

Comparative Analysis: Are You Still Confused About APS, SCM, and ERP?

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Originally Published: February 12, 2010

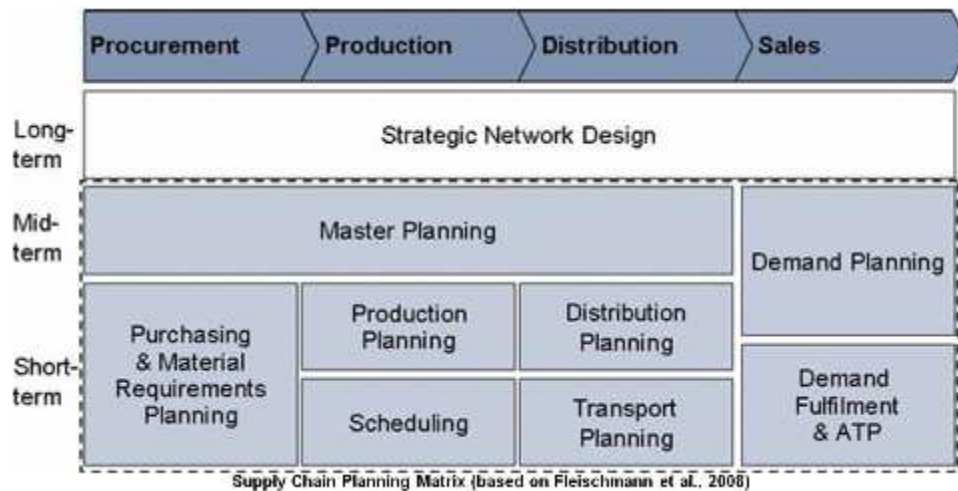
In today's business world, operations have moved globally, which has added more complexity into the equation. In other words, an organization has to rely on more than one application to support its business processes.

When an organization starts buying software without understanding how it will resolve problems, it creates a conflict within the business structure. Each system used by the organization needs to be integrated with other applications in order to optimize information and business processes.

Organizations in manufacturing and retail are now using multiple applications like *enterprise resource planning (ERP)*, *supply chain management (SCM)*, and *advance planning and scheduling (APS)* to optimize the production and distribution processes. Each business application has its own features and functions, but there is a definite overlap between these applications. When these applications integrate with each other they can deliver optimized business operations, increased *return on investment (ROI)*, which gives greater *value on investment (VOI)* for the organization. In this article I will explore the major differences between APS, SCM, and ERP are and how these applications complement each other.

What is APS?

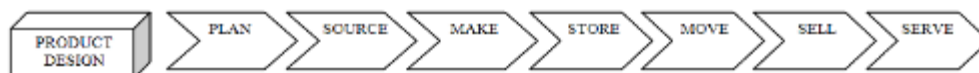
APS is an application used as a decision support mechanism for logistics and manufacturing processes. An APS system takes into account short- to long-term planning horizons. It uses advanced mathematical algorithms to optimize and stimulate the business processes from demand planning to production planning/scheduling to distribution planning to transportation planning. In other words, an APS application works as an umbrella covering the organization's entire supply chain and manufacturing processes. The diagram below represents the stages within advance planning and scheduling software.



The main objective of an APS system is to optimize and provide the best possible solution based on optimal cost benefit analysis for orders, demand, supply, capacity, and logistics. Also, an APS system helps companies collaborate and communicate with other organizations.

What is SCM?

SCM is the management of multiple business processes starting from product planning and ending with delivery. A SCM system helps organizations develop processes that integrate their manufacturing activities with logistics. To understand the entire SCM flow of an organization, let's have a look at the multiple components within the supply chain.



The objective of an SCM application is to provide end-to-end visibility into each component of the supply chain network without losing the long- and short-term goals of the business. So what does “long- and short-term goals” mean? Basically, the organization needs to have a long-term understanding of where the product and market will be with respect to customer demand and the product life cycle. With the long-term goal in mind, business information is structured in a manner within SCM applications to work in conjunction with midterm and short-term objectives. The main objective of any SCM application is to manage the flow of information between buyers, suppliers, production, warehouse, and logistics. In essence, each SCM link has strategic, tactical, and operational layers. The overall objective of an organization’s supply chain is to produce and deliver a product with maximized profitability without investing too much into the entire process.

Due to global manufacturing and delivery operations, each link within the supply chain needs to be integrated in four forms: physically, informational, managing, and organizationally.

What is ERP?

In basic terms, an ERP system is business software that integrates a variety of functions from finance to *human resources* (HR) to manufacturing and sales. In other words, it means to manage enterprise wide resources. An ERP system is designed around multiple business functions, which means that modules communicate with each other via central database. Information between departments is shared because the structure of an ERP application makes it possible to communicate over processes. The major drawback of this application is that its *manufacturing resource planning* (MRP) mechanism has limited capability for planning and decision making. ERP applications are transactional systems, which operate using standard repetitive tasks.

Another drawback is that ERP systems don’t provide enough details when it comes to the customer order perspective. For this reason, many organizations are looking towards SCM and APS applications in order to optimize and fine tune the plan, source, make, store, and deliver processes. Below is a visual description of how ERP links different business functions.



The Difference Between an APS, SCM, and ERP Application

One of the critical problems organizations face today is that they are fully aware of the scope of ERP. It is obvious that an ERP system cannot always be used as a strategic decision-making application—only an APS or SCM system can be used to better understand what needs to be planned and scheduled for optimal operations. These applications have different objectives and the results are based on how they are implemented, integrated, and used. The

APS application is used for planning and scheduling, SCM application is used for visibility, collaboration, and optimization of the supply chain network and an ERP system provides required data and business rules for various business functions.

The prominent difference is that planning for demand, material, manufacturing, and logistics in an ERP application is usually done in isolation from each other so there is less visibility of constraints among business functions. This is not the case within a SCM or APS application. All planning for constraints are performed simultaneously in real-time, which helps the user understand the impact on each business process. For example, when a customer's order delivery date is changed within the SCM application, it calculates simultaneously what needs to be communicated to the supplier with respect to raw material delivery, adjustments within the manufacturing process to accommodate the change in date, where and when to start putting the product in the warehouse, and logistics process without creating additional costs within the supply chain process.

An ERP system lacks the ability to quickly calculate how a change in the customer's order date will impact the overall business functions. With the help of an APS application, an analysis can be done in order to see the impact an order change will have on other customer orders. An APS system can also calculate what the optimal solution based on material, capacity, and logistics constraints will be. Furthermore, an APS application takes into account long- to short-term planning horizons. It provides businesses with the capability of doing what-if scenarios in order to understand what the most efficient and effective manner to deal with a change is without creating additional costs.

The table below has core planning characteristics of an ERP, SCM, and APS application.

Characteristic	APS	SCM	ERP
Approach	Strategic	Strategic	Transactional
Planning Method	Dynamic	Dynamic	Static
Data Processing	Slow	Medium	Fast
Decision Support	Present to optimal	Present to future	Present to past
Data Update Frequency	Real-time	Real-time	Batch
Main Focus	Simulation of manufacturing to delivery processes	Simulation of demand to delivery process	Data and integration management
Constraint Handling	Simultaneously	Simultaneously	Isolated
Analysis Model	Bottom up approach	Bottom-up approach	Top-down approach
Optimization	High	High	Low
Planning Periods	Multiple	Multiple	Single
Planning Approach	Constraints/non-constraint based planning	Constraints-based planning	Capacity-based planning with limited constraints
Calculation Method	Heuristics, optimization, algorithms	Holistic	MRP calculation

How Do APS, SCM, and ERP Complement Each Other?

All these applications can function alone but they provide the best results when they are used together. Without ERP, centralized data, SCM, and APS applications cannot perform rapid decision making when changes are made in supply, demand, and manufacturing processes. Organizations that specialize in manufacturing, logistics, and distribution need applications that can perform real-time analysis and simulation for optimal results for cost, profit, and price of products.

There are no processes within an ERP application to place customer requirements, constraints, and preferences against multiple production sites and geographies. With APS applications, customer requirements can be dealt with in a logical manner, that is, from order entry to planning and scheduling material, capacity, and logistics. ERP and APS applications work together to create a plan most favorable based on constraints, capacity, and material. An ERP application takes the simulated plan from the APS application and generates requirements for different departments (i.e., finance to warehouse).

An ERP application performs a top-down analysis with respect to changes based on customer demand. However, what really matters is how, when, and where the product needs to be manufactured and delivered. SCM and APS systems help with making these assessments.. For example, an ERP system plans for particular orders or requirements according to precedence setup in the system. It does not take into account any exceptions until, but when an ERP system is integrated with an APS system, it takes into consideration not only the availability of capacity, but also material, equipment, human capital, and logistics constraints simultaneously. When the same order requirements are integrated within a SCM application, the order requirements are communicated from bottom to top within the supply chain network. This means that the supplier knows about the new requirements and the logistics provider knows when the material will be ready so it can be delivered to the customer.

APS systems can perform planning at production line or machine levels, which provide users with the capability of manipulating and visualizing orders within the factory. Planning can be rescheduled without running a new MRP within an ERP application. When MRP and APS systems work together, APS takes into account all constraints simultaneously by using mathematical models (linear or heuristics) and provides a short- and long-term production plan, which is then used by MRP to carry out the material requirements.

An SCM application complements an ERP application by responding to changes in supply and demand by providing increased visibility into the supply chain network. With increased visibility comes increased customer satisfaction by offering a common information framework to support communication and collaboration, and to meet the changes in customer demand. When ERP and SCM are used together, organizations can monitor compliance in areas of environment, and health and safety by linking each department's key performance indicators (KPIs) with ERP transactional information.

By providing accurate information from ERP, SCM, and APS systems, companies can produce and deliver the right product at the right time based on the needs of the customer without creating excess or obsolete inventories. Having up to date information cuts costs substantially and provides improved cash flow and higher margins for the organization. With information transparency and the ability to make real-time business decisions, cash cycles and inventory levels are reduced across all operations (i.e. from procurement to manufacturing to transportation).

Aligning the management objectives with production processes is an extremely demanding task since it has a range of interrelated and independent activities. For this reason, ERP, SCM, and APS system implementations should be aligned with the overall business targets. Coupled with the understanding of how the data and information needs to flow from one system to other, this will provide an organization with a unique solution to maximize customer demand requirements by providing the right product quality and service in the right quantity at the right time, at the right place, and at the right price.

Source: Technology Evaluation website