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Enterprise Case Study: Modernizing ICT in the Oilfield Services Industry

How Infosys helped FTS International deploy SAP technologies to overhaul its ICT infrastructure

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Summary

Catalyst

Oilfield services (OFS) company FTS International (FTSI) needed to modernize, harmonize, and expand the capabilities of its IT infrastructure in order to support rapid growth. With the help of systems integrator Infosys, FTSI implemented more than a dozen SAP modules, including the core ERP system and in-memory HANA database. This modernized IT infrastructure has allowed FTSI to become a data-driven enterprise with significantly better operational visibility and solid metrics that enable strong performance improvements.

The lessons of Infosys's SAP implementation for FTSI apply to the OFS industry generally, and they are no less relevant in today's challenging market conditions than they were at the start of the project, when crude oil was trading above $100/bbl. In fact, the lessons may be more relevant today as continuing weakness in the crude market forces the entire upstream industry to manage operations more closely.

Ovum view

Systems integrator Infosys implemented an end-to-end SAP IT infrastructure that gives FTSI the operational visibility and control needed to manage its business during both the boom that was occurring when the engagement began and the challenging market conditions that pertain today. FTSI applied not only its integration skills but also its expertise in SAP technologies, which it has packaged in a solution specifically for oilfield services companies. A crucial success factor was that Infosys worked with FTSI to develop nearly three dozen core metrics against which to measure performance and evaluate requests for custom processes. Another key factor was FTSI's belief in the value of a largely "plain vanilla" implementation built on SAP standardized processes and best practices. This approach saved time and cost in the initial implementation and will continue to pay dividends into the future.

Key messages

- Rapid growth over the decade preceding the crash of crude prices had highlighted significant weaknesses in FTSI's business processes and IT infrastructure that required an end-to-end modernization. Although market conditions were markedly worse by the time the project was complete, the design goals of visibility and control are as valuable in the new operating environment as they had been during flush times.
- Infosys's SmartOFS, which is a preconfigured SAP-based solution, enabled the rapid implementation of an ambitious IT overhaul that involved nearly 1,500 FTSI employees across 20 locations.
- Adherence to standardized practices based on industry best practices kept customization to a minimum and allowed rapid, cost-effective implementation in just 14 months.
- Strong leadership within FTSI and from Infosys ensured that FTSI managers understood and could support the operational changes required by standardized processes.

Recommendations for the oilfield services industry

Recommendations for enterprises

- **Goals:** Weigh every component of an IT initiative according to simple criteria: Does it enhance operational visibility and control, or does it deliver compelling new efficiencies? If it does neither, reject it.
- **Metrics:** Invest time to define key metrics upfront, engaging people at all levels of the organization. Recognize that rank-and-file employees are often closest to the action and may spot problems and solutions not evident to upper management.
- **Standardization:** Wherever possible, adopt standardized processes and best practices. Customizations add time and cost to the implementation and require ongoing support over the application lifecycle.
- **Record and roadmap:** Choose vendors with immediate experience (and strong track records) in OFS. Consider only those vendors that are investing in the product(s) you are considering, and that can demonstrate both a strong history of product enhancement and a compelling product roadmap.
- **Internal support:** Take time to maximize buy-in at all levels of the organization. Ensure C-level alignment on one set of clear objectives and metrics, as any ambiguity will be costly later on. Be sure to enlist the support of mid-level managers who might otherwise be the loudest voices calling for expensive customizations, and who will also be crucial in selling the project to the rank and file.

Using enterprise software to achieve operational visibility and control in upstream oil & gas

Challenging market conditions require laser-sharp decisions informed by data and analytics

FTSI is a large OFS company that specializes in well completion in unconventional oil & gas plays. It has approximately 1,500 employees distributed across 20 locations in North America and aims to become a global player. To that end it has entered a joint venture with Sinopec Group, one of China's major state-owned oil companies. FTSI is also involved in heavy equipment manufacturing, chemical blending and processing, and sand mining in support of its well-completion services.

FTSI grew very rapidly during a decade of crude oil prices above $100/bbl. Its rapid growth strained existing ICT (information and communications technology) systems and exposed a number of core problems. For one thing, the applications it was using were not intended for use by a company as large as FTSI had become, and they could not scale up. Business-critical data was hidden away in spreadsheets, and/or stored in silos that could not be easily integrated with each other. It had few governance tools and procedures with which to validate its data. As a result, it lacked trustworthy data on which to base decisions and track processes essential to managing revenues, costs, margins, and customer service. Such limitations meant the company had little operational visibility or insight.

A central component of FTSI's well-completion business is the delivery of materials and equipment, such as sand and pressure pumps, to well sites for use in hydraulic fracturing. To properly manage its operations, FTSI needs to track several core parameters: for example, how much sand or how many pumps are needed, what has been delivered, what has actually been used, how much to charge the customer, and how much revenue to collect. If it sends more sand than needed, or sends a pump that doesn't get used, it cannot bill for those items, and must absorb the costs itself, which erodes its margins for the job.

The company also lacked reliable operations data on which to base its maintenance and repair programs. For example, it could not accurately predict when a piece of equipment might fail. This can lead to unplanned downtime, which is expensive, causes delays, and undermines customer service. Lack of data on the condition of equipment can also raise costs by forcing a company to perform maintenance sooner or more often than necessary.

A third business challenge was that FTSI's procurement processes were ad hoc and lacked controls. Procurement was done mainly through phone calls and emails, without purchase orders to document orders, deliveries, payables, and receivables. This lack of documentation was raising costs, hurting revenues, and causing inefficiency throughout the system.

Wanted: Modern business management tools – quickly

Like many fast-growing companies, FTSI had addressed business problems as they arose by throwing money and people at them in a do-it-yourself or whatever-it-takes manner. It wanted to modernize its approach to management. It wanted substantial improvements in financial performance and customer service, and it wanted to position itself for further growth and globalization.

It knew that this transformation would require a solid foundation of ICT. It wanted to build this new foundation quickly because its existing systems were taking a toll on business results. And it wanted to be sure that when the new foundation was in place it would have tools to continuously improve its operations.

Before engaging with Infosys and deploying SAP, FTSI had tried and failed three times to implement another vendor's ERP system. That vendor kept pushing FTSI onto new releases, which meant that it was frequently on "Version 1.0" software that was still buggy. Those solutions also required numerous third-party add-ons, which presented integration challenges – a problem that FTSI strongly wished to avoid, given that it had suffered similar problems with its existing systems.

FTSI also considered yet another ERP vendor before settling on SAP. However, it would have had to deploy multiple instances of this vendor's software to support its multiple manufacturing operations. In addition, it appeared that the vendor was not investing in the offerings relevant to FTSI, which meant that any current limitations might well not be addressed in future versions, and that it wouldn't be able to meet FTSI's needs as they evolved.

In many respects, SAP was an easy choice for software. With some 900 oil & gas customers worldwide, SAP has the broadest industry footprint of any software vendor. It also has the most complete solution catalog. And it continues to invest to fill functional gaps and meet emerging needs – for example, by integrating information technologies and operations technologies (IT and OT) to help operators continuously monitor the financial performance of a well or field.

But software was only part of the solution equation. An end-to-end, IT-led overhaul of business processes was a daunting challenge, for multiple reasons. One was the complexity that had developed within FTSI's business processes due to the seat-of-the-pants approach it had taken in order to cope with rapid growth. A related factor was a maverick culture that went hand-in-hand with the "whatever it takes" approach that grew up in the absence of well-mapped business processes and tools. Another was the perceived complexity and rigidity of SAP software. These are partly a consequence of SAP's broad functional scope and the need to ensure that a vast number of operations will work properly together. They are also a result of SAP's legacy as a vendor of software for power users that emphasized functionality over ease of use – a legacy that SAP has done much to change in recent years by putting a high priority on user experience.

Like most enterprises embarking on a major SAP implementation, FTSI recognized early on that it would need the support of a systems integrator/consultancy to ensure success. It considered two major integrators, both well experienced in the oil & gas industry and both having solid preconfigured SAP offerings.

Several factors weighed in favor of Infosys. One was a sense that Infosys had superior partnering skills and the best grasp of FTSI's goal to become fully integrated and able to perform all business functions with excellence. Another was a determination that Infosys had a better implementation process. Yet another was Infosys's methodology around organizational change and how to manage it most effectively. These attributes are embodied in Infosys's "Smart OFS" solution, a packaged set of services, tools, and accelerators specifically designed to help oilfield services companies implement SAP technologies. Infosys's experience was especially attractive because of FTSI's previous unsuccessful attempts to deploy an ERP system.

Success flowed from careful metric-setting upfront

Infosys orchestrated a "big bang" implementation of more than a dozen SAP applications for FTSI that provide end-to-end functionality, including supply chain management, quote-to-cash, account-to-report, operate-to-maintain, project management, master data management, and field execution functionality, across the full breadth of FTSI processes. Infosys also built simplified and role-based interfaces to the various applications using SAPUI5 (SAP User Interface Development Toolkit for HTML5).

The major SAP components that Infosys deployed are these:

- Enterprise Central Component (ECC) 6.0, SAP's core ERP engine
- HANA, SAP's in-memory columnar database technology, which enables real-time analytics
- Sales and Distribution
- Project System (project management)
- Materials Management
- Production Planning
- Finance and Control
- Supply Chain Management
- BusinessObjects Planning and Consolidation
- Multi-Resource Scheduling

- Business Warehouse
- SAPUI5.

Infosys also provided program management, training, and post-implementation support services to FTSI. The implementation was designed to avoid customization and to make use of standard SAP functionality wherever possible.

Speeded by the preconfiguration built into Smart OFS, the project took 14 months (a relatively short period of time given the scope and complexity involved) and covered all of FTSI's North America operations, which comprise multiple manufacturing plants and service operations locations.

Crucial to Infosys's success in transforming how FTSI operates was a joint process at the start of the project that established 35 key metrics for organizational health across the company. The metrics are not just performance indicators, they are also tools for evaluating processes and deciding which to adopt and what customizations to support.

Using its packaged Organizational Change Management program, Infosys guided FTSI toward a "plain vanilla" approach that minimized customizations that would have added time and cost to the initial implementation and imposed ongoing costs and complexity. Every departure from standard procedures and best practices was (and still can be) measured against the metrics established at the start of the process. If a change in accounts payable procedures, for example, does not reduce costs or provide some other specific benefit, it will not be approved.

Although FTSI engaged with Infosys and SAP initially in order to manage rapid growth, its new ICT capabilities are directly applicable to the demands imposed by the crash of crude oil prices that began in mid-2014.

Here are some of the most important new capabilities that FTSI has gained through its engagement with Infosys and SAP:

- **Resource management:** Judicious reduction of staff and inventories enterprise-wide, without impairing quality of service. It could not do this properly in the past because requisite data was inaccessible in spreadsheets. FTSI has been able to reduce the quantities of equipment and materials, such as sand and chemicals, it transports to job sites while remaining confident that it is providing enough.
- **Maintenance and repair operations:** Thanks in part to new IT/OT integration, FTSI is able to perform scheduled equipment maintenance every 400 hours of use, rather than the 200 hours that were the norm in the past. Newly available operations data allows FTSI to make this cost-saving change without increasing downtime.
- **Purchasing:** A new purchase-order system (provided by a third party) reduces costs, captures additional revenue, and enables better service.
- **Master data:** Accurate master data reduces confusion that can arise when a single data element has different names in different locations. This in turn reduces stock-out events and enables improvement in day sales outstanding. Trustworthy master data also has allowed the company to replace spreadsheets with a new, integrated quote/proposal process and an application capable of performing real-time credit checks and pricing/margin analysis.
- **Scheduling:** Electronic scheduling of equipment and personnel has replaced manual whiteboards.

- **Dashboards:** New dashboards provide much better visibility on equipment utilization and enable better spending analysis.
- **Data governance:** Data management and governance tools help the company to enforce compliance with Sarbanes–Oxley regulations and other legal and corporate requirements.
- **Standardization:** New operational visibility has helped FTSI identify redundant and needlessly complex processes and replace them with standardized procedures based on industry best practices.
- **Maintenance structure:** FTSI has been able to move more maintenance to the field instead of bringing all equipment back to its own yards for service, substantially reducing nonproductive time.

In future steps, FTSI plans to bring more operations data into HANA for analysis, but the effort is complicated by connectivity issues. Cellular signals often cannot reach remote worksites, which forces the use of low-bandwidth, high-latency satellite technologies. This in turn limits how much data can be practically transmitted back and forth between field operations and data centers. Ultimately, FTSI may provision some analytics capabilities at the network edge, but these plans are a work in progress. In addition, SAP has built a solution called SAP Transaction Availability for Remote Sites (TARS) that addresses the connectivity issue. FTSI may evaluate it in the future.

The company will continue to use a homegrown operations technology application that manages pumps and other equipment during well completions, but it plans to integrate this application into its new SAP infrastructure.

FTSI also is seeking better purchase-order support from the vendor that provides its invoice management application. The application is designed to ensure consistency across departments and suppliers, and to flag exceptions and potential errors. But it has difficulty with complex purchase orders, so FTSI has had to simplify them more than it would like. It expects this vendor to improve its solution to be able to handle more complex POs.

Appendix

Methodology

Ovum Enterprise Case Studies leverage in-depth interviews with key enterprise stakeholders as well as a review of any available documentation such as strategic planning, RFP, implementation, and program evaluation documents.

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