

## ENTERPRISE INTEGRATION:TRENDS & METHODOLOGIES WITH CASE STUDIES

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*Abstract:* From the Business Consulting perspective of today, the Enterprise Integration challenge has considerably shifted to newer dimensions than what was practiced only a few years ago. In extensive experience of this author from Asia to Americas and from SMEs to MNCs, no company boss ever stops worrying about the return on investment or investment to create the share holder value. Against this environment and e-Supply Chain Management as a domain of the focus, this paper describes the methodology of doing the Business Cases with Case Studies to illustrate the how to Business Case and Blue Printing aspects of Enterprise Integration Technology. *Copyright © 2002 IFAC.*

Key Words: Enterprise, Integration, Manufacturing, JIT, Systems, Supply Chain Management, Operational Improvements.

Today's state of the art companies have already established massive IT infrastructures to do complete integration and automation of not only the Local enterprise but even the Enterprise at the Corporate level. However the quest to be better never ends & they are constantly shopping for the new technologies. But with a slight caveat which can easily be a stumbling block. The caveat being- the business case. Business case as is applicable to Supply Chain Management its trends and practices via case studies is the central theme of this paper.

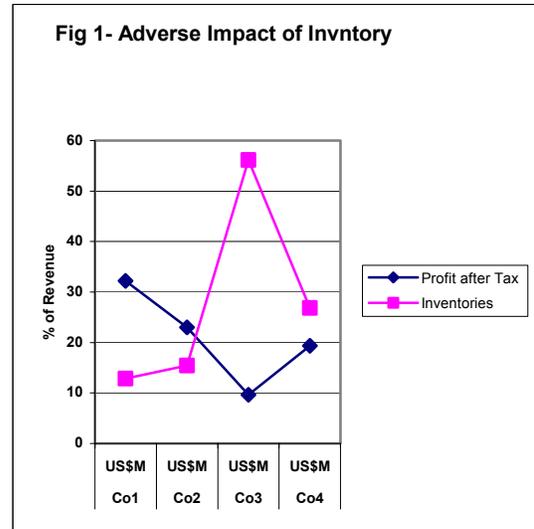
### 1. SUPPLY CHAIN MANAGEMENT

Supply Chain Management has caught more attention than did Artificial Intelligence in the

early eighties. Like AI there is no other domain today which gets more talked about than Supply Chain in the boardrooms. Supply Chains beginning can be traced to the early eighties when MRPII was being extended into ERP. At that time all the manufacturing planning and scheduling was still infinite model based. To alleviate the problems inherent in the infinite capacity based MPS etc. Finite Capacity model based techniques such as Factorol was introduced by Factor, an affiliate of Pritsker. Dynamic Scheduling was talked but not practiced. Early nineties began to see an awareness of holistic management of both the Capacity and the Inventory management. Some of the popular packages that have been introduced in this space to manage, Inventory, Capacity, Planning and Forecasting are from I2,

Tyecin/Manugistics, Red Pepper/Peoplesoft, Paragon, SAP and most recently from Oracle. The essentials of this domain seem to have been lumped together in the -Supply Chain Management. These 3 words tend to embody the planning, management and optimization of Inventory, Capacity, Planning and Forecasting.

Supply Chain Council has put forward a supply chain model. This model SCORE, stands for Supply Chain Operations Reference model. The Supply Chain is comprised of your suppliers supplier and your customers customer. And each node of this chain must look at the enterprise functions such as Plan, Make, Purchase and Distribute, with respect to planning, managing and optimization. Thus, a well managed Supply Chain system will not only manage its own Plan, Make, Purchase and Distribute functions but it will Transmit and Receive, Planning and Inventory information with its suppliers supplier and customers customer.

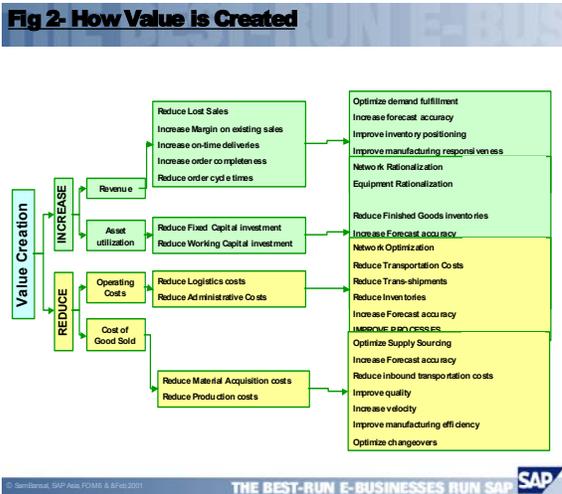


### 1.1 Financial Impact of Supply Chain Costs

The importance of this domain can best be understood from the fact that depending upon the company and the sector, the SCM costs may range anywhere from about 4-22 percent of the revenue or higher. If the reduction of 25 percent is achieved, it is annual & can contribute to almost 100 percent more bottom line profit for an average company running the SCM costs in the neighborhood of 20 percent, which is not uncommon. Studies have been made to establish the impact of glitches in Supply Chains and their impact on the Stock Prices of the companies. Accordingly it has been found that a glitch rumor influences the stock value by 19 percent within 2 days of the rumor on wall street & to a total of 23 percent within 4-5 days. With such an important area which corporate chief will not want his supply chains to be running smoothly.

For example this author studied 4 companies of the silicon valley engaged in the communications semiconductor business. All had high inventory, however the one with highest inventory was least profitable & the Wall Street was punishing the subject company most harshly, as is illustrated in the following graph:

It is not only Inventory that costs profits. The entire value chain from value drivers to stock holders value is shown on Fig 2:



### 1.2 Opportunity Assessment

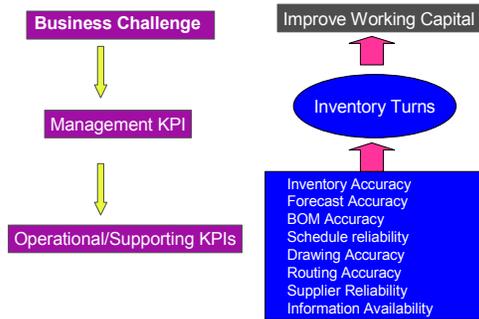
Opportunity Assessment or Supply Chain Opportunity Assessment is an age old cost benefit study but with a modern twist of formalism and lot of extensions. It essentially comprises of Fiscal Data Collection, Data Rationalization, Developing Understanding of the Problem, Developing Total Supply Chain Management Costs, Benchmarking SCM Costs, Estimating the Opportunities for Improvement & finally linking them to the enabling Tools and Technologies. OAs can be done at 2 levels as shown in Fig 3:

**Fig 3. Two Levels of Opportunity Assessments**

	Level 2	Level 3
<b>As Is</b>		
■ Cs on Practices	✓	✓
■ Cs on Metrics/KPIs	✓	✓
■ Work Flow Models	NO	✓
■ KPI Base Score Card	✓	✓
<b>To Be</b>		
■ Work Flow Models	No	✓
■ KPI Base Score Card	Assess	✓
■ Rationalization/Innovation		
■ Bench Mark with Practical Considerations	No	✓
■ Bench Mark with the World at Large	Assess	✓
■ Target Score Card	Assess	✓
■ Estimate Opportunities	✓	✓G
■ Review & Critique by Domain Experts	No	✓
<b>Sustenance</b>		
■ Blue Printing	✓	✓
■ Relate Opportunities to Technologies	✓	✓
■ Time Frames	12 Wks	12 Weeks
<b>Resources</b>	3	4.25
<b>Deliverables</b>		
■ Report	Small	Exhaustive
■ Guarantees	No	Yes, Condtl

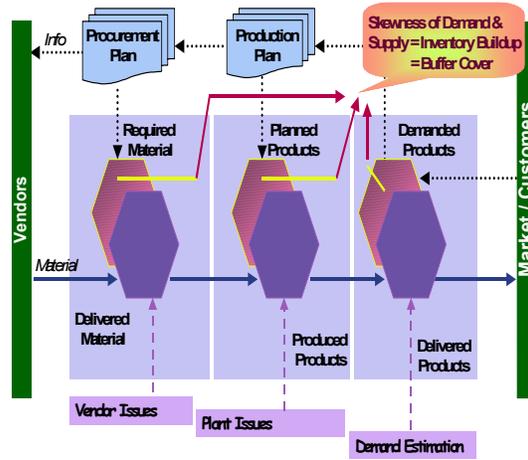
At the enterprise level the KPIs of concern are Inventory Turns, Asset Utilization etc where as at the Process Levels the KPIs of attention become the Inventory Accuracy, Forecast Accuracy, BOM Accuracy, Schedule reliability, Drawing Accuracy, Routing Accuracy, Supplier Reliability, Information Availability etc. This relationship is as illustrated in Fig 4:

**Fig 4. KPI Hierarchy**



Upon close study one finds that the reason supply chain problems exist is because of the difference between the plans vs the actuals, as is illustrated in Fig 5:

**Fig 5. As Is: Supply Chain Paradox**



This delta is the root cause to create bad process level KPIs which eventually transcend to bad enterprise level KPIs such as high inventory turn over and lower asset utilization. The enabling technology would be the one that can eliminate or minimize the effect of the difference between the plan & the actual.

## 2. FOR EXAMPLE- CASE STUDY

This client posed an interesting challenge:

We want you to study our three problems and give us the solution for them.

During scoping and objective setting the client was completely unwilling to let us do a Business Case but as the project began, it was abundantly clear that what they needed most was the Business Case with ROI analysis

Hence the strategy that was adopted was to:

- Study the causes of the problems
- Measure the bottom line impact of the problems, benchmark the costs establishing the enabling technologies and
- Create the solution

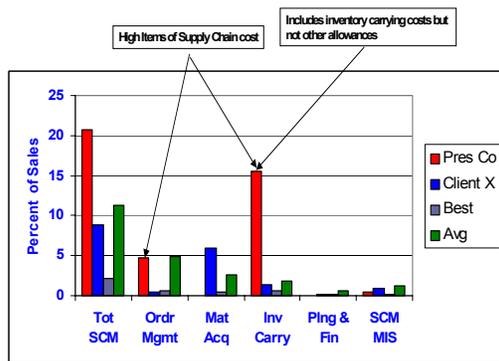
Fig 6 shows the causes creating the 3 problems

**Fig 6. Causal Themes Mapping into 3 Problems**

Theme	3 Problems		
	Stabilising Near Term Requirements	Minging Long Lead Time Components	Static Components Heavily Assembly
Demand Planning Forecast Accuracy	2	2	1
Demand Planning Option Forecasting	2	3	2
Collaboration with Suppliers	2	2	3
Capacity Planning as integral part of the Planning Process	1	1	3
Alert Systems to enable rapid response to variations	1	2	3
Decision Support Tools, Whatif Capabilities	1	1	2
Integration of Support Planning with Production Planning			3

The quantification and benchmarking effort leads to Fig 7, which clearly establishes the bottom line impacts. These are very high as compared against the competition. So they offer the opportunities to improve. Fig 6 establishes the causes creating the problems, Fig 7 establishes the magnitude of the problem .

**Fig 7. Supply Chain Cost Benchmarking**



Order management and inventory carrying costs are significant contributors to high supply chain management costs.

The target reductions & the reduction modeling are given in Fig 8:

**Fig 8. Total Benefits**

	AsIs Value Dollars	Rate Percent	AsIs Cost Dollars	Present Client		SAP Target	
				Reduction Amount Dollars	Reduction Percent	Reduction Amount Dollars	Reduction Percent
Total Factory Inventory	1633	170	224	809	500	816	500
Order-to-Bill Inventory	423	120	506	846	200	216	500
Manufacturing Inventory Improvement by 50% of as per target			1633	809	200	404	250
Capacity Issues Due Cycle Time-12 of 50 percent-25 percent lead for additional market share will create minimum of 10% profit of 30 percent on additional capacity				rooost			95
Supply Network Optimization Industry Reduced 25 Percent/year cost reduction due to 18 SSC			1820	rooost			255
Improved Delivery Performance							
<b>Total Net Improvement</b>				<b>484</b>		<b>1128</b>	

Note: Reduction Amounts for Inventories in Both cases, Present Client as well as Study Target, are Dollar Values, their carrying cost (only) is included in the Total Net Improvement line

### 3. CONCLUSIONS

State of the art practice of Business Consulting focused in the Supply Chain domains has been discussed. Opportunity Assessment methodology starting from investigation of the problems to establishing and benchmarking their impact on the bottom line as well as the reduction modeling has been discussed and amplified by the case studies. It should be stressed that the correlation between the qualitative assessment of the problems impact to quantitative assessment has been found to be extremely close.

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