

Whitepaper

REIMAGINING SUPPLY CHAIN FOR PHARMA



Abstract

In the constantly evolving market dynamics, supply chain has undergone tremendous change in the VUCA world wherein major events like Brexit, covid pandemic and Ukraine war have pushed supply chain to the edge and pharma supply chain is no different. that has resulted in several stumbling blocks like delay in shipment of medicines, additional paperwork, delays at the ports in clearing the customs duties or levies, disruption at borders, change in transportation costs, on-time availability of raw materials, excessive inventory, shortage of cold chain containers, shortages of labor and skills. these challenges have disrupted the pharma supply chain impacting the patient lives at the end of the supply chain. moreover, the current market demands right level of automation, artificial intelligence, and digitization not only for the routine activities in the supply chain space but also in the entire ecosystem including manufacturing and quality to have a reliable and stable supply chain operation.

Key Takeaways

- Future pharma supply chain reimagination is the central focus.
- Understanding current supply chain challenges, trends, and emerging technologies is essential.
- The goal is to identify digital supply chain solutions and define a roadmap for supply chain transformation.
- The desired outcomes include enhanced supply chain efficiency, agility, and resilience.
- A vision for the future supply chain involves a digital twin-enabled control tower for better, faster, and smarter operations

Introduction

In this whitepaper we focus on reimagining the supply chain of the future pharma by understanding the current supply chain challenges, trends and emerging technologies and identifying the emerging digital supply chain solutions. The end goal is to define a supply chain transformation roadmap that can improve supply chain efficiency, agility, and resilience to thrive amid disruption. Our vision for supply chain of the future is a digital twin enabled control tower and which is a better, faster, and smarter version of the existing landscape.

Objective

01

Identification of key supply chain challenges and trends within pharma industry

02

Current business impact and what are the KPI's need to be looked at.

03

Identification of various innovative digital supply chain solutions addressing the key supply chain challenges by leveraging the emerging technologies.

04

Identification of key supply chain challenges and trends within Pharma Industry

Challenges

Key supply chain challenges

The pharmaceutical supply chain involves a complex set of activities to produce a drug product, from sourcing and supply of raw materials, through manufacturing and distribution, to delivery through logistics channel to the end user. While delivering medicines to the end user, supply chain faces several challenges.



Supply Planning

Manual planning

Non-adherence of conformance to schedules

Production planning are defined in enterprise system like SAP but are not integrated with production shopfloor systems like MES, LES.

"What if" scenarios are broadly handled on ad hoc basis.

On-time in-full (OTIF): In efficient planning leads to delay in batch processing and release of products into market.

Capacity and Resource Planning

- Manual ways of working for external supply team
Manual processes around end-to-end pack change and new product introduction (NPI) with manual identification of labeling changes which triggers the pack change process creates a risky practice when the frequency of triggers is high and when the product portfolio is large.

Logistics and Delivery Planning

Fragmented Logistics organizations

Sharing of real time Logistic data by logistic partners

Country model with no hubs

Effort in Connecting Data loggers

Manual process around Shipment costing and Freight invoicing

Cold Chain management

Key supply chain challenges

- Process complexity: Most of the cold chain today uses manual calculation and manages temperature of the consignment throughout the course of logistics movement in ad hoc basis.
- Time based tracking system: Indirect measurement; Current tracking system is time-based instead of temperature-based
- No real-time/ cumulated visibility: Information not interconnected between processes, still some paper processes.
- Multiple Sources of data: Pharma companies are facing difficulty in managing data from multiple source systems across various supply chain legs i.e., inbound, and outbound logistics.
- Cold chain failures at times lead to recall of the products.

Supply chain data

- Supply Chain Visibility: Non availability of single platform for tracking supply chain information, materials and monitoring key dimensions in a global supply chain.
- Data sets reside in silos
- Lack of advanced IT systems to generate real time data insights including trends, predictions, and early warning signals for potential disruptive events within the supply chain.
- Risk Management Process: Proactively risk management process is data heavy, relies on spreadsheets to be circulated via various teams. Growing data sets could slow down systems.

Key insights and themes

- After carefully evaluating the key challenges in Pharma supply chain, the below listed are summary of the key themes and insights, which are focused to derive innovative solutions in next 'Solution Design Discovery' phase.
- Lack of end -to- end visibility and traceability:
- Drug shortage and longer delivery cycle
- Counterfeits
- Lack of resilient supply chain to address dynamic supply and demand
- Cold chain failures
- Recall management
- Lack real time actionable insights and recommendations

Business Impact

It is evident that pharmaceuticals industry is facing ad hoc supply chain disruption due to adverse events, along with several challenges with the supply chain operations that is churning the organization good will and trust. In addition to revenue loss, patient lives at the end of the supply chain are at risk. There is need to quantify the business impact, which can be achieved by defining key performance indicators. Some of the KPI's have been discussed in this section, which are directly impacting the business.

To have resilient business operation and enhance the supply chain efficiency, these KPIs matrix(s) have been defined along with possible dependencies and Industry benchmark. The desired goal for the KPIs varies for Pharma clients depending on their supply chain strategy and priorities. The below listed desired goal against the KPIs is based on assumption that needs to be realized by the implementation of the digital supply chain transformation that would be defined in the 'Digital Transformation Roadmap' phase.

Table1: Key Performance Indicators

Business Requirement/ Priority	Metric(s)	Possible interdependencies	Industry Benchmark	Desired Goal
Supply assurance	Supplier on-time Capacity/Plant utilization	1.Forecast error 2.Raw materials inventory 3.Supplier quality	60-70%	≥ 90%
Customer service	Perfect order (On-time and in-full)	1.Demand/supply planning and procurement processes 2.Inventory levels and logistics costs	60-70%	100%
Working capital optimization (Through inventory reduction)	Inventory management (Days-in-inventory-outstanding)	1.Batches release from QC 2.Distribution channel 3.Supplier performance	≥ 180 days	≤ 150 days
Cost optimization	➤ Plant utilization/ Capacity Utilization ➤ Logistics costs (warehousing and transportation)	1. Planned vs actual batch manufacturing 2.Overall equipment efficiency (OEE)	100%	90-95%
Sustainability	Net Carbon emission tracking	1.Multimodal transport 2.External warehouse management system (WMS) & Transport management system (TMS)	2020 footprint	30% reduction on current level by 2030

Digital supply chain transformation

'Digital Supply Chain Transformation' focuses on creating a digital supply roadmap by enabling integrated business planning and a digital core SC control tower which spans across different functions of supply chain, through innovation in the below four pillars

Automation, digitization, integration, consolidation, and optimization are seen as key steps being taken as part of transformational initiatives across business lines to keep pace with the changing dynamics of the industry, as production and supply chain is vulnerable to disruption.

Digital transformation in the supply chain enables in managing extensive information and superior collaboration that result in improved reliability, agility, and effectiveness across the value functions.

A digitally enabled supply chain operating model is all about implementing relevant digital capabilities along the organizational layers of governance, processes, data & performance management, and along with information technology layer. It allows for required levels of integration and standardization of processes.

An effective transformation depends on a creative, forward-looking concept for reimagining supply chain of the future. Creating a digital twin enabled supply chain control tower will ensure end to visibility, resilience and collaboration across the supply chain functions. The transformation journey will assist to

Move from process driven supply chain to process focused and eventually to process embedded supply chain

Harmonization of IT landscape across various SC functions and stakeholders including partners and vendors

Create a tech landscape that has autonomous processes, resources that are integrated with business and consultative in nature

Build an intelligent business support systems at each touch point of decision making, that are powered by autonomous, augmented, and continuous intelligence.

Creating a platform agnostics architecture to manage multitude of data from various source systems on to a self-service visualization dashboard

Implement intelligent tracking sensors for cold chain management with prescriptive and predictive analytics

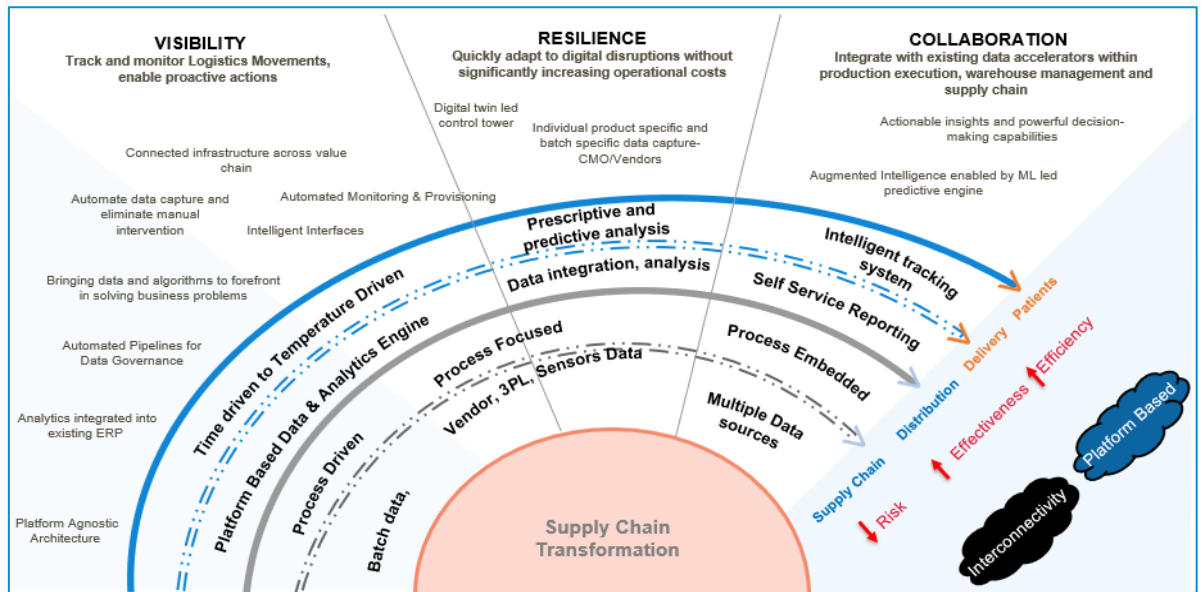


Figure 1: Supply Chain Transformation Framework

Supply Chain Control Tower

Supply chain control tower enables integration of various platforms and other IT system to have real time data monitoring from multiple synchronized sources and provides real time visibility, root cause identification in case of noncompliance, helping in predicting what if scenarios and proactively sharing alerts in case of adverse events.

Supply chain control tower operates 24*7, through a command centre which composed of several IT solutions, some of which have been shortlisted in the previous 'Solution Design Discovery' phase. Depending on the customer business, there might be a need to setup multiple supply chain control tower at various regions or for products lines like one SC control tower for vaccines and one for Pharmaceuticals.

Implementation Approach

To establish a supply chain control tower, all process within the manufacturing and supply chain needs to be digitalized, automated and integrated. Hence, the implementation approach would vary from customer to customer based on their digital maturity. Below is one implementation approach that can be adopted within Pharma industry:

Step 1

Digitize and Harmonize: At the most rudimentary level, the focus is on achieving operational level visibility on supply chain data. The scope of the solution is usually limited to replace the legacy and soiled application landscape with digitized and harmonized SC solutions.

Step 2

Integrate and Automate: with harmonized application landscape, the focus is now to automate workflows by integrating all the relevant applications, manufacturing equipment, logistics devices and packaging sensors. The automation would enable alerts for exceptions and events, with helps in making timely decisions. Connected IT-OT ecosystems provides a real time visibility dashboard for tracking business KPIs

Step 3

Autonomous Operations: This advance phase focuses on leveraging AI and ML algorithms on top integrated IT-OT systems, to simulate 'what-if' scenarios and predict the disruptions within the supply chain. It also helps in perspective analytics by suggesting logical next best actions. This help in creating an autonomous, sustainable, and self-service based supply chain operations.

Customer Challenges in implementing Supply Chain Control Tower

- 1. Lack of clarity on the span of control:** Overcomplicating the span or scope of supply chain operations managed by a control tower can lead to unrealistic expectations about benefits. The pre-discovery and discovery phase of DABL approach can mitigate this risk to some extent.
- 2. Huge effort, time and money needed for mindset change management:** As the processes are replaced and automated, some of the stakeholders may have the fear of losing jobs due to which there would be strong resistance to change or impact the project implementation through non-cooperation. This can be mitigated by having strong leaders or change agents to develop a change plan and invest significant effort to change the existing mindset.
- 3. Late adoption of technology:** Most of the Pharma companies are cautious approach to invest and implement early-stage technologies within supply chain.
- 4. Questions on actual data ownership:** With many business partners providing data into the control tower, who owns the data? Who is allowed to see what data? Who evaluates the data? Who gets benefits out of insights? Who benchmarks the data? it takes tremendous effort to address the data governance as it is directly impacting privacy and security.
- 5. Challenges in Scale:** Scalability across business functions may creating performance challenges while integrating the whole of IT landscape.
- 6. Inconsistent Digital Maturity:** Different stakeholders have non harmonious and non-uniform digital maturity, which can act as a showstopper in implementation of innovative digital solution.
- 7. Data quality:** As the data in current scenarios are residing in multiple systems, there is a possibility of data integrity issues and identifying the single source of truth. Data quality is critical for an effective supply chain control. This can also act as a showstopper to produce accurate actionable outputs.

Digital Transformation Roadmap

Set-up a digital transformation office for monitoring the supply chain transformation. In addition to monitoring, they should provide the required infrastructure, tools, accelerators and support to achieve their targets in terms of efficiency, productivity and savings

They shall also plan the strategy for short, medium and long-term supply chain transformation initiatives in-line with digitization, automation, integration and augmentation to target an automatus ways of operating supply chain. They should also establish Digital Maturity Index Improvement metrics to measure the success of digital transformation. Some of the key KPIs to measure are

Category	KPIs for measurement
Innovation KPIs	# of new ideas in the pipeline YoY # of innovation projects started vs qualified for incubate # of incubate projects vs industrialization projects
Performance KPIs	Innovation spend YoY vs target achieved (ROI achieved in innovation projects) # of new supply chain solutions launched to business per quarter # of accelerators built # of knowledge repository built and made available
Trust (Qualitative) KPIs	# of innovation projects delivered on-time to business Trust score YoY

CONCLUSION

Pharma industry should embark digital transformation journey sooner than later, to develop a supply chain control tower, to enable a better, faster, and smarter supply chain through an Intelligent system which enables end to product monitoring and tracking starting from raw materials, intermediates, manufacturing till it reaches the patient at the end of supply chain.

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