

REVOLUTIONIZING THE DOWNSTREAM SUPPLY CHAIN

Getting product to market more profitably using best-fit technology and processes



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Creating a Product-to-Market Revolution

Business leaders in the oil and gas industry recognize that the right technologies can help them drive business outcomes by improving operations, building customer relationships, and collaborating effectively with partners.

Transportation of product in the downstream sector is a complex, high cost operation. Though oil companies and their haulers seek the most effective strategies for transport between supply depots and customer locations, challenges that include imprecise planning and forecasting, unforeseen customer demand, complex scheduling problems, low fleet utilization, and invoice inaccuracies prevent full realization of this goal. One of the most significant challenges is incorporation of technology-based strategies to streamline operations and save costs.

The most effective and profitable method for getting product to market uses technology-based strategies to add agility to operations and offers opportunities for operational and cost breakthroughs to the oil and gas enterprise, the hauler, and the vendor. With the right system, an enterprise can revolutionize its downstream operations and create business benefits for both internal and external stakeholders.

Product and Profit Challenges

In order to be profitable:

- Oil companies must keep their product moving.
- Haulers must keep their vehicles moving.
- Vendors must keep inventory at the right levels.

This has been true from the earliest days of the oil industry. To fulfill these requirements at that time, significant optimization platforms were put in place, along with an organization to manage, support, and maintain them. A downstream enterprise had to maintain a large logistics operation in order to control scheduling operations and hauler activity. Over time, this operation has grown in many oil companies, becoming increasingly complex.

Today it is not unusual for a downstream enterprise to include a large organization of full time equivalents to manage scheduling processes and hauler relationships. This presents a product/profit challenge: This organization can be a significant cost center with large fixed costs that must be recovered through effective pricing in order to generate profits.

Effective pricing offers a second product/price challenge. Standard operating procedures of the organization can adversely impact pricing effectiveness; for example, scheduling could cut into profits if delivery costs are high relative to negotiated price. Conversely, money could be left on the table if pricers do not have sufficient data to negotiate the best price (for the oil company) with buyers.

Technology-based solutions can make a difference to a downstream logistics operation, facilitating organizational streamlining and price optimization. Leveraging the best-fit technology will:

- Optimize scheduling and associated processes
- Improve operational efficiency
- Lower operating costs

Finding and implementing the right technology solution, however, presents a third product/profit challenge. Identifying technology that produces these results requires specific domain expertise that usually does not reside within the enterprise.

The Product-to-Market Revolution

The product-to-market revolution requires a best-fit technology-based solution that produces the right results for everyone involved—oil company, hauler, and vendor. Product and trucks are kept moving in the most economic fashion, and vendors maintain optimum inventory levels.

The solution must integrate currently disparate aspects of product scheduling, pricing, and distribution into a single process.

The right system for this integration automates large portions of scheduling, pricing, and delivery for Vendor Managed Inventory (VMI) customers¹ and allows Non-VMI customers to cost effectively order and pick up product. An effective system enables the oil company to move away from overreliance on demand forecasts and to maintain strong control over scheduling and pricing through powerful analytics and near-real-time data dashboards.

System Components

Based on our experience and understanding of best practices, the best approach for revolutionizing the product-to-market process is a four-way combination of advanced technologies and innovative business models at the service of oil and gas companies and haulers. While each component offers key value by itself, the combination creates additional synergies to produce benefits that are greater than the sum of the parts.

The four components of a revolutionary product-to-market system are:

- Outsourced Distribution Operation
- Shared Fleet Model
- Dynamic Scheduling and Routing
- Dynamic Slot Booking and Pricing

Outsourced Distribution Operation

To solve the first product/pricing challenge by eliminating a large, complex in-house distribution operation, downstream enterprises in many oil and gas majors are outsourcing non-core activities to concentrate on higher

¹ Customers to whom the supplier is responsible for maintaining an agreed-upon inventory.

Figure I. Components of the Revolutionary Product-to-Market System



margin aspects of the supply chain.² An outsourced distribution operation relieves the organization from the often time-consuming and low value work involved in managing the scheduling process and the relationship with the hauler. It enables the business to manage the operation by exception and put more focus on their customer care.

Shared Fleet Model

Most oil and gas companies run delivery operations through a dedicated in-house fleet, through a service provided by one or more haulers, or through a combination of these two. The fleet is limited to movement between depots and customer sites of a single company. This restriction sub-optimizes fleet utilization and results in a high cost of delivered product per mile.

Using a shared fleet model allows more efficient movement. With multiple companies sharing one fleet, more depots and customer sites are considered during the scheduling process, which offers better routing opportunities between different locations and leads to a lower cost per

mile. The shared fleet model offers another (and unique) opportunity: Vehicles can be used to back-haul,³ making their time on the road more productive.

The benefits of the shared fleet model contribute greatly to higher product volume per mile and better customer service by reducing the risks of stock outs. Similarly, operating a shared fleet minimizes negative impacts from demand forecast inaccuracies.

Dynamic Scheduling and Routing

At present, it is not uncommon for the routing process to be 1) manual or semi-automatic and 2) spread across various systems and interfaces. Often, the individuals who handle in-day changes are the same ones who plan future shifts, making the operation heavily dependent on the special skills and knowledge of a few.

² J.B Heath, "Outsourcing and Asset Disposition: A Proven Model in the Oil and Gas Industry," Offshore Technology Conference, 2005.

³ Product is loaded from a nearby location directly following a delivery instead of returning empty to the point of origin.

Dynamic Scheduling: Conversation with Juergen Spanuth

Dynamic scheduling and routing is a vital component of our recommended strategy to revolutionize downstream supply chain in the oil and gas industry. As Managing Director of Lomosoftware, Juergen Spanuth has contributed significantly to this revolution through the company's scheduling software solutions. Wipro asked Mr. Spanuth to share some of the insights he and his company have gained that illustrate the business benefits of dynamic scheduling. Here are some excerpts from that interview.

What are the most critical challenges that you see companies facing in scheduling and routing prior to implementing dynamic scheduling? One of the most critical challenges is fleet utilization. Oil and gas companies and haulers struggle to maximize quantities of delivered product as well as maximizing drivers' shift utilization. Inability to achieve this maximization leads to lower volume of delivered product per mile. Another challenge is managing customer demands. Generating orders for a combination of VMI customers and non-VMI customers can be very difficult. In addition to these two challenges, customers struggle with planning and forecasting. Restricted visibility of the dispatch operation affects strategic decision making, which results in significant differences between planned and actual schedules. This costs both time and money.

How has dynamic scheduling addressed those challenges? Dynamic scheduling allows oil companies to automate the order generation process and plan schedules in a more efficient way. As a result, the volume of delivered product per mile increases. Dynamic scheduling also affords greater visibility of the dispatching operation, which improves fleet management. In addition, better reporting capabilities allow companies to tighten the bond between forecasting and planning processes and the dispatching operation.

What other "before" and "after" conditions have you observed in your work with large companies and their fleet management? Invoicing accuracy is another area where we have observed a substantial improvement through dynamic scheduling. Utilizing mobile technologies, companies are able to eliminate human errors and make the invoicing process quicker and more accurate. Use of on-truck computing solutions prevents product theft and significantly reduces other HSSE incidents.

Dynamic scheduling offers some significant benefits, including decrease in staff needs, time savings, and customer service improvements. Based on your experience, can you offer some quantitative insight into those benefits? What level of operational cost savings have you seen in your client companies? The immediate results we have seen are a reduction in stock outs at gas stations and "left on board" events to close to zero. Similarly, we have seen examples of up to 18% reduction in number of trips and 15% reduction of stock inventory at sites. With an easy to use interface and automation of many of the core scheduling processes, the same number of dispatchers can handle up to 25% more deliveries. The realization of these cost savings can be very quick—as soon as the first quarter following an implementation.

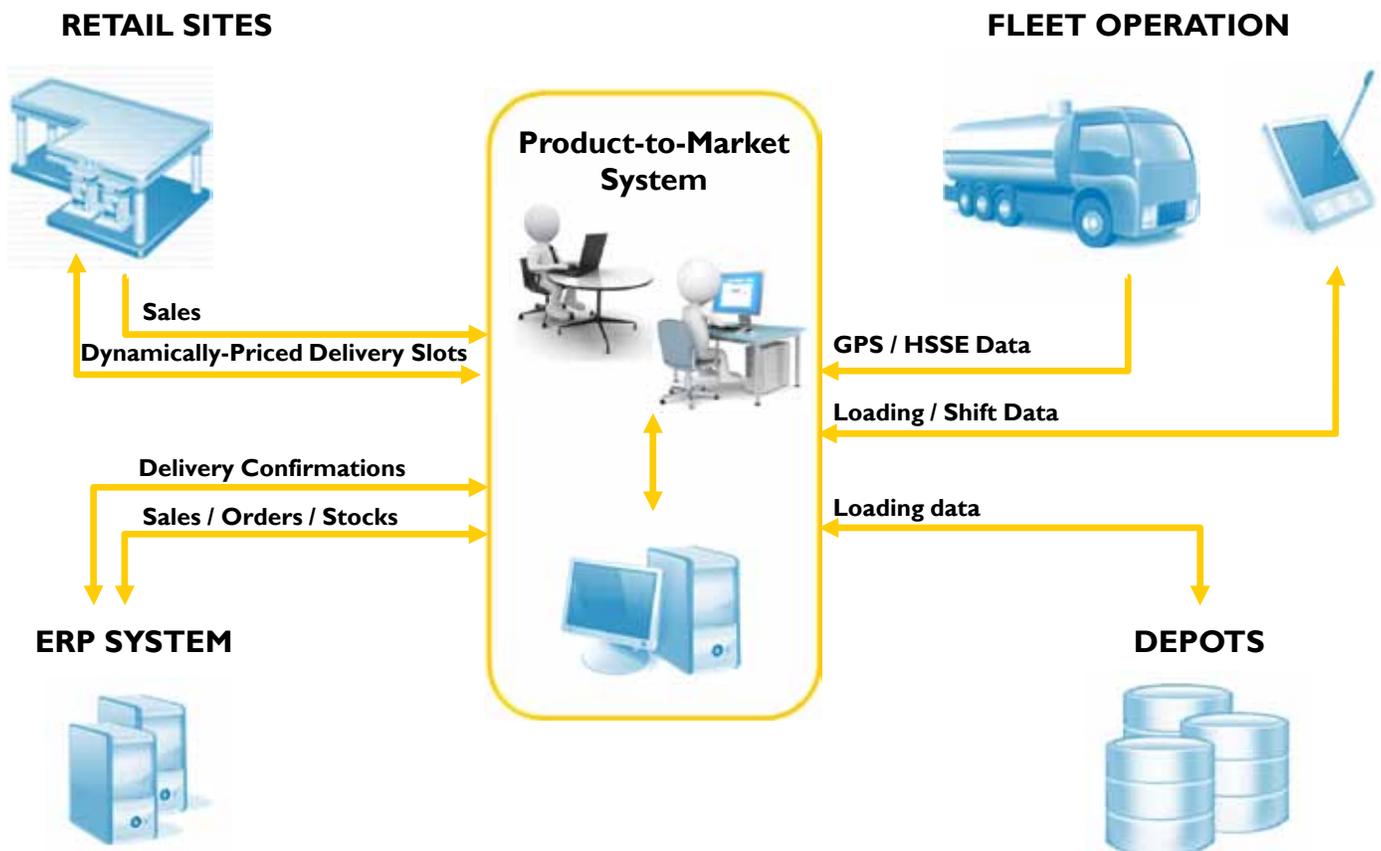
Unlike current solutions, dynamic scheduling automates the entire process. The planning process begins with automatic order generation based on both VMI and non-VMI sales orders. The delivered quantities for each order are optimized based on current, max and dry stock levels, average sales and daily sales structure. This reduces time/money losses as well as the health and safety issues associated with compartment switching.

Orders are automatically assigned to specific vehicles and optimized routes are generated for each of the shifts. The system accounts for various business objectives and constraints such as shift times, customer site opening hours, service level agreements, and truck compartment volume. The planning phase ends with shift schedule and load data dispatched to drivers' mobile devices.

Once drivers are on the road, GPS technology allows the central operation to monitor trucks in real time from an onscreen dashboard. This allows faster and more efficient handling of scheduling exceptions as well as the ability to re-route trucks to fulfill ad hoc orders or react to unplanned events such as road closures and order cancellations. On-board equipment enables information such as harsh breaks, seat belt fastening, and geo-fencing to be captured by the central operation in real time, allowing corrective to be taken in a timely manner.

The final step of the process takes place when a driver transmits delivery confirmation and reconciliation data in real time. Capture of this data in the product-to-market system makes the invoicing process smoother, faster, and less exposed to human errors. The precision of dynamic

Figure 2. Product-to-Market System Operation Overview



routing also affects the demand forecasting process, improving strategic decision making based on accurate, real time operational information.

Dynamic Slot Booking and Pricing

Managing non-VMI customers is one of the most difficult challenges faced by downstream operations. With no clear visibility of orders in advance, the risk of insufficient supply to meet customer demand is very high. The problem becomes even more difficult when the business is handling a combination of VMI and non-VMI customers.

In order to mitigate this problem, dynamic slot booking and pricing, used widely in other retail markets, are implemented in the downstream operation through the system. Slot booking allows a non-VMI customer to

book an appointment through a web-based portal that incorporates the real time availability of the fleet based on the dynamic routing component. This ensures that delivery can be made in the shortest possible time window, which reduces lead times and improves customer satisfaction.

Dynamic pricing, a strategy to drive customer buying behavior into more favorable directions, is a part of this component. The supplier can assign prices according to parameters such as day of the week, time of day, and distance from the nearest vehicle at the time of booking. This enables the business to charge premium rates for delivery during busy times and to encourage customers to book slots in less busy times by offering a lower delivery price in those slots.

Figure 3. Dynamic Slot Booking and Pricing Overview

PRODUCT-TO-MARKET SYSTEM



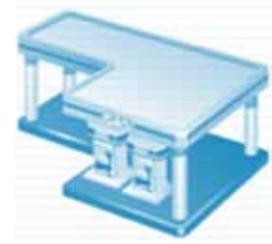
Slots Opened and Priced Based on Real-Time Fleet Availability

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
08:00-09:00	X	X	X				
09:00-10:00							
10:00-11:00	X						
11:00-12:00	X	X	X				
12:00-13:00	X						
13:00-14:00							
14:00-15:00	X	X	X				
15:00-16:00	X	X					
16:00-17:00	X						
17:00-18:00	X						
18:00-19:00							
19:00-20:00							
20:00-21:00	X	X					
21:00-22:00	X						
.....							

ONLINE DYNAMIC SLOT BOOKING via Web Portal

RETAIL SITE

Delivery Requested Based on Available Slots and Price



Product-to-Market System

Stakeholder Benefits

The benefits available to each stakeholder support a strong business case for this four-component system.

Oil and gas company

- Increase customer service:
 - Reduce delivery lead times
 - Reduce risk of stock outs at retail sites
- Reduce costs:
 - Higher product volume delivered per mileage
 - Lower operation and maintenance costs

Hauler

- Increase resource utilization
- Reduce operational costs
- Reduce fixed resources cost

VMI customer

- Touchless, low cost, and worry-free inventory management.
- Leaner unit costs and improved ETA information from strong system analytic capability.

Non-VMI customer

- Ability to achieve a much more precise window for order fulfillment by selecting preferred delivery time slot during the ordering process.
- Cost savings available through dynamic pricing choices (e.g., choice of lower-cost delivery slot, online ordering discounts).

Conclusion

Despite the many enhancements in processes and technology introduced over the years, downstream distribution remains the main contributor to supply chain operation costs and process inflexibility. Any solution in this space will have to apply more sophisticated business models and harness technology in a comprehensive way. The challenges of downstream supply chain distribution are actually opportunities to innovate to win in a world of constraints. Revolutionizing this part of the business by implementing the new business models and technologies will capture the best of the past while creating value in the present and for the future.

With compelling business benefits for all stakeholders, the four-component product-to-market system recommended here is a comprehensive solution that truly revolutionizes downstream supply chain distribution through innovative use of technology. Its unique combination of software and hardware streamlines processes related to order generation, scheduling/routing, dispatching, and monitoring in real time, and delivers significant business benefits to oil companies, haulers, and customers.

About the Authors

David Evans and Shaun Bretstein are leading the Scheduling Solutions team in Downstream Supply Chain group under Wipro's Energy, Natural Resources and Utilities (ENU) consulting practice.

David Evans has extensive experience in dynamic scheduling, transport planning, and the implementation of GIS in a variety of energy industry sectors. Within this area of expertise, he specializes in the use of dynamic scheduling tools to create operational excellence. He has intricate knowledge of operational difficulties that can be faced in the scheduling of a fleet of vehicles and has created solutions that have a tangible impact on the efficiency and profitability of a fleet. He has also been heavily involved in both the technical and strategic decisions involved in the scoping of large scale IT deployments involving real time data integration with fleet management for businesses that have annual revenues in excess of £2 billion.

Shaun Bretstein has over 10 years of experience in dynamic scheduling optimisation for field service workforce, home deliveries and transport in a wide range of industries – energy, utilities, retail, telecommunications etc. He specializes in leading large scale scheduling projects for global organizations and has a wide and deep understanding of the technical and strategic complexities of scheduling solutions across various businesses.

About Wipro Technologies

Wipro Technologies, the global IT business of Wipro Limited (NYSE:WIT) is a leading Information Technology, Consulting and Outsourcing company that delivers solutions to enable its clients do business better. Wipro Technologies delivers winning business outcomes through its deep industry experience and a 360 degree view of “Business through Technology” – helping clients create successful and adaptive businesses. A company recognized globally for its comprehensive portfolio of services, a practitioner’s approach to delivering innovation and an organization wide commitment to sustainability, Wipro Technologies has 130,000 employees and clients across 54 countries. For more information, please visit www.wipro.com

About Wipro Energy, Natural Resources, and Utilities

Wipro’s Energy, Natural resource and Utilities (ENU) Strategic Business Unit (SBU) has over the last decade established itself as a trusted partner to clients across the globe to address their business challenges using its deep industry domain competency and technology expertise. It has over 6600 dedicated consultants serving businesses in the oil & gas, metals, mining, agriculture products, water, natural gas and electricity industries. Having a strong relationship with over 40 customers spread across Americas, Europe, India, Middle East, Southeast Asia, Australia and New Zealand, the ENU SBU has been continuously investing in building competencies to help them do business better. Recently, Wipro has acquired SAIC’s Global Oil and Gas business unit, reinforcing its focus on this industry.



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