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## SUPPLY CHAIN : CORPORATE'S COMPETITIVE ADVANTAGE IN MARKET



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**Supply Chain:** A supply chain is enterprise value chain that performs the functions of procurement, transformation of material from raw state to finished products, and distribution of finished products to customers. Supply chain management is set of approaches for efficiently integrate suppliers, manufacturers, whole sellers/retailers & customers to merchandise and distribute at the right quantity, to the right locations, and at the right time, in order to minimize enterprise wide costs while satisfying customer requirements.

Supply chain decisions fall into three categories or phases, depending on the frequency of each decision and the time frame over which a decision phase has an impact: 1. Supply chain strategy: During this phase, a company decides how to structure a supply chain & develop strategic decisions for longer time span 2 to 5 years period. Strategic decisions made by companies include the location and capacities of production and warehousing facilities, type of information system to be utilised. 2. Supply chain planning: As a result of the planning phase, companies define a set of operating policies that govern short-term operations for 1 to 2 years like optimising the flow of products throughout a given supply chain configuration. 3. Supply chain operation: The time horizon here is weekly or daily, and during this phase companies make decisions regarding individual customer orders, ware house & transport management & production scheduling.

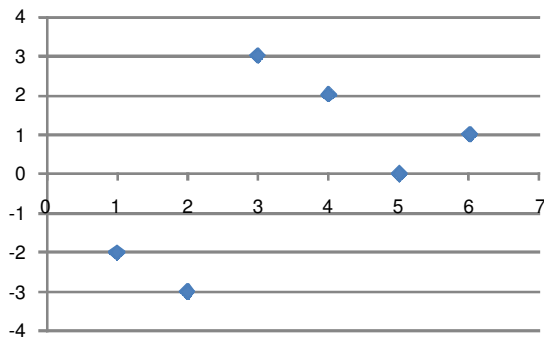
He made the troops carry their own weapons, armor, and some provisions while marching, to minimize the need for a transportation infrastructure.

At the river Beas in India, his soldiers had marched 11,250 miles in eight years - the longest military campaign in history. Alexander lost two-thirds of his force. One prime reason was undermining the importance of logistics in Alexander's plans. Napoleon failed to conquer Russia in 1812. In June 1812, Napoleon crossed the Nieman River into Russia with 600,000 men and over 50,000 horses. He had his supply wagons carry 30 days of food but due to poor road network in Russia, his army suffered from poor logistics leading to inadequate food supplies and increasingly sick soldiers. Within a month over 10,000 horses had died. By the time Napoleon had reached Moscow in September, over 200,000 of his soldiers were dead and when the army crossed into Poland in early December, less than 100,000 exhausted soldiers had crossed into Russia. Immediately after World War II, the United States provided considerable assistance to Japan. In the event, the Japanese have become world leaders in management philosophies in production and service, like Toyota's revolutionary philosophies of Just in Time (JIT) and Total Quality Management (TQM). Supply chain management has got an edge with world class practices of kaizen (or continuous improvement), improved customer-supplier relationships, supplier management, vendor managed inventory, collaborative relationships between multiple trading partners. Supply chain optimisation is a key to successful supply chain management. Supply chain optimisation is calculating the best possible utilisation of resources (man, machine, money, method, time, processes, vehicles, raw materials, supplies, capacity, etc.) needed to achieve a desired result, such as minimizing cost or maximizing profit.

The right set of supply chain performance metrics indicate how well each plan, source, make, deliver, and return supply chain process is performing, highlight where there's room for improvement, and help to diagnose problems and decide where to focus improvement efforts. Metrics also can be a powerful management tool indicating what is expected of them and allowing to track progress—or lack thereof—over time. Supply chain metrics can be difficult to define and even more difficult to measure. At the highest level, supply chain operations are expected to contribute to a company's financial performance. Supply chain metrics, therefore, have three important objectives. First, they must translate financial objectives and targets into effective measures of operational performance.

**Supply chain Capability:** Supplier On-Time Delivery Performance is perfect delivery of material from supplier to customer.

WEEKS	DELIVERY DAYS (-ve & +ve number : early & late deliveries respectively )
1	-2
2	-3
3	3
4	2
5	0
6	1



If supplier delays or delivers material earlier, either way it affects inventory. To achieve perfect delivery a manager needs to first collect sample data, say 6 weeks delivery record. Maximum early & late deliveries are lower and upper control limits of process chart. Some deliveries are earlier, some are de-

layed than expected and some are perfect on time deliveries. To optimize supply chain metric Supplier On-Time Delivery Performance, target is to bring all points nearer to the mean for achieving on time delivery. This is to be achieved by bringing process capability in practice. Process capability compares the output of an in-control process to the specification limits by using capability indices. The comparison is made by forming the ratio of the spread between the process specifications width to the spread of the process values, as measured by 6 process standard deviation units - the process width. To compare the output of a stable process with the process specifications and make a statement about how well the process meets specification. It needs to compare the natural variability of a stable process with the process specification limits.

A capable process is one where almost all the measurements fall inside the specification limits. There are several statistics that can be used to measure the capability of a process:  $C_p$  &  $C_{pk}$ .  $C_p$  is the process capability index.  $C_{pk}$  is the process capability. Assuming a two sided specification, if  $\bar{x}$  and  $\sigma$  are the mean and standard deviation, respectively, of the normal data and  $USL$ ,  $LSL$ , and  $T$  are the upper and lower specification limits and the target value, respectively.  $C_p$  is the ratio of difference of upper & lower specification limits to six times deviation. Whereas  $C_{pk}$  is ratio of any minimum value difference of target mean & specification limit to 3 times deviation.  $C_p$  is the actual observed variance divided by the print tolerance.  $C_p$  assesses the potential ability of the process to meet preset specification limits.  $C_p$  does not take into account the average value of the process.  $C_{pk}$  provides information on how close the average value of the process is to the center of the specification limits. The specification limits are based on design intent and the standard deviation and average are based on the process. A  $C_{pk}$  of 1.33 is equivalent to a defect rate of 30 parts per million.  $C_{pk} < C_p < 1.33$

**Supply chain Maturity:** The Performance Measurement Group (PMG) and PRTM jointly conducted the supply chain practice and information technology (IT) assessment that formed the basis for development of the Supply Chain Maturity Model in 2000.

	Stage 1: Functional Focus	Stage 2: Internal Integration	Stage 3: External Integration
<b>PLAN</b>	Demand/supply planning is done internally, with no integrated processes and tools across plants.	Global demand/supply planning is consistently aggregated across the firm, focused on functional accountability, and continuously improved by comparisons to historical performance.	Strategic partnerships with customers and suppliers is facilitated by direct, collaborative, electronic data exchange, and governed by formal supply chain performance agreements.
<b>SOURCE</b>	Supplier partnerships are poorly defined; processes are informal; there is no integrated set of tools to allow common access to procurement data.	Cross-functional commodity management teams and supplier partnerships are in place. Common ERP systems are used effectively.	Strategic commodity/supplier partners participate in collaborative product development, process/TCO improvement programs, and consortia buying, and have access to select online data. Strategic commodity/supplier partners participate in collaborative product development, process/TCO improvement programs, and consortia buying, and have access to select online data.
<b>MAKE</b>	Manual material and production control activities are driven by rudimentary implementation of MRP/MPS tools.	Material and production control data are tracked electronically to optimize internal scheduling and inventory management.	Customer-driven, APS (linked to suppliers); kanban demand pull manufacturing; real-time inventory control; automated product quality control; and total life-cycle product data management are dominant.
<b>DELIVER</b>	No formal, standardized processes or tools are in place for order management, channel rules, product delivery, or invoicing.	Formal outbound logistics processes, automated order management systems, specific channel rules (terms and conditions), delivery quality standards, and automatic invoicing exist. Variability exists in order entry and scheduling across product divisions.	Product and delivery process data maintenance systems function simultaneously throughout the supply chain, and are accurate and visible to all supply chain partners via e-commerce systems. Differentiated service levels and performance agreements are formalized.

The components of Supply Chain Maturity Model ( SOURCE: The Performance Measurement Group, LLC)

The model is used to assess the stage of capability for each of four processes defined by the Supply-Chain Operations Reference-model (SCOR)—plan, source, make, and deliver.

Stage of maturity is derived from a qualitative practice assessment that characterize supply chain practices in four areas—plan, source, make, and deliver. These areas are further broken down to cover the following scope: planning strategy; demand planning; supply planning; demand-supply balancing and decision making; sourcing strategy; sourcing processes; supplier development/management; sourcing organization and infrastructure; manufacturing strategy; production scheduling; materials issue, movement, and tracking; manufacturing process control; delivery enablement; order entry and scheduling; warehousing, transportation, and delivery; invoicing and cash collection; overall supply chain strategy; overall supply chain performance management; overall supply chain processes; and overall supply chain organization. Based on the company's response in each of the 20 areas listed above, PMG calculates its stage of process maturity. In order for a company to be considered mature for a given stage, it must be effectively using a majority of its practices from that stage.

**Stage 1: Functional Focus** - Functional departments within an organization focus on improving their own process steps and use of resources. The focus is on individual department's costs and functional performance. Processes that cut across multiple functions or divisions are not well understood, resulting in limited effectiveness of complex supply chain processes.

**Stage 2: Internal Integration** - Division or companywide processes are now defined, allowing

individual functions to understand their roles in complex supply chain processes. Cross-functional performance measures are clearly defined, and individual functions are held accountable for their contributions to overall operational performance. Resource requirements typically are balanced across the organization. A well-defined demand-supply balancing process that combines forecasting and planning with sourcing and manufacturing is evident at this stage.

**Stage 3: External Integration** - Stage 2 practices are now extended to the points of interface with customers and suppliers. The company has identified strategic customers and suppliers, as well as the key information it needs from them in order to support its business processes. Joint service agreements and scorecard practices are used, and corrective actions are taken when performance falls below expectations.

**Stage 4: Cross-Enterprise Collaboration** - Customers and suppliers work to define a mutually beneficial strategy and set real-time performance targets. IT now automates the integration of the business processes across these enterprises in support of an explicit supply chain strategy.

**Conclusion:** Considering the value addition, Supply chain is now beyond just functional processes. For products & service oriented companies, it is highly necessary to strategize their deliverables in terms of customer satisfaction, maximizing profit & minimizing costs. Maturity as a parameter of perfect functional capability plays a vital role while companies are looking for best supply chain solutions. Supply chain metrics to be implemented & controlled on ground reality would prove to be advantage factor in competitive market place.

## REFERENCE

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