

On the cover of the 2000 i2 Technologies Annual Report, CEO Sanjiv Sidhu is quoted as saying, "i2 will add \$75 billion of value, in growth and savings, for our customers, by 2005." Confident words, but understandable, since i2 had just blown through the billion dollar sales mark for the fiscal year ending December 31, 2000.

At the end of 2000, i2 Technologies was trading at over \$50 a share, Manugistics was still flirting with \$60, Adexa was an up and comer looking for an IPO, and the smart money remained in love. And why not? The APS companies had a value proposition, a customer base, a track record, a revenue stream, and at least in the case of i2, serious profits.

And then the music stopped.

These companies were not dot bombs, but implementing APS was never easy. Nike reported big problems with their APS implementation in 2001, resulting in lost Q3 sales estimated in the press as approaching \$100 million. Hershey's candy also ran into trouble during their complex software transition and implementation, of which APS was a part, resulting in lost sales estimated at \$150 million one Halloween season.

In fact, the supply chain problems that were supposed to be solved by APS sometimes weren't. Finger pointing among the software buyers, the software companies, and the implementation consultancies turned the market into a soap opera. APS prospects took one look at the situation and headed for the hills.

There has been an active marketplace in APS software for decades. Today, the ERP application suite providers are making inroads; there are many point solutions available from the vendor base, as well as the APS suite providers. Two of these suite providers are both publicly traded and well known, so they provide interesting indicators for the APS market space. A snapshot of i2 and Manugistics then and now provides some insight into what remains of a once vibrant market.

A billion dollar annual run rate is a distant memory for i2. For the nine months ended September 30, 2004, SEC filings report sales of \$305 million, essentially breaking even, reporting a net profit of \$47,000. And

who knows how much value has been created for i2 customers, but now that we have arrived in 2005 does anybody want to defend the \$75 billion dollar figure? Today, i2 trades at less than \$.75 a share and trades over the counter.

Even in the boom time, Manu reported a loss of about nine million on sales over \$150 million for the fiscal year ended February 29, 2000. In the fiscal quarter ended November 30, 2004 Manugistics continued to struggle, losing over \$13 million on sales of \$45 million. Loss from operations is less bleak, but they still report an adjusted operating loss of \$3.3 million in the recently announced results. Today the Manu stock price is driving hard to *recover* and break three bucks.

So, given the meltdown that has taken place, should a forward thinking supply chain professional still consider APS projects?

In fact, the market has survived, and the vendors haven't been resting. Traditional well-known players in the APS space, like i2 and Manugistics, while retrenching, have refined their focus and have improved their capabilities. The leading ERP vendors, SAP and Oracle, have invested aggressively in bringing their own products to the market. And specifically articulated solutions, designed to solve point problems, continue to abound.

Cut through the hype, look past the war stories, and a supply chain professional can find value with APS. But it is complex. APS systems are enablers, but are useless in a vacuum. In order for a technology implementation to succeed, it needs to be bundled with serious, fundamental work in the area of process, policies, and performance. There is no silver bullet.

APS is the application of complex mathematical modeling and optimization techniques in the supply chain process to achieve highly refined and achievable plans that best achieve the organization's goals, while respecting the organizations constraints. Properly implemented APS software works as an "adjunct" to the business core, operating in tandem with policy, process, and performance, drawing on reams of business data to search out the best solution. Business systems (legacy, MRPII, ERP) are transaction based, and much of the analysis that occurs in advanced planning and scheduling occurs above the transaction level of detail.

No APS implementation is easy.

While no two implementations are the same, there are common threads across all well executed implementations. When sizing up your problems that are candidates for an APS implementation, keep these things in mind:

Data

Data is always needed to populate a model. A model should not be built needing data that is not available. Data must be clean and meaningful: garbage in, garbage out.

Models

The level of detail in the model must be appropriate for the planning level.

A common guideline in supply chain planning optimization is that detailed models are not needed for strategic planning, but are needed for operational and tactical planning. A model that does not reflect reality yields solutions that are not meaningful, executable, valid, or optimal.

Mathematics: the "solver"

Mathematical programming & explicit enumeration methods used for strategic planning; methods generally work for linear- and some integer-based models.

Tactical and operational models are usually not linear and are much too complex to solve using mathematical programming methods. Heuristic methods are generally used (including scheduling methods like the Theory of Constraints).

So, now that most of us have our ERP houses in order, is it time to leverage the transactional core and revisit the topic of APS? Some examples of successful APS implementations:

- General Electric Plastics (GEP) implemented an APS solution focusing on Production Planning and Inventory Distribution Planning. Prior to the implementation, GEP turned eight times a year. After the implementation, that number almost doubled to fifteen.
- Delta Airlines creates detailed demand forecasts and then uses these forecasts to optimize pricing strategies. Using the program, Delta produces on average twenty-five forecasts a day for each of their nearly 5000 flights. The forecasts are used to optimize their various passenger value classifications. Subsequent to the implementation, there has been an 11% growth of revenue in North America and 20% internationally.
- Cisco deployed an APS system in service parts planning to change their "static sparing" model to a "dynamic sparing" one. Cisco benefited from a rise in service levels while reducing spare parts inventory by 21%.
- Harley Davidson applies APS techniques to production, reducing work in progress and ensuring assembly parts availability. This allowed Harley to free up 40,000 square feet of floor space, gaining needed manufacturing capacity without a plant build-out. Harley achieved a 19.4% increase in revenue, without new plant construction.
- Whirlpool uses APS to drive demand planning and forecasting, realizing reductions in finished good inventory and improving customer service. For example, in Australia, revenues doubled while finished goods reduced by \$4.8 million, customer service metrics improved by 10 percent, and product availability improved from less than 60 percent to more than 70 percent. According to their Director of Global Logistics Integration, their North American benefits are "substantially greater."
- Sun Microsystems implemented APS and reduced their inventories from \$1.049 billion to \$484 million. Inventory turns had fallen to 6.7 in its worst quarter, but were brought back up to 9 after the implementation. The inventory planning cycle was reduced from three weeks to one.
- Dell implemented an APS and reduced their on-hand inventory. Dell aggregates its orders every 20 seconds, analyzing the material requirements. The APS platform compares Dell's on-hand inventory with its suppliers' inventory, then creates a supplier bill of material to meet its order needs. This enables Dell to operate with seven hours' worth of inventory on the shop floor.

Change Management

An APS implementation has many moving parts. Some are technology, some are people, and all involve fundamental business processes. Without a well constructed change management strategy with strong top-down leadership, don't even bother trying.

When investigating APS, it is important to understand the nature of the problem set to be addressed, both now and in the future. Analytical techniques can be applied in four general areas:

Demand Planning, Forecasting, Collaboration

Production Planning and Scheduling

Transportation, Network Design

Inventory, Distribution Planning, Service Parts Planning

Different products fit different classes of problems. While generalizations are always dangerous, it is important to understand the implications of choosing a solution to approach each class of problem.

Traditional APS offerings offer a breadth of power, configurable to address problems across the Supply Chain spectrum. On the other hand, integration with the transactional backbone can be complex and a challenge with definite interface maintenance issues in the long run. Also, proper use of one of these powerful toolboxes requires a degree of analytical sophistication that may not be present in all organizations.

The offerings from the ERP vendors have captured significant market share over the past several years, and for good reason. Technical implementation (i.e. interfaces) is far easier, for the application is "under the umbrella" of the ERP backbone, offering the potential of a speedier time to benefit and reduced maintenance in the long run. On the other hand, these offerings have less breadth and depth than the traditional APS offerings, which serves as a drag on the achievable benefit.

Point solutions are exactly that. More fully articulated than either of the other classes, these products are designed to solve a specific problem. They offer the promise of a rapid implementation, but are limited in scope and cannot be extended to other problems in the chain.

Rather than viewing the current market turmoil as a negative, the savvy buyer can take advantage of the situation. Step carefully; understand your context, and plan, plan, plan. The value proposition remains.

APS is worth remembering.