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Public Sector Practice

Transforming global health supply chains through data visibility

Health systems in emerging markets have not realized the benefits of data visibility to global health supply-chain operations. To do so, health-system leaders will need to take four critical actions.

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May 2020

The COVID-19 pandemic has demonstrated how important supply chains are to health systems. The pandemic has also revealed the inherent cracks and lack of data visibility in healthcare supply chains in emerging countries. Without transparency, a health system cannot function properly, leaving people who receive its services vulnerable and without access to potentially lifesaving medicine. In many countries, supply-chain inefficiency is a matter of life and death. This article provides a perspective on how countries can create data visibility to improve supply-chain performance.

Data visibility provides several benefits to health systems' supply chains and the people they serve. In addition to reducing stockouts, expiries, and wastages, data visibility combined with strong data management can help reduce operational costs and improve service levels by optimizing processes such as procurement planning, demand forecasting, and inventory management.

However, achieving visibility in supply chains has been a challenge for governments in emerging markets because health-system leaders struggle to achieve the necessary stakeholder support and alignment. Fragmented paper-based systems, a lack of supporting capabilities, and poor network integration can also make the process difficult.

Digitization is a powerful gateway to data visibility. While some countries do achieve success with paper-based systems, digitization has the power to integrate IT, operations, and data needed to improve supply-chain performance and secure supply-chain financing. Some governments may already have the processes and technical skills to support digitization of the healthcare supply chain, allowing them to leapfrog the digital-maturation journey (Exhibit 1).[1] By contrast, countries in a greenfield state may decide to build efficiencies in their paper-based systems before moving forward.

Regardless of the path health-system leaders pursue to achieve data visibility, four critical actions will build a solid foundation to support their efforts. They must secure stakeholder commitment to change, define an aligned road map that includes a stance on the role of digitization, build the relevant data capabilities, and implement interoperability within existing national structures.

The current state of data visibility

Data visibility, quality, and management in emerging markets are ripe for improvement. In many countries, limited end-to-end data visibility makes it difficult to manage the supply chain as a single, integrated system. In countries with multiple data systems that are not well integrated, this situation is exacerbated by the existence of duplicate data points with no unique identifiers and no overall visibility into core system-performance metrics.

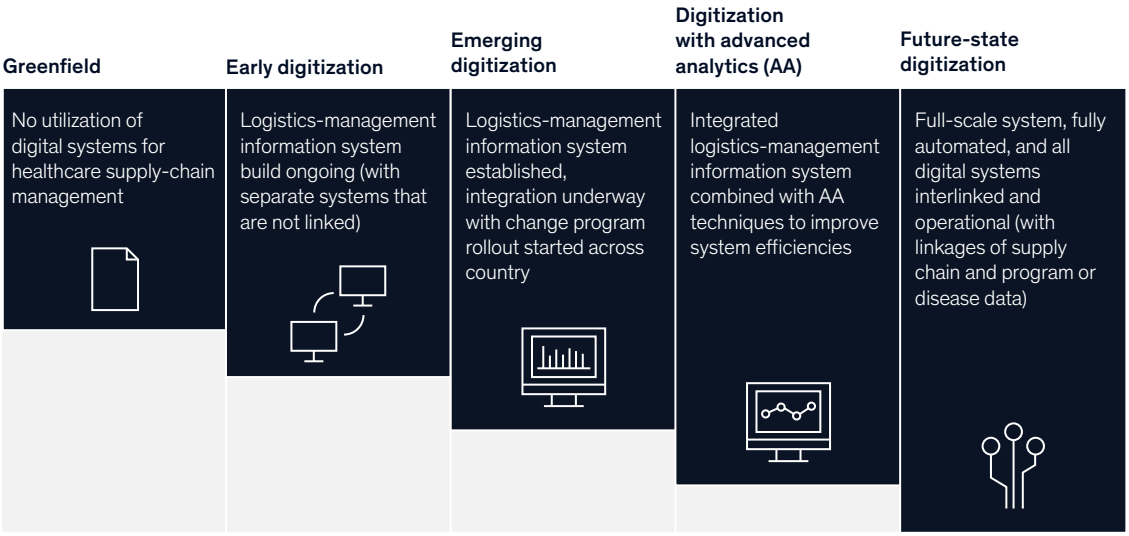
For instance, Nigeria's health system previously consisted of nine distinct supply chains and about 20 data systems, making distribution and supply management difficult and preventing providers and governments from making informed decisions on when (and how much) to replenish health commodities. Likewise, Pakistan's Ministry of National Health Services, Regulation, and Coordination had limited insight into the performance of its supply chains, resulting in widely varied stock-availability reports and stock performance across geographies, commodities, service-delivery entities, and subfunctions. Stock availability at service-delivery points (SDPs), for example, was as high as 95 percent and as low as 36 percent at aggregate provincial levels across the country.

Such lack of visibility presents problems for donors and governments that have a different view of key performance metrics, such as current warehouse inventory of vaccines. A shared end-to-end view of events at different points in the supply-chain system would allow donors and governments to make better-informed decisions about where to allocate resources.

[1] Countries may forgo leapfrogging to full digitization or digitization with advanced analytics capabilities and instead focus on improving their financial status, technical skills, and processes to support future digitization. Some countries might find success by processing paper forms faster or moving data into a consolidated spreadsheet. However, for most countries, digitization is the preferred tool and helps countries achieve data visibility quickly.

Exhibit 1

Digital strategies, capabilities, and other critical factors can help countries become more digitally mature.



Enabling data visibility through supply-chain digitization and integration

Health-system leaders in developed markets have graduated to using strategies and tools involving blockchain and the Internet of Things to improve their supply chains. By contrast, those in emerging markets must build a solid digital foundation before they can employ more advanced solutions. Through our work with emerging markets, we have identified four critical actions to facilitate data visibility through a digitized supply chain (Exhibit 2); these actions have been used in other sectors and developed markets, but their use for healthcare in emerging markets is still nascent.

Secure stakeholder commitment to change

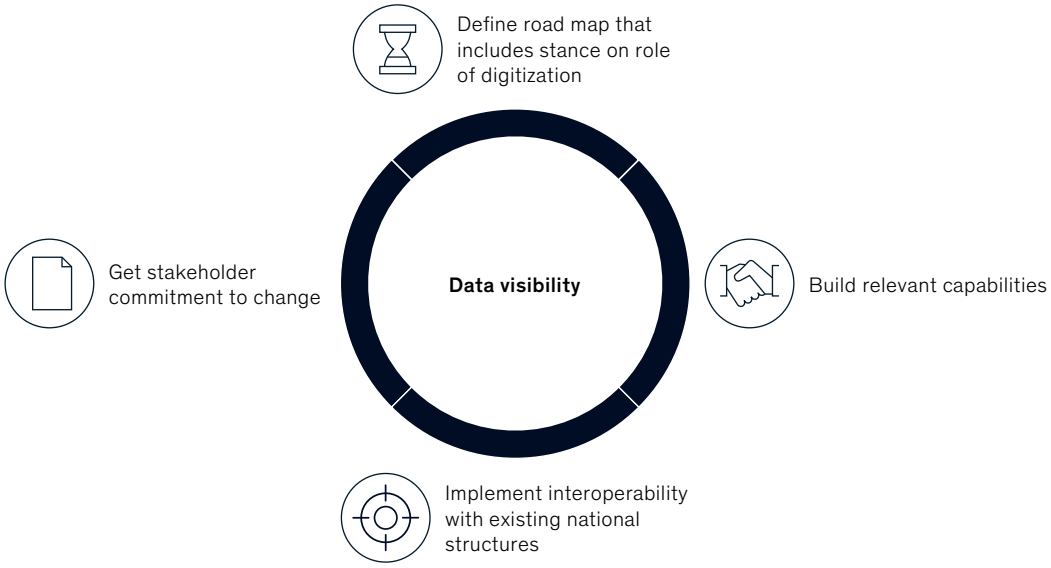
The success of any healthcare project depends on accord and participation from critical stakeholders such as partners, donors, government organizations, and healthcare workers. Without them, health-system leaders will have difficulty securing the support needed to get digitization, or any large-scale project, off the ground. One way to gain this support is to quantify the value (monetary or otherwise) at stake if supply-chain visibility is not achieved.

One country, for example, had the highest neonatal mortality rate in its region at one point, and many of its health facilities lacked access to lifesaving pediatric medicines. Each medicine's supply chain was treated as a separate entity, complicating efforts to effectively track health commodities and efficiently distribute them to people who needed them. The health ministry knew that integration was essential to improving both the supply of essential drugs and access to them, but stakeholders did not see integration as viable. Without stakeholder buy-in, however, integration efforts were not likely to get off the ground.

To address this issue and identify opportunities for advances, health-system leaders first assessed three supply chains: vaccines, family planning, and essential maternal and child health. The

Exhibit 2

Four critical factors can help countries achieve full data visibility.



assessment helped leaders identify six initiatives that could improve the supply chain and support data visibility. Stakeholders then voted on which issue to prioritize, and integration received the most votes. Furthermore, leaders found that integrating supply chains at the provincial level could save the ministry about $10 million by reducing the costs of running multiple supply-chain systems and by improving inventory management. These steps provide the building blocks for future digitization in the country, which, if successful, will increase data visibility, improve stock levels, and help the country achieve its projected cost reductions.

Define a road map that includes a stance on the role of digitization

Setting a digital strategy clarifies the value that digitization could bring to the supply chain. A defined strategy not only helps health-system leaders make a strong case for integration but also clarifies ownership and governance responsibilities, which are crucial to ensuring accountability (see sidebar, "Data visibility at work: The Nigeria Supply Chain Integration Project").

Similarly to Nigeria, Zambia's health-system leadership reviewed its health-supply-chain strategy and found it to be inefficient and mostly reliant on paper-based data-collection systems that made visibility impossible. To address these issues, the Zambian Ministry of Health created a five-year plan to completely integrate the supply chain. As part of the plan, the ministry opted to put a single agency in charge of procurement, storage, and distribution; previously, these responsibilities were spread across multiple owners. The agency was also tasked with constructing an electronic logistics-management information system to integrate supply chains, thus providing end-to-end visibility. Articulating the value this project would bring—that is, data visibility and quality health-commodities analysis—gained the ministry further support and investment from donors and the national government.

Build relevant data capabilities

The type of data capabilities an organization can build depends greatly on where it is on its digital-maturation journey—and whether it has even started that journey. A countrywide audit of

Data visibility at work: The Nigeria Supply Chain Integration Project

Prior to 2018, Nigeria's health supply chain was fraught with challenges. Data quality was poor, no central database meant no aggregate visibility, and data collection alone (which was manual and paper-based) cost between $3 million and $4 million a year. Before moving forward in the digitization journey, leaders decided to address the drawbacks of existing processes and capabilities—that is, a lack of technical skills and unified processes to manage data.

The Nigeria Supply Chain Integration Project was set up by the Federal Ministry of Health (under its National Product Supply Chain Management Program), partners, and other donors to help strengthen the Nigerian health-products supply chain and ensure consistent access to medicine and other health products.[1]

As part of the NSCIP, the government and its partners defined a road map to digitize the country's healthcare supply chain. But before any work could be done, donors and partners needed to see the value in supply-chain digitization.

The team's overarching vision—to design and implement a countrywide data-visibility integration system—would support four objectives: gain visibility into stock supplies, build basic analytics capabilities to improve operations, gather data insights to inform system improvements, and foster network integration across multiple supply-management programs. In this instance, the long-term goal for end-to-end supply-chain visibility was better integration with a unified database and inventory management system, a single point of accountability for decision-making, and a better-performing supply chain.

The creation of the Nigeria Health Logistics Management Information System (NHLMIS) served as the catalyst for supply-chain digitization (exhibit).

NHLMIS collects data from several sources and inputs them into a central repository, improving the data's quality and consistency. Building interoperability into the system gives suppliers visibility into warehouse data, thus reducing response times to low stock levels and improving shipping times. The construction of a control-tower dashboard also provides visibility into stock data across warehouses, distribution centers, and health facilities, improving governance and performance management. Finally, end-to-end data visibility eliminates redundant ordering and distribution.

Overall, the NHLMIS provided complete visibility into the status of the health commodities. With the right stakeholder engagement and buy-in, all 37 state logistics-management units have been onboarded to the NHLMIS, allowing all units to review the dashboard regularly and identify additional areas for performance improvements. The collaborative effort of the various stakeholders has resulted in an initial estimated cost savings of $1 million to $2 million annually. Costs for distribution integration, warehouse wastage, and data collection provide the most savings.

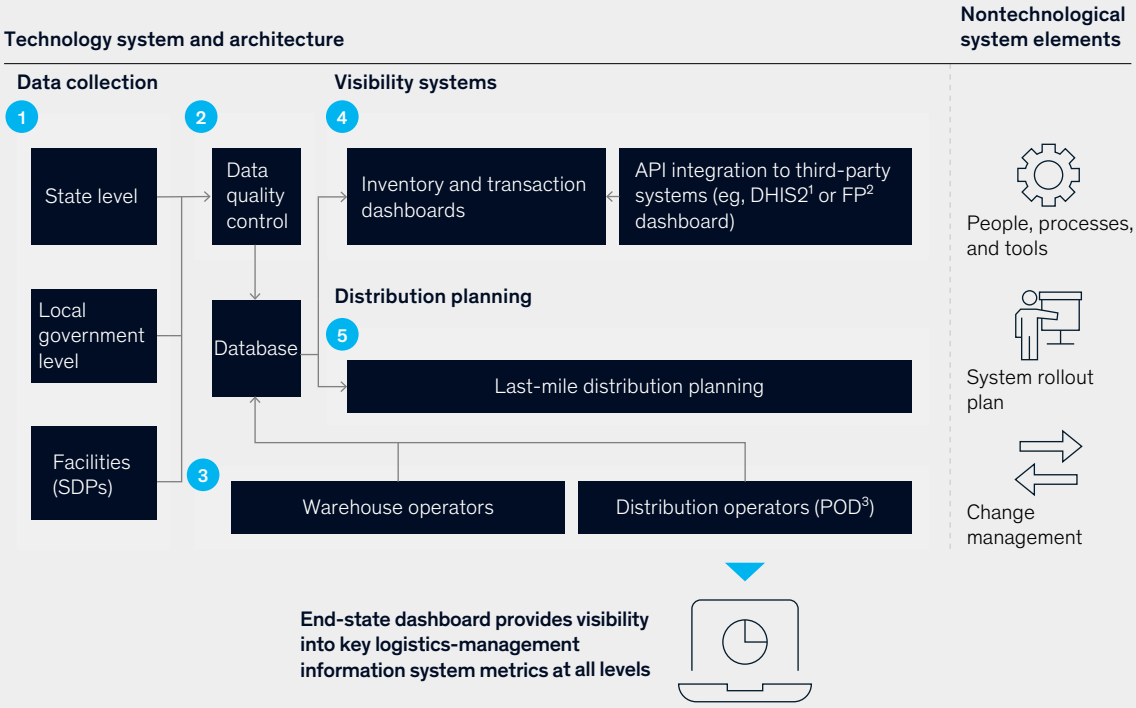
By moving toward digitization via the NHLMIS, full end-to-end visibility across 30,000 health facilities (SDPs) went from nonexistent to 100 percent. Stockout rates also improved: vaccine stockouts were reduced significantly in the cities of Lagos and Kano.

[1] "National Product Supply Chain Management Program (NPSCMP)," Federal Ministry of Health Department of Food and Drug Services, health.gov.ng.

Data visibility at work: The Nigeria Supply Chain Integration Project (continued)

Exhibit

The creation of the Nigeria Health Logistics Management Information System was the catalyst for Nigeria's supply-chain transformation.



[1] District Health Information Software 2.
[2] Family Planning.
[3] Plain old data.

current capabilities may be needed to identify a long-term building plan to ensure a sustainable digital transformation. Most emerging markets will fall into the greenfield or early digitization phase and should therefore focus on refining their current data-collection systems.

Countries should invest in building the necessary data capabilities to support their aspirations. For example, they can employ or train data scientists, software developers, analysts, and frontline staff to perform higher-quality data collection. Indeed, there are various modes of data entry (for example, through centralized locations at the national, state, or facility level) and data collection (through paper forms or scanning devices).

Implement interoperability within existing national structures

A digital supply-chain data system should be flexible and able to communicate information with other data sources or platforms. This interoperability, or exchange of information between computer systems, is critical to

successful digitization and thus data visibility. It provides a comprehensive view of the supply chain—showing logistics or service-delivery information, for example—and enables more advanced analytics capabilities at the national and state levels. Global interoperability standards, such as GS1 and HL7,[2] describe how different systems interact with one another and how that information is securely shared. These standards can guide health-system leaders who are digitizing their supply chains.

The Ministry of Health and Social Action in Senegal, for instance, operated under an inefficient distribution system. Consequently, family-planning supply chains experienced commodity shortages up to 80 percent of the time. So the ministry ran a diagnostic to see what kind of system would best improve the vaccine and family-planning supply chains. A push system that relied on up-to-date data proved be the most efficient. For the system to work properly, the ministry needed to implement the necessary systems and ensure it had countrywide interoperability. As a result of the new model, the Ministry of Health and Social Action was able to reduce stockout rates of vaccines to less than 2 percent in the pilot district.

Data visibility is critical to healthcare systems operating efficiently. In emerging markets, digitized and integrated global health supply chains can lead to improved health outcomes—such as lives saved and uninterrupted patient treatment—as well as operational cost savings. However, data visibility's level of integration and success relies on how well countries can execute these four critical actions. Countries must act now to foster data management and improve data visibility into supply chains; doing so will improve their citizens' quality of life and can pave the way for future supply-chain improvements.

[2] GS1 and HL7 are global interoperability standards that can provide guidance for health-system leaders who are rolling out digitization across the supply chain; for more information, see "GS1 standards: The global language of business," GS1, gs1us.org; and "Introduction to HL7 standards," Health Level Seven International, hl7.org.

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The authors wish to thank Tristan Goodrich, Tania Holt, and Tony Lee for their contributions to this article.