The Ecosystem-Aware Global Supply Chain Management

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Evolution of Global Supply Chains

- Supply chains networks have evolved from single owner vertical integrated networks into globally dispersed multiple owner company networks.
- Each company controls the respective nodes and the links. Coordination & Collaboration with network partners becomes a necessity.
State of the Operational supply Chain

Efforts of Stake holders for last Two Decades have resulted in High Performance, Highly connected and Highly Risk Prone Supply Chains
Need for Supply Chain Redesign

- The global supply chain performance is effected by factors extraneous to the supply chain such as the political and economic climate, Regulations, delivery infrastructure in the locations of the partners, Changes in the availability and cost structure of the resources and host of other factors.
- Redesign of the supply chain networks taking into account all these factors
This course provides with tools and frameworks to manage globally dispersed manufacturing and service network operations to deal with multiple strategic and operational issues such as outsourcing, green regulations, and tensions with the network partners, increased transportation costs and regionalization.

Prerequisite: Basic course on supply chain management
Part 1- Introduction to Supply Chain Networks

- Lectures 1 & 2
- Zara: Lecture 36
- Flextronics Case will add value
Part 2 - The Supply Chain Ecosystem

- Lectures 3-5
- The Supply Chain Ecosystem: Definition, Its four constituents: Supply chains, Delivery service infrastructure, Resources (clusters) and Institutions; Examples; Global manufacturing: Modular product design, Logistics, Outsourcing; Institutions: Regulations and Social factors, Food Supply Chain
- Metro Cash and Carry: Lecture 34
- Harvard Cases: Nokia (Clusters) can be a good addition
Part 3- The GRIP Framework
Analysis of Global Supply Chains Using the Ecosystem

- Total of 16 hours: Lectures 6-18,27,28,33
- High Performance global supply chains: Lecture 6
- Risk in global supply chain networks: Lectures 7,8,9
- Mattel: Lecture 33
- Ecosystem framework for innovations: Lecture 10,11,12
- CEMEX: Lecture 27,28
- Governance of Global supply chains: Lectures 13,14
- The orchestrator model: Lectures 15,16
- Li & Fung 17,18
Part 4-Global Supply Chain Redesign

- Supply chain Redesign involves two steps: The supply chain formation, and supply chain governance: Lecture 23, 24
- Green supply Design: 29, 30, 31, 32
Part 5- Applications

- Food Supply Chain and Food Security: Lectures19,20,21,22
- Green supply Chain design: 29,30,31,32
- Smart Villages and Cities: 25,26
- Location selection; 39,40
Research Areas

- Social Networks and Supply Chains
- Transaction cost economics in the ecosystem framework
- Governance, Coordination and Control
- Green Supply Chains and Carbon Trading
- Orchestrator model for governance of SMEs
- Orchestration of Agri Supply Chains
- Location Selection based on Investment Climate
- Tax Integrated Global Supply Chains
- Game Theory and Supply Chain Coordination
- Scope for further research
Scope for Further Learnings
The Five STERM forces

- **Science** research generates new and or improved products
- New **Technologies** (Internet, Search, Solar) emerge at a rapid pace
- New **Engineering** materials and designs come out every day
- **Regulations and policies** of countries on trade, tariffs, immigration, deregulation, climate change create disruptive innovations & Risks
- New **Management** techniques and business models such as outsourcing, sell direct, supply hubs enable growth.

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Supply Chain Configuration

- Given the government regulations, the investment climate and the vertical space, the company has to tread carefully with right products, services, planning strategies such as location and partnership decisions and business models to succeed.
Queuing and other analytical models can be developed for end to end goods flow. With good data on the routes and times of goods flow one can develop queuing or Simulation models.
Models for Design of Governance Mechanisms

- The **partner selection problem** can be formulated as Fuzzy AHP or MIP problem. One can rank order the suppliers for each component based on the ecosystem parameters based on TCE.
- Coordination, scheduling problems can be solved using Optimization techniques.
- Expert systems, Decision support systems, Case based reasoning and Hybrid control systems are useful for **Exception Management and Execution**
Mathematical Models for Orchestration

- While there is lot of literature on Orchestration, very few mathematical models. Needs attention
Multitier Procurement

- OEMs are buying through Multi-Tier Purchasing Platform for all the suppliers and their suppliers.
- OEM or Brand owner or Broker selects their tier 1 suppliers and also influences or selects tier 2, 3, or 4 suppliers for critical materials and components.
- This creates the need for procurement through supplier factory gate pricing than payment on delivery at OEM site.
- N. Viswanadham and A. Samvedi, Supplier Selection Based on Supply Chain Ecosystem, Performance and Risk Criteria, To appear IJPR 2013
Multi-tier Risk Management

- The focus of the supply chain managers is shifting from managing immediate suppliers to managing the entire network.
- There is tremendous need to take a relook at the supply chain risk and also design of resilient supply chain networks.
The service networks and Construction models were built several decades ago.

New designs, technologies & management models are available to upgrade the existing ones and to building the new ones.

This requires process orientation, modularization, standardization, use of IT, sensor networks and integrated designs.

SES Framework would be highly remunerative.
Conclusions

- The SES Framework holistically models all the factors that interact with the supply chain.
- Has several applications in improving the investment climate, Policy making, Reengineering the companies, Developing infrastructure and several others.
- While going through the book, one can map their Company, Village or City and can visualize opportunities for improvement.