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Abstract:

This report assesses the efficiency of the order fulfilment process at Markes International to determine where potential industry 4.0 solutions can be utilised; with the aim to not only increase efficiency but also increase customer satisfaction.

During this report, multiple steps of the fulfilment process are explored including order entry, assigning shipping dates, sending order acknowledgements, raising works order, resource planning, stock demand and purchasing, and order shipment and tracking.

The outcome highlights multiple areas where current manual practices can be automated through the improved use of software, or through the adoption of digital processes.

Introduction:

Markes International is an SME (small- and medium-sized enterprise) manufacturer and supplier of analytical instrumentation and accessories, such as thermal desorption, time-of-flight mass spectrometry, and adsorbent tubes.

Their business model involves selling through global channel partnerships, as well selling to businesses through their direct sales teams in the UK, USA, Canada, Germany and China.

On time delivery, robust products, and great customer satisfaction are a few key elements to any successful business. High levels of these aspects, amongst many others, means that the business is more likely to retain customers and ensure repeat business and/or collaborations.

However, many factors can negatively affect this. One of which is the order fulfilment process, in which delays in responding to customers and missed shipping dates have a significant impact on the customers overall satisfaction.

This report provides potential industry 4.0 solutions to identified inefficiencies in the order fulfilment process.

Principles and practices of Industry 4.0

What is industry 4.0? Donimik T. Matt, 2020, provides a very simple description: It is essentially the digital transformation of traditional businesses (be they large corporations or SMEs) into smart factories.

This is about enhancing and connecting the processes used within a business through use of technology (hardware or software), which will automate many aspects, making the process more efficient.

Markes Order fulfilment Process

Order Entry

Customer orders are received in many forms: pdf, excel, online shop, telephone, word file; the most common being a pdf via email. These orders may have a quote associated with them that has been

created in the customer relationship management (CRM) software, Salesforce. The quote is exported as a PDF and, in this form, cannot be uploaded into the business management software, SAP Business One.

Herein lies the first inefficiency, the lack of communication between these separate operating systems. Software is available to enable transfer of information between the CRM and SAP, such as APPSeConnect. They describe themselves as an “intelligent integration platform as a service (iPaaS) which can seamlessly connect your entire application stack and stream line data flow”.

However, as a digital service, it does come with a monthly subscription fee. Thus, the time taken to manually input data from SalesForce into SAP, compared to the monthly cost would need to be assessed to decide if this is financially viable for this SME.

Before entry of each sales order into SAP, the orders are sent to the Inside Sales team for technical review. This is to ensure that all products are compatible with each other or that the customer has included everything required for a successful installation. On average, 1 in 30 orders require amendments, therefore this step should not be removed from the process.

An algorithm could be written to perform this check, especially for products which are required to or are commonly purchased together. This would however require the sales order to be in a format that can be uploaded into the software containing this algorithm. As stated previously, Markes customers use different methods of placing their orders, so they are not in a common format.

Entry of the sales order requires the team to perform several steps:

- Manually search for the customer account number,
- Manually typing in the product codes and quantities,
- Select delivery and invoice addresses, which should be pre-set with the account,
- Manually typing in the “Ship to Name” and telephone number,
- Manually adding an arbitrary shipping date of 2049
- Saving as a draft.

Many of these steps are time consuming because they are manual.

SAP has the ability to upload data, including sales orders, provided they are in .csv format. This would require a significant process change and a considerable paradigm shift for Markes customers to submit their orders in this format.

Given the business model that Markes use and the types of sales channels they partner with, specifically Agilent and Thermo, it is unlikely that they will be able to adjust the way in which these companies place their orders.

Assigning shipping dates

The date of 2049 is used to allow another member of the team, the Demand Coordinator, to search for new orders requiring a shipping date. Human error in adding the wrong date risks the order not being pulled into the list.

The Demand Coordinator manually inputs the estimated shipping date, which is obtained through the following steps:

- Open the order and drill down the bill of materials (BOM) of each line item to check stock levels.
- If there is stock to build all products, the item with the longest lead time is selected for the shipping date.
- If there is not enough stock, the coordinator checks when parts are due in or asks for them to be ordered. The longest lead time for these items is selected for the shipping date.

The process should be automated using the material resource planning (MRP) within SAP. However, one of the biggest challenges is that the stock levels reported in SAP are not always accurate, it is estimated that they are only 30% accurate.

For this, Markes could implement barcoded tracking of all stock parts, like that offered by Zoho. This would allow for the electronic tracking of all items being moved in and out of stores, as well as through the factory. It would significantly increase count accuracy and remove human error. This would also increase the accuracy of MRP and allow it to be used for setting the shipping dates.

Sending order acknowledgements

Only after the order has been dated will the Orders team manually email a pdf of the acknowledgement to the customer. The target is to send this within 24 hours, however, this can be several days after the order was initially received.

An improvement here would be to set up an automated message from the orders@markes.com email address, that would send an instant notification that the order had been received and will be processed shortly. This would provide customers with immediate assurance.

Raising works orders

The next step in Markes order fulfilment process is to raise the works order. This is a printed document given by the Demand Coordinator to the relevant team leaders within the factory floor.

For some orders, this document is printed multiple times to provide to multiple teams.

It has been reported that occasionally this document or pages from it have been misplaced and an order has not been fulfilled on-time.

Additionally, using the works order the factory workers will log into SAP, load the BOM for each item, and print out a pick list. Component parts are manually checked out of stores, and the pick list is marked off. If there are any items unavailable from stores, they are added to a separate document which is printed and handed back to the Demand Coordinator.

These shortages are added to an online spreadsheet, which the Purchasing team use to add to their buying list.

One method that can be used to streamline this process is to provide the factory workers with tablets that have access to SAP. With this, they can be assigned digital works orders, access the pick list, and digitally mark off the items.

The challenge with this approach is the initial cost of purchasing enough tablets for the factory, providing training, maintenance of tablets (i.e. software updates which will cause downtime to that device), and the additional energy required to operate multiple devices.

Resource planning

Markes currently use a basic set-up within SAP for the MRP. This is run once a week and pulls up the current demand quantity on parts from open sales orders, minimum stock levels, and a forecast that has been manually created and uploaded into SAP.

This value is deducted from the current stock levels and parts already on order to produce a shopping list of items that need to be purchased.

The shopping list is exported, and the Purchasing team manually issue the required purchase orders. Some weeks this can be in the 100s.

The personnel and machine resource planning is performed off-line by the Production Manager using a spreadsheet. They have the challenge of accounting for holidays, sickness, unexpected instrument downtime, as well as planning maintenance downtime. Add to this, they also need to account for urgent orders that require prioritising over orders already in the planned schedule, as well as missed deliveries from suppliers which then pushes out the expected shipping dates.

This process can be automated within the SAP software that Markes operates. However, it will require substantial resource to clean up and add the required data.

Stock demand and purchasing

Using the information provided by MRP and the shortage list from production, the Purchasing team manually raise orders for the stock needed, as mentioned previously, this can be hundreds of component parts.

SAP can automate part of this process provided the data and minimum stock levels for all parts are fully up to date.

Shipment and tracking

Markes typically use FedEx and DHL for the shipment of their product. With each shipment they receive a tracking number which is manually entered into the delivery note within SAP.

This tracking number is only shared via email to customers who request it. Therefore, most customers have no visibility on the status of their order. This leads to them contacting the salesperson involved with their order, to chase and ask for updates, which causes frustration for both the customer and the sales teams.

Setting up an automated email to be sent to the person who received the order acknowledgement would help to alleviate part of this dissatisfaction.

Conclusion

In conclusion, Markes are on the right track with already having implemented software for CRM and MRP. However, significant improvements can be made to develop the efficiency by adding connectivity between the two software. Implementing an algorithm to assist with checking sales orders. Utilising the full

potential of SAP to automate many of the processes discussed, such as the raising of works orders and purchase orders. This can be realised through training and resource allocation to update and/or implement new processes. Markes could also add tablets and barcode tracking to their stores and factory floor for improved stock accuracy, which will directly improve the accuracy of their MRP. Additionally, Markes can set-up automated messages to customer informing them that their orders have been received as well as providing tracking details upon shipment.

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