Control Tower @ SCM

Knowledge Research Insights

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Oraculi & Dux

A. Executive Summary

As supply chains evolve into complex, multi-enterprise ecosystems, traditional tools and dashboards fall short in delivering the agility, predictability, and precision businesses demand. Enter the modern Supply Chain Control Tower—not just a dashboard, but the nerve centre of operational excellence.

Modern control towers are built to translate visibility into actionable intelligence, enabling predictability, responsiveness, and resilience across the end-to-end supply chain.

The control tower of today is not a passive monitor. It is a digital decision support system (DSS) that integrates data across internal and external systems, enabling organizations to see, understand, and act—often in real time.

Key Components of a Supply Chain Control Tower include five key components

- Data Integration: Aggregates information from disparate systems such as Enterprise Resource Planning (ERP), Warehouse Management Systems (WMS), and Transportation Management Systems (TMS) to create a unified data repository.
- Real-Time Visibility: Offers up-to-the-minute tracking of goods, inventory levels, and order statuses across the entire supply chain network.
- Advanced Analytics: Utilizes predictive analytics and machine learning algorithms to forecast potential disruptions and suggest optimal responses.
- Collaboration Tools: Facilitates communication and coordination among internal teams, suppliers, and logistics partners to ensure alignment and swift issue resolution.
- Performance Management: Monitors key performance indicators (KPIs) to assess the efficiency and effectiveness of supply chain processes.

These platforms unify disparate datasets to enable smart exception handling, prescriptive alerts, and orchestrated responses. With AI and machine learning layered in, control towers are now capable of learning from past events, predicting disruptions, and even recommending countermeasures.

Real-time data and analytics empower organizations to make informed decisions quickly, reducing response times to unforeseen events. Early detection of potential issues allows companies to mitigate risks before they escalate, ensuring continuity in operations

In a highly competitive business envirnment, improved Operational Efficiency by streamlined processes and better resource allocation lead to cost savings and increased productivity. This helps in scalability, adapting to growing business needs and complexities

Ofcourse with the Customer at the center of every enterprise, it boosts Customer Satisfaction in all facets for timely deliveries, countermeasures to transparent communication thus improving customer trust and loyalty.

B. The Context

In today's volatile and hyper-connected world, visibility alone is no longer a luxury—it's a necessity. Yet visibility without control is toothless. While visibility is both the foundation and the catalyst for the control tower's value proposition and of effective supply chain management. But visibility alone is not the destination—it is the starting point.

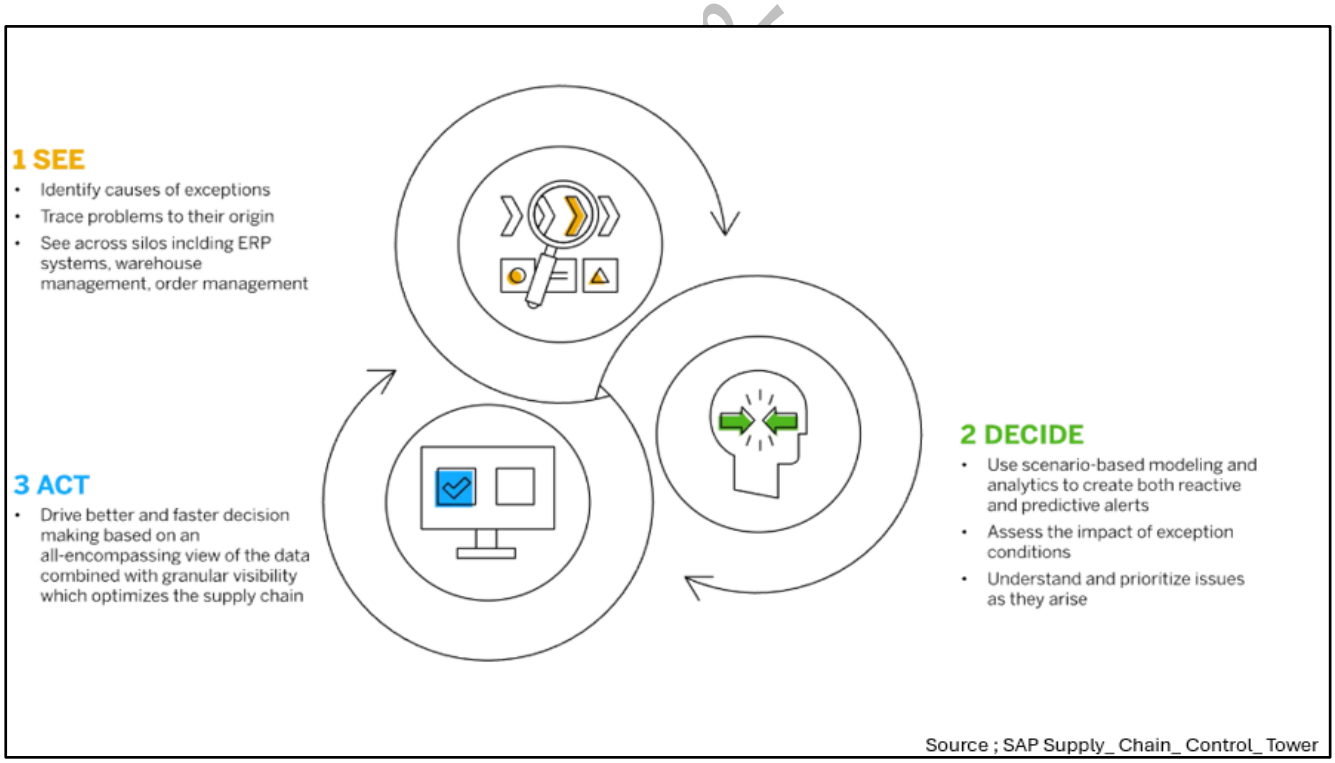
Without the ability to interpret, act upon, and orchestrate responses, visibility remains passive.

Control Towers are especially useful when Supply chains are global, complex, or multi-modal; there are multiple ERP/WMS/TMS systems and there is a need for cross-functional collaboration between procurement, logistics, manufacturing, and customer service

It is imperative in a Multi-Carrier Logistics Optimization, be it for choosing the fastest/cheapest carriers by evaluating historical delivery performance, cost, customs clearance speed.

Similarly for Supplier Disruption / Raw Material Shortage wherein tiered visibility helps trace back the source, identifies affected finished SKUs, runs simulations for alternate sourcing / rescheduling production.

The logical architecture of a control tower is modelled on the PDCA cycle:



Much of the Act and Decide have gone to Algorithms (What-If scenarios), Process Automation and the latest trend being Agentic AI wherein the Agent, akin to a human and carries out multiple tasks as towards a solution.

Evolution of Control Tower: From Descriptive to Predictive

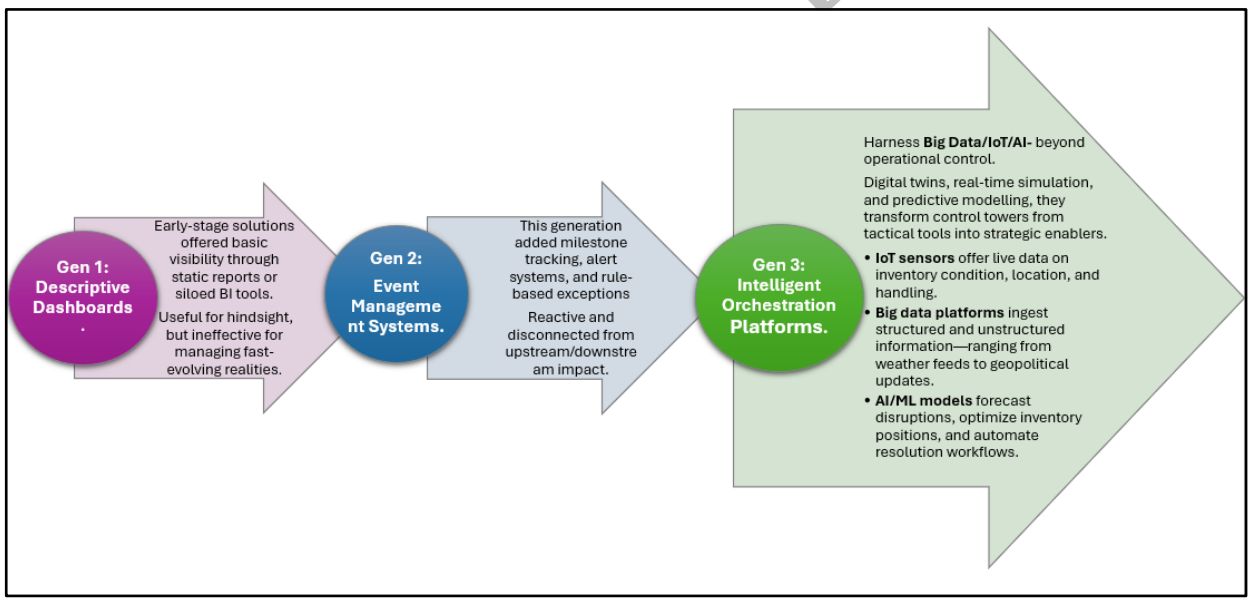
Control towers have undergone a radical transformation in three broad phases:

Gen 1: Descriptive Dashboards. Early-stage solutions offered basic visibility through static reports or siloed BI tools. Useful for hindsight, but ineffective for managing fast-evolving realities.

Gen 2: Event Management Systems. This generation added milestone tracking, alert systems, and rule-based exceptions—helpful, but often reactive and disconnected from upstream/downstream impact.

Gen 3: Intelligent Orchestration Platforms. Today's control towers harness **Big Data, IoT, and AI** to go beyond operational control. With digital twins, real-time simulation, and predictive modelling, they transform control towers from tactical tools into strategic enablers.

- **IoT sensors** offer live data on inventory condition, location, and handling.
- **Big data platforms** ingest structured and unstructured information—ranging from weather feeds to geopolitical updates.
- **AI/ML models** forecast disruptions, optimize inventory positions, and automate resolution workflows.



While a Control Tower works in real time and takes corrective actions, the "what happened" of yesteryears is not useful unless ploughed back into the system and used for automating some of the real time problems as well as being a part of the predictive of what can happen for countermeasures even before the event has actually happened!

C. Current Practices: An O&D Study

Our study revealed leaders in most segments and logistics providers (LLP/3PL) in high value sectors have been running Control Towers over the years, which are evolving with technology- initially GPS and Telematics, then Big Data and Automation.

Virtual Ocean Control Tower

Unilever manages approximately 12,000 containers on 1,500 ships globally, transporting raw materials, packaging, and finished goods. This system integrates real-time data from 25 shipping lines, tracking over 2,000 vessels and 400 ports.

Benefits:

- **Proactive Issue Resolution:** The system uses machine learning and predictive analytics to identify potential disruptions, such as port congestion or delays, allowing for timely interventions.
- **Enhanced Visibility:** An interactive dashboard provides a comprehensive view of global shipping operations, facilitating better decision-making.
- **Operational Efficiency:** Automation of data collection and processing reduces manual efforts, leading to significant time savings.

Data Sharing with Retailers

Facing declining snack volumes and the need for improved sales forecasting, PepsiCo initiated data-sharing collaborations with major retailers. By exchanging checkout data and leveraging AI technology, PepsiCo aimed to enhance demand forecasting and supply chain efficiency.

Benefits:

- **Improved Forecast Accuracy:** Access to real-time sales data from retailers enables more precise demand predictions.
- **Optimized Inventory Management:** Better forecasts help in maintaining optimal inventory levels, reducing both overstock and stockout situations.
- **Strengthened Retailer Relationships:** Collaborative data sharing fosters trust and aligns objectives between PepsiCo and its retail partners.

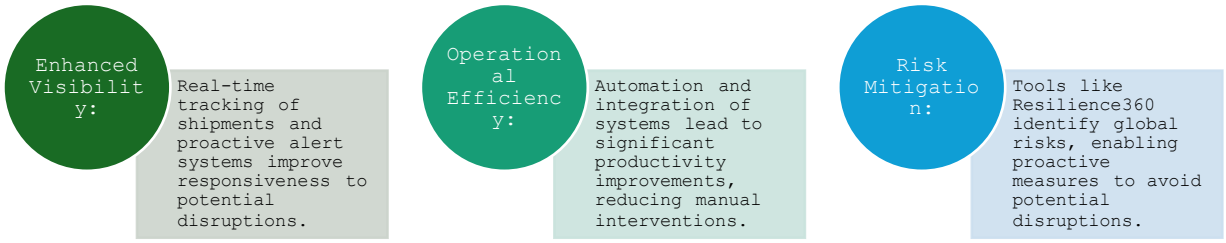
Vaccine Distribution Control Tower

During the COVID-19 pandemic, Pfizer implemented advanced supply chain control towers to manage the distribution of vaccines, ensuring compliance with stringent cold chain requirements and timely deliveries.

- **Real-Time Monitoring:** Continuous tracking of vaccine shipments ensures adherence to temperature controls and delivery
- **Proactive Issue Management:** The system identifies potential delays or issues, allowing for immediate corrective actions
- **Enhanced Collaboration:** Integration with various stakeholders ensures coordinated efforts in vaccine distribution.

Control Tower Operations

DHL Supply Chain operates multiple control towers globally, managing complex logistics for various industries, including automotive and manufacturing. These control towers oversee inbound materials from thousands of suppliers, coordinating transportation planning, execution, and risk management.



Leaders are using control towers to reduce decision latency from days to hours, improve forecast accuracy by 15–30%, and boost supply chain agility by 10–20%.

Now with the advent of LLM and to Agentic AI, Control Towers are slated to advance to sci-fi levels

At the same time, many organizations remain hesitant. Common barriers include:

- **Perceived complexity and cost** of implementation
- **Data quality concerns** and lack of standardized formats
- **Cultural resistance**, particularly from mid-management layers protecting legacy processes
- **Siloed systems** that are not interoperable
- A narrow perception that control towers are just another reporting tool

The Price of Missing the Bus

Inaction has consequences—and in supply chain, they compound quickly. Organizations that delay or ignore the adoption of intelligent control towers often find themselves trapped in a continuous cycle of reactive firefighting, rising costs, and missed opportunities:

- Persistent Inefficiencies
- Firefighting, and
- Lost Productivity

Without real-time visibility and control, supply chain teams spend up to 60–70% of their time managing exceptions manually—through emails, spreadsheets, and phone calls.

Then there are missed SLAs, Customer Churn, and Reputational Damage. Added to that is higher Cost-to-Serve, Excess Inventory, and Capacity Underutilization leading to a Compounding Competitive Gap

D. Insights and Way Forward

The Business Case: Control Efficiency Meets Strategic Value

A modern control tower delivers on multiple fronts:

- **Operational savings**: By reducing expedited freight, detention charges, and inventory bloat
- **Service improvement**: Through better forecasting, stock placement, and order fulfilment
- **Risk mitigation**: Via early warning systems for disruptions across tiers
- **Cross-functional alignment**: Breaking silos between procurement, logistics, planning, and sales

What to Consider When Building Yours

To get started, companies should:

- **Prioritize high impact use cases**: e.g., inventory optimization or exception management
- **Assess data readiness** and build a governance framework
- **Choose the right platform**—whether off-the-shelf or custom-developed
- **Ensure interoperability** with legacy and partner systems
- **Establish cross-functional governance** involving IT, operations, and external partners
- **Invest in change management** to foster adoption across the organization

The key is to start small, demonstrate value, and scale fast—without waiting for the "perfect" blueprint.

The modern control tower is not an IT project—it is a **business imperative**. In an age where disruptions are the norm and agility defines winners, the ability to ***see, decide, and act in real time*** is what sets leaders apart.

Visibility without control is static. Control without intelligence is slow. But a control tower that combines ***real-time data, predictive insight, and actionable countermeasures*** becomes the nerve centre of supply chain excellence.
The future is not just visible. It's orchestrated.

In today's marketplace, speed of response is the new currency of success. And a control tower is the engine that powers it.

The paper provides food for thought for industries and supply chain practitioners for a future ready enterprise.

Our research and advisory teams would be happy to engage with you for a deeper study and scenario building or a strategic road map for your company.

info@oraculidux.com www.oraculidux.com