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Private Sector Solutions for Global Health Supply Chain Challenges in Low-to Middle-Income Countries

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I. The Supply Chain in Low to Middle Income Countries: Challenges and Solutions

Picture a remote village in western Africa, and a mother walking 5 kilometers to the nearest health clinic with her ill 4-year-old son for a malaria test. She knows the symptoms and understands that early diagnosis and immediate treatment are critical to his survival; she has lost one child to the parasite already. When she arrives, the health worker tells her he can perform a blood-smear test, but adds that if her child needs treatment, the clinic is out of stock of oral antimalaria drugs. It's the start of the annual rainy season, and recent flooding means the roads in this remote region of the country will be inaccessible for several days, perhaps weeks.

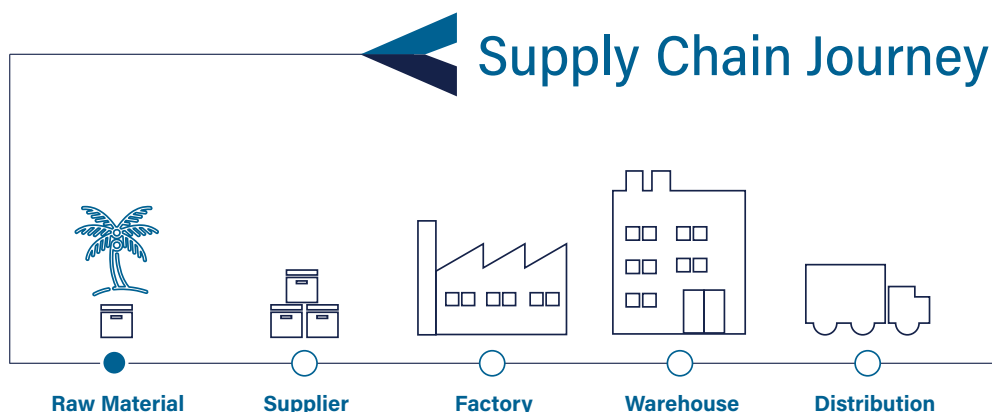
This scenario is fictional, but in many parts of the world the problem is all too real: small clinics on the “last mile” of the health supply chain lack the predictive tools and support necessary to forecast potential inventory outages, or stockouts, of medicine and other health supplies. The health supply chain is the backbone of any country's health system. For too many people, **the integrity of the global health supply chain (GHSC) is a matter of life and death.**

Yet solutions exist. To get life-saving health supplies where they need to go demands meticulous planning and coordination down to the very last mile of the most remote road and village. Multiple actors along the chain — the public and private sector and donor organizations — must cooperate from end-to-end for health products to arrive intact and on time. This is especially true for low- to middle-income countries (LMIC), where blockages occur due to:

- **Poor roads, a lack of electricity and internet access**
- **Under resourced and understaffed ministries of health**
- **Inadequate health clinics**
- **Advanced technology gaps**
- **Lack of local health products and drug manufacturing**

A supply chain is the **network of entities that plan, source, finance, and distribute the end-to-end flow of products, funds, and information** — all the way from raw material suppliers to end-users. The parties involved usually include suppliers, factories, wholesalers, distributors, warehouses, retailers, and distributors carrying out multiple financial, communication, and information transactions to enable the flow.

The global health supply chain entails the physical, financial, and informational resources required to deliver health commodities and services to patients around the world on a massive scale. This chain integrates medicines and medical supplies, quality assurance, human resources, and regulatory policies and



Track and Trace

Track and trace initiatives allow actors on a supply chain to control where a product is at any given time (tracking) and where it came from (tracing). The tactic starts with the process of serialization: a manufacturer allocates a unique identifier to each product using a two-dimensional barcode that other supply chain actors scan and record when it changes hands. The end result is a digital trail of information that records a package's origin, path through the supply chain, and other properties. Track and trace is common in advanced economies.

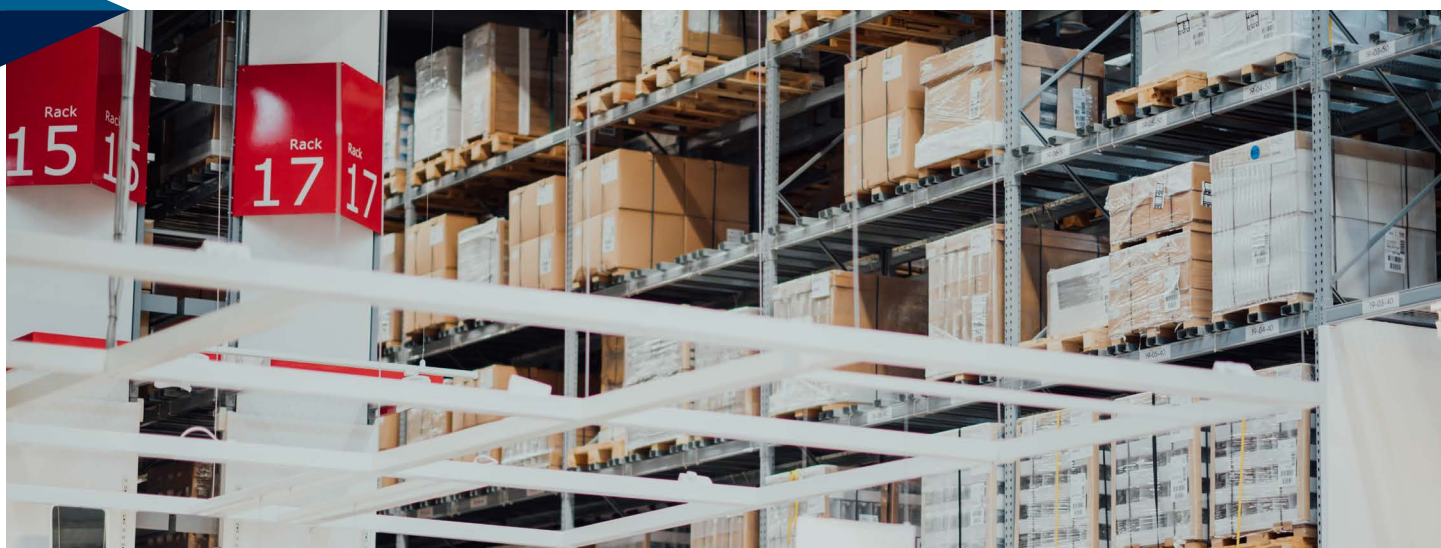
procedures from around the world into its ecosystem. Funding the GHSC typically falls to governments and donor organizations, yet managing the end-to-end supply of health products often involves multi-sector partners. It is both incredibly expensive and terribly complex.

Worldwide disruptions in accessing medical supplies due to the COVID-19 pandemic has underscored the need to improve the GHSC, especially in LMICs. **This is where the private sector can help.** Through strategic outsourcing and contracting with the private sector, government-run and donor-managed supply chains can build capacity in state-of-the-art supply chain designs, data analytics, advanced business models, and stronger monitoring and procurement performance.¹ The private sector, because of its market-oriented approaches, favor successful outcomes because it already knows how to procure specific goods, arrange for global transport, conduct quality assurance checks, book for long-term storage, and provide the kind of last-mile logistics required in LMICs.

To strengthen the GHSC in developing countries, the public sector and donor organizations (referred to as public/donor organizations in this document) must engage the private sector where appropriate. **Regional and local private sector actors can create resilient supply chain processes,** breaking through common obstacles. In recent decades, NGOs and governments — the major funders of health supplies and services — have adopted private sector supply chain practices and tools, such as implementing data-driven decisions and investing in digital tools like track and trace. Locally owned (local is defined here as confined to a nation or a unified trade network region of a continent) and operated health logistics providers in LMICs have demonstrated they can deliver health products and services to the most remote locations.

Today, more donor organizations are encouraging the expansion of private sector supply-chain engagement with their partner countries.

Project Last Mile, for example, a public-private partnership between the Coca-Cola Company and Foundation, the Bill and Melinda Gates Foundation, the Global Fund, and the US Agency for International Development (USAID), has strengthened the public health supply chain in eight African countries by sharing Coca-Cola's best practices in logistics, management, and other private sector expertise in delivering product to target markets with local ministries of health.²



Engaging the private sector is now a priority for the President's Emergency Plan for AIDS Relief (PEPFAR), led and managed by the US Department of State.³ The latest PEPFAR 2021 Country and Regional Operational Plan guidance calls to: "Accelerate utilization of private sector capabilities and infrastructure where appropriate, including specifically outsourcing elements of the segmented supply chain to maximize efficiency and effectiveness."⁴ **By outsourcing certain segments of the supply chain where the private sector has the clear advantage** in state-of-the-art IT technology and strategic risk management practices, the public sector can shift its focus to improve regulatory and customs/tariff policies that affect the movement of health supplies from the port of entry to the point-of-care.

In sum, **the application of market-based solutions to public health supply chain models improves outcomes.** Donor organizations, their health supply chain implementors, and their partner countries are increasingly learning and adopting best practices from the private sector including supply chain management practices. Where they can appropriately implement these practices and train the public sector in LMICs to manage them is the best way to create more sustainable health supply chains for the future.

Since the COVID-19 pandemic began, GHSC managers, wholesalers, warehousers, and distributors have taken particular interest in mending the fractures of the current system. At Washington Business Dynamics (WBD), our strategic risk management and procurement experts have followed the new trends in the GHSC with rapt attention, supplementing and implementing many of the new best practices into our current client and recommendations. In the past year we have advanced our proprietary, data-driven, decision-making tools in our acquisition capabilities to reinforce predictive rather than reactive supply chains.

In working with US government clients in LMICs, WBD has found that **public/donor organization partnerships with regional and local private businesses create the most enduring and scalable health supply chains.** Due to their advanced technological and risk management expertise, private sector supply chain service providers, manufacturers, wholesalers, and distributors add tangible value to the GHSC. From what we have gleaned from their best GHSC practices leads us to recommend that public/donor organizations **adapt and adopt private sector services and state-of-the-art applications early and often into health supply chain models.**



II. Global Health Supply Chain Management

The professionalization of supply chain management in advanced economies took hold in the mid-late 20th century. Universities, including the Massachusetts Institute of Technology and Cambridge, offer graduate degrees in the field, scholarly journals publish research in the discipline, and professional organizations provide supply chain management certificates.⁵ In addition to designing and managing a supply chain, supply chain professionals also provide sales forecasting, contract management, customer relationship management, quality assurance, and business strategy. Supply chain best practices now influence a wide range of supply chain professionals in advanced economies, including those in global health.

15.7
MILLION

As of September, 2019, PEPFAR has:

- Supported lifesaving antiretroviral treatment (ART) for nearly **15.7 million** people
- Enabled **2.6 million** babies to be born **HIV-free** to mothers living with HIV
- Provided critical care and support for **6.3 million** orphans and vulnerable children and their caregivers
- Helped prevent HIV infection in men and boys, supporting nearly **23 million** voluntary medical male circumcisions in eastern and southern Africa
- Driven **steep reductions** in new HIV diagnoses among adolescent girls and young women
- Helped train **280,000 healthcare workers** to deliver and improve HIV care and other health services
- In 2019 alone, invested nearly **\$900 million** on horizontal, above-site health systems strengthening, including more than **\$141 million** for horizontal laboratory systems

2.6
MILLION

3.6
MILLION

23
MILLION

280
THOUSAND

\$900
MILLION

\$141
MILLION

Source: [PEPFAR 2020 Report to Congress](#)

GHSC managers make decisions to streamline the three types of flows noted above — product, funds, and information. Their mission is to align all stakeholder objectives and timelines to enable the three flows of the supply chain from end-to-end.

Consider the worldwide effort on HIV/AIDS treatment and prevention. Donor organizations and governments (the institutional funders) create multi-stakeholder initiatives (including the private sector) in collaborative efforts to procure and distribute antiretroviral medicines for millions of HIV patients and the ancillary laboratory supplies (e.g., pipette tips) used in HIV diagnostic testing. The most notable example is PEPFAR. Working with its partners in more than 50 countries, the US government since 2003 has invested over \$85 billion and saved more than 20 million lives and prevented millions of HIV infections.

In its entirety, PEPFAR's global health supply chain begins with the sources of raw materials required for laboratories and other manufactures to mass-produce drugs and ancillary, health-related equipment to the patient, i.e., the end-user.

This colossal labyrinth requires sophisticated health supply chain management and tools.

Managers use sophisticated digital technology, such as real-time and predictive analytics, artificial intelligence (AI), commodity sensors, and the Internet of Things (IoT) — the billions of physical devices that collect

and exchange information over the internet. In the GHSC, that includes intelligent transportation systems in logistics and fleet management that merge the digital with the physical world, such as Google Maps or traffic signal control systems. It also includes cloud-based supply chain “control-towers,” using AI-enabled and data integration tools to see and manage real-time inventory.

The concept of the control tower is common in supply chain management circles.⁶ A supply chain control tower makes each aspect of the outside supply chain environment visible to everyone along the chain, known as “end-to-end visibility.”

Stakeholders from various sectors comprise the segmented sections of a GHSC, such as procurement or shipping. A successful outcome, getting the product or service to the patient, requires a coordinated effort: money, coming from public/donor organizations and governments, feeds the supply chain horses, which pull a wagon of real-time information to waiting customers.

Some of the key processes, as seen in the model include:

- Demand-planning
- Sourcing
- Forecasting
- Procuring
- Quality assurance testing
- Clearing customs
- Real-time tracking and inventory visibility
- Warehousing
- Last-mile logistics to reach the patient

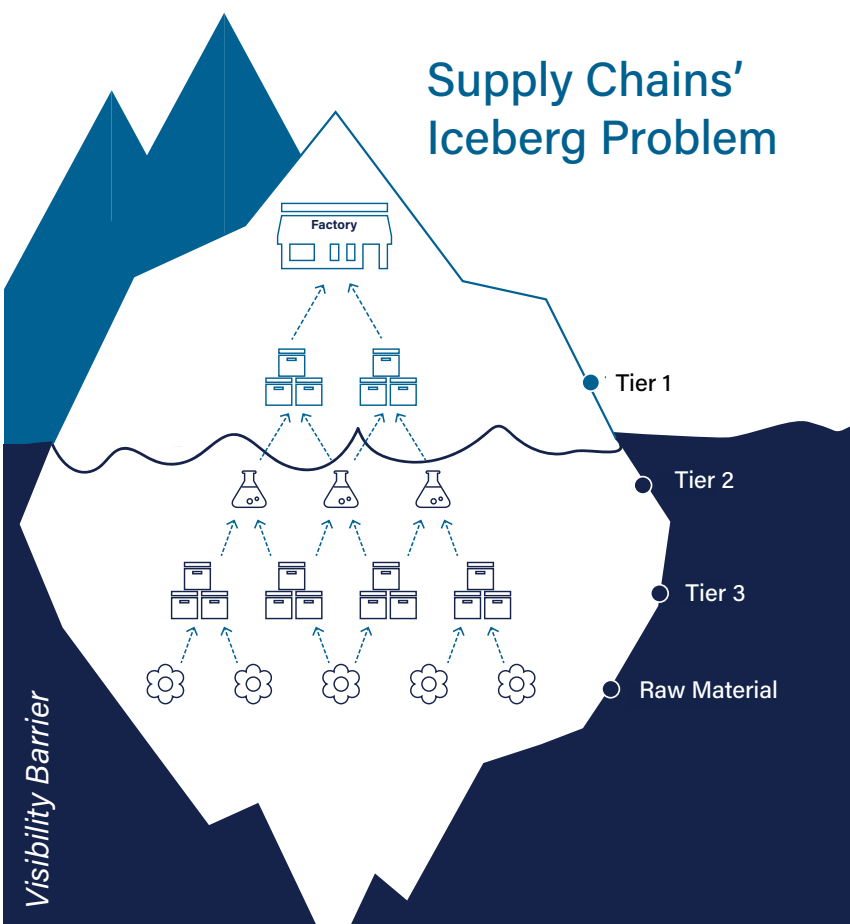


The following sections outline best practices and key challenges currently shaping the GHSC, with an eye on how engaging the private sector vastly improves this picture and where WBD can assist.



III. Four Best Practices Shaping the Global Health Supply Chain

The COVID-19 pandemic has exposed glaring weaknesses in current GHSCs. In a harsh irony, it has also presented an opportunity for an exceptional upgrade. That upgrade begins with **building capacity in the public sphere on how to manage the private sector as it enters and supports the global health supply chain**. Increased private sector management of the global health supply chain will allow governments to focus on improving on health policies and regulations (quality assurance, customs, import fees) to support public health systems. The ultimate goal is to give LMICs the tools necessary to run their own efficient link of the GHSC.



1. Construct a diverse, accurate, and multi-tiered supply chain map.

Getting the right supplies when and where they are needed is the objective of supply chain management. A supply chain map can identify vulnerabilities and reduce the risk of stockouts by tracing the direct, or “tier one,” suppliers’ sources of raw materials to ensure appropriate diversification. A health supply chain map illustrates the source of every ingredient used in a drug or health supply commodity. Yet diversifying direct suppliers is not sufficient by itself; all tier one suppliers could all be relying on the same source. A truly diverse and proper map supplier base requires going deeper into the second and third tiers — the suppliers’ suppliers — to identify, quantify, and mitigate risks.

These “maps” are more often than not schematics, or visual representations, of how goods — and everything that goes in — them travel from one party to another.



Complying with NTMs strains both importing and exporting firms. While many NTMs are in place for legitimate health and safety reasons, some can be considered protectionist and excessive.

World Bank, [“Free trade now: a case for tariff reductions and non-tariff measures simplification to fight COVID-19”](#)

We suggest a strategic mix of open markets, diversified procurement, and stronger regional value chains to combat the current health crisis, build Africa’s resilience against future pandemics, and help the region become a competitive supplier of certain health-related products.

International Trade Centre, July 2020. [“Medical Industries in Africa: A Regional Response to Supply Shortages.”](#)

Challenges

A diversified supply chain includes foreign and domestic sources. Public/donor organizations relying too heavily on international supply chains, rather than on local or regional manufacturing, or are overly reliant on one specific region for sourcing key pharmaceutical ingredients, can lead to trouble when global demand rises and supply is limited.

In May 2020, PEPFAR reported supply chain disruptions for antiretroviral (ARV) medications. The source the life-saving ARV components come from laboratories in China, then are shipped to India, where the majority of US Federal Drug Agency-approved ARV manufacturers are based.⁷ When the COVID-19 pandemic disrupted the supply chain in China, HIV patients in Africa (via their relations with PEPFAR) suddenly found themselves in difficult straits.

In the US, shortages of personal protective equipment (PPE) as well as COVID-19 and other testing supplies were also caused by a dependency on China.⁸ **Rigorous supply chain mapping that accounts for potential overreliance on one country or region must form the basis of a supply chain risk management strategy.**

Supply shortages in LMICs are compounded by legal and trade barriers. Strengthening regional and continental integration in manufacturing through free trade agreements will improve market access and competitiveness. The World Bank reports that beyond tariffs, health supplies face multiple inspections and certifications known as “non-tariff measures” (NTM). The Bank notes that while high-income countries can meet these measures with relative ease, LMICs often lack the administrative capacity to fulfill them.⁹

The Value Add of PSE

Private sector regional value chains would help diversify global supply.¹⁰ The International Trade Centre published a report in July 2020 in response to the medical shortages in Africa brought on by pandemic-related supply disruptions. The report notes that **“Africa provides just 8 percent of its own medical products, importing most of the rest from the European Union, China and India,”** and urges policymakers to consider regional suppliers with export growth potential.¹¹ For example, many African countries export the raw commodities, or inputs, used in manufacturing health supplies such as rubber, ethanol, and fabric. All three are key inputs in the manufacture of masks, latex gloves, and disinfectants. Government investment in the development of regional value chains to produce these supplies would diversify the supplier base and reduce shortages. Governments can deploy the African Continent Free Trade Area agreement to ensure these goods remain duty free and comply with other regulations.¹² In addition, the African Medicines Regulatory Harmonisation (AMRH) initiative is expanding access to quality medicines by improving the pharmaceutical development regulatory environment and offering incentives for local manufacturers to register their products.¹³

Supply chain mapping requires advanced software analytics and money — two obvious stumbling blocks.¹⁴ Yet governments can **build partnerships with supply chain professional organizations and donor organizations to apply private sector, advanced analytics and digital technologies into public health supply chain systems.** The Association for Supply Chain Management Foundation (ASCM), for example, works directly with ministries of health, public and private corporations, and non-governmental organizations (NGO) to build supply chain capacity.¹⁵ The Africa Resource Center, too, supports ministries of health build resilient health supply chains.

And in response to the pandemic, the Asia Development Bank (ADB) in May 2020 released a mapping tool to help governments, banks, and health professionals “trace the companies that make every component in products such as portable ventilators down to the metal and rubber that goes into each part.”¹⁶ They are now using the tool to map the COVID-19 vaccine supply chain and its distribution in collaboration with global health organizations and the private sector.



The ADB Supply Chain Mapping Vision

- The ADB mapping tool is the first to attempt to graphically represent supply chains for critical products in the global response to COVID-19.
- The tool will be a critical resource long after the pandemic, as challenges to global trade will persist.
- The tool is searchable by industry, final product, components, raw material, and company location.
- ADB intends to replicate this initiative in other supply chains.

“To fix any supply chain problems, we need an in-depth description of what goes into these products and which companies are involved,” said Steven Beck, Head of ABD’s Trade and Supply Chain Finance Program. “Mapping these supply chains means that if help is needed, banks, investors, and governments can use the data to quickly relieve bottlenecks and ramp up supplies.”

2. Build integrated technology that allows for real-time data exchange.

Frequently used in the private sector, a cloud computing platform known as “control tower” uses real-time data to provide detailed end-to-end supply chain visibility. When data is combined with predictive analytics, the result is a predictive supply chain. But many LMICs still rely on spreadsheets or even paper and pencil. Donor organizations are now working with partner governments in the public health supply chain to introduce the concept of a control tower.

For example, the Global Family Planning Visibility and Analytics Network, a coalition of eight donor organizations, including USAID, UKAID, and the Bill and Melinda Gates Foundation, share critical supply chain data and coordinate action through the Consensus Planning Group to prevent contraceptive shortages and overstocks in partner countries.¹⁷

The Consensus Planning Group (CPG) works to prevent countries from ending up with too few supplies to meet contraceptive needs or too many supplies to be consumed before they expire. It does so by sharing data that makes it possible to coordinate shipments and allocate resources appropriately within and among countries. The CPG works to prevent imbalances from happening in the first place, but it also serves to remedy the imbalances that do. – Reproductive Health Supply Coalition

Likewise, the USAID Global Health Supply Chain program also plans to establish a cloud-based control tower in its Next Generation Global Health Supply Chain Suite of Programs (NextGen) award. The control tower will provide **effective risk management** oversight for USAID by supporting information sharing and collaboration across all multiple Procurement Service Agents supporting the Global Health Supply Chain Program at USAID in an “up-to-date and end-to-end view of the NextGen operations.”¹⁸

Challenges

Low- to middle-income countries face three key challenges in implementing real-time data exchanges using integrated technology. First, rural areas often lack internet access. Second, where data systems are online, they typically are not integrated.¹⁹ This lack of interoperability in multiple data systems results in duplicate data points, an inability to accurately track inventory (making it impossible to allocate resources or forecast demand), and an inability to coordinate logistics data with health supply data. Finally, in many parts of the world, legal processes and customs regulations for health supply imports transpire offline, in a pen and paper signature environment and sealed with an official stamp. All these barriers preclude an integrated technology system.



In the logistics last-mile space, local Kenyan company Freight-in-Time is now partnering with Gavi, The Global Fund, NorFund, UPS, and the government of Uganda to use its cold-chain delivery to distribute COVID-19 vaccines in three last-mile Ugandan districts.

Shamit Shah, CEO of Freight in Time, explains:

“We managed the monthly deliveries of vaccines to very last mile — to health centers and clinics. It’s not rocket science. We could manage the deliveries, we could get products from A to B, we could maintain the temperatures. But the truth of it was when we looked at the supply chain and asked where was the real issue, we realized that **the problem was the lack of visibility in that last mile.**

So we adapted our own app that does the real-time track and trace, temperature monitoring, and ePODs (electronic proof-of-delivery), but we added a stock function visibility which allowed the clinics and hospitals to see their own consumption, in real time, and allowed them to place orders online — one of the biggest gaps — and allowed us to aggregate orders and manage deliveries. The results were tremendous — 100 percent on-time in-full deliveries. Stockouts were eliminated.

It was just a matter of building confidence. We have to build trust between the public and private sector.”

Freight-in-Time is now working with donor agencies and the government of Ethiopia to deliver COVID-19 vaccines in that country.

February 15, 2021. Palladium Impact Webinar. [“Engaging Local Private Sector Companies to Achieve Global Health Supply Chain Goals.”](#)

The Value Add of PSE

The private sector has been hard at work developing digital technologies that function both online and offline at rural clinics and pharmacies. Some have applied local know-how to meet last-mile delivery challenges. Many provide end-to-end logistics solutions backed by blockchain technology with the ability to micro-monitor shipments and facilitate the interoperability of different logistics systems. Donor organizations, including USAID, make it a best practice to apply local, private sector logistics expertise when possible.²⁰

Here is one example. The software firm Maisha Med built a point-of-sale digital system that captures data from a network of more than 400 small clinics and pharmacies in Kenya, Uganda, Zambia, Nigeria, and Tanzania on products sold and their suppliers. Data uploaded on sophisticated dashboards inform donor organizations, pharmaceutical companies, and other health supply chain stakeholders on “anticipatory logistics” based on predictive algorithms that consider previous orders. **The digital tools also work offline to help providers manage inventory and place new orders based on past sales.** Finally, the tool works with donor organizations that offer incentives for providers to use high-quality, traceable health supplies.²¹



“COVID-19 has shown just how vulnerable medical product supply chains are when relying on a small number of manufacturers for raw materials and final products.”

– Emer Cooke, Director of the Regulation and Prequalification Department, World Health Organization

3. Manufacture health supplies and equipment locally.

Nearly 500,000 children in sub-Saharan Africa die each year from vaccine-preventable diseases because families lack access to essential medicine.²² The COVID-19 pandemic has further demonstrated the need for local health supply manufacturing in LMICs to ensure reliable access to health products. Shortages in PPE, medical oxygen and oxygenators, and ventilators affected LMICs more than nations with greater affluence and influence. The need for governments to invest in **local health supply production and distribution to create resilient health supply chain systems** is real and ongoing. In the wake of the global pandemic, and before the next one, now is the time for governments to engage private sector assistance.

Challenges

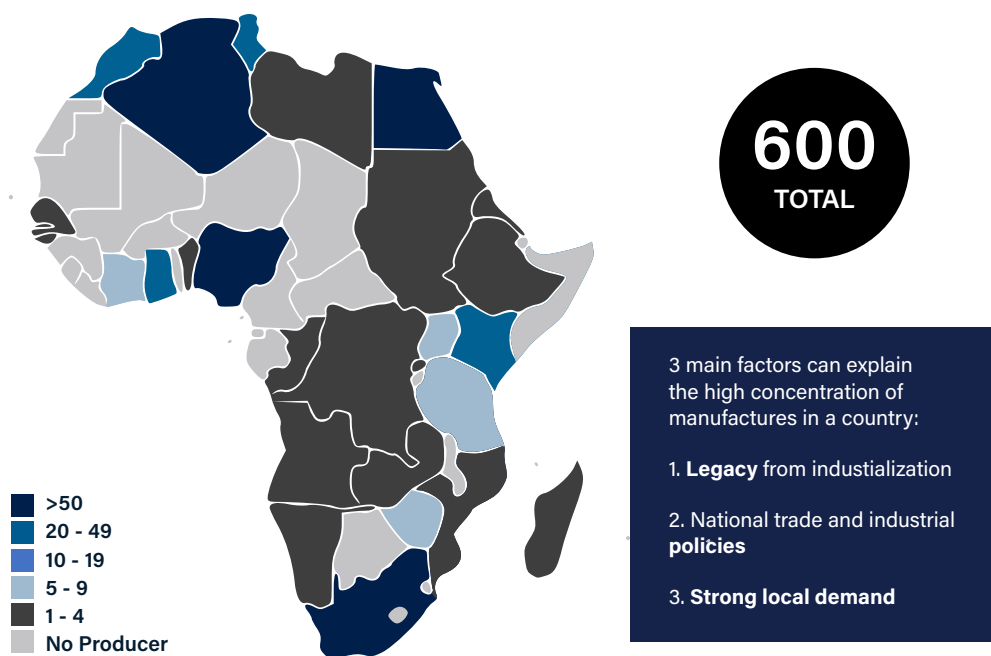
Access to information, financing, technical expertise, weak infrastructure, weak regulatory frameworks, as well as import restrictions and tariffs stymie the local production of health supplies and equipment in LMICs.²³ While most LMICs do not impose tariffs on vaccines or antibiotics, they can be high on the raw materials, ingredients, and other equipment required for their manufacture.

The UN Conference on Trade and Development reports the problem is more prevalent in Africa, where the need for local manufacturing of pharmaceuticals is highest. Other LMICs in Asia, particularly India and Thailand, have been successful manufacturing drugs and health commodities at scale and that meet international standards.

Africa also faces a shortage of specialists in medicine development, regulatory sciences, and clinical research. And regulators and authorities in many LMICs lack the resources to carry out inspections and control the manufacturing of essential health commodities. In many African countries, such oversight bodies do not even exist.²⁴

The Center for Global Development (CGD) reports that in 2020, approximately 600 pharmaceutical manufacturers operated in Africa. Of those, 80 percent were concentrated in 8 countries, and only 4 countries had more than 50 manufacturers; 20 countries had no local production whatsoever.²⁵ At an October 2020 CGD meeting, “Expanding Health Product Manufacturing in Africa,” participants offered three main reasons why health manufacturing was limited to Nigeria, Egypt, South Africa, and Algeria: the legacy from past industrialization, national trade and industrial policies, and demand.

Africa's Pharmaceutical manufacturers by country in 2020



Source: The Center for Global Development

Governments, donor organizations, and development banks must support the business enabling environment. Specific investment incentives — including duty-free or reduced tariffs on raw materials and capital goods imports, tax holidays, and the creation of special economic or industrial zones — are essential because they constitute the foundation of economic growth and development.

For its part, USAID is working with partner countries to minimize regulatory barriers and other institutional constraints to construct better business environments.²⁶ USAID's approach supports the World Bank's Doing Business project, which benchmarks 10 areas of business regulation for 181 countries and provides information and incentives for reform.



54

AFRICAN UNION STATES

endorsed a business plan
created by the African Union
Development Agency



“Technology Transfer of advanced technology is essential for economic development. It is one means by which low and middle-income countries can accelerate the acquisition of knowledge, experience, and equipment related to advanced, innovative industrial products and processes. Technology transfer has the potential to help improve health. It also benefits the overall economy by increasing the reliability of supply, decreasing reliance on imports, and raising the competence of the local workforce.”

The Pharmaceutical Industry and Global Health. Facts and Figures April 2021.

Lack of access to capital and the high cost of doing business impedes growth across the African continent. The cost of finance capital is prohibitive for medical equipment — upwards to 34 percent in Nigeria and 26 percent in Uganda.²⁷ New and small- and medium-sized companies do not have the large cash reserves to finance imports that require loans from commercial banks.

In sum, the core issues that must be addressed include:

- **Remove** trade barriers.
- **Provide access** to innovative financing.
- **Enable** local and regional regulatory capacity to assure quality.
- **Build capacity** around technical skills development.
- **Boost** technology transfer and product development partnerships.
- **Establish** Good Manufacturing Practice facility design.²⁸

Fifty-four African Union states have endorsed a business plan created by the **African Union Development Agency** in collaboration with AMRH, to remove some of the aforementioned roadblocks.²⁹ Implementing this plan, alongside adopting the African Continental Free Trade Area agreement, will help improve the business enabling environment for local manufacturers.

The Value Add of PSE

Interest in local and regional manufacturing of medical supplies and commodities has increased considerably since the COVID-19 pandemic began — and not just in LMICs. In the US, the Biden Administration issued an Executive Order on February 24 to strengthen America’s supply chains by rebuilding its domestic manufacturing capabilities.³⁰ For LMICs, and especially in Africa where the need is greatest, local private sector manufacturing offers increased access and lower costs to high-quality medicine and health products — with accelerated technology transfer and job creation as ancillary benefits. Local private sector businesses also add **unique value to the health supply chain because of their local connections, knowledge of local systems, and lasting presence in the community.**

Local manufacturing reduces risk by shortening the supply chain and lowers costs by eliminating the high mark-ups that inflate drug and health commodity prices, including import tariffs, port charges, importers’ margins, and value-added taxes on medicines.

The UN Industrial Development Organization makes the case for why local pharmaceutical production is important:

- **More than 2 billion people worldwide** cannot get the medicines they need.
- **Local production can help** vulnerable populations, especially those in remote rural areas, to access quality medicines.



90%

of all jobs in LMICs are created by the private sector.

- **Local production can reduce** the dependency on international donations and the shrinking number of overseas companies who dominate the global market.
- **Local production is easier** to control and can help curb the vast influx of sub-standard medicines into developing countries.³¹

Perhaps the greatest value add of local private sector manufacturing is its impact on a country's overall development. The private sector creates 90 percent of all jobs in LMICs.³² Likewise, private sector financial flows are four times greater to LMICs than funding from donor organizations, the largest financial flow to emerging markets.³³

4. Seek Creative Partnerships, Including Outsourcing Where Appropriate.

Key players in the global health supply chain cannot achieve their mission in isolation. Public-private partnerships and multi-stakeholder initiatives (MSI) are a collaboration model where governments, international organizations, and multilateral development banks use the private sector to drive economic growth and development in emerging markets. Other actors such as NGOs, faith-based organizations, and foundations, frequently join the private sector to tackle international development challenges.

Public-private partnerships have succeeded in certain global health areas where governments, the private sector, and NGOs acting alone have failed. Gavi, the Vaccine Alliance, an MSI of multiple donor organizations, governments, the private sector, academia, and non-government organizations, has vaccinated more than 822 million children, preventing more than 14 million future deaths since it formed in 2000.³⁴ Today, Gavi is co-leading the global initiative COVAX to accelerate the development, manufacture, and access to COVID-19 vaccines in LMICs around the world.

Other public-private partnerships provide the logistical resources and expertise required to deliver life-saving health commodities and drugs to remote areas. African health ministries and donor organizations have partnered with regional Coca-Cola bottlers and suppliers to use Coca-Cola's network and supply chain system in Project Last Mile.³⁵ The project integrates private sector approaches into government health ministries, building capacity through knowledge transfer of supply chain management and technologies.

Zipline, a California-based drone delivery startup, struck a deal with the government of Rwanda in 2019 to deliver life-saving health supplies in the country's most remote outposts. Zipline operates distribution centers strategically located throughout Rwanda that are part medical warehouse facility and part "droneport." To date, Zipline has made more than 117,000 medical deliveries, including ones that require cold-chain and other quality storage and handling requirements.³⁶

"What we have seen in policy makers and supply chain leaders is the capacity to understand that existing systems can be re-thought and we can challenge our own assumptions around what it takes to be successful and how we can solve certain long-standing challenges."

— Israel Bimpe,
Partnership Lead, Zipline
Rwanda





The future success of the GHSCs will be built upon creative partnerships like these. MSIs, such as Gavi and PEPFAR, are best positioned to manage complex, multi-country health supply chains that involve multiple sectors that ordinarily do not work together but can unite around a common cause. On a smaller scale, public-private partnerships capitalize on the relative strengths of each sector to address challenges that neither can adequately address on its own. In addition, governments in LMICs should seek global partners to build the capabilities of local pharmaceutical and health commodity manufacturers.

Public outsourcing to the private sector is another form of partnership. Public health systems should engage the private sector when appropriate to boost technical capabilities and improve quality standards of the health supply chain, especially logistics and transportation. Partnerships that employ the expertise and assets of multiple sectors at the local, regional, and global levels are critical to sustaining every segment of the GHSC.

Challenges

Supply chain management is not a core business strength of many ministries of health in LMICs. Too often they **lack the contract management and the oversight capacities** needed to outsource transportation and distribution. Insufficient resources dedicated to recruit, train, and retain qualified supply chain staff to manage private sector contractors remains a challenge for many governments. Public-private partnerships must focus on training health ministry staff in data science, analytics, outsourcing, and contracting.

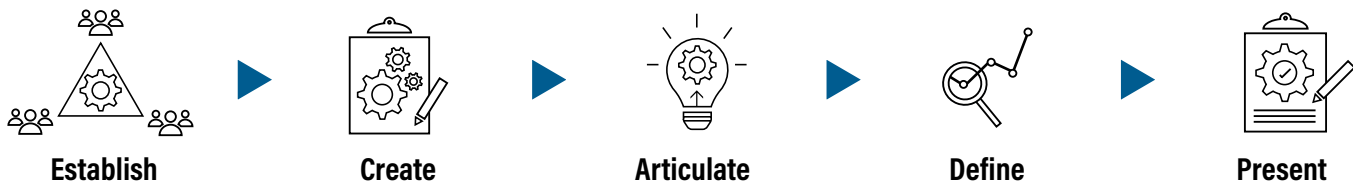
While shifting government resources in LMICs from management of the public health supply chain to overseeing its private sector partners will help to build sustainable and resilient supply chains, it also requires **elevating supply chain management as a profession**. The same donor-assisted programs that have professionalized public procurement in LMICs can be models for supply chain management professionalization.

People That Deliver, a global advocacy initiative that works to professionalize the supply chain workforce in LMICs, says that in many LMICs:

“Access to health supplies suffers from the low importance given to the supply chain and to the personnel who manage and operate it. This low status is characterized by lack of recognition that specific technical skills are necessary for good supply chain management, limited formal educational qualifications or certifications appropriate for supply chain management, limited technical expertise for supply chain management among health systems personnel, and general disempowerment of supply chain managers within health systems.” – People That Deliver³⁷

The organization advocates at the international and national level to develop a cadre of supply chain professionals in LMICs through recruitment and professional certifications.

Best Practices for Launching an MSI



Donor organizations cite that challenges facing MSIs most often involve a lack of governance, transparency, and alignment of objectives.³⁸ A 2015 USAID study of nearly 20 MSIs noted that “setting up an MSI is a high-risk venture, and those considering doing so should proceed with caution.” Best practices lists for launching an MSI from both USAID and PEPFAR include:

1. **Establish an agreed-upon governance structure**, operation norms, and a conflict resolution process.
2. **Create a transition plan** with a blueprint to deliver to the government once the MSI ends.
3. **Articulate objectives and include with a roadmap to achieve them.**
4. **Define what success looks like and how to measure it.**
5. **Require each partner to present a value proposition** outlining how their participation benefits the greater whole and how each of their unique contributions will help achieve results.

Other challenges include making the initial connections, especially for private sector businesses who are trying to engage with large donor organizations or government agencies.

All too often, donor-funded programs have introduced outsourcing supply chain programs in LMICS that reverted to insourcing once the programs ended.³⁹ The need for partnerships that build supply chain management skills and, if necessary, have a transition plan, are required for a donor-funded project to sustain and scale once a partnerships ends.

The Value Add of PSE

Successful and resilient global health supply chains of the future will be built on partnerships **that build capacity, transfer knowledge, and pivot the public sector toward outsourcing to the private sector.** These partnerships capitalize on the relative strengths of each sector to address challenges in LMICs that neither can adequately address on its own.

On Outsourcing

Matthew Barnes, Senior Advisor for Strategy at PEPFAR, says the core of its Next Gen Supply Chain Strategy will be outsourcing supply chains to the private sector.⁴⁰ He says PEPFAR will encourage its government partners and ministries of health to “step away from operating supply chains and into the business of managing and overseeing. The private sector is a critical partner in this.”⁴¹

One the reason is because supply chain operations are labor and resource intensive and require technical expertise. Third-party logistics providers, commonly referred to as 3PL, have the tools at hand to provide supply chain services such as procurement, customs clearance, warehousing, and distribution. Outsourcing what had been private sector services in these particular segments of the supply chain can increase performance while decreasing costs.⁴² And if a more extensive supply chain solution is necessary, fourth-party logistics providers can manage multiple 3PL providers and services.

Outsourcing to the private sector improves overall performance through market-driven competition. Competitive bidding and performance-based incentives stimulate businesses to invest in data visibility and

information systems to remain competitive and win contracts. Private sector contractors are also incentivized to comply with governments regulations, such as medical storage requirements and other quality assurance policies, or risk losing their contracts. And in case of a pandemic or other health emergency, 3PLs are better positioned than the public sector to hire additional employees quickly.⁴³ Overall, outsourcing to small- and medium-sized companies in LMICs helps to sustain economic growth, create jobs, and advance technology innovation.

An innovative contraceptive distribution system in Senegal that began as a partnership with the Bill & Melinda Gates Foundation and Merck for Mothers, **is now transitioning to the Government of Senegal at a national scale** with support from the Global Financing Facility and The World Bank.



CASE STUDY FROM SENEGAL

Outsourcing supply chain logistics to private operators reduced the proportion of facilities experiencing stock-outs from over 80 percent to less than 2 percent.

Before 2016, **women in Senegal had about a 3 or 4 in 5 chance of obtaining contraceptives at public health clinics due to routine stockouts.** The problem, all too common LMICs, was improper supply chain management, specifically inventory management and delivery.

To address this, the government of Senegal embarked on a major overhaul of its supply chain for nine different contraceptives (with two more added later). **Within 6 months, stockouts ceased almost entirely.**

The government of Senegal hired private 3PLs to manage orders and handle deliveries from district warehouses to local health facilities — with clear benefits for service and costs.

One analysis compared cost and service of using private operators versus government employees performing the same activity in a different region of the country. The analysis found that outsourcing decreased the proportion of facilities experiencing stockouts from over 80 percent to less than 2 percent while reducing distribution costs by 36 percent annually.

These gains were achieved during a 3-year program supported by Merck for Mothers, the Bill & Melinda Gates Foundation, and IntraHealth International, among others. During the program, the private sector implemented other components, including an innovative inventory management system and new methods of data tracking to support mobile warehousing. These made stock replenishment more responsive to real consumption. Contractors can now accurately track and verify consumption and stock levels and plan and customize shipments; regular data uploads allow them to quickly address potential issues.

Global Health: Science and Practice. September 2016. 4(3):359-365



Creating Shared Value

“Companies must sometimes team up with governments, NGOs, and even rivals to capture the economic benefits of social progress.”

Economists Michael Porter and Mark Kramer argue that companies can move beyond corporate social responsibility and gain competitive advantage by including social and environmental considerations in their strategies. Treating societal challenges as business opportunities is the most important new dimension of corporate strategy and the most powerful path to social progress.

Shared value results from policies and practices that contribute to competitive advantage while strengthening the communities in which a company operates.

Harvard Business Review

On Shared Value

The shared value between public sector social objectives and private sector core business interests inherently support each other. Partnerships with shared value strategies create what Harvard economists Michael Porter and Mark Kramer calls a “virtuous cycle,” where intentional decisions to improve the social good generates higher profits to reinvest in a self-reinforcing loop.⁴⁴ This is further supported by a recent USAID study, Enduring Results Study 3.0, which concluded that market-oriented partnerships where the private sector has a commercial interest, “scaled more often than the partnerships that used nonmarket-oriented approaches.”⁴⁵ The report also found that “market-oriented partnerships sustained more often by establishing market linkages and/or enabling new customer segments.”

To illustrate, in the global health business strategy for the pharmaceutical giant Merck, two of its three core principles are **a shared-value approach and cross-sector partnerships**, along with providing innovative new drug solutions.⁴⁶ Merck’s open data-sharing platform increases transparency in medical donation supply chains created through public-private partnerships. The tool displays deliveries sent by companies running donation programs — including purchase orders from the WHO — to warehouses, thus painting a clearer picture of in-country inventories.

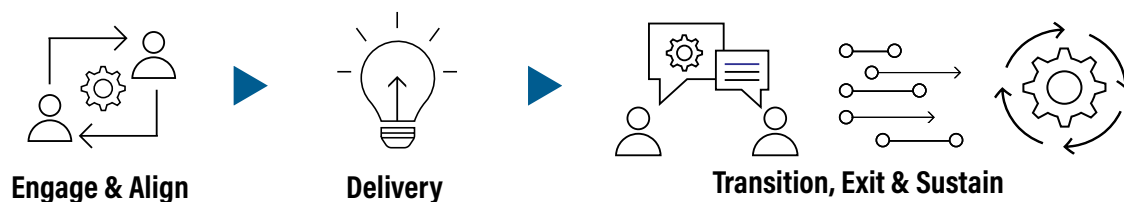
On Building Capacity

Merck is also a founding member the Accessibility Platform, a group that discusses local supply chains, shares best-practices on end-to-end supply chains, and identifies opportunities for collective action.

By their nature, **public-private partnerships build capacity for the supply chain workforce**. For example, Project Last Mile takes a three-stage approach to its programs in Africa:

- 1. Engage and align.** Project Last Mile works with a national ministry of health to improve its health system’s capacity within the local context to meet its unique needs.
- 2. Delivery.** Project Last Mile transfers skills and knowledge from the Coca-Cola system and bottler network to ministry of health partners. The project team’s top experts, mostly sourced from the Coca-Cola system, work with the ministry of health to develop and customize solutions to fit the public health context.
- 3. Transition, exit, and sustain.** Project Last Mile builds the capacity of ministry of health partners to improve and support a sustainable, integrated supply chain solution through detailed transition planning and local engagement.

Best Practices for Capacity Building with Public – Private Partnerships



To meet the **lack of supply chain training** in LMICs, the number of educators and learning centers have expanded globally. For example, the MIT Global SCALE Network, an international alliance of universities dedicated to supply chain and logistics excellence, now has six learning hubs on four continents that teach a common MIT SCALE supply chain management master's curriculum.⁴⁷

On Technology Transfer

One creative partnership to meet the local manufacturing gap is the Biovac Institute in Cape Town, South Africa, a public-private partnership between the Biovac Consortium and the South Africa Department of Health. The partnership incorporated the country's State Vaccine Institute into a commercial company. Today, the Biovac Institute is building capacity around all aspects of vaccine development and manufacture in South Africa for both local and international markets. Over the past 15 years, Biovac has imported, packaged, and distributed vaccines to the private and public healthcare sector in southern Africa — and is poised to become a player on the international vaccine market.



“Establishing strategic partnerships is at the center of Biovac’s success in building capacity in Africa for the development and manufacture of vaccines and biologicals.”

Biovac



IV. How WBD Can Help


The risk management, procurement, and private sector engagement experts at Washington Business Dynamics understand that health supply chains are more than a set of warehouses, trucks, and containers; rather, they see an ecosystem of products, organizations, workers, technology, activities, funds, and information united around a mission to deliver health supplies from the factories to the people who need them — wherever they live — in the most cost-efficient way. Our consultants also know that supply chains are more than a one-way delivery system; they return information, too. Patient information and small health clinics on the last mile to the supply chain collect and return data, such as inventory stock or a local disease outbreak, that in turn helps supply chain forecasters **make better decisions**. Because we work in acquisition and risk management for the US Departments of Defense and Homeland Security, and our team of consultants support the Private Sector Engagement Hub for USAID, WBD is uniquely positioned to both strengthen global health supply chains through private sector engagement and manage supply chain risks with our advanced technological capabilities.

On Supply Chain Risk Management

WBD takes a **holistic approach to identifying, assessing, and responding to risks**, whether they arise internally or externally in a supply chain. We have a comprehensive risk management approach for our US government clients that monitors and proactively responds to supply chain risks whenever they appear. As a result, our clients can evaluate the information they receive along the supply chain, weigh options, and mitigate risks in a strategic and measured approach.

For its client at the Department of Defense in 2019, **WBD designed a secure dashboard-enabled acquisition tool** that allows the government to avoid costly third-party software. The tool allows users to track the development of procurements through their lifecycle and monitor all inputs, outputs, discussions, and decisions quickly and efficiently in a secure and local database.

WBD staff developed program risk tracking heat maps and matrices that are now deployed in support of our **FEMA client**. These heatmaps are updated on a minute-to-minute basis, displayed via dashboarding software. The risk metrics consist of calculations on financial, acquisition, supply chain, and delivery risks.



The team has also **developed advanced analytical tools** that collect, analyze, and track online sentiment in support of **one of our federal clients**. This tool analyzes “consumer” sentiment and produces strategies to mitigate negative sentiment, and highlights positive sentiment, reducing overall risk to the organization.

7

Key features of WBD’s supply chain risk management strategy include:



1. Map supply chains to identify first, second, and third-tier suppliers.

Identify the location and activities of all facilities in the supply chain and all actors involved, including contractors and sub-contractors. Identify vulnerabilities and gaps along the chain, enter them on a register, and continuously monitor all. A comprehensive supply chain map allows managers to identify potential impacts on their suppliers and products in the face of a crisis, such as PPE supplies during the COVID-19 pandemic, and address them quickly by pivoting to alternate locations or by onboarding new suppliers.



2. Diversify supply chains, but build and maintain relationships.

We know that dependence on a single supplier or suppliers from a single geographic concentrates supply chain risk. A diverse supplier base, on the other hand, allows managers to shift production to alternative locations if there’s a disruption. WBD encourages building strong relationships with all supply chain partners and suppliers so that when disruptions occur, the ability to pivot and/or collaborate improves.



3. Use WBD sustainable public procurement capabilities to reduce costs and minimize risk. What we buy and where we buy it matters. Sustainable public procurement encourages diverse and local suppliers that improves communities, reduces costs, and prioritizes safe products — including health supply commodities.



4. Identify potential sources of risks, both internal and external.

Internal risks include inadequate reporting structures, insufficient funding or human resources, or lack of integration. For example, a recent report from the USAID Inspector General found that some of its missions’ “capacity-building activities did not fully prepare host government officials to take over supply chain functions” and also were “operating parallel supply chains.”⁴⁸ We use the comprehensive supply chain map to continuously track all external risks along the chain as well, (e.g., socio-economic problems, political turmoil, environment issues) including identifying the gaps where data is absent.



5. Establish good governance structures and practices.

For our government clients we conduct regular risk assessment reviews and scenario analyses to identify, record, and track vulnerabilities. We direct regular risk awareness and response trainings, including crisis communications. Overall, we cultivate a “risk awareness culture” that appreciates the reality of unknown risks.



6. Protect against cybersecurity threats.

WBD employs proprietary digital tools and advanced technologies, including IoT, in all our risk management frameworks. Protecting against fraud and cyberattacks — malware, ransomware, phishing, and hacking — underlies all our work supporting the US government. Along with the increased digitization of the supply chain comes increased demand for additional measures to ensure data privacy and security. To that end, we are in process of receiving our Cyber Maturity Model Certification from the Office of the Under Secretary of Defense for Acquisition and Sustainment and expect to receive it in 2022.⁴⁹



7. Tools for the future.

Blockchain technology has a promising future in supply chain management.⁵⁰ In a blockchain network, transactions are contained in chronologically linked blocks and stored in “tamper-proof” network nodes. Although blockchain technology for supply chains is still in its early stages, our data scientists can deploy blockchain and other technologies into tomorrow’s supply chains.

On Engaging the Private Sector

WBD has supported governments in Southeast Asia and Africa through the Millennium Challenge Corporation (MCC) as well as USAID on how to engage the private sector to improve development outcomes. This work includes strengthening supply chains for health in LMICs. Our team of economic development consultants advise, promote, and facilitate partnerships that support market systems for our client USAID under our Private Sector Engagement Support contract.

Our approach to making connections between governments and donor organizations with private sector partners is deeply rooted in creating shared value and building partnerships based on mutual trust. This includes fostering transparency to make sure all details of the engagement are understood by both partners.

Where outsourcing to the private sector is appropriate, we ensure that capacity-building is built into the contract. Where appropriate, we conduct a **comprehensive, cost-risk-benefit and private-sector capability analysis that may include:**

- **Cost analysis** of the existing government-run transport and distribution system
- **Landscape analysis** of regulatory barriers and market maturity to identify market-based solutions.
- **Survey** of the private sector logistics operators' geographical reach, costs, labor practices and standards, technical capabilities, and quality assurance capacities
- **Ensure government ownership** of the process at the top levels, including the finance ministry, to ensure analysis is fully funded, implemented, and moves forward.
- **Assistance finding suitable private sector contractors**

Together, WBD's risk management team and private sector engagement specialists offer unique capabilities to **secure and strengthen existing supply chains in LMICs** with private sector technologies, innovations, and market-based approaches that build public sector capacity alongside securing health supply chains.



Endnotes

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