Control Towers:
Solution for an integrated and efficient Manufacturing Supply Chain.

**Authors**

Anjali Barthwal, Avik Roy

Contents

Introduction

Quite often we come across news on the volatile geo-political scenarios across the globe. The rising trade disputes, tariffs and instability within nations, along with more frequent natural disasters, viral pandemics etc. are creating new kinds of challenges for organizations which operate across borders. This is where the need for end-to end visibility with real time monitoring and control arises for a global supply chain.

A Control Tower, with its advanced technologies gives visibility to the Operations team enabling control of the extended supply chain, efficient management and decision-making. Rather than depending on the past performance data, a Control Tower uses time-sensitive data to integrate tools and processes across the end-to-end supply chain. This type of analysis provides the opportunity to highlight issues before they occur, along with the potential cause of deviation.

Control Tower & its features

A supply chain is a network of interlinked functions that provides enhanced visibility to the customer. It includes the holistic value chain starting from the sourcing/procurement to the final delivery, and these activities are required to be planned, organized and controlled with collaboration and coordination among the channel partners like suppliers, vendors, customers, etc. To manage these activities in a controlled environment, a control tower for the supply chain is a good solution. The control tower can give a centralized and holistic view of the entire supply chain and enable an industry to change its approach from reactive to proactive.

Visibility

Real time monitoring

Collaboration

Data analytics
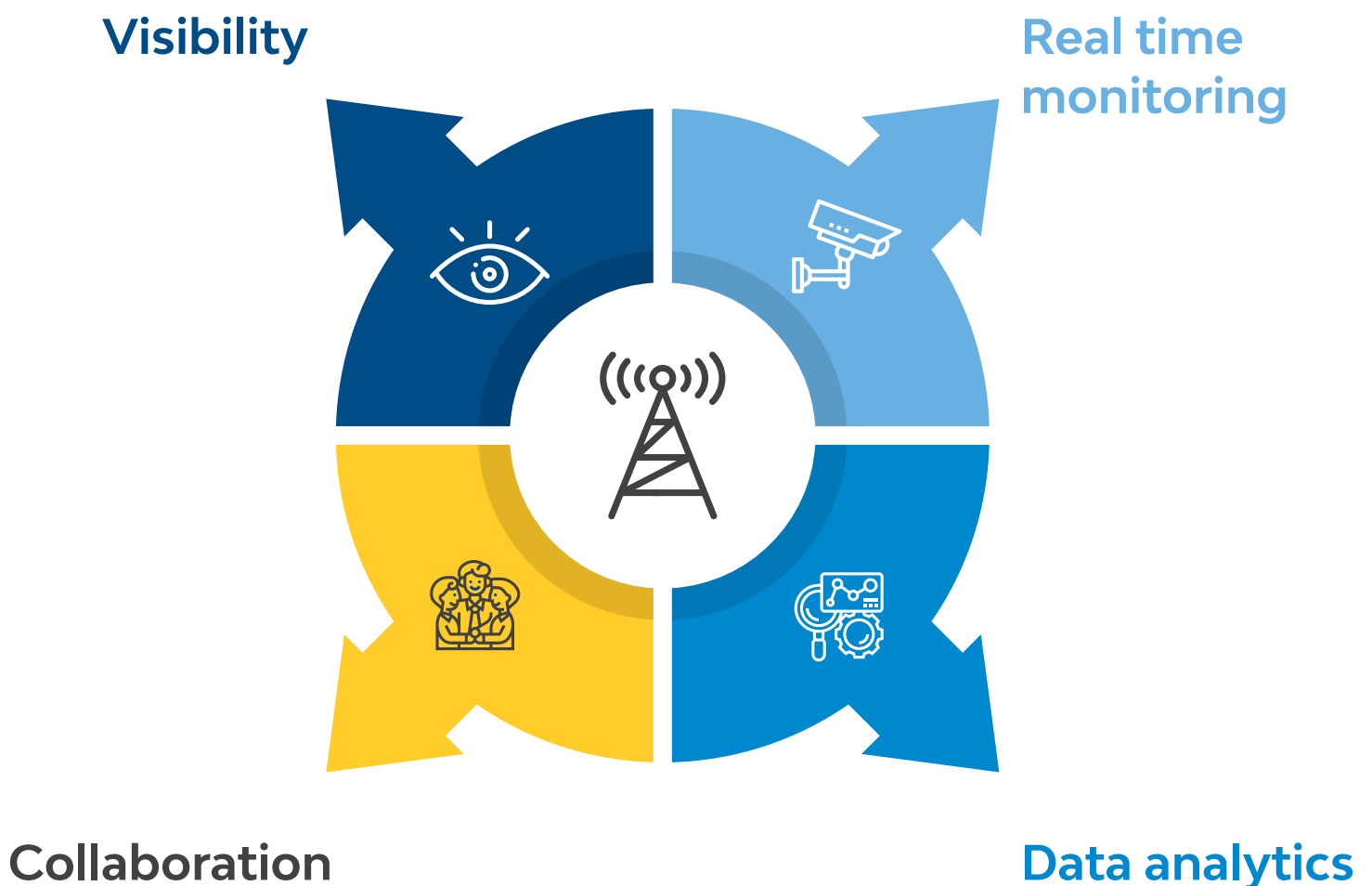
Key features of Control Tower:

Visibility and Control: It gives end-to-end visibility in a supply chain for demand, capacity, orders, deliveries and inventory. It can tell at any point in time 'what is happening where'.

Collaboration: It works on the principle of collaborating with cross-functional teams, which gives a broader perspective to solve the issues across the supply chain.

Real-time monitoring and tracking: This creates a chain of communication among various partners and helps resolve issues quickly.

Data Analytics: With this feature, an optimized solution for an issue can be generated without human intervention. It can also suggest the best risk mitigation actions for any issues.

Benefits of Control Tower

A control tower addresses many issues within the supply chain to deliver tangible benefits such as increased revenue, better margins, asset efficiency, enhanced risk mitigation, etc. It also offers many indirect benefits that help improve the efficacy of a supply chain. Some of these major benefits are:

Improved decision-making capabilities

A control tower not only gives visibility to what has already happened and what is currently happening, but it also helps in predicting what can happen next. Also, by performing the scenario analysis, better decisions can be taken.

Improved productivity

With the visibility of what is happening and what can happen, a better planning of the work can be done.

Quick retrieval of information

Real-time monitoring provides every information about the supply chain every time.

Increased responsiveness

It provides collaboration across various functions both inside and outside the organization, which gives an effective response to the events.

Optimized inventory

By providing the information of the inventory requirement based on the current capacity utilization, a control tower helps in optimizing the inventory.

OTIF (On Time & In-Full) compliance

With all its features, a control tower helps in managing the supply chain effectively resulting in fulfilling the customers' order on time.

Better capacity planning and optimized operations

This is possible because of the visibility to demand and uncertainties.

Better logistics efficiency and transport solutions

Route selection, transportation carrier's selection, driver allocation , etc. can be done in a better way, thereby reducing the risks of potential issues. Also, the collected data can be utilized to better manage future orders.

Supply Chain in Manufacturing Industry

Current scenario:

A vast majority of manufacturing companies are using technologies such as: ERP, planning & optimization, transportation & warehouse management to manage their supply chain. Still, many struggle to gain the visibility of activities across the process boundaries, relying on lag-based information. Due to this many organizations find themselves ineffective in optimizing inventory, demand planning, capacity utilization etc.

Today, organizations lack in :

Horizontal integration
Close integration of both internal and external partners.

Accurate demand forecasting
Predictions are still mostly based on past data and not on the daily operational level data.

Inventory visibility
Organizations have yet not reached the level of visibility to eliminate or even identify excess/ obsolete inventory, thus inventory optimization is still a challenge.

Adequate analytical capabilities
Difficulty in analyzing performance metrics, inefficiency in aggregating meaningful data to act upon, inability to model cost implications of the business decisions.

Managing demand & supply
Because of the volatility, and less than ideal visibility across the supply chain, it is extremely difficult to align demand and supply.

Challenges faced by Manufacturing Industry

Some of the major challenges faced by any manufacturing industry at present are:

Supply Chain Visibility

Inventory Optimization

Lack of Collaboration

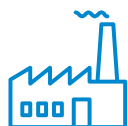Growing complexity of operations

Process & Systems Silos

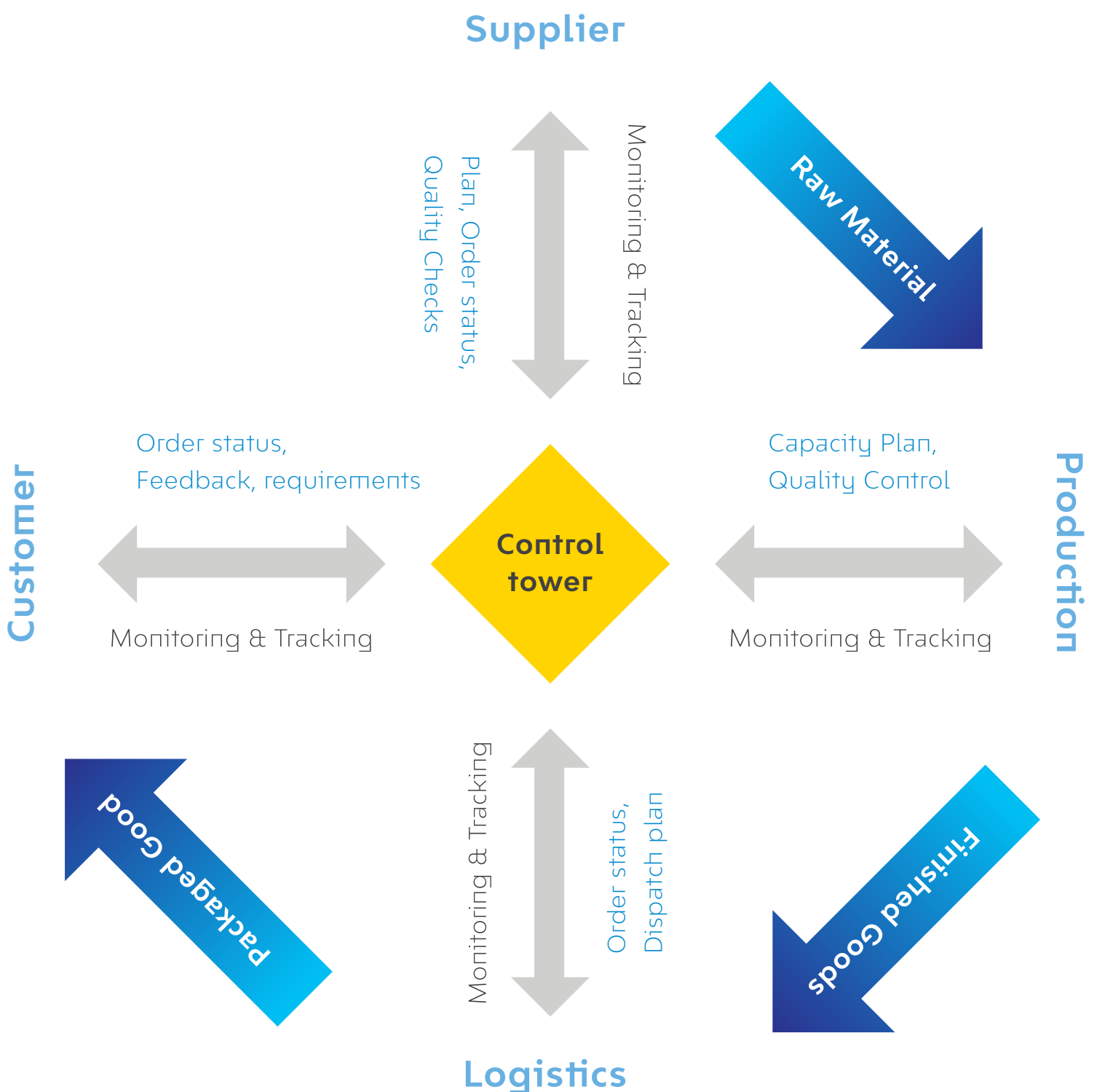Response Planning

Demand Volatility

Production planning

Information retrieval

How Control Tower can overcome these challenges

A Control Tower integrates organizations (Suppliers, Operations, Logistics and customers), systems, and processes, in order to provide supply chain partners with a high level of product visibility with real time tracking along the entire supply chain.

A control tower's role in managing the supply chain:

Supplier

Plan, Order status, Quality Checks

Monitoring & Tracking

Raw Material

Order status, Feedback, requirements

Capacity Plan, Quality Control

Customer

Production

Control tower

Monitoring & Tracking

Monitoring & Tracking

Monitoring & Tracking

Order status, Dispatch plan

Packaged Good

Finished Goods

Logistics

Technology enablers
for Control Tower

**Artificial
Intelligence**

**Cognitive
automation**

**Robotic process
automation**

**Advanced
Analytics**

**Design
& simulation**

Blockchain

IOT

Features a Control Tower
with these advanced and
new technologies can enable
in a supply chain:

Technologies such as Predictive analytics, AI, Machine learning etc. enable faster response and decision making.

Faster

Ad hoc and real-time planning allows a flexible & well-thought- of reaction to changing demand or supply situations.

Flexible

Customers can be managed in much more granular clusters and a broad spectrum of products are offered.

More granular

The span of information reaches from synthesized top-level KPIs to very granular process data.

More accurate

Automation of both physical tasks and production & demand planning boosts the efficiency of supply chain.

Increased Efficiency

Use cases

1. Incoming material quality

Problem : In any manufacturing company, the quality of incoming material/ raw material is crucial and any deviation in quality can lead to a heavy loss. It not only includes the operational challenges, but safety threats as well, especially in a chemical industry. Since there are several suppliers, it is difficult to track the quality and hence many a times an issue is captured only when it has already done the damage.

Solution: A control tower can help in tracking the quality at each step and with prescriptive analytics built in, it can also suggest the process alternatives to address the quality issues (for example addition of chemicals or increasing the retention time for processing). Also, because of continuous monitoring, high risk supplier can also be identified thus preventing these issues from re-appearing.

2. Inventory optimization

Problem: Manufacturing companies usually stock up critical inventory because of uncertainties, especially on machine side- machine stoppages and maintenance. Every machine is critical for the operations of a plant and to ensure its availability, its spare parts are kept ready. But this creates a problem of huge stock of inventory, which also ends up inflating the inventory holding cost.

Solution: With the help of the control tower data analytics capabilities, machine operations- machine current, loading/unloading, RPM, etc. can be aligned to the operational needs. Any change in the supply chain & operations can be known in real time and hence the uncertainties can be minimized. Also, machine running condition can be monitored every microsecond and based on the machine damage-fault-cause analysis, inventory can be optimized.

Challenges

With so many benefits,
a control tower has its own set of challenges as well:

Investment

Setting up a Control tower requires a substantial amount of investment. This is partly since the IT landscape of most organizations aren't really matured to enable a connected ecosystem. However, there are technical innovations such as APIs, Microservices etc. that are now allowing a means of real time interface between the legacy and modern applications to co-exist, and thus helping organizations manage the investments needed.

Connectivity

It requires strong connectivity among the various functions and partners in the supply chain. To ensure that the connectivity does not become a distraction in any way, a clear understanding is required on how all the networks and technologies be handled, how all the entry points to the networks be secured and how the uncertainties can be handled.

Complexity

Due to multiple connections, different technologies and applications are used which makes it a complex structure. However, with a detailed and strategic approach to select the technologies and applications, it can be managed in a better way. Only the systems tailored to fix the specific needs, should be chosen.

Privacy and data security

Since Control tower works on the collaboration, it shares the data among the various partners. This introduces new security vulnerabilities that need to be addressed. A reliable and comprehensive security solution that can make it easier to protect the IT infrastructure must be selected. It is also required to practice risk management on partners, third-party vendors and service providers.

Conclusion

Though it has a potential of taking the supply chain management to another level, a 'True Control Tower' is mostly implemented in a limited scope as of now. At present, only the leading companies are starting to adopt this concept to reality and it is still relatively new for manufacturing facilities in an industry. Setting-up a Control Tower, that gives an entire picture of supply chain performance and helps in optimizing the various processes in real time, is an incremental journey, which takes time and effort. However, it is important to identify and build upon the foundational capabilities that are needed to enable the big picture of end-to-end visibility and control to manage the supply chain risks effectively. The recent happenings around the world substantiates the volatile and uncertain times we are facing now which at fore the question: Are you ready to manage your supply chain risks completely? If not, a control tower view to manage the supply chain effectively must be looked at.

Authors

Anjali Barthwal
Consultant, LTIMindtree

Anjali has 6 years of experience in Manufacturing and digital Transformation. She has worked in Operation Excellence, Predictive Maintenance and Digital Strategy domains; and has driven and executed various Six Sigma Projects in the past.

Avik Roy
Senior Consultant, LTIMindtree

Avik has over 10 years of experience across Manufacturing and Information Technology and has been assisting clients in various programs towards benchmark studies towards improvement in products and operational capabilities. He has also been engaging with clients to embrace NextGen Digital Technologies to drive the next wave of operational excellence and business growth.