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A NEW-AGE MANUFACTURING LANDSCAPE

The digital thread refers to the communication framework that allows a connected data flow and integrated view of the asset's data throughout its lifecycle across traditionally siloed functional perspectives. The digital thread concept raises the bar for delivering "the right information to the right place at the right time."

The COVID-19 pandemic has fundamentally changed the way the world has been operating over the last year and a half. While the knowledge industry might have been better positioned to transition to a remote working model, the more traditional industries, like manufacturing, had to reset and devise elaborate business continuity programs to continue operating in the emerging new normal. Technology has undoubtedly been the difference maker as it has helped manufacturing organisations that are driven by conventional physical models, to become more agile and accelerate their digital transformation journey.
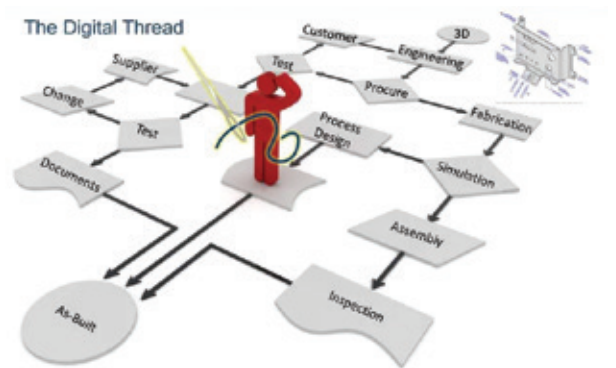
Manufacturers have been transitioning to digital for years. These digital transitions included model-based systems engineering (MBSE), computer-aided design (CAD), computer-aided manufacturing (CAM), product lifecycle management (PLM), enterprise resource planning (ERP), manufacturing execution systems (MES), maintenance, repair and operation (MRO), and supply chain maintenance (SCM) implementations.

One of the exciting areas in the next phase of technological innovation is the 'Digital Thread' as it has the potential to help manufacturers achieve unprecedented levels of visibility across the product lifecycle while providing stakeholders with detailed, accurate and timely information.

The digital thread is a structural approach that connects digital information throughout a product lifecycle from R&D till the last stage of scrapping the product. Manufacturers can accommodate connecting an entire product ecosystem by establishing a digital thread between suppliers, production on the shop floor and customers, thereby ensuring efficiencies and lower costs.

This can be a boon to managers of large plants and can benefit them in the following ways:

1. **Accurate Demand Forecasting:** Digital thread enables manufacturers to review data from various sources including customers and other third-party sources thereby facilitating plant managers to fine tune production on the shop floor at any given time with the forecasted current and future demand.

2. **Data Access to all Stakeholders:** Digital thread provides valuable insights to all stakeholders through quality data, thereby assisting in knowing the status of machine operations on a shop floor in real-time. This data can also be utilised to carry out predictive maintenance and help shop floor managers in taking necessary proactive actions, thus ensuring that the desired business results are achieved.

3. **Mitigate Investment Risk and Enable Remote Maintenance:** Digital thread can leverage a digital twin to enable manufacturers to understand the working of a production cycle on the shop floor before an actual installation. This can lead to significant cost savings by detecting any defects and

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optimising production through simulating a virtual factory.

Digital twins can also be used for remote maintenance as they create a replica of the original equipment and help in remote monitoring of performance and identification of issues.

However, for the digital thread to yield the benefits outlined above it is imperative that certain crucial aspects of manufacturing operations are stitched together. However, this is usually not the case, and it adversely impacts the potential benefits that can be reaped from establishing a digital thread. Some of the key aspects are:

1) **Inbound Logistics:** It is quite common to face a lack of real-time material visibility and the absence of unified material tagging, which causes delays and disruptions in the planned production cycles. It is important to improve this visibility of inbound inventory, as it can positively influence the ordering of shortfall and predicting the turnaround based on a supplier's inventory. Triggering such workflows in advance to meet production targets can lead to smooth inbound logistics operations.

2) **Production Operations:** Often data exists in silos and there is a lack of visibility of real-time operations of machines, assets or workers which make remote operations quite challenging. This needs to be addressed by connecting

Areas to Connect with the Digital Thread
Product Design. Supply Chain. Production. Maintenance Services.

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the production lines, digitising manpower planning, attendance and capacity management, remote monitoring of worker health and safety, energy monitoring and connected utilities for environmental compliance to ensure remote operations readiness.

3) **Integration with Dealers/Distributors and Customer Systems:** Dealers and distributors are key for any forecast of the demand for new product sales and customer systems are key for spare parts replacement. The systems that need to be integrated here would vary from spreadsheets to sophisticated ERP/CRM systems.

4) **Outbound Logistics:** Disconnected inventory management and distribution management systems can cause various problems for the production efficiency on the shop floor. It would be prudent to
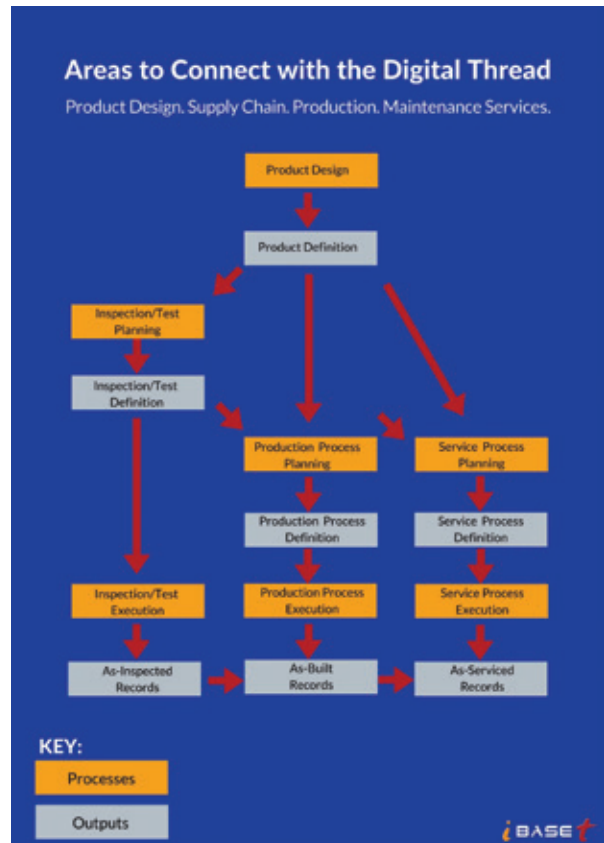
start right from the digitisation of the loading dock allocation process as smooth dispatch is one of the key elements to ensure the efficiency of the system.

CONCLUSION

It is important to note that many of the above-mentioned approaches are put in place but only as point solutions for certain use cases. The key to a successful digital thread implementation is embracing a platform-based approach that can provide rich insights into the manufacturing process across various key functions.

These are times of change and a few manufacturing entities have already started on this journey by setting up digital organisational units. Given the changing operational models and varying intensity of market demand right now, the opportunity exists to work with the right technology partner to tie together the right knots of a robust and reliable digital thread.

Manu Tayal is the VP and Head of the Industrial and Manufacturing business at Happiest Minds. He brings with him over two decades of rich industry experience and is currently focused on helping our clients make their industrial products and platforms ready for the future. He is deeply passionate about creating business impacting digital transformations for customers by leveraging technologies such as IoT, AI and ML.