

Supply Chain Information Systems Maturity Model

USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM

Procurement and Supply Management

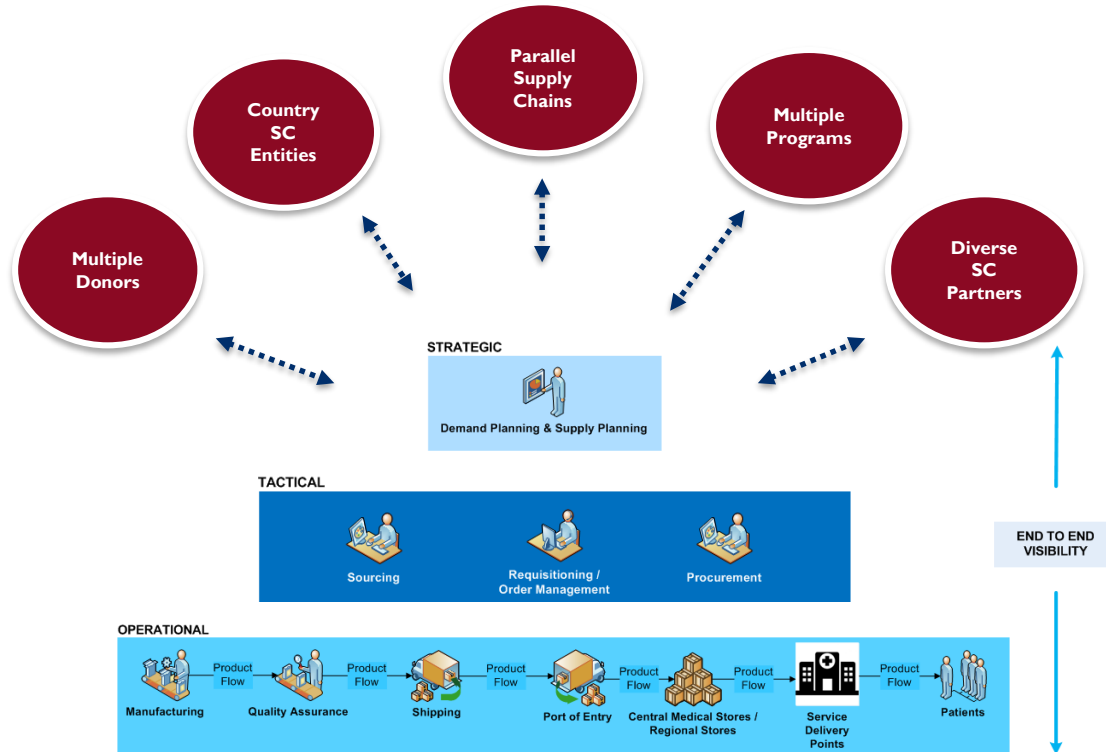


Agenda

- Supply Chain Information Systems
- Supply Chain Information Systems Maturity Model
- The Nepal Example
- Feedback and Q&A

— Supply Chain Information Systems

What is Today's Supply Chain?



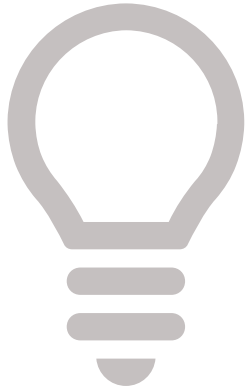
Supply Chain Complexities

- Expanding beyond traditional flows of commodities from manufacturers to end consumers/patients
- Orchestrating all processes from planning to execution to final consumption
- Increasing number of diverse SC partners, donor initiatives, and resulting parallel SCs

Key

- While such factors make Public Health SC more complex, it is imperative to adopt a holistic approach to organize & operate our SC.

How do we address Complexities?



Learning to rethink our approach to focus on:

- Efficient and effective supply chains with well coordinated processes & timely information exchange
- Transforming from reporting or data entry system to real time transaction processing system
- Systems that are overarching across critical processes and not just limited to specific supply chain areas or levels or specific

Existing system approaches concentrate mostly on:

- A limited number of supply chain areas such as warehousing or inventory management
- Specific supply chain levels such as Central Medical Stores, District Pharmacies
- Specific programs/initiatives such as USAID Task Order 1 (HIV) or Task Order 3 (Reproductive Health)

What are Supply Chain Information Systems (SCIS)?

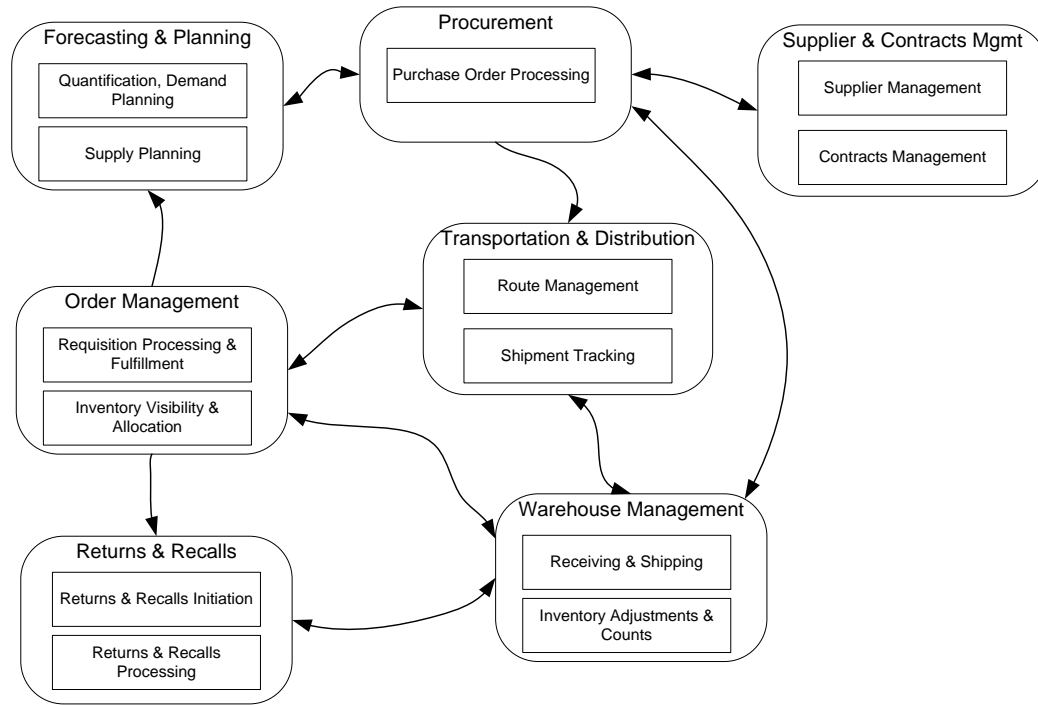
SCIS are foundational in supporting efficient flow of physical commodities from manufacturer to patients.

In addition, SCIS are essential in facilitating strategic and tactical objectives including planning, control and decision making

Effective SCIS should

- Improve the **consistency** to deliver right products to patients
- Improve **efficiencies** across SC processes
- Reduce **lead times** in processing and delivering commodities
- Enhance the effectiveness of SC **decisions**
- Provide better **visibility and control** of the overall SC

Why are SCIS Important?

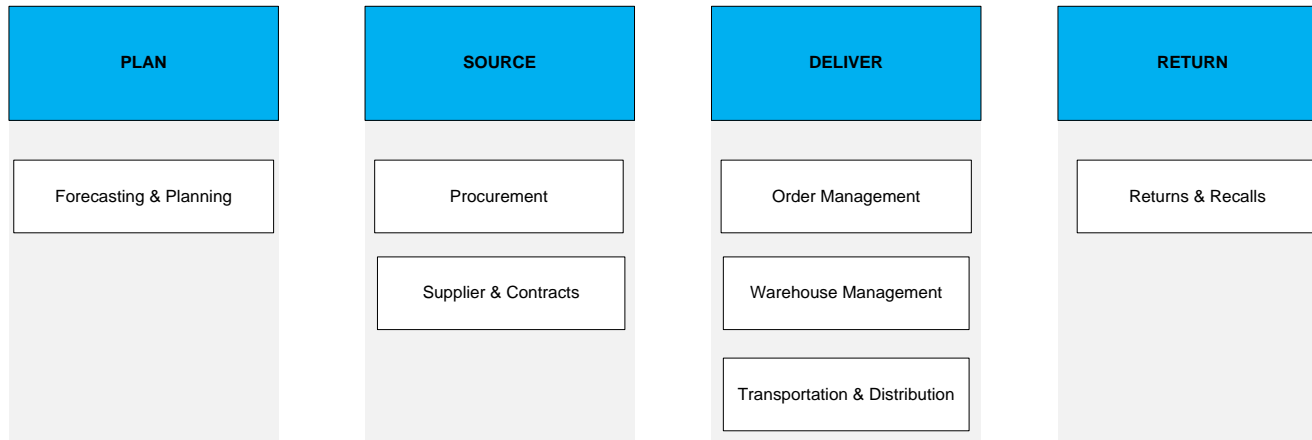


Importance of SCIS

- Coordinated execution of SC processes essential for efficient flow of commodities
- SCIS form the back bone in managing & coordinating the physical, informational & process flow from planning to consumption of commodities
- Without effective SCIS, commodities as well as data/information will move at a slower pace limiting visibility, impeding decision-making and ultimately impacting the ability to serve patients

What are key SCIS Functionalities?

- SCIS Functionalities have been organized based on the Supply Chain Operations Reference (SCOR) model and the American Productivity & Quality Center (APQC) Process Classification Framework.
- Key elements of SCOR model and APQC framework have been leveraged and tailored as appropriate:



**About SCOR & APQC*

How are SCIS Organized?

Master Data Management

- Product Master
- Facility/Location Master
- Supplier Master

Interoperability

Track and Trace

- Commodity Tracking
- Traceability
- Product Authentication

Forecasting & Planning System

- Demand Planning
- Supply Planning
- Plan Distribution

Procurement System

- Procurement Processing
- Fulfillment Visibility

Warehouse Management System

- Inbound Processing
- Inventory Management
- Outbound Processing

Supplier & Contract Management System

- Sourcing & Contracting Strategies
- Tender Management
- Contract Authoring
- Supplier Information Management

Order Management System

- Requisitioning
- Requisition Approval
- Inventory Visibility
- Requisition Fulfillment
- Order Visibility

Transportation Management System

- Route Management
- Transportation Execution
- Freight Audit and Payment

Technical, Foundational and Cross-Cutting Capabilities

Supply Chain Functional Capabilities

How is this approach different?

	Existing Approaches	SCIS
Processes	Data is captured into the system after the transactions are performed	Systems drive the transactions thus capturing data real time as transactions are performed
Visibility	Delayed visibility of transactions & data	Real time data visibility
Data Integrity	Certain or most data captured manually impacting data integrity & quality	Systems driving the transactions ensure data integrity
Decision-making	Delayed access to data impedes effective decision making	Real time availability of data enhances decision making
Interoperability	Tend to operate in a siloed fashion	Holistic implementation ensures SC systems are integrated to facilitate transaction processing & trouble-shooting

— Supply Chain Information Systems Maturity Model

What is the Model?

Maturity Level	Warehouse Management System			
	Level 1	Level 2	Level 3	Level 4
Business Case	Basic Warehousing Operations (Storage, In and out activities)	Warehousing Operations (Inventory data, forecasts and system managed transactions)	Business Transaction Processing and advanced warehouse management for warehouse personnel	Advanced Warehousing including functionality and Analytics Management
Benefits	Improved accuracy of inventory data Improved inventory control and management	Forecast annual effort to drive strategic and planning transactions Forecast and manage customer activities Better tracking of inventory for each item Increased visibility of warehouse location and shipping etc.	Real time data provides insight into inventory visibility and issue identification Increased efficiency of warehouse personnel	Tracking and timing of inventory of other location level Ability to set an inventory discontinuation and timely receive monitoring check
Capabilities	<p>Advanced Processing Capable to support advanced shipping capabilities, item, item, quantity, and attributes and to meet through channel business needs Ability to support customer from "ship to in the system" Process to manage inventory through order channel from receiving back department</p> <p>Inventory Management Inventory processes and generate ability to split stock across items Inventory processes and generate ability to split stock across items for sales support Inventory process for user development Process different inventory classes Allow for inventory adjustments</p> <p>Advanced Processing Supports work order and ship and order in the system, allowing of all attributes Capable of managing shipment (Preparation) including Preparation & Labeling, Receipt, Tracking and Shipping, and the ability to create and maintain a record of performance of the transaction</p>	<p>Advanced Processing Capable to support advanced shipping capabilities, item, item, quantity, and attributes and to meet through channel business needs Ability to support customer from "ship to in the system" Process to manage inventory through order channel from receiving back department</p> <p>Inventory Management Inventory process and generate ability to split stock across items Inventory process and generate ability to split stock across items for sales support Inventory process for user development Process different inventory classes Allow for inventory adjustments</p> <p>Advanced Processing Supports work order and ship and order in the system, allowing of all attributes Capable of managing shipment (Preparation) including Preparation & Labeling, Receipt, Tracking and Shipping, and the ability to create and maintain a record of performance of the transaction</p>	<p>Advanced Processing Capable to support advanced shipping capabilities, item, item, quantity, and attributes and to meet through channel business needs Ability to support customer from "ship to in the system" Process to manage inventory through order channel from receiving back department</p> <p>Inventory Management Inventory process and generate ability to split stock across items Inventory process and generate ability to split stock across items for sales support Inventory process for user development Process different inventory classes Allow for inventory adjustments</p> <p>Advanced Processing Supports work order and ship and order in the system, allowing of all attributes Capable of managing shipment (Preparation) including Preparation & Labeling, Receipt, Tracking and Shipping, and the ability to create and maintain a record of performance of the transaction</p>	<p>Advanced Processing Capable to support advanced shipping capabilities, item, item, quantity, and attributes and to meet through channel business needs Ability to support customer from "ship to in the system" Process to manage inventory through order channel from receiving back department</p> <p>Inventory Management Inventory process and generate ability to split stock across items Inventory process and generate ability to split stock across items for sales support Inventory process for user development Process different inventory classes Allow for inventory adjustments</p> <p>Advanced Processing Supports work order and ship and order in the system, allowing of all attributes Capable of managing shipment (Preparation) including Preparation & Labeling, Receipt, Tracking and Shipping, and the ability to create and maintain a record of performance of the transaction</p>
Key Features	Availability of system data on all business items and business functions Master data information across all processes and supporting transactions Data, task and advanced reporting capabilities with the resources for the Supply Chain, regulatory data and quality etc. available in warehouse format	Physical facility using such that business/capabilities are available to perform warehousing operations such as receiving, picking, loading etc. Forecast of transaction such as Barcode system, Label printer, Barcode etc. Capable to support customer from "ship to in the system" Capable to support customer from "ship to in the system" Forecast process based on receiving back, such as customer, partner, processes etc.	Operational capability within other integrating systems to generate and send data Forecast of transaction such as Barcode system, Label printer, Barcode etc. Capable to support customer from "ship to in the system" Capable to support customer from "ship to in the system" Forecast process based on receiving back, such as customer, partner, processes etc.	Advanced system infrastructure support of managing inventory volumes of data and in real time Capable to support customer from "ship to in the system" Capable to support customer from "ship to in the system" Forecast process based on receiving back, such as customer, partner, processes etc.
Supply Chain	Global Master Data Regional Master Data Supply Chain	Global Master Data Regional Master Data Supply Chain	Global Master Data Regional Master Data Supply Chain	Global Master Data Regional Master Data Supply Chain

Maturity Levels

- SCIS capabilities have been categorized across four maturity levels
- Maturity levels defined to facilitate phased incremental implementation of capabilities
- Capabilities within each maturity level grouped to promote stabilization of SC processes before progressing to the next level



Microsoft Excel
Worksheet

Who will use the Model?

Intended Users

- Country Field Office Team
- USAID Mission
- Country Supply Chain Leadership
- System Implementation Partners
- Other Donor Organization Teams

How will the Model be used?

Intended Usage

- As guidance to self-evaluate current capabilities & gaps
- As a framework to prioritize capabilities to be implemented based on desired benefits, strategic objectives, and constraints
- As a basis to define system requirements for desired SC capabilities during RFX events and system implementations
- As a tool to develop tailored roadmaps for implementing SCIS

SCISMM – Potential Next Steps

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Forecasting & Planning System	Level 1 - Standardized templates to accumulate monthly demand & supply data - Simple forecasting methods to quantify	Level 2 - Integration to accumulate weekly/monthly data from transactional systems - Collaboration with suppliers and other supply chain players	Level 3 - Multiple forecasting templates and methods - Dynamic Adjustments to refine forecasts regularly	Level 3 - Multi-level hierarchical enterprise planning - Managing planning exceptions - Key measures from other systems to contribute towards planning	Level 4 - Real time planning by integrating with transactional systems - Include supplier capacity details to refine supply planning
Supplier & Contract Management System	Level 1 - Supplier Master Data Management - Manage e-bidding/RfX events through the system and upload supplier responses to the system	Level 2 - Annual/multi-year procurement plans based on forecasts - Manage e-bidding through supplier portal	Level 3 - Supplier portal for suppliers to register - Supplier performance measurement using data from transactional systems	Level 3 - Monitoring for contract expiry, ceiling and notifying automatically - Procurement plan integrated with budgeting	Level 4 - Multiple stocking strategies such as VMI, drop ship - Integration with transactional system to enable real time analysis of supplier data
Procurement System	Level 1 - Capture purchase order in the system close to real time (weekly) - Print POs generated in the system	Level 2 - Use system generated/initiated POs - Product details align with GS1 standards	Level 3 - Integrate with suppliers to send POs electronically - Integrate with financial systems for payment processing	Level 3 - Track PO milestones for better planning - Monitor for exceptions and delays	Level 4 - Integrate with other systems to facilitate forecasting, planning, sourcing etc - Integrate with QMS and WMS for drop shipping etc
Order Management System	Level 1 - Capture re - Print requ	Maturity Roadmap facilitates phased incremental implementation of SCIS			Level 4 - Drop shipping integrating with procurement system - Integration with other systems to facilitate demand and supply planning
Warehouse Management System	Level 1 - Capture de - Manage inventory levels by updating receipts, shipments,				Level 2 - Real-time processing of all warehousing tasks;
Transportation Management System	Maturity Roadmap is tailored to the unique needs and context of different countries				Level 4 - Optimization; consolidation and automated payment
Returns & Recalls System					Level 2 - Adjust inventory manually
Analytics	Level 1 - Analytics performed using transactional systems - Data from transactional systems manually loaded into reporting/analytcs tools (monthly basis)	Level 2 - Aggregation is handled via exports and manually pulling and loading data (weekly basis)	Level 3 - Data pulled into reporting/analytcs tool on a daily basis (at least from key transactional systems such as OMS, WMS and Procurement)	Level 4 - Data Warehouse with standard ETLs and analyze trend across years and slice & dice data	
Interoperability	Level 1 - Use of standardized data such as master data with placeholders for GS1 standards	Level 2 - Master data management and synchronization across systems	Level 3 - EDI integrations supported by GS1 standards such as GTIN, GLN through use of GDSN etc	Level 4 - Continuous monitoring for data quality and any exceptions	
Track & Trace				Level 3 - Ability to track and trace from supplier to health post at a batch level	Level 4 - Ability to track and trace from supplier to patient at a serial number level
Central Medical Stores	100%	100%	100%	100%	100%
Provincial Medical Stores	50%	100%	100%	100%	100%
District/Sub Provincial Stores	25%	50%	75%	100%	100%
Municipality Stores	25%	50%	75%	100%	100%
Health Posts	10%	30%	50%	75%	100%

— The Nepal Example

Approach to Building Nepal SCIS Roadmap

- Used eLMIS initiative to determine the target capabilities that would be introduced based on business requirements for planned implementation
- Evaluated current systems and processes to assess the gap between current and planned
- Evaluated the selected software to understand how these requirements would be addressed
- Began to layout planned future capabilities based on the Maturity Model versus 2017/2018 evaluation
- Assembled the roadmap of capabilities

SCISMM: Nepal Illustration

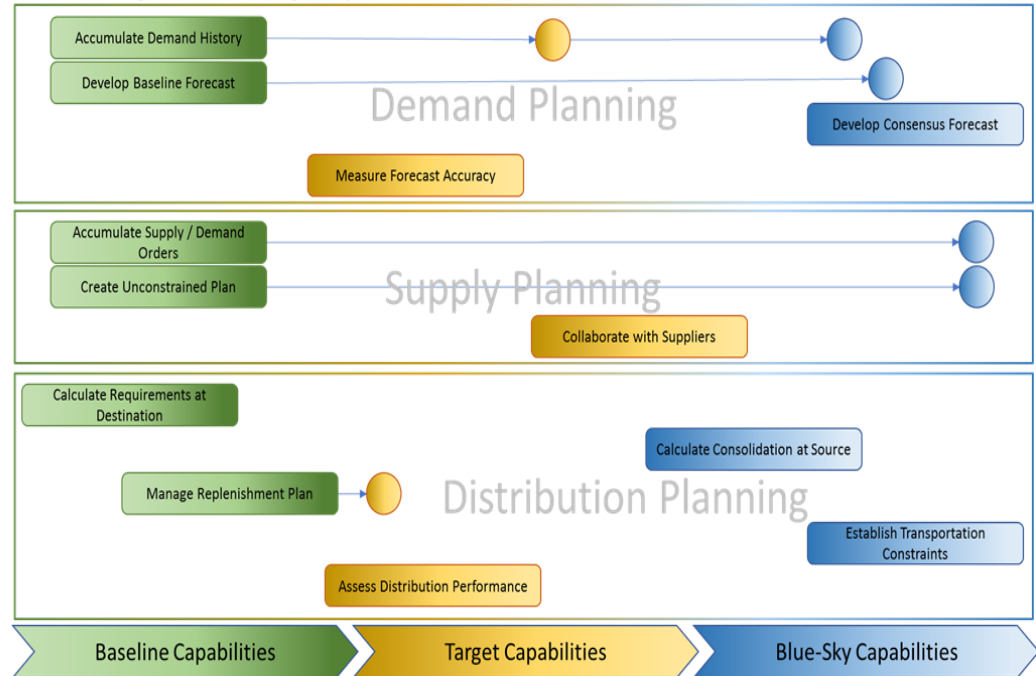
- Identified capabilities from the Maturity Model that were available in the eLMIS system and those planned to be deployed in 2017/2018
- Evaluated the current capabilities (pre eLMIS) to understand how the planned capabilities could be deployed
- Made adjustments based on how much of the gap could be accomplished

	Level 1	Level 2
Maturity Level	Basic Warehousing Operations (Manual, if not automated)	Warehousing Operations through electronic data, barcodes and system managed transactions
Benefits	<ul style="list-style-type: none"> - Improved accuracy of inventory data - Improved inventory control and management 	<ul style="list-style-type: none"> - Reduced manual effort in data entry/capture and processing transactions - Improved data integrity and hence accuracy - Better tracking of inventory (at batch level) - Increased visibility of inventory statuses such as expiring etc
Capabilities	<p>Inbound Processing</p> <ul style="list-style-type: none"> - Capture inbound shipment details including shipment#, item, uom, quantity, and expiration date (at least through upload feature) on weekly basis - Enter or upload received items' details in to the system - Putaway to storage locations through adhoc moves from receiving dock <p>Inventory Management</p> <ul style="list-style-type: none"> - Manually generate cycle counts and provide ability to print cycle count sheets for warehouse personnel to perform counts - Manually generate physical counts and print physical count sheets for the whole warehouse - Manually adjust for count discrepancies - Provide different inventory statuses - Allow ad-hoc inventory adjustments <p>Outbound Processing</p> <ul style="list-style-type: none"> - Perform pick, pack and ship and update the status in the system, manually if not automated - Capture details of outgoing shipment (Requisitions) including Requisition #, products/items, quantities, expiration date and delivery dates (manually, if not automated, within a week of performing the transactions) 	<p>Inbound Processing</p> <ul style="list-style-type: none"> - Capture inbound shipment details including batch details through EDI from the shipping facility/supplier - Receive items through use of barcode scanners - Generate putaway tasks as soon as items are received - Manually assign putaway tasks to warehouse personnel - Generate barcodes for pallets/cases to be used during putaway, storage, picking etc - Define storage/bin locations within the warehouse - Receiving, Staging, QC, Forward Pick, Bulk Pick etc and assign location numbers (GLNs where applicable) <p>Inventory Management</p> <ul style="list-style-type: none"> - Generate cycle and physical counts automatically and print count sheet - Provide ability for supervisors to accept or reject count discrepancies - Track inventory at bin level (location, bin, aisle etc) - Track batch level details <p>Outbound Processing</p> <ul style="list-style-type: none"> - Capture requisition details through EDI - Generate picklists and tasks for warehouse personnel - Print picklists, pack tasks etc - Generate packing labels and print - Generate details of outgoing shipment (Requisitions) including Requisition #, products/items, batch #, expiration date, quantities and delivery dates based on the associated outbound order in the system

Current and Future Capabilities Mapped

- Assemble the current capabilities and assess what future capabilities should be targeted
- Reassess future capabilities based on capacity for change

Forecasting & Planning Capabilities



Establish Priority of Capabilities

- Future capabilities were added to the roadmap based 1st on existing capabilities not yet deployed; 2nd based on need

• Existing

• Need

- Added capabilities throughout the project and limited others
- Will reassess the roadmap frequently to balance with what is actually being completed on the roadmap

Level 2	Level 3
<p>Warehousing Operations through electronic data, barcodes and system managed transactions</p> <ul style="list-style-type: none"> - Reduced manual effort in data entry/capture and processing transactions - Improved data integrity and hence accuracy - Better tracking of inventory (at batch level) - Increased visibility of inventory statuses such as expiring etc 	<p>Realtime Transaction Processing and Automated workflow management for warehouse personnel</p> <ul style="list-style-type: none"> - Real time data provides superior accuracy in inventory visibility and hence decision making - Increased efficiency of warehouse personnel
<p>Inbound Processing</p> <ul style="list-style-type: none"> - Capture inbound shipment details including batch details through EDI from the shipping facility/supplier - Receive items through use of barcode scanners - Generate putaway tasks as soon as items are received - Manually assign putaway tasks to warehouse personnel - Generate barcodes for pallets/cases to be used during putaway, storage, picking etc <p>Inventory Management</p> <ul style="list-style-type: none"> - Generate cycle and physical counts automatically and print count sheets - Provide ability for supervisors to accept or reject count discrepancies - Track inventory at bin level (location, bin, aisle etc) - Track batch level details <p>Outbound Processing</p> <ul style="list-style-type: none"> - Capture requisition details through EDI - Generate picklists and tasks for warehouse personnel - Print picklists, pack tasks etc - Generate packing labels and print - Generate details of outgoing shipment (Requisitions) including Requisition #, products/items, batch #, expiration date, quantities and delivery dates based on the associated outbound order in the system 	<p>Inbound Processing</p> <ul style="list-style-type: none"> - Notify warehouse personnel about the incoming shipment so as to plan for space etc - Receive items through barcode scanners and associate against an existing ASN so as to close the ASN upon complete receipt - Assign putaway tasks to warehouse personnel based on factors such as skill, work load etc <p>Inventory Management</p> <ul style="list-style-type: none"> - Assign counts to warehouse personnel based on work load (randomly for cycle counts) - Integrate through EDI to provide real time process updates on inventory adjustments <p>Outbound Processing</p> <ul style="list-style-type: none"> - Assign picklists/tasks to warehouse personnel - Create shipments and assign carrier information - Publish shipment information to requisition management system and other systems such as reporting and to receiving facilities - Integrated with order management system to provide real time updates regarding the outbound shipment

Nepal SCIS Roadmap

- The roadmap is capabilities (middle) achieved over time (top) across geography or organization (bottom)
- Current Capabilities inform the initial period
- Future periods are the roadmap, frequently reassessed
- Add capabilities for technology as needed

	2018	2019	2020	2021	2022
Forecasting & Planning System	Level 1 - Standardized templates to accumulate monthly demand & supply data - Simple forecasting methods to quantify	Level 2 - Integration to accumulate weekly/monthly data from transactional systems - Collaboration with suppliers and other supply chain players	Level 3 - Multiple forecasting templates and methods - Dynamic Adjustments to refine forecasts regularly	Level 3 - Multi-level hierarchical enterprise planning - Managing planning exceptions - Key measures from other systems to contribute towards planning	Level 4 - Real time planning by integrating with transactional systems - Include supplier capacity details to refine supply planning
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Order Management System	Level 1 - Capture requisition in the system close to real time (weekly) - Print requisitions	Level 2 - Capture and process requisitions real time through the system - Inventory visibility and batch level tracking	Level 3 - Inventory visibility and allocation/reservation - Status tracking and serial number tracking	Level 3 - Monitor for exceptions and delays - Track shipping/delivery status and goods receipt to increase visibility	Level 4 - Drop shipping integrating with procurement system - Integrate with other systems to facilitate demand and supply planning
Warehouse Management System	Level 1 - Capture details of inbound shipments, outbound shipments (weekly) - Manage inventory levels by updating receipts, shipments, adjustments (weekly)	Level 2 - Capture inbound shipments, outbound requisitions through EDI - Real-time processing of all warehousing tasks; - Track bins, aisles, batch #s; bar code scanning	Level 3 - Generate automated picklists, manage task assignment to personnel - Real time updates to OMS and Procurement system		Level 4 - Use of hand held devices for all warehousing tasks - Integrate with other systems to facilitate supply planning, transportation management etc
Transportation Management System				Level 3 - Track transportation status and update other systems such as OMS and WMS - Freight audit and automated payment	Level 4 - Route/Network optimization; consolidation - Real time audit and automated payment
Returns & Recalls System		Level 1 - Initiate returns/recall in the system (within a week of initiating) - Adjust inventory manually	Level 2 - Coordinate returns/recalls through the system by searching for batch numbers	Level 3 - Coordinate returns/recalls with shipping & receiving facilities electronically - Track recalls at serial number level	Level 4 - Link the returns/recalls to the original requisition/PO for traceability
Analytics	Level 1 - Analytics performed using transactional systems - Data from transactional systems manually loaded into reporting/analytcs tools (monthly basis)		Level 2 - Aggregation is handled via exports and manually pulling and loading data (weekly basis)	Level 3 - Data pulled into reporting/analytcs tool on a daily basis (at least from key transactional systems such as OMS, WMS and Procurement)	Level 4 - Data Warehouse with standard ETLs and analyze trend across years and size & dice data
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Keys to Assemble the Roadmap

- Prerequisite capabilities in the physical supply chain must be met in order to consider many of the system capabilities – e.g., managing inventory using a FEFO model is a prerequisite to a system's batch management functions
- Current capabilities include multiple systems to be analyzed
- Later phases include stretch goals that often rely on new technology investments
- Frequently reassess the future targets based on accomplishments

— Feedback and Q&A

— Additional Resources

ABOUT SCOR & APQC

About SCOR

The SCOR® model is the product of the Supply Chain Council (SCC), a global non-profit consortium whose methodology, diagnostic and benchmarking tools help organizations make dramatic and rapid improvements in supply-chain processes. SCC established the SCOR® process reference model for evaluating and comparing supply-chain activities and performance. The SCOR-model captures the Council's consensus view of supply chain management. It provides a unique framework that links business process, metrics, best practices and technology into a unified structure to support communication among supply chain partners and to improve the effectiveness of supply chain management and related supply chain improvement activities. The SCC was organized in 1996 and initially included 69 practitioner companies meeting in an informal consortium. Subsequently, the companies of the Council elected to form an independent not for profit trade association. The majority of the SCC's members are practitioners and represent a broad cross-section of industries, including manufacturers, distributors, and retailers. Equally important to the Council and the advancement of the SCOR model are the technology suppliers and implementers, the academicians, and the government organizations that participate in Council activities and the development and maintenance of the Model. At the time of this release, the Council has approximately 800 corporate members worldwide and has established international chapters in Australia/New Zealand, Latin America, Greater China, Europe, Japan, Southeast Asia, and Southern Africa with additional requests for regional chapters pending.

The Supply-Chain Council is interested in providing the widest possible dissemination of the SCOR model. The wide-spread use of the model results in better customer-supplier relationships, software systems that can better support members through the use of common measurements and terms, and the ability to rapidly recognize and adopt best practice no matter where it originates.

Global companies such as Intel, BASF, GE Oil & Gas and Ingersoll Rand use SCOR model to improve their supply chain efficiencies.

(Source:

1. *Supply Chain Operations Reference Model Version 9.0, Supply Chain Council Inc.*

2. <http://www.apics.org/apics-for-business/customer-stories>

APICS - American Production and Inventory Control Society

About APQC

APQC (American Productivity & Quality Center) helps organizations work smarter, faster, and with greater confidence. It is the world's foremost authority in benchmarking, best practices, process and performance improvement, and knowledge management. APQC's unique structure as a member-based nonprofit makes it a differentiator in the marketplace. APQC partners with more than 500 member organizations worldwide in all industries. With more than 40 years of experience, APQC remains the world's leader in transforming organizations. APQC's Process Classification Framework®(PCF) is the most used process framework in the world. It creates a common language for organizations to communicate and define work processes comprehensively and without redundancies. Organizations are using it to support benchmarking, manage content, and perform other important performance management activities. Organizations such as HP, Royal Philips, Pearson and Children's Hospital of Philadelphia use APQC Process Classification Framework to implement process improvements.

(Source: <https://www.apqc.org/about>)

APQC – American Productivity & Quality Control

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The USAID Global Health Supply Chain-Procurement and Supply Management project provides commodity procurement and logistics services, strengthens supply chain systems, and promotes commodity security. We support USAID programs and Presidential Initiatives in Africa, Asia, Latin America, and the Caribbean, focusing on HIV/AIDS, malaria, and population and reproductive health commodities.