

USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM
Procurement and Supply Management

Technical Report

Supply Chain Information System Assessment Maturity Model Assessment

Ministry of Health (MoH), Guinea

Date: September 2020



Document Revision History

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1. EXECUTIVE SUMMARY

Supply Chain Information System Maturity Model (SCISMM) developed by GHSC-PSM in collaboration with USAID, was intended to be used as an assessment tool to evaluate the maturity status of information systems (IS) implemented in country for the supply chain operation. Outcome of the assessment will support country

1. Score the current operational status of ISs implemented
2. Outline the strength, weakness and opportunities for improvement in country leveraging the ISs
3. Identify improvement roadmap and prioritize activities that would be aligned with the Information System strategy of the country
4. Establish performance indicator for continuous improvement

The SCISMM assessment Short Term Technical Assistance (STTA) was conducted for the duration of August 5 – 21st, 2020 remotely by the PSM team members due to the COVID-19 global pandemic. A 3-phased approach, including pre-trip, on-site and post-trip, was defined for the task execution. Refer to section 3 for the detail.

The scoring diagram on the right summarizes the score of each category based on the answers provided. The score percentage indicates the number of performed operations/activities in comparison to all activities of all four (4) maturity levels in each category.

- Master Data Management: 15%
- Forecasting and Planning: 74%
- Supplier and Contract Management: 34%
- Procurement: 48%
- Order Management: 74%
- Warehouse Management: 67%
- Transportation Management: 63%
- Track and Trace: 24%
- Interoperability: 88%



Refer to section 4 for the detail.

It is strongly recommended that Guinea FO, in cooperation with the SCISMM team, reviews the scoring outcome, establishes the roadmap for improvement and outlines the improvement execution plan in Q1/Q2 of FY21. Brief MoH with the improvement plan at Q3/Q4 of FY21 for concurrence and adjustment then identify activities for the 2022 work plan.

2. INTRODUCTION OF SCISMM

2.1. Background

Since 2016, the Ministry of Health of the Republic of Guinea has embarked on large projects for the automation of its health information system. Regarding the supply chain health products, the projects included the implementation of the electronic LMIS (e-SIGL), the implementation of SAGE L100 at the central medical store (PCG) and the setup of an interoperability infrastructure enabling now data transfer between e-SIGL to DHIS2.

Guinea has made many gains in ICT infrastructures over the past few years. These include achievements in the automation of systems that are operational at many levels of Guinea's Public Health Supply Chain (Sage 100 (WMS), DHIS 2 (HMIS), e-SIGL (eLMIS), Pipeline and Quantimed, etc.) and incorporated an innovative mix of paper-based and technological solutions. While these health information systems have provided improvements in operational efficiencies, they are not all integrated thus limiting the ability to operate the supply chain seamlessly and in a secure way. This also limits the ability to address supply chain issues such as stock outs, overstocking, wastage etc. on a timely fashion. These open issues provide opportunities to further streamline and automate processes from planning to dispensing that will ultimately enable true end-to-end supply chain visibility as well as commodity traceability.

The Supply Chain Information System Maturity Model (SCISMM) will be used to evaluate Guinea's current systems capabilities. Completion of the SCISMM assessment will enable development of a roadmap of information technology investments for the country and establish priorities for further deployment of existing capabilities.

In this ecosystem which evolves both in performance and in complexity, it is necessary to assess the maturity of the information system on the supply chain in order to better align its evolution with the global roadmap of the Ministry of Health.

2.2. SCISMM Introduction

USAID supply chain technical assistance programs heavily invested in information systems as a means of achieving contraceptive security. In FY18, GHSC-PSM developed with USAID the Supply Chain Information System Maturity Model (SCISMM) to meet the needs of countries and technical assistance providers in assessing and implementing standards-based information systems that reflect best practices.

SCIS 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 details information system capabilities in public health supply chains based on the SCOR model and provides a framework for adopting a progressive implementation for supply chain information systems.

The SCISs are organized based on the supply chain operation life cycle such as:

- I. Master Data Management
 - a. Product Master
 - b. Facility/Location Master

- c. Supplier Master
- 2. Strategic Processes
 - a. Forecasting and Planning System category
 - Demand Planning
 - Supply Planning
 - Plan Distribution
- 3. Technical Processes
 - a. Supplier and Contract Management category
 - Sourcing and Contracting Strategies
 - Tender Management
 - Contract Authoring
 - Supplier Information Management
 - b. Procurement System category
 - Procurement Processing
 - Fulfillment Visibility
 - c. Order Management System category
 - Requisitioning
 - Requisition Approval
 - Inventory Visibility
 - Requisition Fulfillment
 - Order Visibility
- 4. Operational Processes
 - Transactional
 - a. Warehouse Management System category
 - Inbound Processing
 - Inventory Management
 - Outbound Processing
 - b. Transportation Management category
 - Route Management
 - Transportation Execution
 - Freight Audit and Payment
 - Exceptions
 - a. Return and Recalls System category

- Return Management
- Recalls Management

2.3. Maturity Levels

SCIS capabilities have been categorized across four maturity levels

1. Maturity levels defined to facilitate phased incremental implementation of capabilities
2. Capabilities within each maturity level grouped to promote stabilization of SC processes before progressing to the next level

3. SCIS ASSESSMENT TASK EXECUTION

The SCISMM assessment Short Term Technical Assistance (STTA) was conducted for the duration of August 5 – 21st, 2020 remotely by the PSM team members due to the COVID-19 global pandemic.

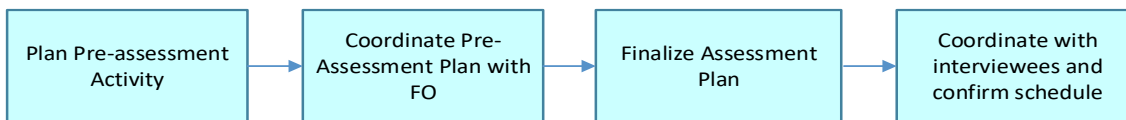
As part of this remote STTA, the TA provider will support the Assessment of the supply chain systems' maturity using Supply Chain Information System Maturity Model v0.8 (SCISMM) and develop overall system evolution roadmap with the Field Office to establish an SCIS improvement strategy to share with the MoH moving forward.

3.1. Process of TA Execution

To perform a thorough assessment, the TA provider shall manage the task through a three (3)-phased approach to effectively and efficiently perform the assessment TA within the time allotted.

The 3-phased approach include, pre-trip, on-site and post-trip. Followings are the process flow depicts the activities of each phase

3.1.1. Pre-Trip process and activity

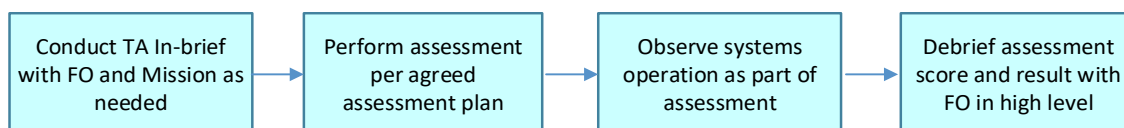


The activities of the pre-assessment plan shall include but are not limited to:

1. Identify document for pre-reading such as the National MIS Strategy or National Supply Chain Operation Strategy
2. Confirm the scope of assessment, primary focusing on the National level SCIS operation.
3. Identify and confirm interviewee candidate(s) from MoH and/or GHSC-PSM or other Implementing Partners (IPs) if applicable
4. Propose interview schedule for confirmation in terms of activities, schedule (date/time), location, interviewees and observation of system operation.
5. Confirm schedule for observing system operation.
6. Plan for in-brief and out-brief if applicable

All activities summarized above required support from the MIS team of field office for finalization

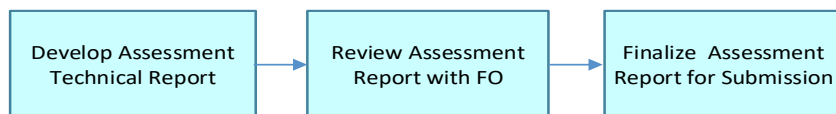
3.1.2. On-Site process and activity



The physical on-site activities were conducted remotely. Same activities were resumed in accordance with the agreed plan.

1. During the in-brief, reconfirm of the assessment plan is needed to ensure the availability of the interviewees and location. Should a change required, TA provider shall rearrange the activities to optimize task execution during the on-site period.
2. Due to the language difference, translation to documentation and or conversation may need to be arranged in advance.
3. During the assessment period, ambiguous questions shall be highlighted for later review. The answer shall be toward the negative position as this will allow the improvement recommendation to be identified.
4. Purpose of the observation of system operation is to confirm the interview answer is consistent with the actual system operation as it can provide the insights for possible system functionality enhancement (e.g. via configuration or development) and/or strengthening of standard operating procedures (SOPs) to be align with the systems.
5. De-brief with FO and or the Activity Manage of USAID in country would be optional depending on the availability and request from both entities. However, an out-brief to the Country Director is strongly recommended if time permits.

3.1.3. Post-Trip process and activity



1. Main purpose of the post-trip activity is to develop the assessment technical report.
2. Upon the submission of final assessment technical report, a de-brief to USAID backstop in Washington DC would be optional. PMU would have the final decision.

3.2. Approach

The GHSC-PSM MIS team lead will use the latest version of USAID SCISMM, provide remote support to the country for this assessment and deliver the expected results.

The GHSC-PSM Guinea FO team will provide field coordination and facilitation to:

1. Identify key local stakeholders
2. Identify the main local actors capable of providing the information requested during the evaluation
3. coordinate the organization of online meetings with local stakeholders at the request of the TA provider

4. to carry out the necessary translations and restitution in both directions for more visibility and better appropriation of the results of the intervention by local actors

The methodology for executing the assessment are:

1. Review relevant documents
2. Interview operational candidates
3. Observe system operation

With the combination of the three (3) methods, the more objectives conclusion can be captured in order to achieve a fair outcome for a more a realistic score evaluation.

Due to the COVID-19 instance during the assessment schedule, a remote assessment was done. Only the e-SIGL system operation was observed.

3.3. Participants

Table below summarizes the participants of the SCISMM assessment in terms of name, organization and job title

Table 1: Participants of the Assessment

Id	Name	Organization	Job Title
1.	Dr. Kalivogui Joseph	Malaria Program	PSM Specialist MNCP
2.	Dr. Adama Keita	PCG	Head of the Distribution Unit PCG
3.	Fabou Koulibaly	MoH IT Unit	IT Specialist
4.	Serge P. N'Guessan	GHSC-PSM Guinea FO	Senior MIS Advisor
5.	Dr. Dantouma Keita	GHSC-PSM Guinea FO	Technical Advisor
6.	Jamal Sayess	GHSC-PSM HQ	Senior MIS Advisor
7.	Swaroop Jayaprakash	GHSC-PSM HQ	Senior System Architect
8.	Jean Miller	GHSC-PSM HQ	MIS Lead

3.4. Schedule

Table below lists the assessment schedule in terms of date/time, assessment category focus and participants.

Table 2: Assessment Execution Schedule

Id	Date and Time	Activity	Participants
1.	8/12/2020 2:00-3:00 PM Guinea time	Assessment kickoff meeting	<u>MOH:</u> <ul style="list-style-type: none"> • Dr. Kalivogui Joseph • Dr. Adama Keita • Fabou Koulibaly

Id	Date and Time	Activity	Participants
			GHSC-PSM Guinea Field Office: <ul style="list-style-type: none"> • Serge P. N'Guessan • Dr. Dantouma Keita GHSC-PSM TA provider: <ul style="list-style-type: none"> • Jamal Sayees • Swaroop Jayaprakash • Jean Miller
2.	8/17/2020 2:00-4:00 PM Guinea time	Assessment Topics – Warehouse Management, Transportation Management	MOH: <ul style="list-style-type: none"> • Dr. Adama Keita GHSC-PSM Guinea Field Office: <ul style="list-style-type: none"> • Serge P. N'Guessan • Dr. Dantouma Keita GHSC-PSM TA provider: <ul style="list-style-type: none"> • Jean Miller
3.	8/18/2020 2:00-4:00 PM Guinea time	Assessment Topics – Forecasting and Supply Planning, Supplier and Contract Management, Procurement, Order Management	MOH: <ul style="list-style-type: none"> • Dr. Kalivogui Joseph GHSC-PSM Guinea Field Office: <ul style="list-style-type: none"> • Serge P. N'Guessan • Dr. Dantouma Keita GHSC-PSM TA provider: <ul style="list-style-type: none"> • Jean Miller
4.	8/19/2020 2:00-4:00 PM Guinea time	Assessment Topics – Master Data Management, Interoperability, Track and Trace	MOH: <ul style="list-style-type: none"> • Fabou Koulibaly GHSC-PSM Guinea Field Office: <ul style="list-style-type: none"> • Serge P. N'Guessan • Dr. Dantouma Keita GHSC-PSM TA provider: <ul style="list-style-type: none"> • Swaroop Jayaprakash • Jean Miller
5.	8/24 - 26	Clarification on questions and answers	GHSC-PSM Guinea Field Office: <ul style="list-style-type: none"> • Serge P. N'Guessan • Dr. Dantouma Keita GHSC-PSM TA provider: <ul style="list-style-type: none"> • Jean Miller

4. OUTCOME OF ASSESSMENT

4.1. MIS Landscape

Diagram below illustrates the information systems landscape operated in country. It outlines the data entrance method and integration and data exchange method among DHIS2 (Health Management Information System) and e-SIGL (Logistic Management Information System) as well as the standalone systems for warehouse management (Sage L100), Forecasting (Quantimed) and Supply Planning (Pipeline).

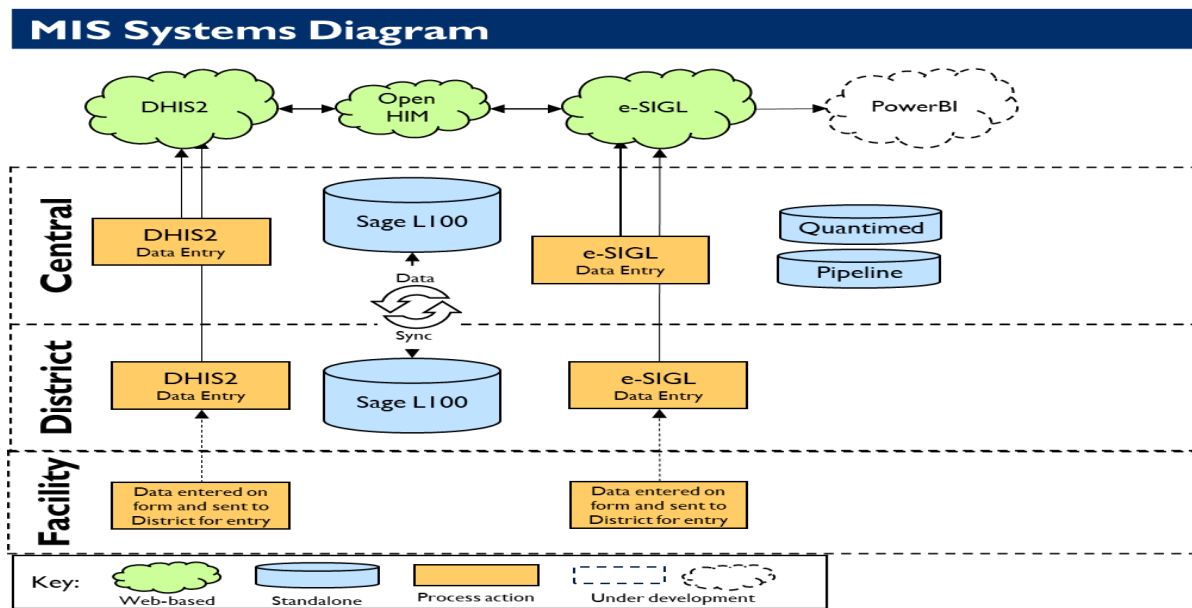


Figure I: MIS Landscape in Guinea

4.2. Assessment Score

The configuration, integration and operation of the ISs showing above is the primary objective of the assessment.

The dashboard shown on the right summarizes the score of each category based on the answers provided. The score percentage indicates the number of performed operations/activities in comparison to all activities of all four (4) maturity levels in each category. Refer to the

Per responses gathered from the Guinea team, the score of each SCIS category is:

- Master Data Management: 15%
- Forecasting and Planning: 74%

- Supplier and Contract Management: 34%
- Procurement: 48%
- Order Management: 74%
- Warehouse Management: 67%
- Transportation Management: 63%
- Track and Trace: 24%
- Interoperability: 88%

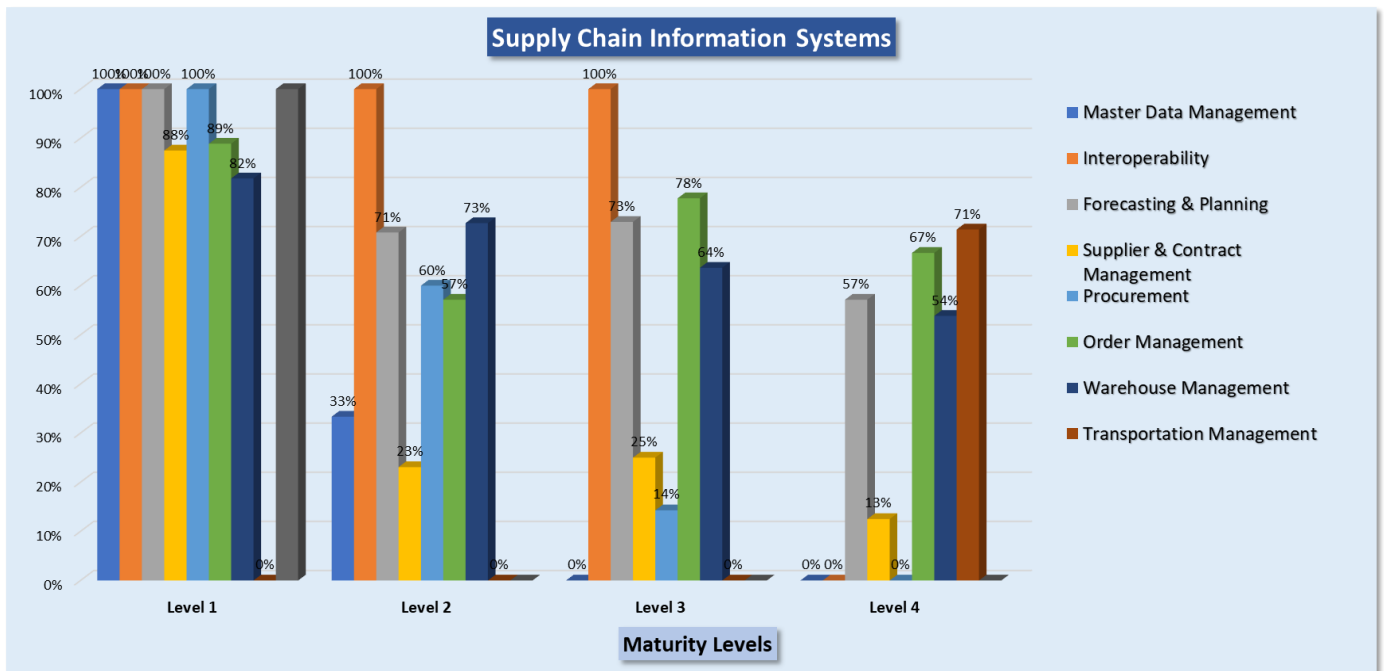


Method of score calculation:

The total number of questionnaire answered with “Yes” of the supply chain category / Total number of questionnaires listed of the supply chain category. For example, the total number of questionnaires with “Yes” answered of Master Data Management category was 2 and the total number of questionnaires of the Master Data Management was 13. Thus $2/13 = 15\%$

4.3. Activity Performance Landscape

The diagram below depicts the performance of activities of each maturity level within each Supply Chain category. The percentage of each level indicates the percentage of total performed activity(ies) (e.g. answered with “Yes”) of that level of a designated category. Using the Master Data Management category as an example, there is one question of level 1, and the answer was “Yes” to the question, therefore, a 100% score was given.



4.4. Score Analysis and Observation

The master data management received the lowest score (15%) and following the Track and Trace (24%). Main reason of the low scoring is due to the incompliance of the GSI/GTIN practice. The questionnaire emphasizes the importance of GSI/GTIN practice for the product, facility and location codes.

Interoperability category scores highest as there is standard product, facility and location codes used across the existing information systems despite the codes are not GSI/GTIN compliant. There are data interfacing mechanisms established. The OpenHIE platform has been successfully implemented between e-SIGL and DHIS2 through an operational interoperability layer to support the data exchanges, analysis and reporting requirements for the programs. To support the national supply chain operation, expansion of the OpenHIE integration and interoperability to other applications would be required including master data standardization.

Supplier and Contract Management score low (34%) ... Currently, the drug acquisition process is not clearly defined. The central purchasing body PCG stocks drugs, but these are mainly purchased by a cabinet of the Ministry of Health. However, the PCG does perform some purchase of products and enter information into SAGE, but this is marginal.

Basic procurement processes (48%) are manually managed. The WMS (Sage L 100) system is operating in a standalone mode, no interface established with the e-SIGL system where is the source of the order information. Purchase orders are entered into SAGE system and linked afterward to reception documents.

Both Forecasting and Planning and Order Management achieve high score of 74% due to the stable operation of the e-SIGL (LMIS) system.

With the constantly improving e-SIGL system for last 4+ years, the e-SIGL system captures the requisition and reporting information from majority of health facilities monthly for all major health programs in country, e-SIGL offers high quality and predictable requisition, fulfillment and order data for forecasting and supply planning.

4.5. Lessons Learned

During the assessment, lessons learned were also identified via the observation of the questions and answers discussion which will be leveraged as a continuous improvement recommendation for the assessment operation in the future,

1. Difficult for remote Q&A assessment session due to limitation and constraint of internet stability and availability of staff. Interview sessions sometimes can't perform as scheduled.
2. Language challenge, the questionnaire was written in English with specific technical terminologies which creates difficulty for translation on the spot. A translated SCISMM questionnaire to be shared with the interviewees would be helpful to obtain a better response.
3. Questions with multiple conditions and ambiguous questions that can be interpreted with various situations created confusion to determine what answers should be.
4. Answers received from the interview assessment are subjective opinion of interviewees. Observation to system operation would be accommodation for confirmation.
5. Responses to the GSI/GTIN capability and compliance questionnaires are in general no. However, country does implement standard product, facility and location codes and used among

all information systems for data sharing to promote interoperability. Reassign GSI/GTIN compliance to higher level of maturity could offer credibility of existing operation and set target for compliance when the IS operation achieve certain objectives and stability in country.

5. APPROACH TO BUILDING A STRATEGICAL IMPROVEMENT ROADMAP

Upon acceptance of the assessment technical report, the TA provider will work with the representative of the FO to establish an SCIS improving roadmap. Activities may include but are not limited to:

1. Evaluate current systems and processes to assess the gap between current and planned
2. Propose future target capabilities based on the current SCIS Maturity Model assessment
3. Establish priority of capabilities
 - Establish baseline of the defined KPI of high prioritized supply chain category
4. Assemble the roadmap of capabilities
 - Assemble the current capabilities and assess what future capabilities should be targeted
 - Reassess future capabilities based on capacity for change
5. Identify targeted goals/objectives of each level of high prioritized supply chain category
6. Establish progress review schedule with FO for status and progress evaluation and continuous improvements to achieve the goals/objectives

Table 3: Sample of Continuous Improvement Roadmap

	2018	2019	2020	2021	2022
Forecasting & Planning System	Level 1 - Standardized templates to accumulate monthly demand & supply data - Simple forecasting method 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 - Multilevel hierarchical strategic 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, colling and notifying automatically - Procurement plan integration with budgeting	Level 4 - Multiple stocking strategies such as VMI, drop ship - Integration with transactional systems 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 OMS and WMS for drop shipping etc.
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/lot 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 systems - Integration 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/lot, 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	Level 4 - Route/Network optimization, consolidation - Freight audit and automated payment
Returns & Recall System		Level 1 - Capture details of returns/recalls in the system (within week of initiating) - Adjust inventory manually	Level 2 - Initiate 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 & hard/soft data export 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 trends 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 GTN, GLN	Level 4 - Continuous monitoring for data quality and any exceptions through use of GS1Net
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	30%	30%	50%	75%	100%

Attached is the final version of the SCISMM with assessment answers for Guinea.



Supply Chain Information Systems

6. QUESTIONNAIRES WITH ANSWERS OF SCISMM

Note: questionnaires highlighted in red are questionable and or ambiguous questions which are suggested for improvement by the country team.

6.1. Questions and Answers of the Master Data Management category

Master Data Management								
	Level 1		Level 2		Level 3		Level 4	
Maturity Level	Standardized common list of products available across supply chain levels		Common master data system available to be reference across supply chain levels		Integrated systems with GS1 identifiers and attributes assigned to products and facilities		Master data systems integrated with GDSN	
Benefits	Easier tracking and reporting of transactions with the same product identifier used across all transactions		Enhanced master data quality enabling fewer exceptions and broken references		Integrated master data eliminating data duplication and ensures data consistency		Single source of product data avoiding master data redundancy and confusion across the entire supply chain	
Capabilities	Product Master	Y/	Product Master	Y/	Product Master	Y/N	Product Master	Y/N
	- Product master (list of items) commonly recognized across all supply chain levels (could be stand-alone managed manually)	Y	- A common product master system such as a national registry or product information management (PIM) system that is GS1 compliant, is available - Product related data from agencies such as Drug Regulatory Authority is manually linked with product master either through data upload or data entry to ensure regulatory requirements are	N N	- All products have GTINs and GS1 attributes in the product master (uploaded or maintained manually) - Product master is integrated with systems of agencies such as Drug Regulatory Authority (DRA) to ensure products being procured are registered	N N	- Country level product master/registry is integrated with GDSN product data pool provider to create and update product information - County level product master/registry is synchronized with DRA systems to add attributes specific to country regulatory requirements etc	N N
	Facility/Location Master	Y/	Facility/Location Master	Y/	Facility/Location Master	Y/N	Facility/Location Master	Y/N
			- Facility master data managed manually and the same data is referenced across all systems within the supply chain (through manual data sharing)	Y	- Facility master integrated with a common facility master database that includes GLNs for all in-country facilities including ship-from and ship-to	N	- Facility master integrated with GDSN data as well as product master to capture GLNs specific to manufacturer locations in addition to GLNs for in-country facilities	N
	Supplier Master	Y/	Supplier Master	Y/	Supplier Master	Y/N	Supplier Master	Y/N
					- A common list of suppliers (name and id) and supplier details such as address, manufacturing and pick up locations are maintained by uploading data or manually entering data	N	- Supplier portal available where suppliers can add or update details upon contracting - GLNs linked to supplier/manufacturer locations within supplier master	N N

6.2. Questions and Answers of the Forecasting and Planning System

Forecasting & Planning System						
Level 1	Level 2	Level 3	Level 4			
Maturity Level	Basic Forecasting (Quantification), Supply Planning (netting of forecast against	12 Month Rolling Forecast, with integrated Supply Plan, and Multi-level (hierarchical)	Collaborative Demand Management, with Advanced Supply Chain Planning	Advanced Demand Management (with advanced algorithms and consensus managed		
Benefits	<ul style="list-style-type: none"> - Improved forecast accuracy - Improved visibility to future net requirements - Improved visibility to stockout conditions - Inventory availability-driven distribution plan 	<ul style="list-style-type: none"> - Further increased forecast accuracy - Reduced inventory levels - End-to-end visibility of supply actions to be taken - End-to-end visibility of future stockout conditions - Automation of plan execution (planned purchase and planned transfer orders) 	<ul style="list-style-type: none"> - Further increased forecast accuracy - Reduced inventory levels - Exception-based planning activities - Near real-time planning of all supply chain activity 	<ul style="list-style-type: none"> - Alert and exceptions reported with actionable messages to prevent/correct supply chain disruption - Product lifecycle management for smoother new product introduction and product retirement - Lower total cost of ownership in the end-to-end supply chain 		
Capabilities	<p>Demand Planning</p> <ul style="list-style-type: none"> - Usage/consumption/dispense activity is accumulated manually on a monthly basis for reporting purposes - Consumption is separated manually from other forms of usage, including expiry, inventory adjustments (loss), and recalls/defectives - Consumption is captured by location (central, provincial and local locations) - Basic product/item information such as item identifier and description is used in planning, and is consistent across other transactional systems - Products' (generic) and associated manufacturer specific items' Unit of measure is translated manually to a forecast unit of measure - Annual demand data is used to manually calculate a simple forecast, last year's usage equals next year's forecast (quantification) - The forecast (in format such as xls) is reviewed and agreed upon by supply chain stakeholders - Forecast is published manually (xls files through emails) for use in downstream planning processes - Actual demand is captured manually to calculate forecast accuracy - Forecast accuracy measures are published manually for use in downstream planning processes, such as inventory replenishment planning and stocking policies <p>Supply Planning</p> <ul style="list-style-type: none"> - Supply planning data including forecast demand, available supply, and scheduled receipts are captured manually - All unfulfilled actual orders and forecasted demand are captured manually for each location - All on-hand and in-transit inventories and purchase order scheduled receipts are captured manually for each location - Actual demand and forecast are compared manually with available supply and scheduled receipts - Net requirements are calculated manually to determine resupply quantities - Planned purchases are created manually based on net requirements and published manually procurement systems/teams <p>Plan Distribution</p> <ul style="list-style-type: none"> - Incoming supply is determined manually from an annual procurement plan - Distribution requests to higher supply chain levels are created manually using a min/max replenishment model 	<p>Demand Planning</p> <ul style="list-style-type: none"> - Usage is captured in a transaction system and reported through the system - Usage can be accumulated in any time bucket, e.g., daily, weekly, monthly (preferably daily but weekly at minimum) - Three years of demand data is maintained in all applicable systems - Product information captured in the system includes product attributes such as product family, category, UNSP SC - Demand data can be loaded into a forecasting tool - Forecasts are created in the system using monthly bucketed demand history - The forecast horizon can be set in the system to produce an extended forecast in monthly buckets - A 12 month rolling forecast can be calculated each month in the system - Simple forecasting algorithms can be applied using the system, such as simple moving average, weighted moving average, and first and second order smoothing - Product, service and supply chain stakeholders review and suggest adjustments in the system to the baseline forecast using qualitative information - Stakeholders approve the forecast in the system - System uses forecast accuracy measures to determine appropriate forecasting algorithm - Forecast accuracy is automatically calculated in the system <p>Supply Planning</p> <ul style="list-style-type: none"> - Demand and supply planning data is loaded into a supply planning template presenting time series data in a horizontal plan - System calculates net requirements against available and/or scheduled resupply using actual or forecast demand - Planned orders are scheduled based upon supplier lead time - Supply plan can be adjusted in the system based on changes in supply conditions - System determines next actions needed in the supply chain to correct or prevent availability problems <p>Plan Distribution</p> <ul style="list-style-type: none"> - System can determine future distribution requirements to calculate requirements at the destination based on supply plan containing forecast demand for each location - System can incorporate known resupply requirements based on min/max replenishment model - System monitors replenishment model and stocking levels with changes in the 12 month rolling forecast and changing forecast accuracy measures - System provides a consolidated view of planned shipments to minimize transportation cost - System can use forecasted demand to calculate inventory turns - Distribution costs are captured in the system for budget planning 	<p>Demand Planning</p> <ul style="list-style-type: none"> - Demand data is accumulated and loaded into a demand management tool - Demand data is analyzed for outliers and actions are taken to smooth demand data where anomalies are identified - Demand history adjustments are captured and preserved - Demand history can be analyzed across geographic or product hierarchies - Some advanced forecasting models are used for calculating trend, seasonality, intermittent demand and other time-series conditions, e.g., multiple exponential smoothing techniques, Holt-Winters, Box-Jenkins - Apply best-fit analysis or Bayesian modeling to determine forecasting algorithm - Flexible time buckets and units of measure - A formal collaborative forecasting processing is in place with a monthly cycle of baseline forecast publish, collaboration partner forecast adjustments and consensus forecast development and approval - Adjustments to the forecast are captured with reasons for the adjustment captured and recorded - Forecast adjustments are measured against actual demand to determine the forecast adjustment accuracy, by collaboration partner - Use forecast accuracy to calculate best-fit forecasting algorithm - Determine forecast accuracy by collaboration partner - Use lead time offsets to determine forecast accuracy through the cumulative lead time <p>Supply Planning</p> <ul style="list-style-type: none"> - Allow for multiple planning templates to facilitate simulation - Allow adjustments to the loaded data to move supply or demand - Calculate inter-unit distribution supply in a multi-level, hierarchical enterprise planning tool - Plan Supply Chain, Plan Source and Plan Deliver in the same template - Identify planning exceptions of late supply to actual demand versus forecast demand - Measure plan accuracy based upon planning exceptions - Enable planners to own specific elements of the plan and resolve exceptions - Enable plan simulations with alternate solutions - Measure plan accuracy across multiple plan simulations to select the best plan - Publish planned purchase orders to suppliers - Collaborate with suppliers allowing the supplier to adjust planned orders based upon supplier constraints - Adjust the supply plan based upon commitments from the supplier for actual and planned orders <p>Plan Distribution</p> <ul style="list-style-type: none"> - From the multi-level supply plan, anticipate receipts - Planners orchestrate the supply chain to solve anticipated shortages throughout the supply chain - From the multi-level supply plan, anticipate shipments - In-country suppliers are integrated into the distribution plan for drop-shipments to lower echelon distribution centers - Establish routing monitoring of replenishment levels - Anticipate stock changes with product replacements and new products - Anticipate short supply and plan for redistribution of materials - Transportation constraints are considered in the distribution plan - Transportation management systems can be leveraged to consolidate shipments - Perfect order fulfillment is measured, including on-time, right product, right quantity, right quality - Order cycle time and delivery lead time variability contribute to replenishment model planning - Inventory utilization reporting contributes to replenishment model planning 	<p>Demand Planning</p> <ul style="list-style-type: none"> - Demand data can be transferred between products to facilitate product lifecycle management - Product life cycle profiles are maintained for applying to new product forecasts - Causal factors are identified and data is accumulated for use in advanced forecasting techniques - Regression forecasting techniques with multiple causal factors - Real-time Operations Planning enables continuous collaboration and consensus forecast management - Multiple demand scenarios can be maintained - Proportional contribution to the consensus forecast based on collaboration partner accuracy - Measure forecast performance to drive continuous forecast accuracy improvements <p>Supply Planning</p> <ul style="list-style-type: none"> - Enable real-time operation planning with adjustments to the model based on actual supply chain activity - Capture supplier capacity in the supply plan - Create planning exceptions based upon supplier capacity violations - Electronically communicate changes to existing purchase orders and new planned purchase orders <p>Plan Distribution</p> <ul style="list-style-type: none"> - Integrate with the transportation planning system to anticipate receipts - Prioritized demand will redistribute supplies based on customer requirements - Integrate with the transportation planning system to plan shipments - Suppliers are integrated into the transportation plan - The replenishment model shows less utilization as anticipated requirements are delivered based on planned distribution to meet forecasted requirements - Fully integrated to transportation management system to manage constraints and optimize the distribution plan - Measure distribution responsiveness - the consistent speed of providing products to customers - Measure agility - response to changes in demand, correction of supply problems - Measure all cost components of operating the distribution network 		

6.3. Questions and Answers of the Supplier and Contract Management

Supplier & Contract Management System								
	Level 1		Level 2		Level 3		Level 4	
Maturity Level	Basic system to manually capture supplier and contract information		System driven sourcing and contract management processes		Automated sourcing and contracting process through workflow management		Integrated and collaborative system facilitating system driven end-to-end sourcing and contracting process	
Benefits	<ul style="list-style-type: none"> - Sourcing and contract details captured in the system for future reference and analysis - Streamlined processes for sourcing and contracts 		<ul style="list-style-type: none"> - System driven contract authoring reduces manual effort and any opportunities for human errors - Improved data accuracy and integrity 		<ul style="list-style-type: none"> - Increased visibility of sourcing and contracting processes - Analytical capabilities facilitate better decision making 		<ul style="list-style-type: none"> - Collaborative sourcing improves supply visibility - Enhanced supply chain agility with multiple sourcing strategies - Use of standardized data improves operational efficiency 	
Capabilities	Sourcing		Sourcing		Sourcing		Sourcing	
	- Annual procurement plan is developed from the quantification forecast and is uploaded into the system	Y	- Annual Procurement plan, developed using the system, is used to identify items currently under contract and any new sourcing/contracting requirements	N	- Procurement plans are used to establish budgets and ceilings across various suppliers within the system	N	- Multiple sourcing strategies are available in the system to choose from including stocking, direct-drop, VMI, consigned stock and Marketplace solutions	N
	- The annual procurement plan is netted against available supply to determine purchases to be made for the year, manually	Y	- Product details and specifications are captured in the system based on GSI standards and validated against Drug Administration product registrations etc	N	- Individual procurement plans are produced adhoc from the 12 month rolling forecast for items requiring new contracts	N	- Supplier relationship management forms a collaborative sourcing model with participation from suppliers, manufacturers and marketplace providers	N
	- New purchase requirements from the annual procurement plan are manually entered/uploaded into the system	Y	- Supply planning process at a country level as well as at each supply chain level is managed within the system to determine sourcing requirements	N	- New contracting requirements are requested through eProcurement, with specifications for the procurement in the request	N	- Warehouse/Facility/End consumption driven replenishment planning is engaged to determine sourcing needs based on demand, lead time, distribution costs and other factors	N
	- Product/service specifications are gathered from the organization and each facility/store needs are determined and captured in the system manually	Y	- Expiring contracts are monitored for new sourcing requirements	N	- Multi-year forecasting within the system is used to determine sourcing requirements	N		
	- Based on stocking levels and demand, sourcing requirements are determined manually using the annual procurement plan	N			- Contracts are automatically validated against budget and ceiling requirements	N		
	Tender Management & Contracting		Tender Management		Tender Management		Tender Management	
	- Contracts or Purchase Orders are developed outside the system and uploaded to a system for tracking supplier commitments	Y	- Standard contract templates that can be used for different contract types such as FFP, IDIQ, or BPA, are defined and maintained in the system	N	- Standard contract templates are customizable	Y	- System capable of coordinating with suppliers and procurement & risk teams (through portals) for contract reviews, approvals and electronic signatures	N
	- RFx events are managed outside the system, but the event details, supplier responses and award details are uploaded into the system	Y	- Standard templates applied while authoring various contracts using the system	N	- History/Audit of contract changes and approvals are maintained in the system	Y		
			- Contract approvals and signatures are tracked in the system but manually managed by signing printouts or pdfs and uploading into the system	N	- Contracts processing workflow to manage reviews and approvals available in the system	N		
			- Details of supplier, items, multiple prices, ceiling, period of performance etc are captured as part of the contract	N	- Contract addendums for any modifications to the contract are managed within the system	N		
			- Contract addendums for any contract changes are managed outside the system and uploaded as part of the original contract	N				
	Supplier Information Management		Supplier Information Management		Supplier Information Management		Supplier Information Management	
	- Supplier master data such as supplier name, address, sites etc are manually entered or uploaded into the system	Y	- Data such as addresses, data formats, mandatory data etc are validated for data integrity	N	- Supplier portal available for suppliers to register and provide supplier master data	N	- Product and supplier master data integrated with other transactional data such as orders and shipments for automated KPIs and performance analysis.	N
			- Supplier master data is managed in the system	N	- Spend analysis by product category, available	N	- Integrated with other systems such as Procurement, Order Management and Financial Systems to propagate supplier information required in order processing, and payment processing	Y
			- Transactional data related to purchasing, supplier deliveries and quality metrics are uploaded into the system to facilitate supplier performance analysis	N	- Uploaded transactional data such as Total value ordered by suppliers, Total volume by suppliers, seasonality, and price are analyzed in the system to explore strategic sourcing or consolidation opportunities	N	- A formal supplier rating system is in place with suppliers are alerted to performance exceptions	N

6.4. Questions and Answers of the Procurement System

Procurement System									
Level 1		Level 2		Level 3		Level 4			
Maturity Level	Basic procurement processes manually managed		Procurement process managed through the system		Automated procurement process workflows		Integrated system to facilitate automated processes		
Benefits	<ul style="list-style-type: none"> - Better visibility of supply - Higher quality data exchanged with suppliers/manufacturers minimizing errors 		<ul style="list-style-type: none"> - Reduced manual effort in data entry/capture and processing transactions - Improved data visibility 		<ul style="list-style-type: none"> - Direct integration with suppliers eliminates incorrect data issues - Standardization of data minimizes confusion and improves operational efficiencies 		<ul style="list-style-type: none"> - Improves supply chain agility by providing multiple ways of fulfilling demand - Enhances end to end supply chain coordination thus eliminating stock 		
Capabilities	Procurement Processing		Procurement Processing		Procurement Processing		Procurement Processing		
		Y/N		Y/N		Y/N		Y/N	
	- Basic details of purchase order captured in the system through manual data entry on a weekly basis	Y	- Purchase orders are captured directly in the system on a real time basis	Y	- System based PO workflow management available to coordinate multiple approvals and rejections	N	- Integrated with OMS to facilitate automated direct drop shipping for requisitions that cannot be fulfilled from stock in medical stores/facilities	N	
	- Unique PO number generated	Y	- PO progress tracked manually	Y	- POs sent to suppliers via EDI	N	- Integrated with WMS to trigger replenishment POs depending on min-max rules, inventory levels, buffer stock requirements etc	N	
	- Product master (list of items) to select items from is available and is commonly recognized across all suppliers and supply chain levels (could be stand-alone managed manually)	Y	- Product master aligns with GS1 standard to accommodate GTIN and other standard product attributes	N	- Integrated with GDSN or similar for product master	N	- PO information electronically shared with other MIS such as financial systems for payment processing, WMS for inbound visibility etc	N	
	- Facility Master available to choose standard ship to locations	Y	- Facility master aligns with GS1 standard to accommodate GLN etc	N	- Order modification logs/audits captured	N	- Automated notifications sent to authorized personnel for any process exceptions	N	
	- PO validated for data integrity, data formats, mandatory data etc.	Y	- Basic workflow available to review and approve/reject POs	Y	- Exception management in place to identify process exceptions and allow for reprocessing	Y			
	- POs printable to be sent to suppliers/manufacturers	Y							
	- Supplier/manufacturer invoices uploaded to the system	Y							
	- Processed supplier payment details captured in the system	Y							
	Fulfillment Visibility	Y/N	Fulfillment Visibility	Y/N	Fulfillment Visibility	Y/N	Fulfillment Visibility	Y/N	
					- Different milestones of the PO captured along with timestamps to facilitate automated calculation of KPIs such as cycle times, lead times etc	N	- Order and inbound shipment information electronically shared on a real time basis with other systems such as forecasting and planning to facilitate supply planning	N	
					- Integrated with suppliers via EDI to accept modifications and status updates for POs and inbound ASNs.	N			

6.5. Questions and Answers of the Order Management System

Order Management System								
	Level 1		Level 2		Level 3		Level 4	
Maturity Level	Basic Requisitioning & Fulfillment (Manual, if not automated)		System driven Requisition capture & Fulfillment		Predictable Requisition Processing & Fulfillment		Advanced Inventory Visibility & Exception Management	
Benefits	<ul style="list-style-type: none"> - Better visibility of requisitions/demand - Better data integrity and quality 		<ul style="list-style-type: none"> - Reduced manual effort in data entry/capture and processing transactions - Improved data integrity and accuracy 		<ul style="list-style-type: none"> - Better workflow management and auditing of user/approver actions - Enhanced visibility of inventory - Demand driven inventory management - Enhanced exception management - Increased visibility of fulfillment processes facilitating better exception management 		<ul style="list-style-type: none"> - Better Budget control through direct linkage to Requisitioning - Improved inventory utilization - Improved exception resolution 	
Capabilities	Requisitioning	Y/N	Requisitioning	Y/N	Requisitioning	Y/N	Requisitioning	Y/N
	- Basic details of requisitions captured on a weekly/periodic basis	Y	- Requisitions captured real time through the system	Y	- Delivery estimates provided based on the chosen item lead times and shipping facility	Y	- Capable of capturing and processing Requisitions for non-catalog products	Y
	- Product master (list of items) commonly recognized across all supply chain levels (could be stand-alone managed manually)	Y	- Product master is GS1 compliant and integrated with a common product master system such as a national registry or product information management (PIM) system	Y	- System based Requisitions workflow management available to coordinate approvals and rejections	Y	- Requisitions validated automatically against available budget/funds	Y
	- Unique requisition numbers assigned	N	- Visibility to at least the inventory in primary fulfillment location provided during Requisition capture.	Y	- Facility master integrated with a common facility master database that includes GLNs for all facilities including ship-from and ship-to	Y	- Visibility to future inventory provided during Requisition capture	Y
	- Requisitions validated for data integrity, data formats, and mandatory data	NA	- Requisition approval performed in the system	Y	- Products have GTINs and other GS1 attributes and standard codes	Y	- Capable of scheduling Requisitions based on promised/requested delivery dates and based on inventory availability including future inventory	Y
	- Requisition approvals tracked in the system manually	Y			- Visibility to inventory across all fulfillment locations provided during Requisition capture.	Y		
	- Inventory visibility provided through manual reports	Y			- Exception management in place to identify and alert appropriate personnel of processing exceptions such as delays, shortages and rejections; Allows reprocessing of exceptions	Y		
	Requisition Fulfillment	Y/N	Requisition Fulfillment	Y/N	Requisition Fulfillment	Y/N	Requisition Fulfillment	Y/N
	- Inventory allocated manually	Y	- Inventory from primary fulfillment location allocated automatically with ability to override to other locations in the event of shortages.	N	- Inventory allocated automatically based on availability and shelf life across multiple locations.	N	- Optimal fulfillment location allocated based on complex factors such as availability, proximity, and shelf life	N
	- Option available to print Requisition details to send to shipping facility	Y	- Requisition details sent to the fulfillment facility electronically	N	- Allocated and scheduled (soft allocated) inventory not double allocated to other Requisitions	Y	- Requisitions can be prioritized and allocations managed across requisitions	N
	- Fulfillment stages tracked manually	Y	- Key stages of fulfillment such as shipped and delivered tracked through electronic integration with fulfillment facility	N	- Most Fulfillment status updates such as picked, packed, backordered, shipped and delivered tracked through electronic integration with fulfillment facility	N		

6.6. Questions and Answers of the Warehouse Management System

Warehouse Management System								
	Level 1		Level 2		Level 3		Level 4	
Maturity Level	Basic Warehousing Operations (Manual, if not automated)		Warehousing Operations through electronic data, barcodes and system managed transactions		Realtime Transaction Processing and Automated workflow management for warehouse personnel		Advanced Warehousing including Serialization and Exception Management	
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) 		<ul style="list-style-type: none"> - Real time data provides superior accuracy in inventory visibility and hence decision making - Increased efficiency of warehouse personnel 		<ul style="list-style-type: none"> - Tracking and tracing of inventory at serial number level - Ability to act on inventory discrepancies on a timely manner minimizing stock outs 	
Capabilities	<p>Inbound Processing</p> <ul style="list-style-type: none"> - Inbound shipment(ASN) details including shipment#, item, uom, quantity, and expiration date captured, at least through manual upload, on weekly basis - Received items' details entered or uploaded in to the system - Received commodities putaway to storage locations through adhoc moves from receiving dock - Items identified with common ids that are recognized across the supply chain. Item master within the system is GS1 capable 	Y/ Y Y N	<p>Inbound Processing</p> <ul style="list-style-type: none"> - Inbound shipment details including batch details captured from the shipping facility/supplier - Items received against ASNs that are captured in the system - Putaway moves are performed manually in the system - Storage/bin locations defined within the warehouse for receiving, Staging, QC, Forward Pick, Bulk Pick etc and location numbers assigned 	Y/ Y Y N	<p>Inbound Processing</p> <ul style="list-style-type: none"> - Warehouse staff notified about incoming shipments so as to plan for space and personnel - Items received through barcode scanners and reconciled against ASNs in the system for batch and expiry details - Putaway tasks generated by the system as soon as items are received and are available for manual assignment to warehouse - All stocked items have GTIN and GS1 compliant attributes and codes - Warehouse has GLN assigned that is recognized across the supply chain - Capable of blind receiving when ASNs don't exist 	Y/N Y N N N Y	<p>Inbound Processing</p> <ul style="list-style-type: none"> - Serial numbers, in addition to batch details, captured during receiving through barcode scanning - Receiving discrepancies identified and discrepancy reports provided - Received items inspected and quarantined if required depending on damages etc - Receiving and putaway performed using handheld devices - Putaway tasks assigned to warehouse personnel based on factors such as skill, work load etc 	Y/N N Y Y N Y
	<p>Inventory Management</p> <ul style="list-style-type: none"> - Cycle counts manually generated using the system and printed out for warehouse personnel to perform counts - Physical counts manually generated using the system and printed out for warehouse personnel to perform counts - Inventory adjustments done manually for count discrepancies - Different inventory statuses such as Onhand, Damaged, Quarantined etc available - Ad-hoc Inventory adjustments possible to move inventory across different inventory buckets/statuses 	Y/ Y Y N Y	<p>Inventory Management</p> <ul style="list-style-type: none"> - Cycle and physical counts generated automatically based on pre-defined rules and printed for warehouse personnel to perform counts - Inventory tracked within the warehouse at bin level (location, bin, aisle) - Inventory details such as batch number, expiry date and batch quantity tracked for all items 	Y/ Y Y	<p>Inventory Management</p> <ul style="list-style-type: none"> - Counts assigned to warehouse personnel based on work load (randomly for cycle counts). - Integrated electronically to upstream systems such as OMS to provide real time Inventory data such as for receipts and adjustments 	Y/N Y Y	<p>Inventory Management</p> <ul style="list-style-type: none"> - Counts and inventory adjustments performed using Handheld devices - Warehouse supervisors able to accept or reject count discrepancies through the system - Inventory adjusted automatically for count discrepancies based on acceptance of rejection by supervisors - Serial numbers tracked in all inventory transactions within the warehouse 	Y/N N Y Y
	<p>Outbound Processing</p> <ul style="list-style-type: none"> - Pick, pack and ship process details updated in the system, manually if not automated - Details of outgoing shipment (Requisitions) including Requisition #, products/items, quantities, expiration date and delivery dates captured (manually, if not automated, within a week of performing the transactions) 	Y/ Y Y	<p>Outbound Processing</p> <ul style="list-style-type: none"> - Requisition details for outbound shipments captured through the system - Picklists and tasks generated and printed for warehouse personnel. Task assignment done manually - Packing labels generated and printed through the system - Packing list generated and printed based on manually created outbound shipment 	Y/ Y N N	<p>Outbound Processing</p> <ul style="list-style-type: none"> - Picklists/tasks assigned through the system for warehouse personnel to perform using printouts - Outbound shipment details including Requisition #, products/items, batch #, expiration date, quantities and delivery dates, generated in the system based on the associated outbound order in the system - Integrated with order management system to provide real time updates regarding the outbound shipment 	Y/N Y Y Y	<p>Outbound Processing</p> <ul style="list-style-type: none"> - Picking and packing tasks performed using handheld devices - Picklists/tasks consolidated & picking optimized based on factors such as ship-to location, product etc. - Shipments created and assigned carrier information - Shipment information published electronically to OMS and other systems such as reporting and to receiving facilities 	Y/N Y N N

6.7. Questions and Answers of the Transportation Management System

Transportation Management System								
	Level 1		Level 2		Level 3		Level 4	
Maturity Level	Not Applicable		Not Applicable		Basic system to track transportation stages		Automated route management, transportation tracking and freight bill payment processing	
Benefits					Visibility of physical movements of commodities		<ul style="list-style-type: none"> -Improved logistical efficiency and reduced transportation costs -Increased visibility of commodity movements 	
Capabilities	Route Management		Route Management		Route Management		Route Management	
		Y/		Y/		Y/N	<ul style="list-style-type: none"> -Optimal routes are planned based on deliveries to different destinations -Routes are optimized based on various criteria such as distance, volume, urgency etc 	Y Y
	Transportation Execution		Transportation Execution		Transportation Execution		Transportation Execution	
		Y/		Y/		Y/N	<ul style="list-style-type: none"> -Transportation statuses (shipped, in-transit, delivered etc) are manually updated in the system 	N N N
	Freight Audit and Payment		Freight Audit and Payment		Freight Audit and Payment		Freight Audit and Payment	
		Y/		Y/		Y/N	<ul style="list-style-type: none"> -Freight bills/invoices are consolidated and reconciled in the system -Freight bills are automatically allocated to orders/shipments, adjusted if required and audited -Payments to logistics vendors are processed through the system 	Y Y Y

6.8. Questions and Answers of the Track and Trace

Track and Trace								
	Level 1		Level 2		Level 3		Level 4	
Maturity Level	Basic ability to identify, track and trace commodities manually		Automated tracking and tracing across 2 -3 supply chain levels		Automated tracking and tracing across all supply chain levels and ability to authenticate commodities based on batch numbers		Product serialization and advanced tracking, tracing and authentication of commodities based on serial numbers	
Benefits	Basic visibility of commodities		Ability to trace and track batch level details for most critical supply chain operations		- Ability to track and trace batches across the entire supply chain for most SC operations - Reduce manual errors and improve operational efficiency		- Ability to track, trace and authenticate commodities at unique serial number level - Ability to eliminate counterfeit commodities from the supply chain	
Capabilities	Commodity Tracking	Y/	Commodity Tracking	Y/	Commodity Tracking	Y/N	Commodity Tracking	Y/N
	- Product master (list of items) commonly recognized across all supply chain levels (could be stand-alone managed manually)	Y	- Product master is GS1 compliant and integrated with a common product master system such as a national registry or product information management (PIM) system	N	- Facility master integrated with a common facility master database that includes GLNs for all facilities including ship-from and ship-to	N	- Serial numbers are linked to GTINs, batch/lot, and expiration date. This linkage is retained even if serial numbers are aggregated or disaggregated to/from their associated batches.	N
	- Location master (list of facilities) commonly recognized across all supply chain levels (managed manually)	Y	- Batch details are captured for all products across all systems within the supply chain	N	- Barcode scanning is used for all commodity movement transactions such as receiving, picking and shipping	N	- Serial numbers are captured, tracked and exchanged across supply chain systems as items flow through transactions.	N
	- Basic tracking of commodities available based on manually captured product details such as item#, uom, expiration date	Y	- Critical movements of products are tracked using the system across all supply chain systems	N	- All physical movements of products within the supply chain are tracked real time through barcode scanning and associating the scanned data with appropriate master and transactional data such as orders and ASNs	N		
	Traceability	Y/	Traceability	Y/	Traceability	Y/N	Traceability	Y/N
	- Capable of tracing commodities manually at least one level up and one level down based on manually captured product details such as item#, uom, expiration date	Y	- Capable of tracing commodities by batch numbers in systems across all supply chain levels within the country (manually checking in each system if all systems are not interconnected)	N	- All supply chain systems are integrated such that each physical movement of products from receipt into the country to dispensing is automatically traceable	N	- Products are traceable at unique serial number level with the ability to aggregate upto a batch level as well as disaggregate down to serial numbers from batch level	N
Product Authentication	Y/	Product Authentication	Y/	Product Authentication	Y/N	Product Authentication	Y/N	
				- Capable of validating batch details of products including expiration date and receipt date, against a central database/system that maintains linkage to all physical movements into and within the country	N	- Products are authenticated using their unique serial numbers against a central database/system that maintains linkage between serial numbers and batch numbers and records all physical movements at serial number level within the country supply chain	N	

6.9. Questions and Answers of the Interoperability

Interoperability		Level 1		Level 2		Level 3		Level 4																				
Maturity Level	Standardized data exchange formats for exchanging data manually through uploads	Standard data message format and protocols in place for systems to exchange data electronically		Interoperability layer to manage data exchange across various systems		Minimized effort to plug and play additional systems to the interoperability layer to exchange data																						
Benefits	Ability to easily combine and link data from disparate systems	Eliminates manual effort to exchange transactional data thus improving operational efficiency		Process of mapping data from different systems streamlined in one layer thus eliminating the effort for various systems to cater to multiple message formats and transport protocols		Ability to integrate disparate systems easily and quickly																						
Capabilities	<table border="1"> <thead> <tr> <th>Interoperability</th> <th>Y/N</th> </tr> </thead> <tbody> <tr> <td>-Basic standardized data templates for products, facilities, orders, inventory and shipments available</td> <td>Y</td> </tr> <tr> <td>-Data can be downloaded in standardized templates from systems that manage products, orders, inventory and shipments</td> <td>Y</td> </tr> <tr> <td>-Data in standardized templates can be uploaded into systems</td> <td>Y</td> </tr> </tbody> </table>	Interoperability	Y/N	-Basic standardized data templates for products, facilities, orders, inventory and shipments available	Y	-Data can be downloaded in standardized templates from systems that manage products, orders, inventory and shipments	Y	-Data in standardized templates can be uploaded into systems	Y	<table border="1"> <thead> <tr> <th>Interoperability</th> <th>Y/N</th> </tr> </thead> <tbody> <tr> <td>-Standard data message formats defined for products, facilities, orders, inventory and shipments using XML, flat file etc</td> <td>Y</td> </tr> <tr> <td>-Standard data transfer protocols such as web services, message queues, ftp etc defined</td> <td>Y</td> </tr> </tbody> </table>	Interoperability	Y/N	-Standard data message formats defined for products, facilities, orders, inventory and shipments using XML, flat file etc	Y	-Standard data transfer protocols such as web services, message queues, ftp etc defined	Y	<table border="1"> <thead> <tr> <th>Interoperability</th> <th>Y/N</th> </tr> </thead> <tbody> <tr> <td>-A dedicated interoperability layer supports integration between critical supply chain systems by translating data from one system to another, converting data formats if required and using appropriate data transfer protocols</td> <td>Y</td> </tr> <tr> <td>-Systems integrated to exchange critical supply chain information such as orders, inventory and shipments in standardized data formats using defined data transfer protocols</td> <td>Y</td> </tr> </tbody> </table>	Interoperability	Y/N	-A dedicated interoperability layer supports integration between critical supply chain systems by translating data from one system to another, converting data formats if required and using appropriate data transfer protocols	Y	-Systems integrated to exchange critical supply chain information such as orders, inventory and shipments in standardized data formats using defined data transfer protocols	Y	<table border="1"> <thead> <tr> <th>Interoperability</th> <th>Y/N</th> </tr> </thead> <tbody> <tr> <td>-Systems can plug into the interoperability layer by pushing or pulling data in standardized formats thus minimizing the effort to tailor specific integrations</td> <td>N</td> </tr> </tbody> </table>	Interoperability	Y/N	-Systems can plug into the interoperability layer by pushing or pulling data in standardized formats thus minimizing the effort to tailor specific integrations	N
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