Design and Implementation of Supply Chain Multi-Sourcing with SAP and Kinaxis Rapid Responce for Pharmaceutical Industry

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Abstract—This Paper will focus on the Realtime design and implementation of Global Supply chain multisource functionality with SAP and Kinaxis RapidResponse implemented in one of the US based multinational pharmaceutical Company. This solution was rollout across many countries in different Continents EU, APAC and Americas. This paper will give you thought process behind implementation and step by step approach for designing the solution with SAP (System Applications and Products) and Kinaxis RapidResponse so that this can leverage for implementation in other pharmaceutical company.

Keywords—SAP(System Applications and Products), ERP (Enterprise Resource Planning), RapidResponce (RR), Purchase Requsition(PR), Purchase Order(PO), Sales Order (SO), Process integration/Process orcastration (PI/PO), Multi-level Serach (MLS), ERP central component (ECC), Businsee warehouse (BW)

I. INTRODUCTION

The conventional supply chain run on the signal supplier whereas Supply chain multi sourcing run on the multiple suppliers which make supply chain process more resilient.

pharma supply chain is more global than those of other industries, companies often source critical materials from a single region, putting them at risk of shortages during natural disasters and local conflicts. Around 40 percent of pharma trade occurs within a particular region, while the average is 50 percent for other industries. Companies can reduce their exposure to single sources and other supply-chain risks by diversifying where they buy materials. To secure an input better, a company might revert to domestic production, nearshore the supply, or offshore to new locations means developing multiple sources whether it is internal or external for a product to mitigate the risk of supply chain disruption. The Current Pandemic is a good example of supply chain disruption. This Pandemic made the Global supply chain collapsed which increased the gap between the demand and supply that resulted into inflation of price of the products. In Pharmaceutical industry we can't afford to create stock out situation because of supply chain disruption which bring the patient life in danger. To mitigate this risk, supply chain Multi Sourcing is the best solution which makes alternative sources available for a product in crises situation. This paper talks about recent implementation of global supply chain multi sourcing with SAP and Kinaxis RapidResponse in one of the US based multinational pharmaceutical company. This solution can be leverage by other pharmaceutical company to make there supply chain process more resilient.

SAP: Systems Applications and Products, is a widely used enterprise resource planning (ERP) software. SAP creates a centralized and integrated system for businesses that enables every department/business function to access and share common data to create a better work environment for every employee in the company.

RapidResponse: RapidResponse from Kinaxis is a supply chain planning software that lets you easily monitor and respond to demand and distribution requirements planning (DRP) issues. RapidResponse acts as one platform that provides a variety of supply chain planning solutions.

Supply, Demand and Inventory planning happen in RapidResponse (RR). and RR will push closed loop file to SAP which interns converted into Planned order and then PR to PO.

II. INTEGRATION WITH PLANNING SYSTEM
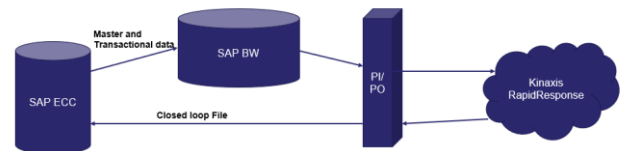
A. SAP Integration with RapidResponce

Fig. 1 SAP- RapidResponse Interface

Data from SAP will be extracted by BW and then it will be push to RR through SAP PI/PO. Also, the product forecast has been feed into RR which together help to carry out Supply and demand planning in RR. Supplier selection and quota per supplier will be decided in the RR. Closed looped file is generated which contain the information about supplier, quantity to be purchase and other details for creation of planned order in SAP, will be pushed to SAP through PI/PO which will be converted into planned order and then into PR and PO. PO will then send to supplier to get the material.

Following data will be push to RR from SAP

- Master Data:
  - Material Master
  - Vendor Master
  - Customer Master
  - Bill of Materials
  - Total and Available capacity of machine
  - Production Version in manufacturing
  - Alternate Unit of Measure

- Demand:
  - Deliveries in current month
  - Open Sales Orders
- Supply:
  - Total Inventory on Hand
  - Firmed planned orders in SAP
  - Open Purchase Requisition in SAP
  - Open Purchase orders in SAP
  - In transit Stock to receive in site
  - Process Orders in manufacturing
  - Batch number
- Other Transactional data:
  - Batch Number with expiry information
  - Reservations against Subcontracting PO or Workorders

RapidResponse will return following data to SAP:

- Firming:
  - Firmed Planned orders
  - Purchase Orders

B. Standard /Existing part source selection in RR:

Standard part source selection is base on single source for a product. This is a conventional way of source selction . Following steps will explain how the single source selection happen in RR.

- Part sources in Rapid Response are created based on master data maintained in ERP systems by the supply planner. This is all based on fixed source maintained in source list of SAP.
- Planners can influence part source selection using priority / target logic
- Once forecast is loaded, and planning parameters are set, Rapid Response chooses part sources based on the below table shown in Fig.2
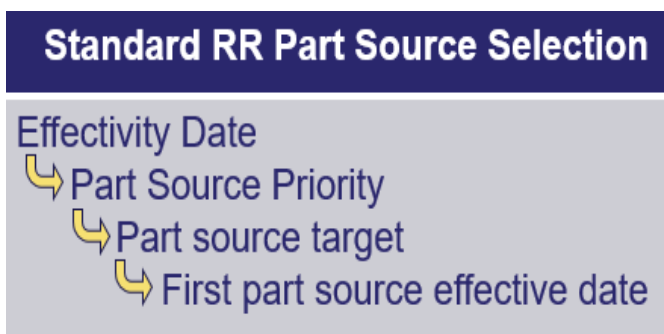

Fig.2. Standard Part Source selection

C. Multi -Level Search (MLS) Process in RR:

MLS was used for multi-source selection in RR. This process will explain how the multiple source selection will be done in RR for a product. Below Fig.3 shows the step-by-step approach for source selection.
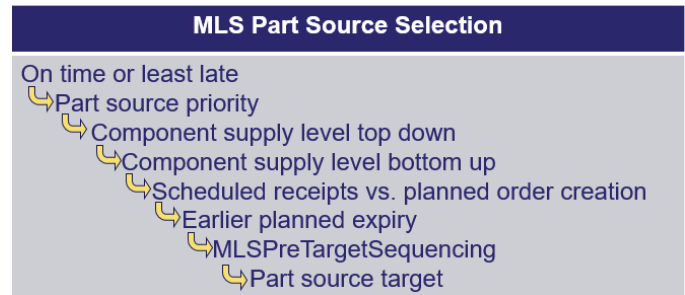

Fig. 3. MLS Part Source Selection

- Multi-Level Search (MLS) is maintained in RapidResponse at part/site level. MLS will be enabled in Part Properties Workbook, Planning policies Worksheet.
- Planners can influence MLS part source selection using part source priority.
- Planners will need to ensure the Dual Source data table in SAP is maintained and that MRP areas are maintained in Material Master
- Once MLS is enabled, forecast is loaded, and planning parameters are set, RapidResponse chooses part sources based on the above table.

III. SAP DESIGN

A. Supply chain Multi-Sourcing design in SAP

The supply chain flow starts from the demand planning in RR which generate closed loop file and push to affiliate site in SAP. Closed loop file contains the supplier number and the quantity, plant and other details to create planned order at affiliate /market site which then converted into PR and then PO. For one product, closed loop file will be generated per supplier and accordingly supply chain process will continue.

Once PO created at affiliate which will drop the sales order at Hub automatically which interns create PR automatically at Hub and then PR will be converted into PO manually which will go to supply external supplier.
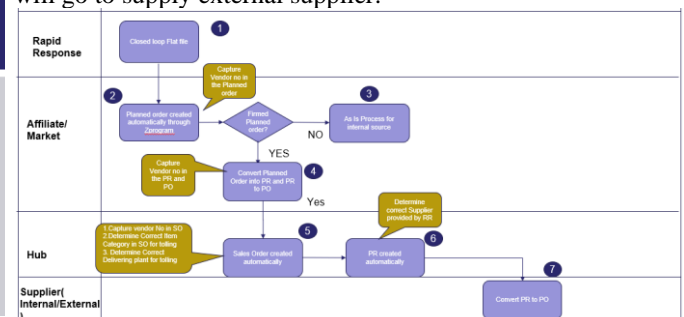

Fig. 4. Supply chain flow with multi-sourcing

Following enhancement were done in SAP ECC at various stages of supply chain process to run the multi sourcing smoothly

1. At step 2, capture the vendor number in the planned order. Here planned order creation program has beeen enhanced to update the vender number from closed loop file into planned order.
2. At Step 4, Capture vendor number in PR and PO
3. At Step 5, determine correct item category in Hub sales order for subcontracting (Tolling) process and determine correct delivering plant in sales order for

Published by :

http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 11 Issue 06, June-2022

tolling process. Both these determinations happened through Ztable: ZPTS_DUALSOURCING

4. At step 6, determine the correct supplier provided by RR. This determination happened through Ztable: ZPTS_DUALSOURCE

Fig. 5 SAP Dual Sourcing Ztable

The above enhancements were done for external suppliers only. If sourcing from internal supplier, then source determination happened through SAP standard source list which will be marked as fixed source.

Fig. 6. SAP Source list

Following Scenarios were considered for the implementation of multi-sourcing:

- Multiple Sources Between Internal Manufacturing Site and External Vendor.
- Multiple Sources Between Internal Manufacturing Site and Subcontracting Vendor
- Multiple Sources Between 2 or more Subcontracting Vendors
- Multiple Sources Between a Subcontracting Vendor and an External Vendor
- Multiple Sources Between 2 External Vendors

B. *Business benifited in folloiwng ways:*

- Business will be able to execute the supply chain process seamlessly with less manual intervention resulting into saving of resources and time.
- Automatic and controlled routing of products through system and not by user ensured product to be sourced from right supplier and delivered to right affiliate increased the supply chain accuracy result in saving of time and money.
- Reduced the supply chain lead time by automating order creation and order confirmation activities which gives the business the clear visibility when the products are available to them for sales to cash paying customer. This help to meet the on-time delivery commitment to customer and hence increase the customer satisfaction index.

- Closed integration with planning tool "RapidResponse" will help to get the exact demand and source for the products to be procure.
- Supply chain multisource helped customer to mitigate the risk of inventory stock out situation and ensure the product are delivered to affiliate at right time with good quality.
- Enabled the customer to buy the same product from multiple supplier which avoid the dependency on only one supplier and open more avenues for sourcing.
- Keep the product supply chain uninterrupted during any disruption and made supply chain process more resilient which resulted into saving of millions of dollars

IV.   CONCLUSION :

Pharmaceutical supply chain has become global and complex. With more outsourcing, new modalities and novel ways to reach patients, its critical to ensure that they can withstand shocks. By implementing this Global Supply chain multi-sourcing solution with SAP ECC and Kinaxis RapidResponse, pharmaceutical company can make their global supply chain process more resilient in crisis situation and keep the product supply and demand gap at minimum level. This will help to avoid stock out situation and prevent the inflation of product prices.

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