Traversing disruptions with True Intelligent Supply Chain

The need for a true intelligent supply chain

The world is rife with disruptions, and what it truly needs is a very strong intelligent supply chain – a supply chain that can automatically look at upstream manufacturing, product intake, logistics, transportation and delivery, and feed intelligence to produce the right product at the right time and in the right place. But to do so, we not only need fragmented systems, but a data fabric that extends right across the entire manufacturing landscape to the end-to-end supply chain. Therefore, we need an integrated system to make a true intelligent supply chain or make one that is effective.

So where does the problem lie?

The primary concern is integration. When we break down the supply chain end-to-end, we have 3 separated entities:

1. UpStream manufacturing
2. Manufacturing process
3. Supply chain and logistics

Upstream manufacturing

Upstream manufacturing consists of the core of production where sourcing of products and raw materials happens. For the retailer, it might consist of product needs required for final assembly. In the current industry, any PLM entity that takes care of the product processes, and the ERP systems and its corresponding IoT gateway devices, possesses this data. Another key element that we need to foresee is the correlation of the products present - our research suggests that an RFID tag, a product reference, an SKU ID or a serialization number should serve this purpose. This data should give us a head start on what really is the need of the hour.

Manufacturing process

Every manufacturer owns ERP/MES systems that usually take care of the entire process such as – details on OEMs, raw material suppliers for manufacturing, process compliance in industries where mandatory, such as Health concentration on serialization etc. All these factors are well defined and stored as data in the corresponding systems. The thread of this data is enabled based on upstreamed raw materials thereby defining the second step of connection.

Supply chain and logistics

For finished goods, repacking, and logistics systems, there are ERP systems such as JDA, Manhattan etc. that are masters in maintaining data. Retailers who have their own legacy systems also exist. We always require data to be intact for usage. Data covers everything from an Order Management system to the transportation system. During our research, we realized that there are a few providers who completely outsource logistics and transportation, where integration of data to either an ERP system or to some unstructured data has to be done. Intersection of this data to the source of manufacturing happens with an SKU ID or the purchase order ID that has indices to all the requested products.

How to integrate and design Cognitive Intelligence

Intelligent supply chain platform

Artificial intelligence

Data analytics and process engineering layer

Data fabric (Data research and storage)

Predict / Prevent/ Propose

Manufacturing process
- OEM | Compliance
- Raw material suppliers

ERP/SAP
- Order management | Replenishment
- Warehouse management | Transport / Logistics

3rd Party/ Partners
- Unstructured data
- ERP

Optimized inventory levels

Manufacturing
- RM | Core
- Process

Physical devices
- Hand held | Trucks
- GPS | Sensor/ Devices

Reduced fulfilment lead time

Real-time fulfilment visibility, reduced cash cycle

Visualization / Analytics/ Digital twin

Customer entities/systems

Partners/ 3rd party systems

Blockchain /BEL/ RFID

Upstream manufacturing

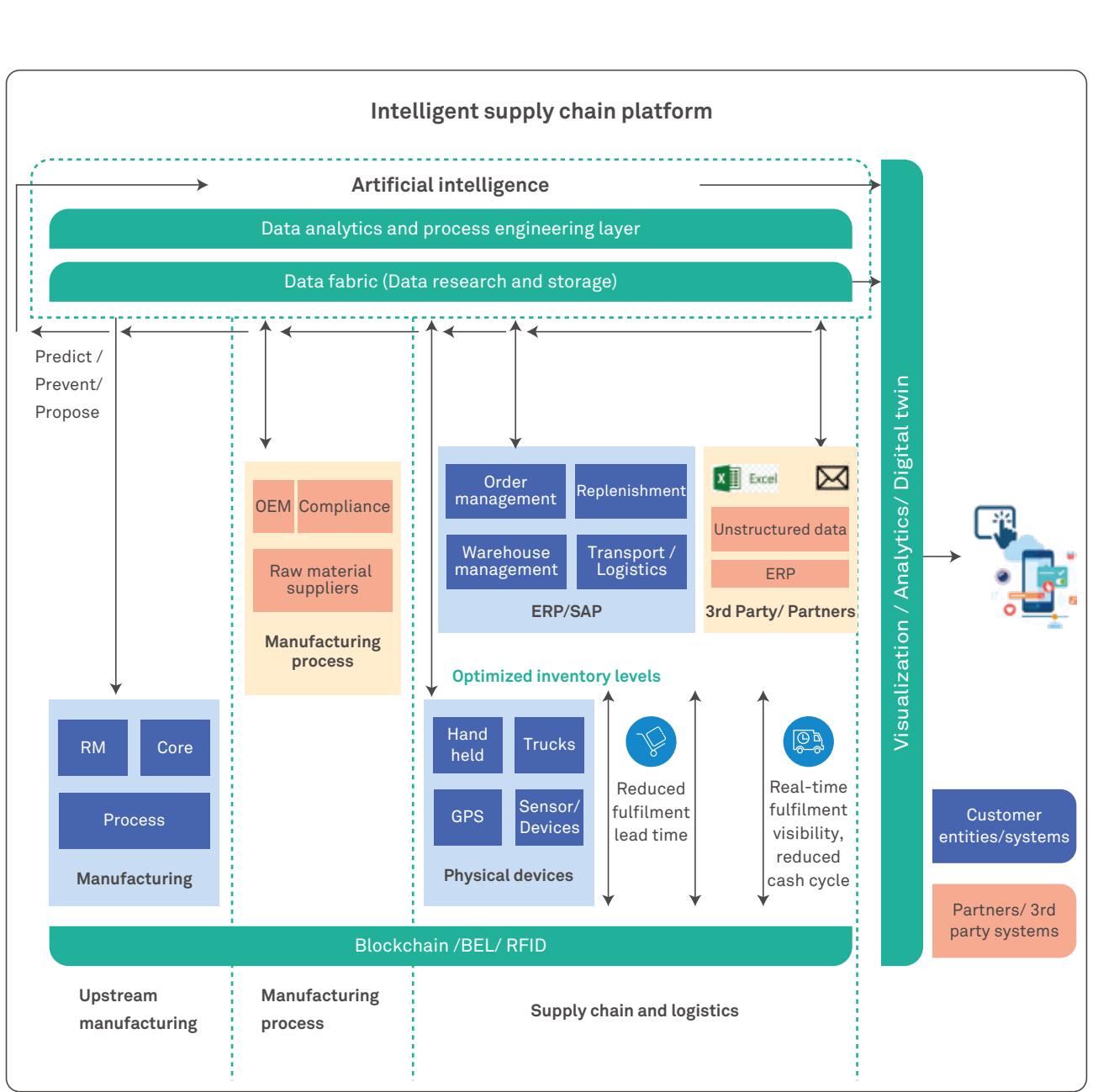Manufacturing process

Supply chain and logistics

Fig1: Architecture of intelligent supply chain

Being Intelligent involves a lot of work, especially where it is necessary to have the right data integration to provide meaningful insights. The challenging part is integration where the identification of the right primary keys solve the problem. Fig1 explains the architecture of the integration of multiple elements and of 3rd party systems that can be present.
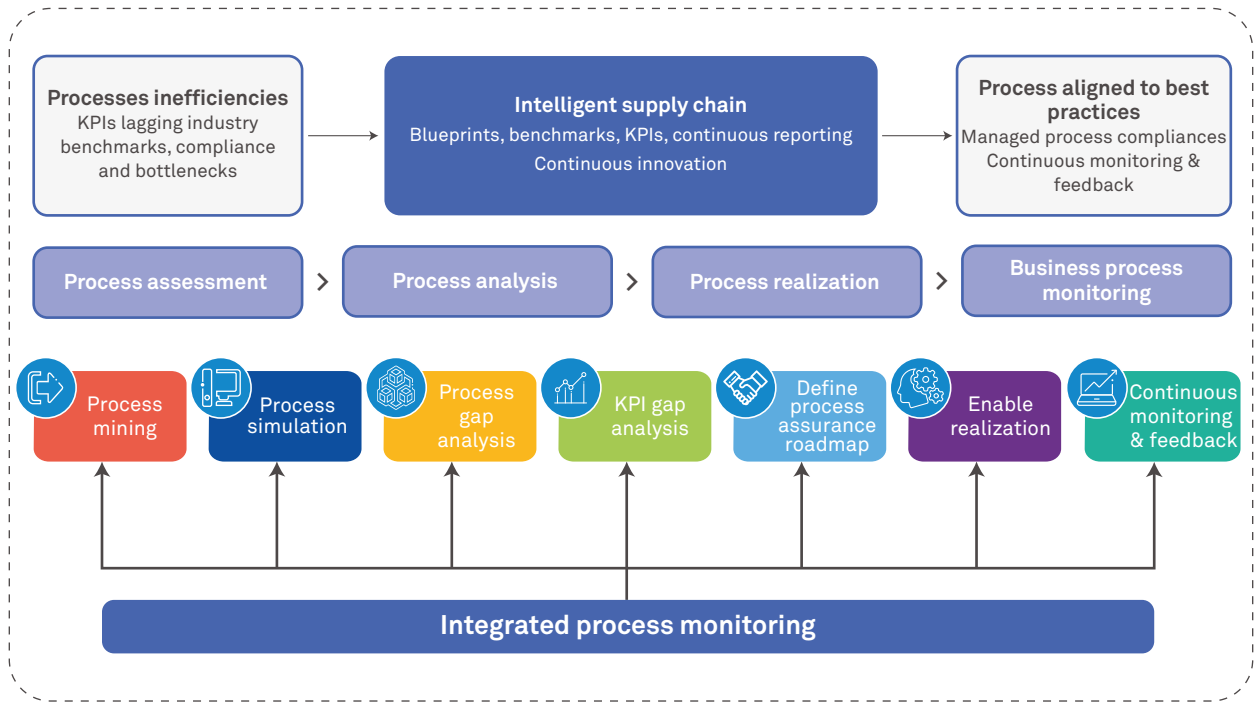
Supply Chain Intelligence

Fig2: Inside the artificial intelligence

Inside the Artificial intelligence, the process assessment, analysis realization and monitoring are all done taking into account the real need of the situation. Here is where the system becomes effective, especially in times of crisis like the world faces today.

How can it help traverse disruptions in an epidemic?

Product priority

An intelligent system now has data to send and monitor the right need of the product based on the market conditions. It can trigger the manufacturing process for upstream manufacturing of the right raw materials and define the right product to be manufactured. E.g. medical drugs, masks, hand sanitizer etc.

Order priority

With the information on SKU ID and purchase order reference, the priority of the order can be modified by a trigger to the ERP systems. Priority of the order is to be done by not modifying the order but creating a second database, which the ERP can refer to and pick up only the order that corresponds to it. Today, big e-tailers struggle in identifying the right orders to be sent since the mechanism lacks the intelligence to identify the items in the order.

Distribution priority

Order priority determines distribution priority. Once the right products order is satisfied, an order to a medical store or hospital can be

prioritized over an order coming from a household. For example, it can pick the least route to make sure the information is being sent to an order location so that someone need not wait for their order. Also, no door delivery of order is needed thereby avoiding physical contact completely.

Information priority

Reflection of the order priority on the driver as well as the user now shall refer to the newer database that can be created and enhance the way data is being utilized. Even predictive algorithms on when the next order should be auto placed vs. received can be triggered.

End user

For every end user, be it in a hospital, a medical shop, or a person receiving medicines or anything physical, contact avoidance, priority of order and social distancing needs to happen. With the amount of data intelligence available, all three eventualities are possible.

Conclusion

Disruptions are rampant in today's world. A few kinds of disruptions really push the envelope, resulting in an increasing degree of stress. In a way, this stretches innovations to its core, and pushes organizations to be ready for the next big disruption. A successful cognitive and intelligent supply chain that can operate end-to-end can reduce stress and ensure that the situation makes products available to the right person, at the right time, with the right amount of information possible.

About the author

Venkat Jayaraman,
Distinguished Member of Technical Staff and Client Solutions Head

Venkat is a Distinguished Member of Technical Staff and Head of Client Solutions for the Industrial Engineering Team. He is a technologist with over 41 patents filed/granted to his credit. He is a Subject Expert of Supply Chain and Logistics and has worked in multiple supply chain transformation programs for more than 10 years across the globe. With over 20 years of industry experience, his expertise has enabled the success of multiple programs and customer wins.

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