consider a maturity-based approach through which countries deploy and stabilize essential system features before implementing advanced capabilities.

BENCHMARK FRAMEWORKS

The SCIS functional requirements leverage the maturity-based SCIS capabilities defined in the Supply Chain Information Systems Maturity Model (SCISMM). SCISMM is designed using Supply Chain Operations Reference (SCOR) model principles. Details of the SCOR model and the SCISMM framework are provided here.

- **SCOR Model**

Association for Supply Chain Management's (ASCM) SCOR model provides a framework to categorize and organize supply chain business processes. The SCOR model recognizes 6 major supply chain processes: Plan, Source, Make, Deliver, Return and Enable.[1] The SCOR model is used by several global large-scale companies to organize business processes, gain clarity on process interdependencies, and improve supply chain efficiencies. While frameworks such as the SCOR model can help organize supply chain processes in the public health sector, they need to be tailored to address the unique needs of this sector. The following figure, using the SCOR model's applicable process categories, organizes public health supply chain processes that SCIS should support.



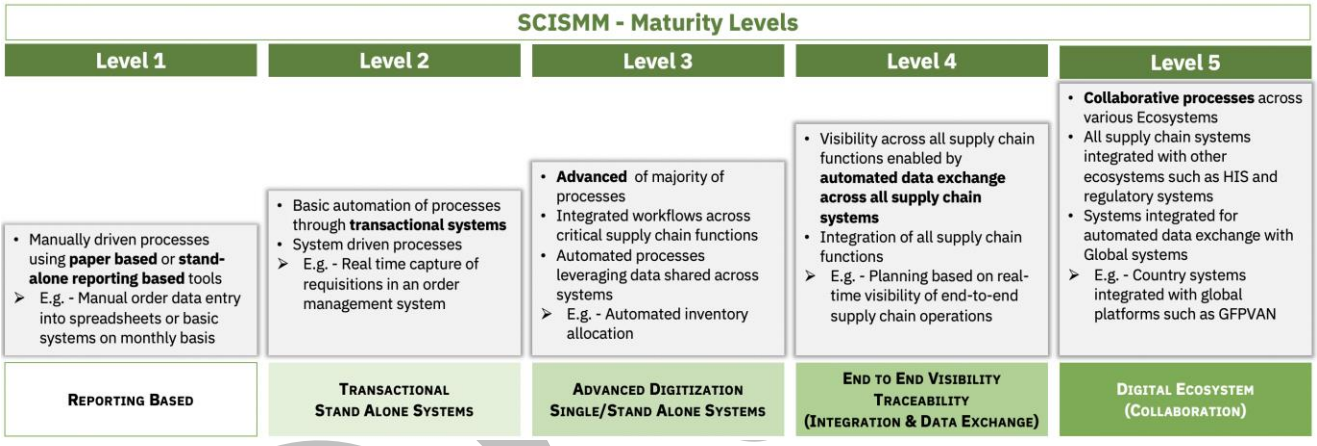
- **SCISMM Framework**

The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project developed the SCISMM[2] framework to help countries analyze their current supply chain systems holistically and plan their investments in supply chain information systems accordingly. The SCISMM is a guiding tool to aid supply chain actors, including governments, donors, and implementing partners/procurement agents, in planning and strategizing around future SCIS investments to enhance the functionality of supply chain

[1] *ASCM, "SCOR Quick Reference Guide, Version 12.0", (http://www.apics.org/docs/default-source/scor-p-toolkits/apics-scc-scor-quick-reference-guide.pdf)*
[2] *USAID GHSC-PSM, SCISMM Framework, Version 2.0, (https://www.ghsupplychain.org/node/1483)*

operations. The model can be used to evaluate current capabilities or to target priority areas for improvement or development, as in the case of its application in Nepal, Pakistan, and Rwanda.

While the SCISMM has been developed in the context of public health supply chains, it was designed with core supply chain principles in mind, including the SCOR model framework. With the maturity model, supply chain information system capabilities such as planning, order management, and warehouse management, as well as foundational capabilities like master data management and interoperability, have been categorized across five maturity levels. Each level defines the extent and maturity of system capabilities. The model provides pre-requisites for each maturity level and the capability to develop baselines and measure improvements as systems mature.



OBJECTIVES

The objectives of this document are to provide the following:

- Guidance on system functional requirements that can be used in SCIS implementation and improvement activities to achieve SCISMM level 3;
- A guiding reference when formulating requests for information or requests for proposals from prospective SCIS vendors;
- A basis for supply chain organizations to plan system implementations in an incremental yet holistic way by considering the categorization of SCIS improvements by functional area;
- A beginning point for LMICs to define business requirements, system specifications and technical design while implementing SCIS at SCISMM level 3; and
- A benchmark reference for LMICs to review current SCIS capabilities and plan for adopting advanced capabilities from SCISMM level 3 and onwards.

INTENDED AUDIENCE

This document is intended to benefit the following stakeholders as a guiding reference of system features to expect while investing in SCIS improvements.

- Ministry of Health
    - Chief Technology or Information or Digital Officers
- Implementation Partners
- Donor Organizations
- SCIS Vendors
- System Integration Companies

SCIS Functional Requirements

The SCIS functional requirements listed here are based on supply chain process categorizations and definitions available in the SCISMM framework. The functional requirements marked as "Essential" are SCIS capabilities that have up to SCISMM level 3 maturity. The functional requirements marked as "Advanced" include SCIS capabilities that have SCISMM level 4 and level 5 maturity.

FORECASTING AND PLANNING

	Functional Requirements	Essential	Advanced
Demand Planning	System is synced with demand data that is captured in transactional systems in any time bucket (weekly at minimum)	X	
	System provides the ability to upload demand data	X	
	System retains three years of demand data to make 12-month rolling forecasts using simple algorithms such as moving average	X	
	System provides the ability to set forecast horizon to produce an extended forecast in monthly buckets	X	
	System checks for forecast accuracy to determine appropriate forecasting algorithm	X	
	System allows for forecast approvals by users	X	
	System captures demand data, historic demand data, and any adjustments in historic data across geographies and product hierarchies	X	
	System analyses demand data for any outliers and smoothens data if anomalies are identified	X	
	System uses advanced forecasting models to calculate demand in time series conditions such as multiple exponential smoothing techniques		X
	System allows collaborative forecasting in pre-defined forecasting cycle, such as monthly, and allows for collaborative adjustments and approvals		X
	System captures and maintains history of forecast adjustments along with reasons		X
	System can use adjustment data to calculate forecast adjustment accuracy in addition to forecast accuracy		X
	System maintains multiple product life cycle profiles and allows transfer of forecasts from a product version being retired to a newer version		X
	System provides the ability to maintain multiple demand scenarios		X
	System provides advanced forecasting models that use factors such as population density, supply chain fluctuations, seasonality, and special events that impact demand		X

Supply Planning	System provides supply planning template to capture and load inventory, demand, and supply data	X	
	System calculates net requirements by comparing demand against availability and planned/scheduled supply	X	
	System allows updates to supply plans based on changes in demand and supply conditions	X	
	System suggests corrective actions needed in the supply chain to prevent stock-outs or overstocking	X	
	System provides multiple demand and supply planning templates to facilitate simulation with alternative solutions to select best plan		X
	System measures supply plan accuracy and identifies planning exceptions for planners to take action and resolve		X
	System provides plan simulations with alternate solutions		X
	System measures accuracy across multiple simulation plans and allows selecting the best plan		X
	System provides real-time collaborative planning with suppliers to consider supplier capacity and adjust plan based on supply chain exceptions		X
	System provides integration of plan data with other supply chain systems and ecosystems such as Health Information Systems and regulatory to enable end-to-end visibility and enhanced digital collaboration		X

SUPPLIER AND CONTRACT MANAGEMENT

	Functional Requirements	Essential	Advanced
Sourcing	System maintains annual procurement plans and is able to identify sourcing requirements	X	
	System uses inventory data and demand data to determine sourcing requirements that feed into annual procurement plans	X	
	System allows supply planning at national level and each supply chain level to determine sourcing requirements	X	
	System monitors and alerts for expiring contracts in advance	X	
	System uses procurement plans to establish procurement budgets and ceilings for suppliers	X	
	System creates individual procurement plans using 12-month rolling forecasts for products that might require new contracts	X	
	System captures new contracting requirements along with procurement specifications	X	
	System is capable of using multi year forecast data to determine sourcing needs	X	
	System automatically validates contract values against established budget and ceilings		X

	System allows multiple sourcing strategies such as direct drop shipping and vendor-managed inventory		X
	System allows collaboration with sourcing stakeholders such as suppliers, manufacturers, and freight forwarders		X
	System uses distribution and consumption data along with lead time and logistics costs to calculate sourcing needs and frequency		X
Tender Management	System provides standard contract templates for different contract types such as firm fixed price and blanket purchase agreement	X	
	System provides ability to capture contract specifics such as supplier details, product information, pricing information, period of performance, and necessary contractual terms	X	
	System tracks contract approvals	X	
	System allows uploading contracts, addendums, and changes as part of original approved contract	X	
	System provides the ability to manage RFx events to facilitate competitive bidding		X
	System allows contract addendums and changes and maintains history/audit of changes		X
	System provides a contract management workflow that allows reviews and approvals		X
	System allows collaborative reviews and approvals through electronic signatures with suppliers and procurement & risk teams through portals		X
Supplier Information Management	System allows capture of supplier name, address, sites that can be cross-referenced across sourcing and contractual documentation	X	
	System validates mandatory fields of supplier data and checks for data integrity	X	
	System utilizes transactional data uploaded in the system to analyze supplier performance	X	
	System provides a supplier portal for suppliers to register and provide supplier master data with Global Location Numbers (GLN)		X
	System uses uploaded transactional data to explore strategic sourcing and analyze spendings by product category		X
	System uses transactional data with product and supplier master data for automated key performance indicators and performance analysis		X
	System is integrated with other systems to share supplier information for operational and financial processes		X
	System can rate suppliers and alert users for supplier performance exceptions		X

PROCUREMENT MANAGEMENT

	Functional Requirements	Essential	Advanced
Procurement Processing	System generates unique purchase order numbers and provides capability to capture purchase order details including header details such as address and line details such as product information, quantity, and price	X	
	System does purchase order validations such as checking for mandatory fields and data integrity	X	
	System allows purchase order modifications along with appropriate reasons and maintains history/audit of modifications	X	
	System identifies process exceptions such as delays	X	
	System is capable to tracking various purchase order workflow statuses		
	System is capable of integrating directly with suppliers to exchange purchase orders and order updates		X
	System is capable of integrating with other operational systems to share procurement information for visibility and various processes such as payments		X
	System automatically notifies process exceptions to authorized personnel and allows them to resolve through the system		X
	System is capable of integrating with order management system/module to facilitate direct drop shipping		X
	System is capable of integrating with warehouse management system to automatically initiate replenishment orders based on inventory needs		X
Fulfillment	System is capable of tracking purchase order fulfillment statuses with timestamps	X	
	System is capable of creating advance shipment notices linked to purchase order line(s)	X	
	System allows creation of multiple advance shipment notices against purchase order	X	
	System allows capture of receipts, along with details such as batch number, quantity, and expiration date, against advanced shipment notices	X	
	System updates purchase order status based on status of associated advanced shipment notices and closes out the purchase order based on completion of receipts against advance shipment notices	X	
	System is capable of integrating with other operational systems as well as supplier systems via electronic data interchange (EDI) or appropriate mechanism to exchange data such as purchase order modifications and status updates and inbound advanced shipment notices		X

ORDER MANAGEMENT

	Functional Requirements	Essential	Advanced
Requisitioning	System generates unique requisition order numbers and provides capability to capture requisition order details including header details such as delivery address and line details such as product information, quantity, and price	X	
	System does order validations such as checking for mandatory fields and data integrity	X	
	System provides delivery estimates for requisition based on item lead times	X	
	System provides automated requisitions workflow management to coordinate approvals and rejections	X	
	System identifies processing exceptions such as delays and alerts appropriate personnel	X	
	System is capable of initiating and managing returns and recalls of damaged or sub-standard quality products and linking the returns and recalls to original requisition order	X	
	System validates requisition automatically against available budget/funds pulled from financial systems		X
	System is capable of integrating with fulfillment locations (inventory systems) to provide visibility to inventory across the supply chain when placing a requisition		X
	System schedules fulfillment of requisitions based on promised/requested delivery dates and inventory availability across fulfillment locations, including future inventory		X
	System provides delivery estimates for requisitions based on shipping location proximity, logistics & transportation lead time, and any item-specific lead times		X
	System dynamically updates delivery estimates based on information from other systems on changing conditions		X
	System is capable of integrating with other systems to exchange order information and updates		X
	System is capable of capturing and processing requisitions for non-catalog products to trigger linked sourcing and procurement process		X
	System is capable of reconciling and tracking requisitions against supply/distribution plans		X
	System is capable of automatically triggering requisitions based on demand/dispensing and inventory consumption patterns in downstream systems		X
	System is capable of triggering and linking requisitions with procurements when warehouse inventory is not available		X
Requisition	System is capable of allocating inventories automatically based on availability and shelf life with capability to override allocations if required	X	

	System is capable of printing requisition orders	X	
	System ensures that allocated inventory is not available for allocation to other requisition orders	X	
	System is capable of integrating with fulfillment systems to share requisition order details and track fulfillment statuses/updates	X	
	System allocates optimal requisition fulfillment location based on availability, proximity, and shelf life		X
	System is capable of prioritizing, adjusting, and managing requisition locations based on unforeseen circumstances		X
	System is capable of tracking detailed fulfillment stages end-to-end by integrating with other systems		X
	System is capable of dynamically allocating and adjusting inventory allocations based on changing scenarios shared by other systems such as fulfillment systems		X
	System tracks and uses detailed fulfillment stages for exception management with capability for users to take necessary action		X

WAREHOUSE MANAGEMENT

	Functional Requirements	Essential	Advanced
Inbound Processing	System allows capture of advanced shipment notices, along with details including shipment number, product information, unit of measure, and quantity	X	
	System provides capability to scan barcodes to receive products against advanced shipment notices and capture serial number, batch number, and expiry date when available	X	
	System generates put-away tasks once products are completely received and allows printing of tasks for warehouse personnel to perform	X	
	System is capable of blind receiving products when shipment details are not captured in the system	X	
	System captures warehouse equipment details and personnel skill details to help in assignment of tasks		X
	System automatically assigns put-away tasks to warehouse personnel based on factors such as workload, skills, and storage space		X
	System is capable of performing put-away tasks using handheld devices		X
	System is capable of integrating directly with suppliers and logistics providers to exchange advanced shipment notices/shipments along with status updates		X
	System alerts warehouse personnel of inbound shipments, based on the captured advanced shipment notices and estimated delivery dates, to enable planning for space and labor		X

	System generates receiving discrepancy reports after items are inspected and discrepancies are identified		X
	System provides the ability to quarantine products in a quality control location based on inspection		X
	System calculates warehouse space dynamically based on inbound shipment and storage availability		X
	System alerts issues related to storage spaces dynamically		X
	System captures and shares inbound processing exceptions with other systems such as procurement to enhance planning, vendor performance management, and recalls		X
Inventory Management	System provides capability to configure warehouse locations, including aisles and bins and define what category of products get stored where	X	
	System tracks inventory in the stored locations with information such as product identifier, batch number, expiration date and quantity	X	
	System provides the ability to adjust inventory	X	
	System generates cycle count tasks randomly and physical count tasks based on warehouse count schedule, and allows printing them for warehouse personnel to perform tasks	X	
	System is capable of integrating with other systems, such as order management systems, to provide real-time inventory data such as receipts, stock on hand, and adjustments	X	
	System assigns inventory counts automatically to warehouse personnel based on workload and skills		X
	System provides the capability to perform inventory counts using handheld devices		X
	System allows warehouse supervisors to accept/reject count discrepancies and automatically adjusts inventory based on acceptance or rejection		X
	System provides the ability to configure cold storage locations		X
	System is capable of capturing serialization data and aggregating and disaggregating serialization data across all warehouse transactions		X
	System is capable of integrating with other systems to share inventory information, including cold chain storage details		X
Outbound Processing	System allows capture of requisition/outbound order details including requisition number, product details, and quantities	X	
	System generates outbound shipments, with details such as shipment number and product details, based on associated outbound orders in the system	X	
	System generates picklist tasks that can be printed out for warehouse personnel to perform	X	
	System is capable of integrating with order management systems to provide real-time updates regarding outbound shipments	X	

	System captures details of picked products including batch number, quantity and expiration date and associates them with shipments	X	
	System provides ability to pack products in required pack sizes and prints packing labels and packing slips	X	
	System consolidates and optimizes picklists and picking tasks based on factors such as warehouse location, order priority, and product category		X
	System is capable of performing picking tasks using handheld devices		X
	System is capable of assigning carrier information to shipments		X
	System is capable of integrating with other systems to share shipment information and status updates electronically		X

TRANSPORTATION MANAGEMENT

	Functional Requirements	Essential	Advanced
Route Management	System assigns optimal routes based on vehicle space, sequence, and distance to different destinations	X	
	System is capable of optimizing routes based on various criteria including volume, urgency, and distance		X
	System uses real-time updates of weather/traffic and coordinated updates from shipping and receiving systems for route optimization		X
	System provides simulation-based network and route optimization options		X
	System captures and shares inbound processing exceptions with other systems such as procurement to enhance planning, vendor performance management, and recalls		X
Transportation Execution	System provides the ability to update transportation statuses manually	X	
	System captures real-time transportation statuses (shipped, in-transit, delivered, etc.) based on electronic updates from drivers		X
	System is capable of integrating with other systems to share transportation statuses and provide other updates		X
	System is capable of integrating with transporter's vehicle tracker (GPS) application for real-time movement visibility		X
	System captures electronic proofs of delivery and automatically sends in real time to all connected supply chain systems		X
Freight Audit and	System allows upload of freight invoices and payment details while linking with associated shipments and deliveries	X	
	System allows reconciliation and consolidation of freight bills and invoices		X

	System adjusts, audits, and allocates freight bills to respective orders/shipments		X
	System provides ability to process payments to logistics vendors		X

TRACK AND TRACE

Note: Commodity tracking and commodity verification features are considered advanced features except for basic product identity verification.

	Functional Requirements	Essential	Advanced
Commodity Tracking	System is capable of tracking all physical movements of commodities across the supply chain		X
	System is capable of tracing products by batch numbers across the supply chain		X
	System can initiate recalls of batches distributed within the country based on traced commodities		X
	System is capable of tracking all physical commodity movements through barcode scanner and associating the scanned data with master and transactional data		X
	System is capable of tracing specific instance of the products by serial numbers across the supply chain		X
	System is capable of initiating national supply chain-level recalls based on global product quality alerts		X
Commodity Verification	System is capable of verifying scanned GS1 (Global Standards) barcodes of products, using globally standardized identifiers such as Global Trade Item Numbers (GTINs) maintained in either national product master database or global product master data repository	X	
	System is capable of verifying scanned GS1 barcodes of products for batch numbers and expiry dates, along with GTINs, against a central database or global repository		X
	System is capable of verifying products using their unique serial numbers against a central database or global repository		X

DATA MANAGEMENT

	Functional Requirements	Essential	Advanced
Product	System allows capture of standardized product information, including images, in a centralized way	X	

	System provides the capability to map and link standardized product identifiers such as GTINs with national identifiers, if and when required	X	
	System provides users the ability to create, update, and delete product information	X	
	System captures history of changes made to product information records	X	
	System provides workflows to manage updates to product information and approvals to accept updates	X	
	System is capable of integrating with other transactional systems to exchange product information		X
	System is capable of integrating with data providers such as Global Data Synchronization Network (GDSN) data pool to receive standardized data		X
Facility Master Data	System allows capture of facilities information in a standardized and a centralized way	X	
	System provides the capability to map and link standardized location identifiers such as GLNs with national identifiers, if and when required	X	
	System is capable of integrating with other transactional systems to exchange standardized facility information		X
Supplier Master Data	System allows capture of supplier master data, such as supplier identifier, name, and address, along with location details	X	
	System is capable of integrating with transactional systems to share supplier master data		X
	System can map GLNs to supplier information such as supplier locations		X
	System provides a supplier portal where suppliers can provide their details in a standardized way		X

FUNCTIONAL AREAS FOR FUTURE CONSIDERATION

The following functional areas will be detailed in future iterations of this document.

- Dispensing
- VData Exchange & Interoperability

Appendix

Additional Resources

USAID GHSC-PSM, 2021, SCISMM Framework

ASCM, SCOR Digital Standard