



Putting Integration into Perspective: Proven Practices to Strengthen Public Health Supply Chains



For over 20 years, the goal of USAID's health supply chain strengthening efforts has been to maximize customer service based on the resources available.

Supply chain integration is the most effective way to both improve customer service and lower costs, because it focuses on better connecting demand with supply.

SEPTEMBER 2009

This publication was produced for review by the U.S. Agency for International Development. It was prepared by the USAID | DELIVER PROJECT, Task Order I. HIV-related activities of Task Order I are supported by the President's Emergency Plan for AIDS Relief.

Background

Historically, in public sector health supply chains, there have been a number of different interpretations for the term integration. Integration is often used to characterize desirable supply chain improvement efforts. Country program managers and

policymakers, non-supply chain technical assistance providers, and donors/funders typically use it to mean the merging of programmatically separate (or vertical) supply chains for specified programs or product categories. By its very nature, this approach to integration looks at measures to reduce redundancy and complexity across supply chains, without explicitly focusing on improved customer service. Thus, while this approach to integration can increase efficiency, it does not necessarily lead to improved product availability. For public health programs undertaking these initiatives, we suggest that this type of integration be called product integration, i.e., where management of some or all logistics functions is combined in the same supply chain for different commodity categories.

It is clear that the same players (country program managers and policymakers, non-supply chain technical assistance providers, and donors/funders) that advocated product integration in the quest for greater efficiency also care deeply about improved supply chain performance and customer service. To achieve those ends, though, the definition of integration used in the field of commercial supply chain management is more pertinent. In the logistics world, supply chain integration means striving for seamless linkages between the

Customer service is characterized as a situation where products are available according to the six rights (the right product, at the right place, at the right cost, in the right condition, at the right time, and in the right quantity) to provide the expected level of service. The objective of any supply chain, whether in the private commercial sector or in the public health sector, is to deliver products reliably to end users.

different levels, organizations, and functions within a supply chain so as to maximize customer service based on the resources available. According to this definition, supply chain integration means that the organizations (or levels or units within organizations) that form the supply chain share a common vision, understand each other's needs, treat each other as internal customers, share information, and are explicitly aligned to meet the ultimate customers' needs.

An integrated supply chain is one in which there is visibility of information and activity up and down the chain, fewer number of steps in the process, and greater coordination and predictability of demand between all the levels in the system. Supply chain integration, thus defined, is the most effective way to both improve customer service and lower costs, because it focuses on better connecting demand with supply. Henceforth, when we refer to supply chain integration, we mean working to seamlessly link the different pieces and partners of the supply chain together.

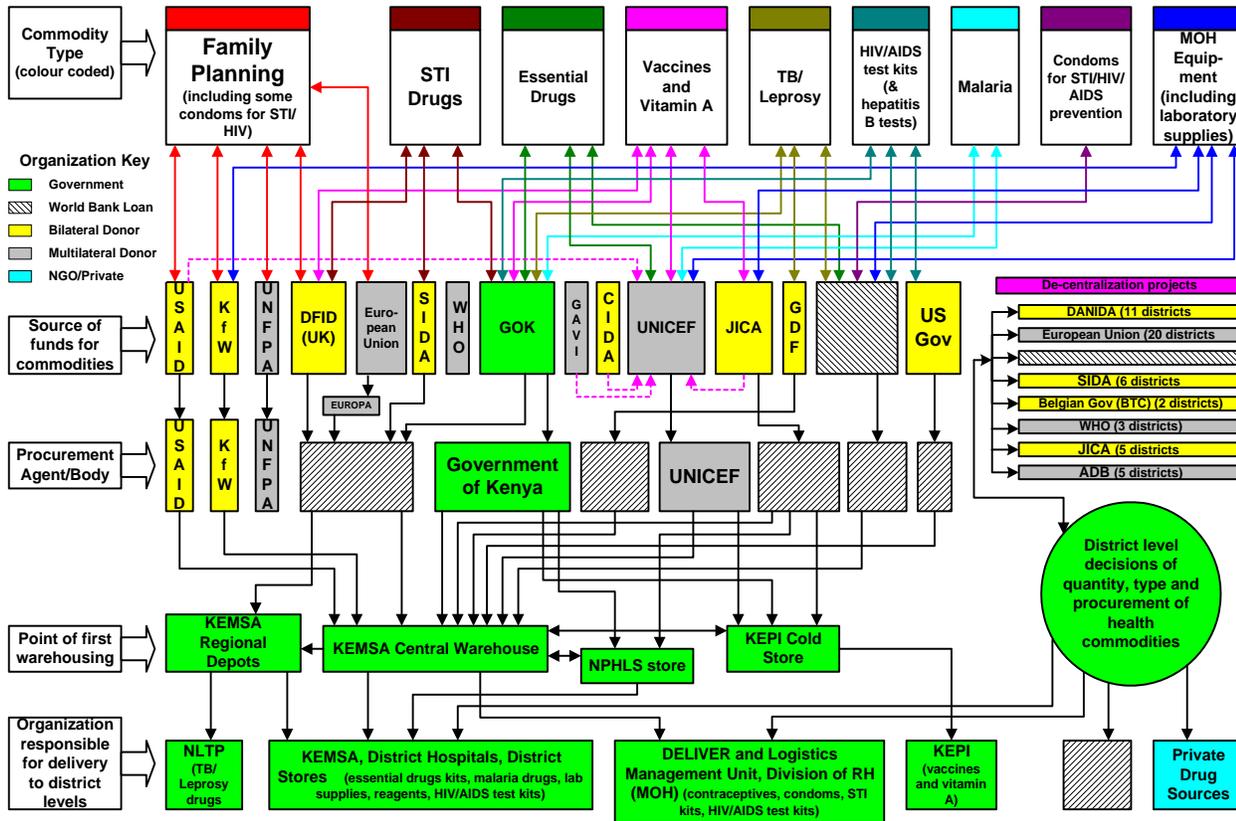
For over 20 years, the goal of USAID's health supply chain strengthening efforts has been to maximize customer service based on the resources available. As part of this quest, the project has engaged in supply chain integration efforts across a variety of countries, programs, and situations, although these were rarely labeled as supply chain integration interventions. The project has also undertaken what we define as product integration efforts in a number of countries, usually in response to national strategies and policies in which integration of this kind is a priority. As the project reviews lessons and practices from strengthening supply chains over the course of three decades, it is evident that both kinds of integration are relevant and demand understanding in relation to each other. Both public- and commercial-sector evidence indicate that costs and customer service levels can be improved via thoughtful supply chain integration activities. Integration of this kind may, therefore, be considered a central element of system strengthening efforts. However, while supply chain integration is instrumental in improving performance, it is not sufficient in and of itself. Product integration, as well as other approaches that target specific supply chain functions, can be an important complement to supply chain integration, and they should be understood within the context of overall supply chain system strengthening.

The purpose of this technical brief is to clarify the definition and understanding of supply chain integration and product integration so that these approaches can be implemented in a more purposeful way, and be included in country strategies, objectives, and implementation plans to promote stronger, better performing supply chains.

The Case for Supply Chain Integration: Commercial Sector Examples and Country Experiences

Supply chain integration provides the visibility, alignment, and incentives necessary to manage complexity, while retaining a focus on customer service through reliable product availability. While commercial sector supply chains are known for complexity, and supply chain integration is a well-established approach for improving those supply chains, a great deal of intricacy can also be seen in the global and in-country supply chains serving developing country health systems. Therefore, approaches from the commercial sector have some resonance in these settings. Figure 1 maps all the public health supply chains in Kenya in 2004. As illustrated in this figure, due to the nature of health systems, country government structures, and international aid architecture, supply chains in these settings are exceedingly complicated.

Figure I. Public Health Commodity Supply Chains in Kenya



While the figure demonstrates that Kenya’s public sector is an obvious candidate for product integration, and the country is undertaking product integration of a number of its public health supply chains, a recent example shows that product integration alone is insufficient for ensuring reliable product availability. In Kenya, currently the distribution and ordering of contraceptives and antimalarials in the public sector has been combined with those functions for the essential medicines (EM) pull system, which is operational in three provinces. While facilities value having commodities delivered directly to them, when stocks of essential medicines are low in the country, distribution of contraceptives and antimalarials is delayed along with the essential medicines, since it is the high volumes of essential medicines being distributed that drive the delivery schedule. Thus, while a reduction in complexity and apparent duplication of effort in the supply chain was achieved by this product integration approach, it was done at the cost of ensuring reliable availability of contraceptives and antimalarials to customers.

In Kenya, while product integration could eliminate the redundancy of parallel distribution mechanisms, in this particular case, merging the supply chains negatively impacted the availability of contraceptives and antimalarials at service delivery points (SDPs). To achieve both objectives—namely improving efficiency and improving product availability—both product integration and supply chain integration should be implemented as complementary approaches. Supply chain integration activities could include reviewing and addressing the processes and factors that may be driving poor performance in the essential medicine supply chain. Therefore, product integration efforts that may have high-level policy support also present an opportunity for concurrently undertaking supply chain integration efforts. By prioritizing supply chain integration activities, countries can reduce complexity and redundancy while still developing supply chains that have better information that will lead to better decisions, with managers at all levels working toward the common vision of improved product availability.

There are numerous examples of how supply chain integration has been applied in commercial sector settings. Similar principles may and have also been applied in resource poor settings, and examples from countries undertaking such efforts have resulted in improvements in the supply chain. Table 1 provides some examples of parallels in specific supply chain integration efforts in the commercial sector and USAID | DELIVER PROJECT-supported countries and the demonstrated improvements in performance.

Commercial Sector Example	Country Example
<p>Supply chain integration activity #1: One of the key tenets of supply chain integration is enhanced visibility throughout the levels and/or functions of the supply chain so as to better connect demand and supply.</p>	
<p>Wal-Mart, the largest retailer in the United States (and indeed, in the world), collects real time information about which products are consumed, very close to the time of purchase. There is a high level of visibility of information, which is sent upstream for decision making. By analyzing retail and demand data more frequently, in real time, Wal-Mart is able to rapidly respond to customer needs. Wal-Mart is able to hold lower inventories of new products in stores and replenish more frequently until demand for the product is predictable.</p>	<p>Although public health supply chains might not be able to achieve the visibility described in the Wal-Mart example, supply chain integration efforts have created improved levels of customer service. In Kenya, the visibility of demand for antiretroviral (ARV) drugs is high, with a 95 percent reporting rate on consumption and stock levels at facilities. Facilities report every month so data are close to being in <i>real time</i>. Demand is volatile, with facilities enrolling more patients than the programs anticipated providing supplies to. By sharing regular consumption data during monthly coordination meetings, program managers and donors are able to make timely decisions about calling down additional shipments, borrowing stocks from other supply chains, and mobilizing additional funding to prevent stockouts. As with the Wal-Mart example, having monthly visibility into consumption at the lowest level allows appropriate upper-level decisions to be made to ensure product availability.</p>
<p>Supply chain integration activity #2: Vendor Managed Inventory (VMI) is a strategy that contractually makes the supplier responsible for availability.</p>	
<p>At the Lahey Clinic in Massachusetts, the hospital previously ordered the medical supplies. Stockouts were common and inventory management for non-drug consumable commodities (including gloves and syringes) was very poor; subsequently, nurses were hoarding the products. To address this, Lahey worked with the supplier, Cardinal Health, to install Pyxis <i>vending machines</i> for these products. Instead of nurses being responsible for counting and ordering, Cardinal Health undertook responsibility for replenishing the Pyxis vending machines. The result was near-100 percent availability. This is an example of a VMI strategy where Cardinal Health is doing all the inventory management through periodic counting and replenishing on-the-spot.</p>	<p>A similar VMI solution is what the USAID DELIVER PROJECT has implemented in Zimbabwe through the Delivery Team Topping Up (DTTU) system. Instead of SDPs counting and ordering replenishments, a delivery truck loaded with supplies arrives at the SDP, counts the stock, and <i>tops up</i> inventory levels accordingly. This takes the counting and ordering function away from SDP personnel, and allows the <i>vendor</i> to handle this function. This approach reduces the management and reporting burden on SDP staff and has resulted in better service levels. For example, the stockout rates for nevirapine tablets decreased from 33 percent to 2 percent after they were merged into the DTTU.</p>

Commercial Sector Example	Country Example
<p>Supply chain integration activity #3: Reducing the number of levels of information in the system better connects supply with demand and improves product availability.</p>	
<p>A major U.S. manufacturer of lawn tractors decided to remove a level in the flow of information moving up the system. Previously, customers would go to a Home Depot store and select from an inventory of lawn tractors for purchase; Home Depot would then send regular reports and reorders to the manufacturers. The manufacturer decided that rather than holding inventory at Home Depot, they would allow customers to place an order for a customized tractor through their website and deliver the tractor directly to Home Depot for pick up. By removing one level in the information flow, the manufacturer expanded the options available to customers, reduced the inventory of idle tractors at Home Depot, and was better able to match supply and demand.</p>	<p>A similar approach was taken in Tanzania in the design and implementation of the integrated logistics system (ILS). Originally, districts were an added level in the supply chain; they held stocks and aggregated consumption and stock level for all the facilities in the district. The supplier (Medical Stores Department [MSD]) and program managers had no data on consumption or stock levels at each facility. Through the ILS, districts no longer hold stock for lower levels, but are solely a pass-through for distributing pre-packaged commodities from the MSD. They approve, rather than aggregate, facility orders. These changes have reduced lead times and inventory levels for the whole system, and made facility-level consumption and stock data available at the central level.</p>

Country Experiences with Product Integration

In this brief, product integration is defined and labeled within the context of public health programs, since it has evolved as a specific response to the nature of these health systems. Thus, when undergoing product integration, previously distinct supply chains—such as for family planning and essential medicines—join at various points by sharing information, facility/transportation/IT infrastructure, personnel, processes, and money to reduce complexity, redundancy, and costs. In the commercial world, product integration-like activities are often referred to as the merging of functions, products lines, or supply chains.

Figure 2 provides a snapshot of experiences in product integration from six countries, where some or all of the logistics functions of different supply chains are merged. Storage and distribution are the most commonly integrated functions, meaning that products from previously distinct supply chains are stored together at the central warehouse and then distributed jointly to health facilities. Further, product integration for a particular function may take place only at some levels of the supply chain—e.g., the logistics management logistics system (LMIS) may be integrated at the central level but not at the facilities.

Figure 2. Country Examples of Product Integration

COUNTRIES	SUPPLY CHAIN FUNCTION					
	Product Selection	Quantification	Procurement	Storage	Distribution	LMIS
Ghana	Not integrated	Not integrated	Full Integration All health commodities	Partial Integration ARVs / essential medicines / contraceptives	Full Integration All health commodities	Partial Integration HIV test kits and Laboratory Supplies
Kenya	Not integrated	Not integrated	Not integrated	Full Integration All health commodities	Not integrated	Partial Integration Integrated LMIS database at the central level.
Malawi	Not integrated	Partial Integration Coordination of procurement activities across commodities	Not integrated	Full Integration All health commodities	Partial Integration Essential medicines / contraceptives / sometimes HIV test kits	Partial Integration Essential medicines / contraceptives / HIV test kits
Tanzania	Not integrated	Not integrated	Full Integration All health commodities	Full Integration All health commodities	Partial Integration HIV test kits / essential medicines / contraceptives	Partial Integration HIV test kits / contraceptives
Zambia	Not integrated	Not integrated	Partial Integration	Full Integration All health commodities	Full Integration All health commodities	Partial Integration HIV test kits / essential medicines / animalarials / contraceptives
Zimbabwe	Partial Integration	Partial Integration	Not Integrated	Partial Integration All health commodities except lab supplies	Partial Integration HIV test kits / NVP, Cotrimoxazole / TB medicines / essential medicines	Partial Integration HIV test kits / essential medicines

In some cases, product selection and quantification may be coordinated but not integrated.

In Malawi, there is a national quantification team for all pharmaceutical and non-pharmaceutical products and medical devices, with subsets that focus on specific commodity categories.

LMIS data collection and reporting at facilities is integrated in some cases, but integration of LMIS data management at the central level is more common.

In Kenya, facility-level LMIS records and reports are separate for all programs, but the data is integrated into one central-level LMIS database.

Storage and distribution are the most frequently integrated.

In Zambia, all health commodities are stored at the MSL central warehouse (except vaccines). ARVs are kept in a secure area within MSL.

While numerous countries have initiated and undertaken product integration efforts, the perception of success has sometimes been hampered by a mismatch between the objectives of product integration and expectations about what will be achieved. While in many cases, country program managers and policymakers, non-supply chain technical assistance providers, and donors/funders expect to see improved product availability as a result of product integration, that is not necessarily an outcome from this type of integration. Resources and implementation plans are geared toward merging logistics functions across separate supply chains, without explicitly focusing on improving actual supply chain performance.

In reviewing early initiatives in product integration, a clear lesson that emerges is that many countries were focused on enhancing efficiency by integrating as many products as possible, resulting in programs that treated

Common Pitfalls with Product Integration

- Country stakeholders' may have unrealistic expectations of outcomes from product integration.
- Merging systems without qualified staff to assume new responsibilities is common.
- While product integration enables leveraging of disease-specific funding to increase availability of commodities across programs, vertical funding by disease category makes it difficult to track funds for attribution.
- Frequent risk of not achieving perceived health outcomes once vertical programs, supply chains, and funds are merged, since resources won't be targeted to a specific issue but available for the system as a whole
- Explicit focus may not be on customer service, resulting in poor distribution of stock, and in stockouts and overstocks.

all products the same—or taking a one size fits all approach—that undermined the viability of a customer-focused supply chain. Looking ahead, supply chain segmentation, rather than per se combining of vertical supply chains, may offer countries a more systematic and rational approach to achieving desired results by providing an analytical tool to help programs make better decisions.

Segmentation as a Best Practice for Achieving Product Integration

Supply chain segmentation can be the best practice for undertaking product integration, since it provides a framework within which to make rational product integration choices. Segmentation is a process of reviewing and analyzing product and customer characteristics to identify commonalities and then organizing the supply chain into segments to best respond to customer needs or product requirements. Not all products are the same and not all customers are the same; supply chains managers need to take this into account. Rather than organizing the supply chain by program, or by market, or even having only one supply chain into which all products are channeled, a supply chain segmentation framework provides a strategic and rational way in which to tailor the supply chain to match customer and/or product requirements. Therefore, segmentation, as an activity, should always precede and accompany product integration.

In a number of countries, segmentation is increasingly being used as an analytical approach to rationally think about and discuss product integration. In Kenya, segmentation analysis was conducted across seven commodity supply chains that were candidates for product integration. The initial objective was to analyze product, customer, and financing characteristics for each supply chain to determine if product integration was feasible and, if so, what would be the best configuration of supply chains to be product merged. For each type of analysis, products with like characteristics were grouped into separate supply chains, offering different alternatives for how the commodity supply chains could be organized. For example, products requiring cold chain conditions would be stored and distributed together even if they were used for different program activities. This enabled the program to prioritize the critical factors in developing a roadmap for product integration.

In Zimbabwe, the National Tuberculosis Programme identified the need for significant improvements in the logistics management of tuberculosis (TB) drugs (both fixed dose combination drugs and single drug formulations), TB laboratory commodities, and TB x-ray commodities. The system was characterized by low reporting rates, low confidence in TB patient and logistics data, significant stock imbalances and frequent stockouts of TB drugs, and an inconsistent supply of TB laboratory and x-ray commodities. Product integration with one of three other supply chains was the preferred strategy for the TB commodity system design. Prior to the design, a segmentation analysis was conducted to look primarily at customer characteristics (e.g., the type of commodities needed at the different types of facilities, reporting burdens at facilities), given that there are two types of TB facilities—diagnosing sites, which are larger hospitals, and continuation sites, which include smaller rural health centers. The results from the segmentation analysis pointed to integrating the TB commodities into three separate systems, which is being implemented on a pilot basis:

- TB laboratory and TB x-ray commodities for diagnosing sites were integrated into the ARV drug and fluconazole system.
- TB fixed dose combinations (FDCs) and sputum cups, for continuation sites, were integrated into the DTTU system.
- TB FDCs and single drug formulations for diagnosing sites were integrated with the NatPharm (essential medicines) system.

Segmentation, in both the Kenya and Zimbabwe cases, provided a framework for identifying and analyzing options for grouping supply chains to best serve customers and enable program managers to more rationally develop implementation plans for product integration. More details on segmentation can be found in *Re-engineering Supply Chains: How Supply Chain Segmentation Can Frame the Task (DRAFT)*. 2009. USAID | DELIVER PROJECT, Task Order I.

Putting the Pieces Together: Supply Chain Integration and Product Integration

Supply chain integration and product integration should not be viewed as mutually exclusive interventions but rather as supply chain strategies that can both serve to improve the supply chain landscape for public health commodities. While product integration is often a time-bound intervention that may not apply to all commodity supply chains, supply chain integration can and should be a continuous goal for all public health supply chains. Ultimately, the value in understanding these different definitions of integration lies in helping countries and programs to clearly identify their specific objectives for both supply chain and product integration and to determine corresponding strategies for implementation.

In practice, all supply chains that are focused on improving performance through product integration are usually implementing supply chain integration in one form or another—although perhaps interventions may not be labeled as such, or they may not be purposefully designed to achieve improved customer service. Frequently, both types of integration are implemented side by side, even within the same logistics function. Figure 3 illustrates an example of the LMIS in Zambia where both types of integration are being undertaken concurrently, each with different objectives.

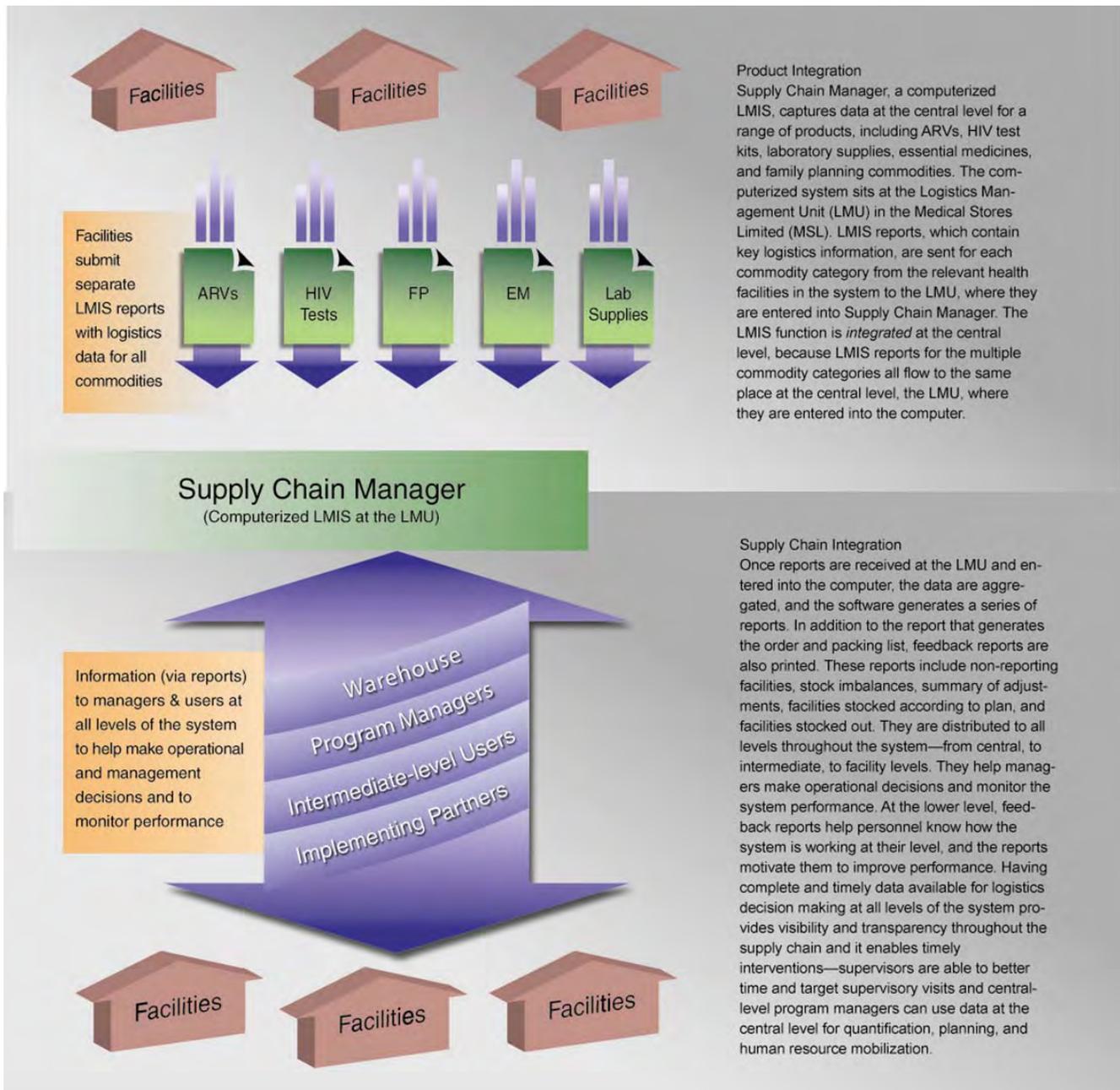
The top half of the diagram depicts product integration efforts—integrating the logistics data management function at the central level enhances efficiency and coordination among different programs. The lower half depicts supply chain integration efforts where distributing feedback reports generated by the computerized LMIS increases transparency and visibility between different levels of the system, for all supply chains. The information also feeds into other logistics functions: LMIS data is used for quantification; information from the quantification is used to make procurement decisions. In this example of supply chain integration in Zambia (in the lower half of the diagram), better information creates the seamlessness between functions and levels in the system.

Performance Characteristics to Incorporate in Integration Objectives

Regardless of which approaches countries and programs choose for integration, identifying characteristics that lend themselves to strong, well-performing supply chains will help keep interventions focused on developing supply chains that improve customer service. The goal is to use these characteristics as end goals for supply chain performance and then choose a rational approach and process for integration based on the desired outcome.

- **Product availability:** The six rights or another measurement
- **Efficient/cost effectiveness:** Minimizing costs based on the service level
- **Continuous improvement**
- **Quality:** Selecting, procuring quality products and storing and distributing them in a way that maintains quality.

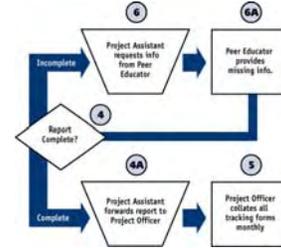
Figure 3. Example of Concurrent Product and Supply Chain Integration Efforts in the LMIS in Zambia



The Zambia example illustrates another lesson that has emerged from country experiences, namely that while supply chain integration plays a critical role in strengthening supply chains and should be a continual goal for evolving supply chains, it alone is not a sufficient means to achieve reliable product availability. In addition to segmentation and product integration as approaches for improving supply chains, other tools can be valuable in assessing the supply chains' suitability for integration efforts, highlighting process and bottlenecks and identifying solutions. The tools are outlined in the following text box.

Tools for Assessing Supply Chains and Identifying Solutions

Process Mapping: This is a tool that analyzes workflow to assess or improve system efficiency. Process mapping is an information gathering and analysis technique used for assessing, redesigning, and creating processes. When applied in Ghana, the number of steps in the contraceptive supply chain were reduced from 200 to 104 and the pipeline length from 17 to 12 months.¹ An example of a process map is shown on the right.



Supply Chain Optimization: Optimization has been defined as “the process of making something as good or as effective as possible with given resources and constraints.”² Specifically, it is a tool that helps calculate the many relevant trade-offs that are inherent in supply chain design and to help decision makers better understand the cost/benefit of changing the structure of their network.

Supply Chain Simulation: A tool that models how the network will behave over time by incorporating events and variability that are similar to the real world. It considers the complexities of the supply chain that optimization alone cannot consider, such as uncertainty in demand and variability in lead times.

Supply Chain Cost Analysis: This is the process of estimating the procurement, transportation, warehousing, and operating costs of a supply chain. Costs can be estimated for all levels of the supply chain—from the central level to the last mile.

Considerations When Planning for Integration

Before embarking on any type of system change that includes either supply chain integration or product integration through supply chain segmentation, or both, there are a number of important issues/questions that must be considered. None of the concepts presented in this brief—supply chain integration, segmentation, and product integration—offer a *one-size fits all* solution for countries or programs to adopt. Countries will have to consider these concepts within the context of their existing supply chains, goals, and objectives. Following is a series of contextual questions that countries should consider as they operationalize the integration concepts within their own supply chains. These questions are not exhaustive but are rather illustrative of the types of questions that countries should consider in order to thoughtfully plan and implement integration efforts.

¹ John Snow, Inc./Deliver. 2003. How to Cut 100 Steps from Your Contraceptive Supply Chain. Arlington, Va.: John Snow, Inc./Deliver.

² Council of Supply Chain Management Professionals (CSCMP). 2006. Supply Chain and Logistics Terms and Glossary. (Definitions compiled by Kate Vitasek). Bellevue, Wash.: Supply Chain Visions.

Vision/Goals/Objectives

- What is the goal of the *integration* efforts?
- Do participants understand and endorse the concepts of supply chain integration and a supply chain segmentation approach to product integration?
- Are customer (internal and external) requirements known?
- What customer service and performance improvements does the program want to achieve through integration? Are customer performance levels clearly defined?
- What characteristics define a well-performing supply chain in this context?
- Is there a clear vision for what integration will look like?
- How will the success of integration be measured?

Leadership/Coordination

- Is leadership within the system supportive of either or both integration efforts? Can expectations be aligned?
- Is there a champion to lead the integration effort?
- Do mechanisms for coordination and communication between units exist or can they be created?

Policy

- Do clear policies support integration as the intervention for system improvement? If not, how can policies be adapted to support integration?

Organizational Development

- Do current organizational structures support either/both kinds of integration? If not, how can they be adapted?
- Is there sufficient human resource capacity to implement the integrated system? Are roles and responsibilities clearly defined?
- What are the organizational-/program-specific ownership and territory issues and do they present obstacles to the integration process?
- Does the organization have the ability to learn during the integration process and adapt as needed?
- Is there a change management plan in place or in the planning stage?

Resources/Financing

- What are the cost savings the country hopes to achieve through integration? How will these be measured/assessed?
- Is there funding for the integration process (including implementation)? Is the funding flexible across products/programs?
- Is there funding for products?

Specific Questions for Supply Chain Integration:

- Are current supply chain processes well defined?
- What strengths in the processes can be built on?
- What common breakdowns and bottlenecks in the logistics processes can be solved through integration?
- What aspects of the system will be integrated first? Next? Later?
- How can the levels in the supply chain and the logistics responsibilities be better linked?
- What is the relationship and level of coordination between organizations/entities in the system?
- What is the level of visibility in information between different levels of the system (e.g., is there real-time information at the central level about consumption at the SDP)?
- How does the demand currently connect with supply?

Specific Questions for Product Integration through Supply Chain Segmentation:

- What are the product/customer characteristics of products and are there commonalities/opportunities for grouping (e.g., segmentation)?
- Can LMIS forms for multiple product categories be integrated and streamlined?
- Is there an LMU or some other central-level repository for logistics information?
- Where are products currently being stored centrally? What is the readiness of the central-level warehouse to manage multiple commodity categories?
- Where are the different commodities currently being delivered and how frequently?
- What kinds of procurement structures/policies are in place?
- Where is quantification conducted and how is it done across programs?
- Who has the responsibility for overseeing and carrying out supervision for each program?
- What are the mandates/responsibilities of various disease programs for logistics?

Key Messages for Supply Chain Strengthening

A number of key ideas presented in this brief can guide countries as they move forward with supply chain strengthening efforts, including integration.

1. *Make customer service your common vision.*
Developing and sharing a common vision around improved product availability and customer service will ensure that all organizations, at all levels of the supply chain, are aligned in the same direction and working toward the same objective.
2. *Let demand inform product availability.*
By bringing actual demand information to all levels of the supply chain in a timely manner, managers can reduce demand uncertainty and improve efficiency and product availability.

3. *Share your information.*

Enhanced visibility in the supply chain through deliberate sharing of useful information in any direction will always help improve performance, if managers are motivated to use information to make decisions.

4. *Strengthen the supply chain partnerships.*

Supply chain integration initiatives, such as improved visibility and transparency, are not achievable without stronger trust and partnerships among stakeholders in the supply chain.

The authors' views expressed in this publication do not necessarily reflect the views of the U.S. Agency for International Development or the United States Government.

USAID | DELIVER PROJECT

John Snow, Inc.

1616 Fort Myer Drive, 11th Floor

Arlington, VA 22209 USA

Phone: 703-528-7474

Fax: 703-528-7480

Email: askdeliver@jsi.com

Internet: deliver.jsi.com