Segmentation, Flexibility and Predictable Operations: Enabling Certainty through Science Driven Supply Chain Management

Introduction

Today’s supply chains operate in an era of a ‘new normal’, characterized by unprecedented volatility, uncertainty and complexity. These are caused by uncertainty in macroeconomic, geo-political, and climatic conditions, as well as growth in product and service personalization levels. These factors contribute to the inability to anticipate the effect of changing market and technology trends and the lack of connected execution across all elements of the supply chain. As a consequence, supply chains end up imbalanced from a supply demand matching perspective. Constantly managing change through the effective orchestration of supply chains requires scientific fact based supply chain design and engineering.

Challenges to effective Supply Chain Management

A diverse partner ecosystem, and increasingly globalized, often outsourced, supply chains have compounded the complexity of supply chain management (SCM). For instance, low-cost country sourcing strategies have led to extended multi-link global supply chains that are more susceptible to disruptions, thereby requiring contingency plans which add to the supply chain costs. On the other hand, shortened product lifecycles in the face of declining prices and increased demand volatility amplifies the costs associated with these contingency plans and suggests a regional supply chain design as the optimal approach.

Figure 1: Lower On-Shelf Availability at Retailers
Clearly, decisions that seem most advantageous today may cease to be so in a few years due to industry consolidation, changing market conditions, factor costs and evolving distribution channels. Factoring in the increasing consumer demand for customization as well as intense competition, the task of managing supply chain complexity with its accompanying tradeoffs assumes critical importance. The challenges that retailers face in managing on-shelf availability helps illustrate this point. The lowering of on-shelf availability at retailers despite millions of dollars spent by retail and CPG companies is due to the perfect storm of rapidly changing demographics of shoppers, proliferation of mobile based e-commerce, ascendance of non-traditional retailers and an increasing proportion of value conscious consumers.

Addressing Supply Chain Ecosystem Dynamics

In response to the aforementioned challenges, the focus has now shifted from internal alignment and optimization of systems and processes to the management of dynamic ecosystems. This requires multi-tier synchronization and collaboration across suppliers, technology partners and customers.

The principles required to effectively manage dynamic supply chain ecosystems are:

- **Segmented thinking:** The supply chain of an enterprise is a collection of multiple supply chains with varying degrees of interaction operating under the umbrella of a single organization, and in most cases, a ‘single infrastructure’. This necessitates a thought process that structures and operates them using different rules.

- **Flexible design:** The supply chains’ cost optimality needs to be coupled with flexibility to make them adaptable and viable in a changing environment.

- **Visible and predictable operations:** Timely use of internal and external information to dynamically analyze, visualize and predict the way forward is essential to enable risk mitigated agile operations.

To realize these design objectives, innovation efforts should be centered on two major themes –

- **Science based approach to SCM** that utilizes cutting edge algorithms, analytics and intelligent logic to solve supply chain management problems.
  
  For example, supply chain design that adopts dynamic simulation based approaches to analyze and design flexible and cost optimal supply chains.

- **Variable cost delivery models** that allow customers to pay for services consumed, effectively transitioning from capital expenditure to operational costs (also referred to as Cloud pricing).
  
  For example, a Managed Services Delivery Model that uses predictive analytics and information fusion in a managed services environment to augment the organization’s supply chain talent.

Benefits of a Science Based Approach to SCM

The key deficiency in most Commercial off the Shelf (COTS) supply chain solutions is that existing optimization algorithms and statistical forecasting techniques are several decades old and the architecture is not designed to scale to address today’s business requirements. Another gap is the lack of sufficient parameterization and representation of supply chain policies and time driven dynamics to support rapid site operation modeling and performance simulation.
A key point to note is that traditional As-Is To-Be consulting models are also deficient in their own ways. The biggest challenge with the traditional consulting models is that they are not dynamic – they are designed to solve problems at a point in time rather than on an ongoing basis. Also, these consulting models are not driven by deep analytics and don’t have a platform architecture behind it and thus, the results are sub-par and difficult to execute.

Supply chain management solutions should have the ability to effectively capture supply chain dynamics, variations, and volatility in terms of time based events. They need to also facilitate the rapid evaluation of different strategic design options and operational policies. The recommended approach goes beyond capturing the uncertainty and volatility in terms of probabilistic distributions by modeling them as time based events and specific variations of them, thus effecting significant reduction in supply chain overdesign. This approach helps identify the upper control limit and lower control limit under which the supply chain will operate. These control limits serve as the guiding principle to perform operational execution for the supply chain.

Benefits of a Variable Cost Delivery Model

A variable cost delivery model can be leveraged to build adaptive, cost optimal supply chains that deliver superior financial and operational performance despite the pressures imposed by globalization and changing market needs. It can be accomplished by designing responsive supply chain platforms to provide tailored services appropriate to business conditions. These supply chain platforms can be implemented in a cloud based environment, providing organizations the added benefit of SCM services delivered on a ‘variable cost model’. A variable cost model delivers services as an operational expense and not as a capital expenditure. The benefit of this approach is that the services can be added on an ad hoc basis, without significant upfront investment and, based on the service levels delivered, additional capabilities can be procured.

Based on our experience with the managed services model in the planning domain, we have identified a pattern (Figure 3) in terms of value added analysis. A managed service typically starts out with heavy effort upfront in understanding demand patterns and algorithms needed. As the process stabilizes over time, the effort reduces and shifts to value added services. The significant advantage of this approach is that the company can perform value added analysis and process transformation work at a fraction of the typical cost incurred for similar consultative engagements.

![Figure 3: Managed Services Adds Focus on Value added Analysis](image)

**Conclusion**

In summary, we see that existing supply chains are struggling with the challenges of volatility, uncertainty, complexity and ambiguity. Our analysis suggests that the key tenets of Supply Chain Segmentation, Flexibility and Predictable Operations are absolutely essential to solve these supply chain challenges. To this effect, a science based approach towards a solution and the delivery of this solution through variable cost delivery models is essential.
About TCS’ Supply Chain Centre of Excellence

Tackling today’s complex, volatile and uncertain global Supply Chains requires innovatively engineered solutions, provisioned using variable-cost delivery models that blend strategic thinking with hands-on practicality.

The traditional process re-engineering approach is no longer acceptable in today’s highly dynamic business environment. To help clients achieve and sustain supply chain performance excellence in this age of rapid change, TCS leverages a capability accelerators based approach implementable in a short timeframe. Our accelerators utilize scientifically designed IT solutions that combine robust analysis of complex data sets with engineering rigor. This in turn enables clients to quickly derive benefits without the need to re-invest in process redesign initiatives.

Our team comprises highly experienced industry veterans who are well-versed in successfully addressing end-to-end supply chain challenges. Their collective wisdom is supplemented by our Analytics and Operations Research related Intellectual Property, which is developed to enable the delivery of high-impact solutions that offer our clients a sustainable competitive edge.

Contact
For more information about TCS’ Supply Chain Centre of Excellence, visit: www.tcs.com
Email: global.supplychain@tcs.com