Data Sheet

Digital Data
Your Roadmap To Supply Chain Efficiency

The global supply network that underpins life science manufacturing is vast and highly complex. Maintaining a reliable inflow of critical materials depends on more than your relationship with a particular supplier—it also depends on that supplier's supply chain, with further dependencies and variabilities all along the value chain. With contract manufacturers also in the mix, the complexity facing today's manufacturers multiplies even further.

When your operations are running smoothly and predictably, that complexity may not be an issue. But the moment an unexpected fluctuation in the marketplace bottlenecks your supply chain or a problem arises in your manufacturing plant, complexity can impede your ability to act fast—especially if the data you need is hard to access and constantly changing. There are many reasons why this may the case, including:

- **A lack of standardization.** Vendors submit their data in different structures and formats, making it difficult and time-consuming to build a cohesive, useful picture of your supply chain inputs.
- **The persistence of paper-based systems.** Manual data collection can trap valuable insights in silos, hampering your ability to make mission-critical decisions and complicating the pathway to future growth.
- **Complex supplier networks.** Customized systems and processes could leave you dependent on specific solutions only available from certain vendors, which limits your supply network. You may choose different options at different sites to manage that risk, but what you gain from a more diverse network you could lose in greater complexity.

THE SOLUTION

What do manufacturers need in order to cut through these challenges and move with agility through such a dynamic and complicated landscape?

They need their data to be accessible, meaningful, and harmonized. From a supply chain point of view, that's the difference between retrieving an outdated PDF attachment from a supplier's email and consulting a live digital dashboard that draws from a data lake of consolidated, contextualized source data. The former checks a box; the latter tells you why that box matters, which other boxes are nearby, and what you can do today to proactively manage potential pinch points and supply chain risks.

With access to insights like these, you can answer mission-critical questions before they become problems, such as:

"Do our suppliers have the necessary capacities?"

"Do I have what I need in inventory?"

"Does this product meet our specifications?"

"When demand changes, will I be able to keep up?"

Knowing that the key to supply chain resilience is digital transformation—that is, establishing a system for consolidating digitized supplier data in a harmonized data lake—is only half of the battle. Getting to that point takes careful planning.

THE ROADMAP

The urgency behind digital transformation is real. In the very near future, manufacturers still using paper-based systems and inefficient workarounds to compensate for siloed processes will find themselves left behind.

But urgency and speed are not the same thing. Trying to meet this challenge by rapidly scaling several digital programs at once will create fragmentation, which is counterproductive. The power of a digital system is its ability to streamline your operation, giving you all the insights and analytics you need through a single, harmonized access point.

To get there without developing siloed programs, start by defining the key areas of your supply chain ecosystem which will benefit from digital transformation. What comes next is crucial: rather than overhauling them all at once, identify one specific area from your list to focus on, then select a key vendor in your supplier network to help you accelerate and optimize that particular digital transformation project. By perfecting your approach in a single area first, you'll establish the strong foundation you need to incrementally—and successfully—harmonize your digital transformation journey across all key areas. Here's how.

First, choose which area to prioritize first.

Your internal business needs will help you identify which area of your supply chain to prioritize. Consider, for example, the potential benefits of digitizing the data associated with each of the following areas, and how those benefits align with your corporate drivers.

1. SELECTING VENDORS

Key data inputs may include:

- Supplier data such as location, plant design, size of workforce, plans for future expansion, and so on. If you're planning to scale production in the future, for example, you need to know if this supplier has the capacity to scale with you.
- Product data including test reports, drawings, and quality information. If you're purchasing single-use assemblies, for example, you need to see extractable and leachable reports to understand if those assemblies are compatible with your process and the chemicals involved.

By digitizing this data, you gain:

- A system for comparing suppliers and products more easily, helping you to streamline your selection process and consider multiple data inputs at once when making key business decisions.
- A more informed approach to managing risk inside your supplier network, with a deeper understanding of the potential for future bottlenecks and a roadmap for planning production scale-up in lockstep with your suppliers' available capacity.

2. ORDERING PRODUCTS

Key data inputs may include:

- Product specifications and standard lead times
- Supplier proposals and quotations
- Purchase order and delivery acknowledgements

By digitizing this data, you gain:

- A leaner, more efficient logistics process with less time spent chasing emails, making phone calls, and tracking down multiple documents. Compounded across all of your sites and suppliers, even a small gain in efficiency could generate meaningful impacts on your bottom line.

3. RECEIVING, TESTING, AND USING PRODUCTS

Key data inputs may include:

- Shipping notifications
- Certificates of Analysis
- Genealogy information
- Raw material data

By digitizing this data, you gain:

- A more organized and proactive warehousing approach, with the ability to rapidly confirm product compliance, quality, etc.
- The potential to coordinate with suppliers in order to receive chemicals, filters, and other production materials in right-sized packaging at appropriate increments, ready for a production run without an extensive staging process.
- A system for rapidly investigating the cause of an out-of-specification situation during your production runs.

Next, recruit a key vendor as your strategic partner in this transformation.

Once you've identified your area of priority, look for a supplier to help you take that first step. The key is to collaborate with a partner who understands your challenges and offers digital experience and solutions for success. This will position you to eventually seek cooperation and buy-in from across your supply network in order to standardize and harmonize all of your supplier data inputs.

Our advice: approach a critical supplier in your network—one who has a significant impact over your internal logistical and analytical processes, and who offers a large installed base and industry expertise. Share your digital transformation vision with this key business partner and collaborate with them to develop a roadmap toward a standardized and harmonized supply chain ecosystem.

A CASE STUDY

How our customers are using a standardized platform to streamline supply chain logistics and analysis.

Because of its direct impact on production outcomes, many manufacturers start with the third area we identified: receiving, testing, and using products.

Several of those manufacturers have partnered with the Merck team to improve data harmonization and accelerate outcomes in this area.

The result of these partnerships is an evolving solution we call the eMERGE™ Program.

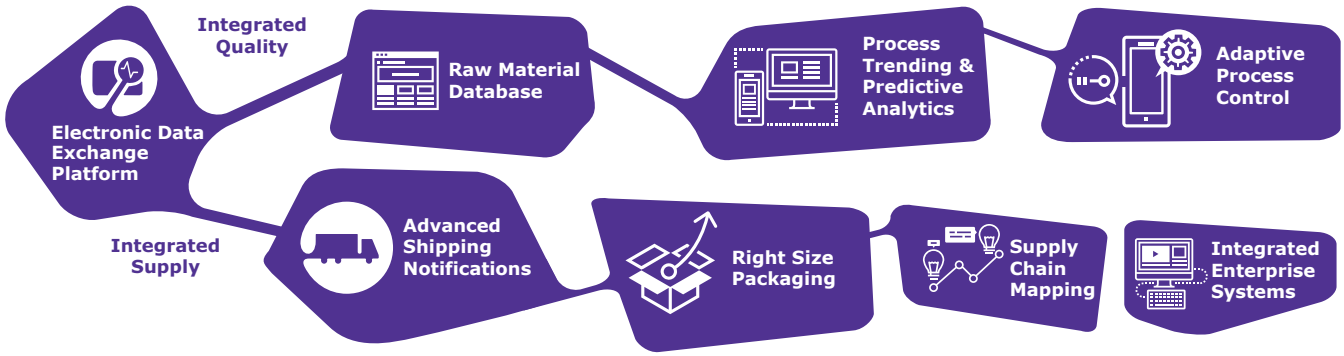

Figure 1. Our vision for the eMERGE™ eData platform includes potential benefits for both logistical and analytical teams, helping manufacturers simplify and streamline the process of receiving, testing, and moving materials into production.

To make eMERGE™ work exactly the way our customers need it to, we started by asking them about the pain points currently holding them back from more efficient, automated data systems. Then we focused our program's initial objectives to address those pain points and help our customers take their first decisive step toward a harmonized, end-to-end supply chain ecosystem

FIRST CUSTOMER PAIN POINT: A LACK OF STANDARDIZATION

It takes time for our customers to standardize the data they receive from different suppliers, and this process exposes them to the risk of manual errors.

Our objective: Standardized supplier data.

Our supplier eData aligns with ASTM E3077-17 (Standard Guide for Raw Material eData Transfer from Material Suppliers to Pharmaceutical & Biopharmaceutical Manufacturers). Our team also continues to work with the ISPE and other industry organizations to actively develop additional data standards that cover a broader range of use cases and applications.

Our eMERGE™ collaborating partners believe that ASTM E3077-17 is a great starting point and a solid foundation for establishing a true digital data sharing platform. We anticipate that this momentum will incentivize an industry-wide shift toward standardization over the coming years.

SECOND CUSTOMER PAIN POINT: INEFFICIENT DATA COLLECTION PROCESSES

Customers have expressed concerns and issues across their entire buying journey, which they say leaves them mired in PDFs, emails, and paper records and makes it difficult for their functional teams to drive internal processes efficiently.

Our objective: A direct, automated pathway linking supplier eData to our customers' own data platform.

Our customers' ability to operate efficiently has a direct impact on their bottom line. When they're spending time chasing emails from thousands of suppliers, leaving voicemails for thousands more, and converting PDF files to XML, they are losing efficiency—fast.

With eMERGE™, we aim to help them cut out that wasted effort. The moment our customer places an order with us, that order activates eMERGE™ to push standardized, platform-agnostic eData directly to the customer's secure platform, when available—no manual interventions required. Not only does this eliminate process bottlenecks, it also supports cGMP compliance by ensuring that all data is reliable, up-to-date, and traceable directly to its source.

THIRD CUSTOMER PAIN POINT: LACK OF VISIBILITY INTO FUTURE RISKS AND TRENDS

To harness the power of advanced tools like artificial intelligence and machine learning, manufacturers need a large quantity of harmonized, high-quality data.

Our objective: A data ecosystem designed to support stronger risk management strategies and greater process reliability.

As we continue to develop eMERGE™ alongside our customers, we are focused on helping them predict future demand, de-risk their supplier networks, and build resilience in the face of a turbulent global economy. That means developing AI-based applications capable of harnessing eData for a wide variety of use cases, including:

- **Supply chain mapping:** In the future, our customers will be able to use their quality-related eData to build greater resilience into their supplier networks, helping them rapidly adapt if one supplier is unable to meet requirements.
- **Integrated enterprise systems:** With development of a future industry-wide forecast process based on eData, we'll be able to prepare for surges in demand before they happen.
- **Adaptive process control:** Using AI-driven tools fed by supplier eData, customers will be able to establish an autonomous, self-correcting platform capable of controlling and optimizing operations without human intervention.

Learn more about our eMERGE™ Program here.

SUPPLY CHAIN DIGITIZATION ISN'T THE FUTURE. IT'S NOW.

Life science manufacturers are embracing digital transformation not only because a bottlenecked, unstable global supply chain has forced them to, but because they see it as the pathway to a patient-focused future of high-quality therapeutics.

To deliver on those innovations, manufacturers need a supply chain they can rely on, made more transparent through abundant eData and more resilient through forward-thinking analytics. With the right supply chain partner helping you develop solutions tailored to your needs, this vision of supply chain transparency and data-driven insights can be more than a vision—it can be your key to a successful future

For additional information, please visit
www.MerckMillipore.com/eMERGE

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