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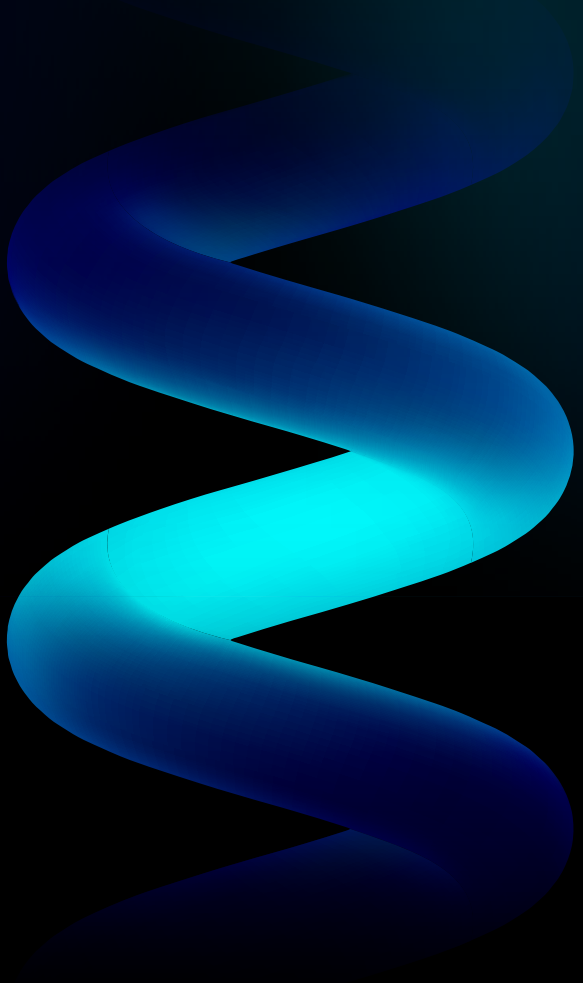
DIGITAL TRANSFORMATION FOR A RESILIENT SUPPLY CHAIN



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SPECIAL REPORT

Digital transformation for a resilient supply chain

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SPECIAL REPORT

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Why pharma must turn to digital transformation for greater supply chain resilience

By Sheila Kennedy, CMRP, contributing editor

Over the last several years, pharmaceutical leaders have come to realize that their old ways of supply chain management are vastly inadequate for today's hard-hitting challenges. A paradigm shift is underway as manufacturers face this reality and work to address the risks that threaten agility and resilience, not to mention product availability and safety.

Volatility across the world has put a spotlight on deficient resiliency planning, with inflexible supply chains and inadequate safety cushions causing disruptions in commercial and clinical manufacturing processes. It has exposed the industry to delays in drug development and clinical trials, slowdowns in manufacturing, and at worst, product shortages—including of potentially lifesaving medicines.

Arguably, the confluence of issues has a bright side: it hastened a change in the perception of digital transformation from a curious and potentially intriguing concept to a modern-day business necessity.

WHAT CHANGED?

The COVID-19 pandemic that set the global supply chain crisis in motion is showing no signs of abating. Early in the pandemic, dextrose (glucose), a commonly used raw material, faced severe shortages due to a spike in demand from hospitals. The rush to develop vaccines also caused shortages due to the common nature of ingredients with other lifesaving and life-enhancing drugs, which forced suppliers to reprioritize, says Nakul Nagarajan, Manager of Consulting at GEP (www.gep.com).

Subsequent variants of COVID are still causing periods of lockdowns or business restrictions in parts of the world, including major manufacturing centers such as Shanghai and Beijing. Each such event potentially limits access to critical inventory such as ingredients, packaging, and equipment parts.

But the pandemic is not the only culprit. Long-standing skilled labor shortages and recent geopolitical developments have also constrained decades of 'well-oiled' global supply chains. For instance, the Russia-Ukraine conflict caused

"Because of supply shortages, manufacturers are now forced to either update recipes or add new sources rapidly—a process that typically took several years before the pandemic."

some trade, clinical trials, and investments in Russia to cease; bans on Russian oil may affect the availability of plastics used in medical supplies; and imports of Ukrainian aluminum foil, a common packaging component, may be at risk.

Because of supply shortages, manufacturers are now forced to either update recipes or add new sources rapidly—a process that typically took several years before the pandemic.

A parallel challenge is how the portfolio of drugs approved by the FDA has rapidly expanded and become more complex. "From 2017 to 2021, the FDA approved 40% more medicines than in the previous five-year period," explains Nagarajan. "During the same 10-year time span, biologics, which are more complex medicines, have nearly doubled in approvals. These trends are expected to continue and grow more complex with the introduction of next-generation personalized medicines such as cell therapy."

WHY SUPPLY CHAIN DIGITALIZATION MAKES SENSE

When data is siloed and disconnected, access to production statuses, inventory levels, capacity, forecasts, KPIs, and other essential decision-support information is delayed. When supply chain processes are overly lean and inconsistent, exposure to risk increases and any mitigation requires serious effort. The fact that pharmaceuticals, biopharma, and life sciences are such highly regulated industries only intensifies the problem.

Digitizing supply chain information and digitalizing supply chain processes and systems improves visibility, promotes collaboration, and enables better and faster decision-making based on real-time data. It delivers the ability to sense changes in demand and predict disruptions, and quickly and efficiently make effective adjustments.

Standardizing on a single, centralized platform for purchase orders, inventory, manufacturing, forecasting, and vendor-managed inventory helps not only the pharma manufacturers but also their suppliers, contract manufacturers, and distributors by improving collaboration throughout the supply chain. Nagarajan has seen some real-world examples:

- **End-to-end inventory visibility:** An inventory dashboard provides a comprehensive view by SKU of the inventory status, short-term and long-term forecasts, supplier information, and delivery status. It makes real-time information available to cross-functional teams and allows them to rapidly prioritize critical actions. It is also used as a tool for escalation management. A decision-making process was set up around this tool where teams at different levels are empowered to make financial decisions to mitigate risks based on the insights the dashboard generated. These decisions require extensive business cases that in the past took weeks to analyze and prepare but now can be compressed to a few days.
- **Strategic risk and resilience planning:** A risk dashboard visualizes a database of raw material BOMs with supplier information, including real-time risk ratings codified using algorithms and linked to an annual resiliency planning process. It also displays external insights such as weather-related disruptions or compliance risks that impact parts of the supply chain. This dashboard's information enables procurement leaders to quickly zoom in on areas needing intervention. It is not for day-to-day problem solving but rather for strategic resilience planning.

GLOBAL PHARMA COMPANY'S RESILIENCY GAINS

Digitalization helped a global pharma company to close sizeable gaps in its supply chain processes. Its considerable operations span 65 countries and include more than 100 legal entities, which are dependent on a seamless access to time-sensitive ingredients and critical operational parts and spares.

"Standardizing on an advanced digital supply chain management solution delivers to pharma manufacturers and their suppliers the power to improve planning, collaboration, and execution—and ultimately build resilience."

The lack of a unified platform for supply chain management compromised its inventory management and procurement efficiency and inhibited collaboration with its commercial and clinical suppliers. To improve visibility, agility, and resilience, it was necessary to automate time-consuming, costly manual processes and consolidate on a single source of truth.

Implementing GEP NEXXE, a next-generation supply chain management software from GEP, and connecting it with existing ERP systems and other enterprise applications significantly improved supply chain visibility, reduced costs and allowed for better collaboration. Leveraging vendor-managed inventory for automated supplier replenishment helped to maintain inventory at optimal levels. Implementing GEP NEXXE Control Tower provided live reports of supply chain disruptions.

Additionally, harmonizing the technical infrastructure with GEP S2P enabled a unified user experience. A single login for suppliers allowed them to participate in purchase order, forecast, and quality collaboration.

The benefits reported are substantial:

- Up to 40% reduction of obsolete inventory
- 10%-20% reduction in lead time on order-to-ship-to-receipt velocity
- 30%-40% reduction in issue resolution time
- 20%-30% productivity gain in order management and warehousing
- 50% increase in operational efficiency by reducing the overhead of multiple systems
- Better planning across the supply chain through better collaboration
- Reduced capacity constraints, rejections, and stockouts

READY TO PROCEED?

Pharma companies considering embarking on digital transformation can take steps to ease the journey, such as these three recommended by Nagarajan:

1. It goes without saying that data accuracy and ongoing stewardship is crucial to ensuring success. The data must be refreshed at least once daily, if not available in real time.
2. Focus on tools that democratize data visibility and allow for cross-functional collaboration.
3. The biggest ROI comes from digitizing repetitive analytical tasks and synthesizing large sets of data such as supply planning, forecasting, and knowledge management aspects.

Digitalization is key to improving business visibility, agility, intelligence, and performance, particularly in times of ongoing global volatility. Standardizing on an advanced digital supply chain management solution delivers to pharma manufacturers and their suppliers the power to improve planning, collaboration, and execution—and ultimately build resilience. ☐

Digital essentials for an agile, resilient and high-performing pharma supply chain

The global pharmaceutical industry has experienced unprecedented growth in recent years, with revenues surpassing $1.25 trillion in 2020.[1]

At the same time, the industry is confronting extraordinary change and disruption. The challenges facing individual pharmaceutical companies and the sector — even before the pandemic — are immense. They include globalization, changing consumer demand and the integration pains that come with mergers and acquisitions.

This is occurring in one of the most highly regulated industries. Pharma companies must navigate a sea of jurisdictions for drug approval and market access. And subsequent hurdles in logistics and navigating customs are well illustrated by the challenge of delivering COVID vaccines via a cold supply chain.

All these factors contribute to what the pharma C-suite sees as the No. 1 challenge for the industry: the increasing complexity in the operating environment.

Pharmaceutical companies need to meet these challenges while still achieving their strategic priorities, including strengthening R&D and drug development, establishing better control over processes and operations, containing costs and driving growth.

THE PANDEMIC IS STRESSING PHARMACEUTICAL SUPPLY CHAINS

Supply chains are critical to building resiliency and agility for a business, underpinning its ability to weather a storm and pivot to address business changes and opportunities.

COVID-19 was a wake-up call that further exposed the weaknesses in many a supply chain. From the C-suite to Wall Street to the White House, there is an increasing focus on supply chain resiliency, particularly in the healthcare and pharmaceutical sectors.

Over the past two decades, the pharmaceutical supply chain, like those in most industries, sought to globalize and become lean. Unfortunately, the result has been that pharma supply chains have become too extended and exposed, growing progressively rigid and inflexible.

This has left them increasingly prone to risks and disruptions. And, despite all the benefits, those

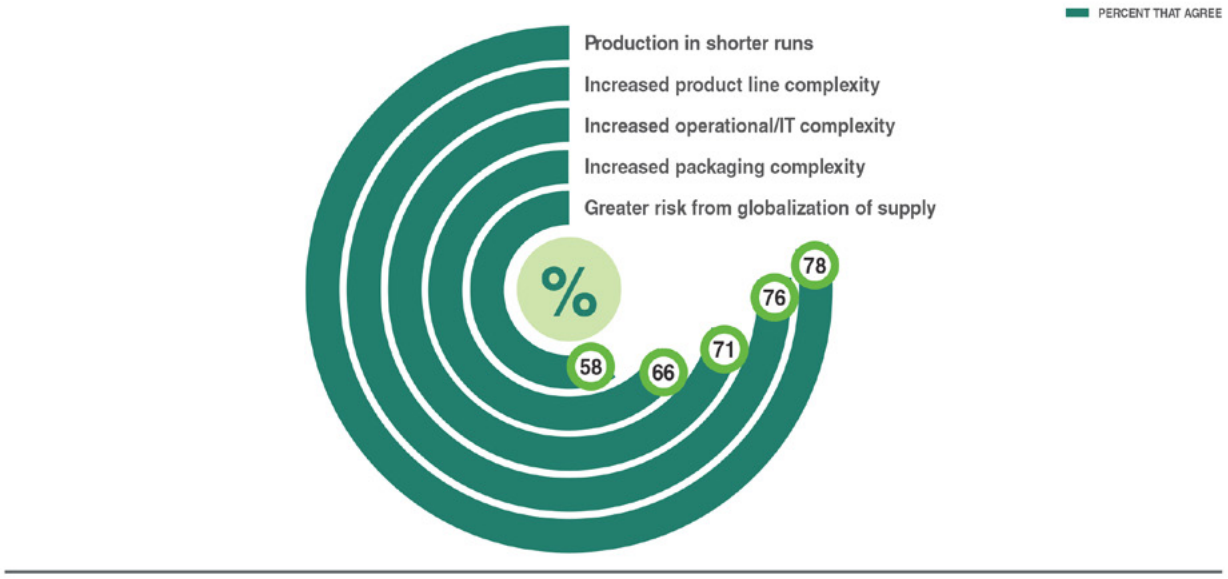
PHARMA INDUSTRY CHALLENGES

Reliance on contract manufacturing organizations (CMOs) has heightened as globalization of the industry has brought increased competition and driven greater reliance on partners and contract manufacturing organizations.

Mergers and acquisitions (M&As), which grew 35% over the past year, [2] have increased production capabilities and fueled growth while bringing significant integration challenges.

Changing consumer demand and innovation are driving a greater diversity of products, targeted therapies and personalized medicines. The result is a shift in contract manufacturing and production to smaller lots and shorter timelines. In addition, the rising cost of drug development and R&D expenditures — which rose more than 60% in the last decade[3] — and accelerating generic drug approvals also have increased the growth of products in the market and impacted production.

Complexities in the Global Biopharmaceutical Ecosystem



Source: The Supply Chain Resource Cooperative and North Carolina State University

risks are exacerbated when a company works with CMOs.

Robert Handfield, executive director of the Supply Chain Resource Cooperative and distinguished professor of operations and supply chain management at North Carolina State University, summarizes the post-pandemic pharmaceutical supply chain environment as:

- **Volatile** – Experiencing high demand and supply volatility due to rapid and dynamic changes
- **Uncertain** – Defined by high variability and less predictability
- **Complex** – Highly complex given globalization, M&A, and the growing number of varying products
- **Ambiguous** – Struggling with fragmented and siloed planning processes

Dr. Handfield posits that the existing pharmaceutical supply chain is incapable of navigating the new operating environment. As he states, "Digital connections still do not permeate your supplier network, data is siloed and updated in batches instead of in real time, processes are inefficient and highly manual, and there have not been sufficient resources put into risk and disruption sensing and response. Not to mention that contract manufacturers still don't even have a seat at the planning table."

BY THE NUMBERS: THE STATE OF THE PHARMACEUTICAL SUPPLY CHAIN

The state of readiness of pharmaceutical companies to meet the challenges of the post-pandemic operating environment is well documented and illustrated through a few key performance indicators (KPIs). Of course, there are unique circumstances for each industry and each company, but the pharma industry is generally underperforming:

Stock turns — measures of how quickly a business turns over inventory — lag in the pharma industry. An average pharma company has about one-third the stock turn rate of a best-in-class pharma company

"The GEP team enabled us to weather the COVID-19 crisis, and despite all obstacles, helped us transform at full speed. At a time when we needed GEP the most, its partnership and dedication were invaluable in supporting our fight against the coronavirus pandemic and in pursuing the Bayer vision of 'Health for All, Hunger for None.'"

— Thomas Udesen, Chief Procurement Officer, Bayer

and less than one-tenth the rate of a best-in-class manufacturing company.

On-time-in-full (OTIF), a measure of how quickly and effectively a company can meet the demands of its customers and markets, is extremely poor for the average pharmaceutical company, ranging between 60% to 80% as compared to 99.6% for best-in-class manufacturers.[4] The process capability index (Cpk), a measure of process capability and efficiency, is just one-third of that for best-in-class manufacturing companies.

Based on the data, the conclusion is clear that the pharmaceutical industry is failing at supply chain execution and has tremendous room for improvement.

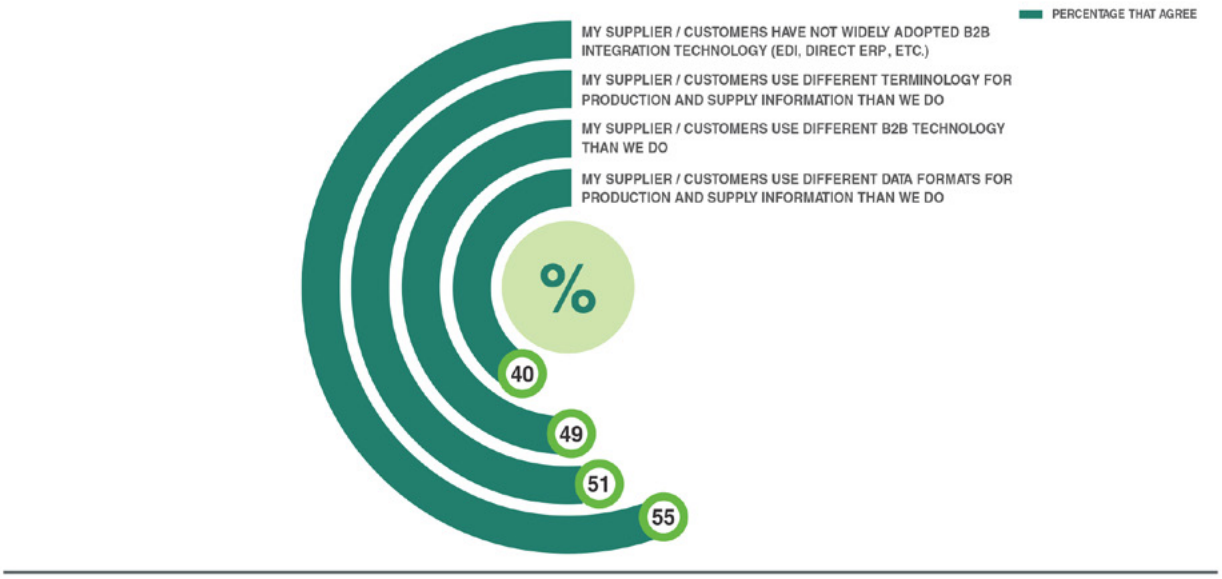
DATA AT THE ROOT OF THE PROBLEM

Leading pharmaceutical supply chain executives report that the root of their problems lies in poor data visibility and disconnected processes, among other areas. Traditional ERP systems lack the real-time data visibility and robust reporting demanded for an optimally operating global pharmaceutical supply chain. And point solutions that address particular pain points don't easily complement ERP systems and other supply chain solutions. In sum, these executives understand that their current technology stack for sharing information and collaborating does not serve the modern needs of the

Key performance indicator	Pharmaceutical industry now	A winning pharmaceutical plant	A world-class manufacturing plant
Stock turn	3 to 5	14	50
OTIF	60% to 80%	94.4%	99.6%
RTF	85% to 95%	96.0%	99.4%
Cpk	1 to 2	2.5	3.2
OEE	30%	74%	92%
Cycle time (hours)	720	48	8

Source: Supply Chain Resource Cooperative

Degree of Shared Electronic Protocol



Source: Supply Chain Resource Cooperative

pharmaceutical supply chain and the company.

Executives report a critical need for real-time visibility and data access. Their priorities for real-time data are in the areas of production status, production forecasts and inventory. Simply put, these executives want to know: Where is my order? What is its status? They want information on production forecasts and capacity. Too often, this information resides in paper or Excel format and is not easily available or accessible on demand.

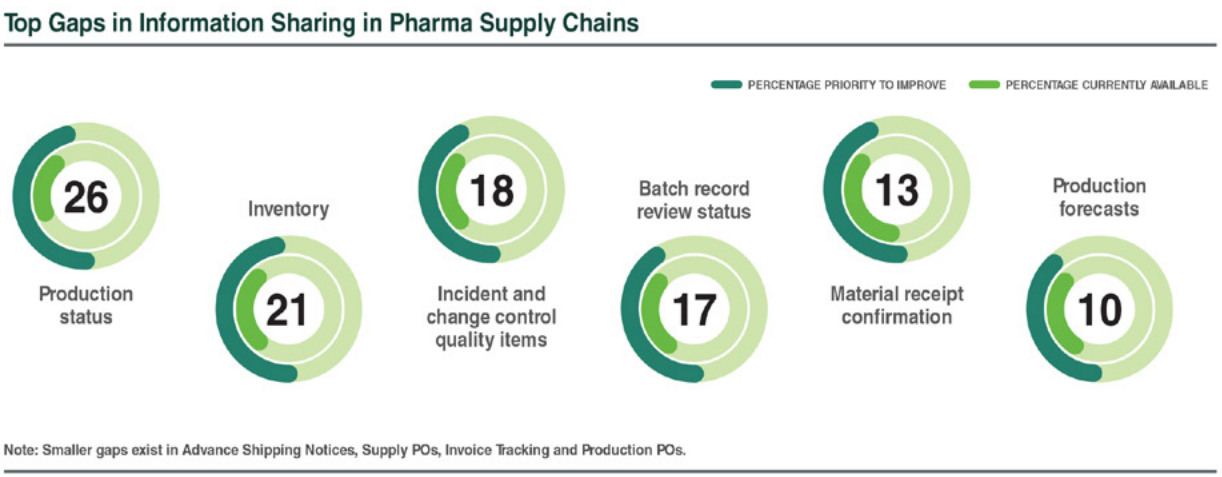
About two-thirds of pharma supply chain executives are dissatisfied with the overall level and detail of the metrics that they receive. They are often not receiving KPIs and reports as frequently as they would like to ensure optimal or even acceptable performance. For example, OTIF is reported monthly for the average pharma company, whereas executives would ideally prefer to have weekly OTIF reporting.

Most executives report a need for weekly or more frequent reporting on active pharmaceutical ingredients (APIs), WIP goods and expiring inventory. However, in a survey conducted by the Supply Chain Resource Cooperative and North Carolina State University, 60% of pharma supply chain executives reported that they were dissatisfied with the timeliness of their data and reporting around critical KPIs.

PHARMA COMPANIES TRANSITIONING TO DIGITAL SUPPLY CHAIN

To address these inadequacies, the pharmaceutical industry is shifting to modern, digitally enabled supply chains. This transformation takes pharma supply chains from static and siloed states to a more collaborative and integrated supply chain. Effective supply chains can sense and respond to changes in demand to predict and mitigate risks and disruptions more readily.

For most pharma companies, this involves an ongoing digital transformation to enable centralized and real-time access to critical data. The goal is streamlined and automated core processes and increased



Source: Supply Chain Resource Cooperative

capability to collaborate internally and externally.

This process includes a focus on:

- Gaining access to the key production and supply chain data in a timely and precise fashion
- Providing overall and detailed visibility across supply relationships and across the production life cycle from order/ forecast to final product delivery
- Getting all companies, facilities and virtual supply teams in the supply network connected
- Enabling joint value creation and better decision-making by providing an operational environment for multienterprise collaboration on shared business processes in the supply chain

A DEEPER DIVE: 4 STRATEGIC IMPERATIVES FOR PHARMA SUPPLY CHAINS

This section takes a closer look at how a digital transformation with a unified supply chain platform can impact four critical challenges for pharmaceutical supply chains. We'll also examine the specific capabilities and benefits of real-time data visibility, streamlined and shared processes and greater internal and external collaboration:

1. Risk mitigation and resiliency

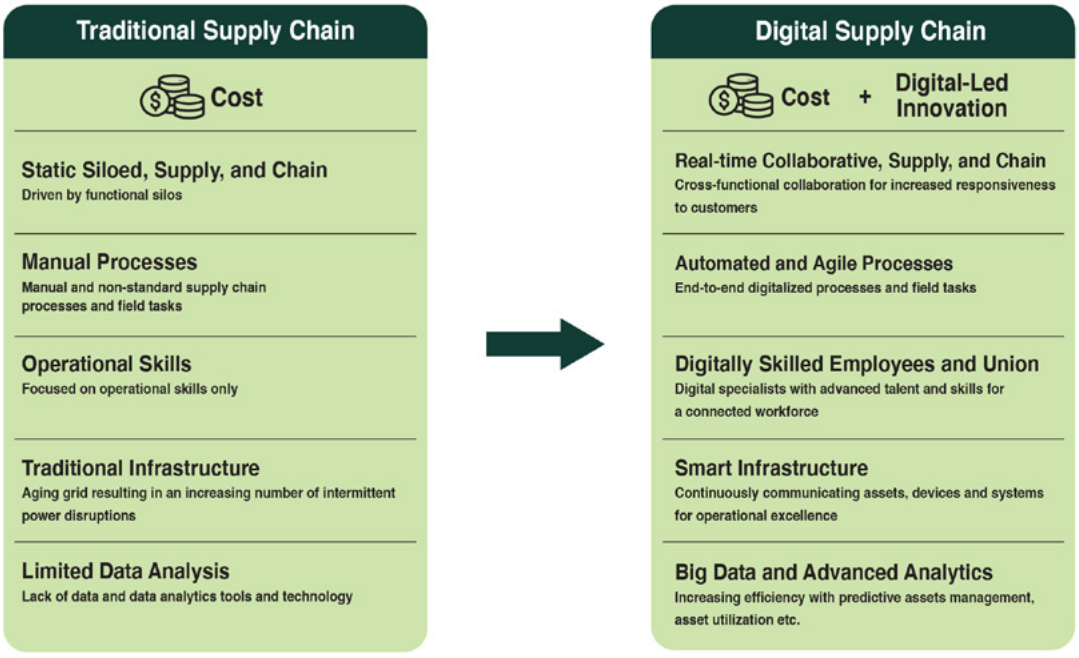
Pharma companies generally have suboptimal visibility into and collaboration with contract manufacturers, suppliers, and distributors.

They lack timely and accurate insight into consumer, partner and market-by-market demand. In addition, they have poor visibility into external disruptions and a lack of understanding of their impact on their supply chain.

Finally, they lack real-time visibility into inventory, including inbound and expiring inventory and the status of OTIF delivery to customers. This all adds up to a limited view of risks and disruptions — and limited agility and ability to respond to demand fluctuations and mitigate the impacts of risks and disruptions. Risk management and resiliency have become a top strategic priority for pharmaceutical companies — and should be the top priority for their supply chain organizations.

With a unified supply chain platform that provides real-time data and intelligence, streamlined and shared processes, and greater collaboration, pharma supply chain organizations can:

- Leverage a central **control tower** tapped into all relevant systems and data sources for centralized, real-time visibility across the CMO, supplier and partner ecosystems. This includes integrating third-party data sources for better visibility into external events.



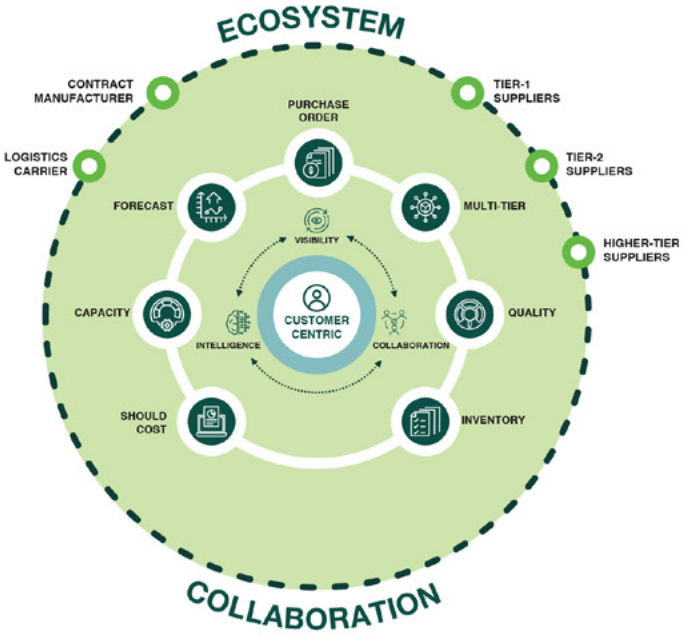
- Establish **multi-tier visibility** into CMOs and suppliers and the suppliers that feed those organizations. This extends visibility to see potential disruptions earlier and provides time and information for mitigating action.
- **Streamline and establish shared processes** and regulated, shared visibility with CMOs, key suppliers and partners, improving and accelerating collaboration. This is particularly helpful with shared capacity and forecast planning, greatly improving accuracy and expediting response to demand fluctuations and disruptions and ensuring smoother inventory flow and production.
- Deploy best-in-class supply chain platforms **enabled with AI** to provide correlation and analysis of data and KPIs. **Smart alerts** to potential disruptions or issues provide an understanding of the impact on operations and orders and offer **recommendations for "next best actions"** based on history and organizational standards. These platforms also include collaboration capabilities for internal and external teams to work together on specific issues, linking relevant data and documents to the workspace and in-app messenger.

2. API and raw material costs, cost fluctuations and shortages

Pharmaceutical companies and CMOs cite costs, availability and price fluctuations of APIs and raw materials as significant challenges. However, lacking real-time data and intelligence on API prices, availability and inventory, companies are too often forced to keep large safety stocks of these components.

The COVID-19 pandemic exacerbated API demand, availability and volatility issues. The market dispersion of production of APIs — with the U.S. and Europe home to roughly a quarter of FDA-approved API production each and China and India accounting for 31% of production combined[5] — put a renewed focus on the associated supply chain and political risks in each of these markets. With the virus's early spread in China and subsequent strong spread in India, concerns on the impact of API production flared.

The GEP Collaboration Suite



With a unified supply chain platform, pharma supply chain organizations can mitigate some of the impacts of API and raw material costs as well as price and availability volatility:

- Leverage **demand sensing** capabilities that apply data intelligence from historical trends and market sources, as well as detect events and conditions that will impact API and raw material prices and availability.
- Use links with **live market indices,** as well as forecasts, historical data and alerts, to greatly enhance visibility into prices and cost-reduction opportunities.
- Provide capabilities to **analyze prices**, assess trends and market indices and compare should-cost against actual costs. Analytical and predictive models compare costs and indices over time and allow you to drill down into each element for granular visibility into cost drivers.
- Integrate supply chain platforms with procurement to offer comprehensive, real-time visibility across end-to-end sourcing, **procurement** and supply chain processes.
- Gain fast and easy access to **forecast data** across items, sites and suppliers enabled by buyer-supplier master data integration.
- Manage forecasts and receive commits in app for long-range and **replenishment forecasts** to quickly respond to market conditions.
- **Simulate "what-if" scenarios** and forecast changes in real time, enhancing the ability to proactively plan for a range of situations.

3. Increased reliance on CMOs

The pharmaceutical supply chain is increasingly reliant on external CMOs. The average pharmaceutical company works with 37 different CMOs, accounting for 39% of their production, according to the Supply Chain Resource Cooperative at NCSU. In addition, CMOs require a network of hundreds of material suppliers, whereas that number stood at a dozen or two just ten

years ago. The number of suppliers and material components they must manage significantly increases the complexity of inbound supply for CMOs.

Capabilities to consider include:

- Provide **shared platform** for visibility and processes with contract manufacturer organizations, improving communication and collaboration in supply planning and forecasting.
- Enable contract manufacturers to **share and react to forecast and capacity data** and reports for greater forecast and capacity planning.
- Allow users to view and **analyze capacity** of manufacturing/assembly lines at the group or item level.

4. Nearshoring

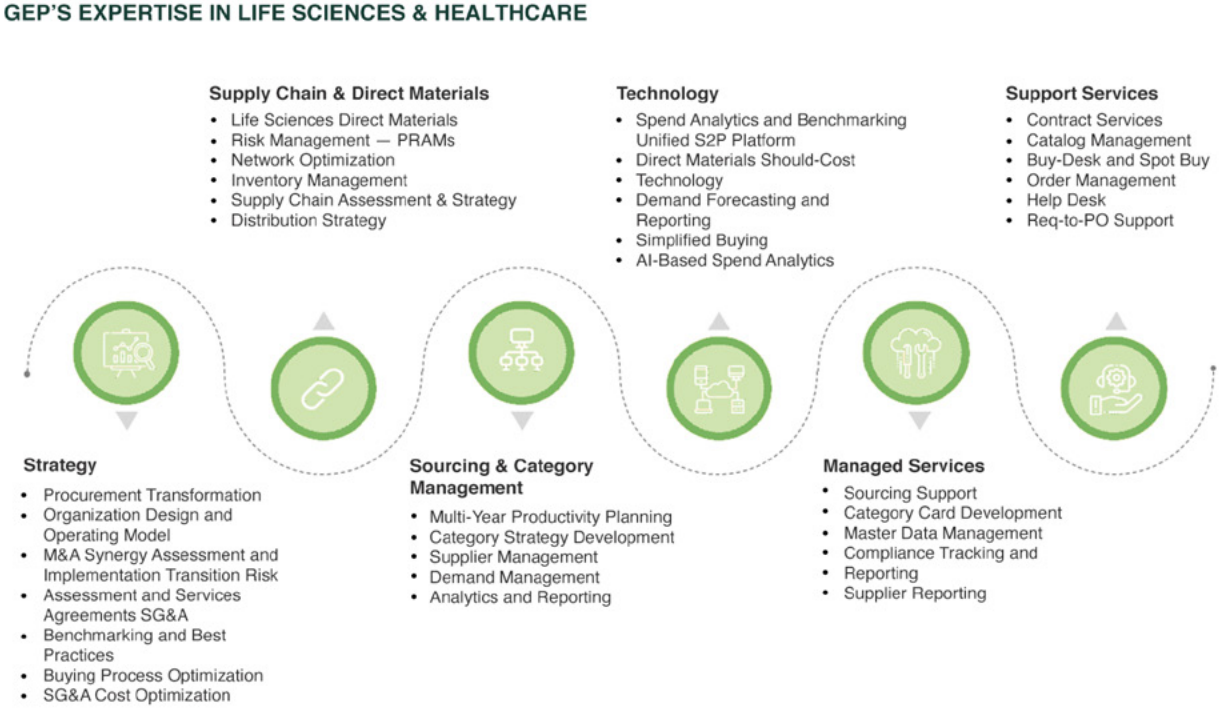
Offshoring has been growing in pharma for more than two decades, driven by the labor advantages of operating in countries such as India and China. This model made sense when pharma manufacturing was highly labor intensive. However, the growing adoption of automation and robotics, challenges in transportation to major markets and local bureaucracy have provided headwinds against offshoring.

With the onset of the global pandemic and resulting market and political demand for critical drugs and APIs, the idea of nearshoring has accelerated and gained C-level attention. In addition, competitive and market drivers are causing a shift from global supply chains to more self-sufficient regional pharmaceutical supply chains.

As a result, nearshoring — the practice of transferring certain business operations, CMO and key supplier operations to major markets and nearby countries — is gaining momentum. This approach aims to reduce costs, particularly for transportation and customs clearing.

With a modern supply chain platform, pharma supply chain organizations can accelerate nearshoring and offset some of the challenges of collaborating with CMOs and key suppliers:

- A **shared collaboration platform** and configurable **workflows** efficiently and effectively



"With a modern supply chain platform, pharma organizations can accelerate nearshoring and offset some of the challenges of collaborating with CMOs and key suppliers."

bring together different stakeholders across your supply chain.
- Extended external, real-time visibility combined with AI-enabled capabilities empower your organization to be more **agile** in response to disruptions and business model changes.
- Highly configurable workflows and low-code design **accelerate the digitalization and automation** journey while providing the flexibility to customize to your unique operating environment.

GEP – A PARTNER IN YOUR SUPPLY CHAIN TRANSFORMATION

Pharmaceutical companies face a dynamic future. Breakthroughs in drug development, technological advancements and globalization represent distinct opportunities. However, the decline in R&D efficiency is a significant challenge. In this environment, pharmaceutical companies would be well advised to assess their supply chain strategy, operations and effectiveness.

GEP works with numerous Fortune 500 and Global 2000 clients to leverage AI-enabled supply chain solutions to en- hance their business value and support innovation and production. We work with you to:
- Transform supply chain [and procurement] functions to create, capture and sustain value
- Drive risk assessment and mitigation planning for complex and geographically diverse supply chains
- Enable synergy assessments and value capture in mergers and acquisitions, as well as perform transition planning for divestitures

GEP NEXXE™ SUPPLY CHAIN MANAGEMENT

The global business environment is getting increasingly complex and susceptible to disruptions. Customers expect products to be constantly available and delivered seamlessly. GEP NEXXE provides better visibility, collaboration, and intelligence to optimize and orchestrate complex supply chains. The modern, open platform and cutting-edge AI connect people and processes assists in making better, faster decisions in response to disruptions and shifting customer demand. Enable seamless collaboration and effective execution with trading partners and multitier suppliers.

INTEGRATED SOLUTION FOR END-TO-END SUPPLY CHAIN AND PROCUREMENT

GEP NEXXE provides a robust, flexible suite of functions that enable enterprises to thrive by bridging the gaps between procurement and supply chain planning and execution. It enables your supply chain to align with your business goals with the seamless flow of goods, information and capital that help you manage risk, speed up time to market, improve quality, and drive growth for the enterprise.

BUILT ON LOW-CODE/NO-CODE ARCHITECTURE

GEP NEXXE's low-code/no-code

design truly empowers supply chain professionals to configure their workflow and build new capabilities easily — without a heavy dependency on IT. Users can build customized applications by dragging and dropping components, without the need for specialized coding knowledge. It enables supply chain teams to configure apps efficiently and rapidly to suit their specific needs and business process changes.

ADVANCED AI AND ML

GEP NEXXE uses Advanced AI and ML to solve real-world supply chain problems. The advanced technologies embedded in the platform correlate structured and unstructured data and run predictive and prescriptive analytics to alert supply chain teams on upcoming events and advise them on the next best action. And when disruptions happen, AI helps to connect the dots and enables supply chain teams to quickly identify and understand the impact.

REAL-TIME DATA EXCHANGE FOR EXCEPTION MANAGEMENT AND DECISION-MAKING

GEP NEXXE provides real-time data and insights for data-driven decision-making to help your supply chain adapt to constant changes and increase resilience. The solution enables actions managed by exceptions through alerts, notifications, fraud detection – to proactively mitigate disruptions.

INTUITIVE, USER-FRIENDLY REPORTING

The user-centric interface enables faster user adoption, saving time and money and enabling easy visualization and reporting on data in the way users want. The system is adaptable and scalable, so it can expand easily to accommodate different business locations, larger volumes of data and business process changes.

FLEXIBLE, OPEN PLATFORM THAT CONNECTS ALL SUPPLY-CHAIN AND ERP SYSTEMS

GEP NEXXE connects to any legacy system and enables enterprises to access their data from a single digital workplace with its flexible, secured, cloud-agnostic, system-agnostic platform. Strong out-of-the-box functionalities and ease of configuration to your enterprise-specific workflows mean a low barrier to entry for customers through reduced time and cost of implementation. Modernize supply chain technology to provide greater business agility. ◻

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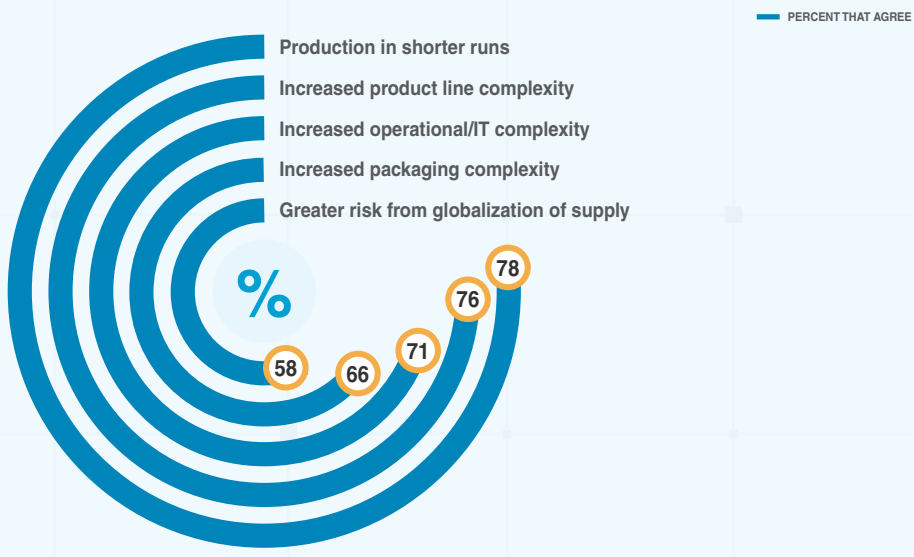
COLLABORATION CAPABILITY IS A TOP PRIORITY FOR PHARMACEUTICAL SUPPLY CHAINS

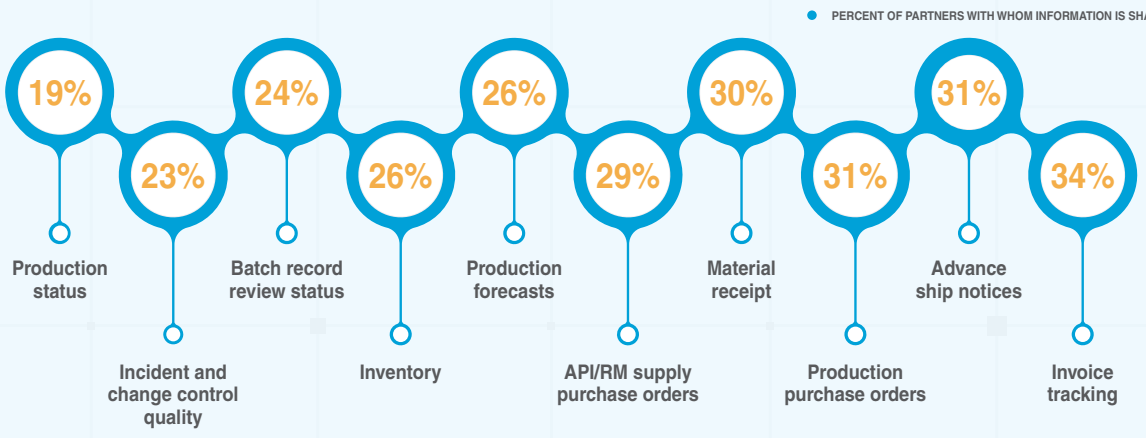
Data-driven, action-oriented collaboration with suppliers and contract manufacturers is now imperative to navigate the complexities of today's operating environment.

Complexities in the Global Biopharmaceutical Ecosystem



Source: Dr. Robert Handfield (NCSU): "Analysis of Performance and Collaboration in Production and Supply Operations"

Extent of Data Sharing in Manufacturing and Supply Chain



Source: Dr. Robert Handfield (NCSU): "Analysis of Performance and Collaboration in Production and Supply Operations"

Top Gaps in Information Sharing in Pharma Supply Chains

Note: Smaller gaps exist in Advance Shipping Notices, Supply POs, Invoice Tracking and Production POs.

Source: Dr. Robert Handfield (NCSU): "Analysis of Performance and Collaboration in Production and Supply Operations"

Key Elements to Drive Supply Chain Performance

CONNECTIVITY
A supply network in which companies, facilities and virtual teams are tightly and digitally connected

DATA
Access to the latest, most accurate production and supply chain data

VISIBILITY
A holistic, detailed visibility across supply relationships and production life cycle

COLLABORATION
Create an operational environment that facilitates multi-enterprise collaboration across shared supply chain processes

Source: Dr. Robert Handfield (NCSU): "Analysis of Performance and Collaboration in Production and Supply Operations"; GEP Analysis

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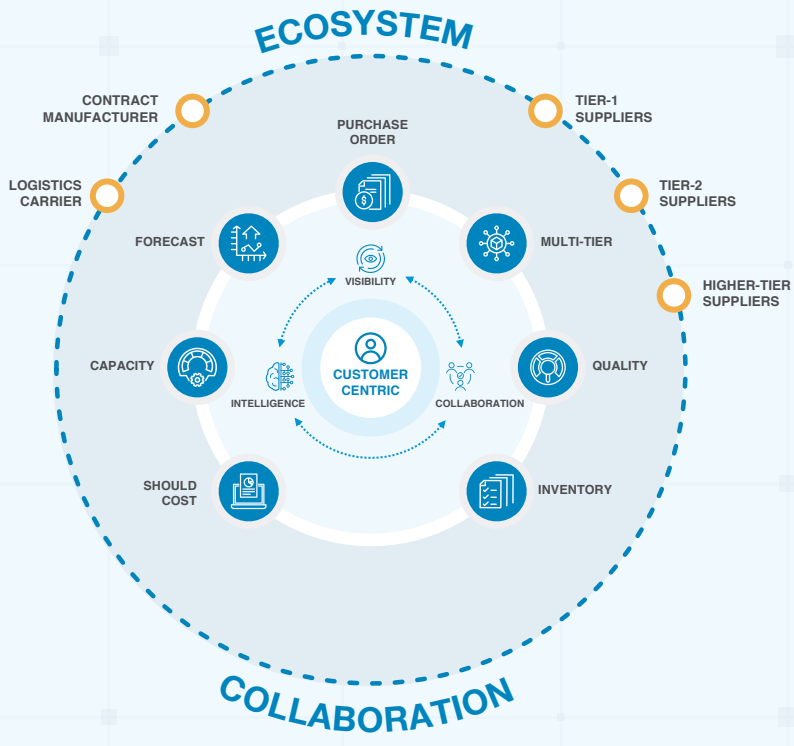

Source: GEP Analysis