

Supply Chain Risks in Remote Locations

Assess supply chain risks early when making offshore investment decisions

Oil, petrochemicals, iron ore, metallurgy—these are just some of the natural-resource processing industries that are moving into more remote locations to be closer both to their natural resources and to their customers in emerging markets. Yet with limited on-site infrastructure, these locations present significant supply chain challenges and risks that must be addressed as an integral part of location decisions, project evaluation and feasibility studies. This is because they impinge directly on board-level project and investment decisions.

The reasons for relocating industries to remote locations are twofold. Natural resources are becoming scarcer, and their extraction takes place in increasingly distant locations. Resource-processing industries follow this trend because it is more efficient to organize supply chains for processed products than for raw materials—this is because products are usually of a lower quantity and higher value.

The rapid rise of emerging countries such as Brazil, Russia, India and China (the BRIC countries) and Central Asia means that the demand for basic materials is often in areas with a dearth of infrastructure. For example, 80 percent of the rise in steel production between 2006 and 2010 was from the BRIC countries. Similarly, China and India alone represent 48 percent of the additional refining capacity between 2000 and 2008.

Supply chains in remote locations present major costs, challenges and risks and have a significant impact on project

strategy, specifications, profitability—and, ultimately, investment decisions.

Supply Chain Costs and Complications

Supply chain costs in remote locations can be high and significantly differ between potential markets. As a result, product pricing and net costs (“netback prices” in the oil and gas business) can vary greatly. This has board-level implications; for example, the supply chain issues might result in the initially chosen market becoming less than ideal. And while slavish insistence on delivery to that market can destroy value, moving to a different market could have political or counterpart-relationship ramifications that cannot be dealt with effectively at lower levels. The move to a different market may also mean changing product specifications, which in turn may require the use of a radically different overall supply chain and investment strategy.



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The ripple effects from these issues may alter the financial attractiveness of the investment.

There can be other complications. Supply chain assets are often in the hands of joint-venture partners, affiliated companies or even competitors. For example, in one recent project a coal company was a joint-venture partner and was also responsible for running the rail system and building the roads. Ownership issues like these can influence a project's success, and therefore must be factored into the equation at the evaluation stage.

Also key to the decision are the lopsided risks—those that occur between the project owner and its customers. A project that is considered high-risk for a supplier (for example, one that has no influence with the state railway company) may be low risk for the customer (who may have substantial influence with the state railway—particularly if the customer is state-owned or a monopoly). In this situation, many companies would transfer supply chain risk to the party best able to mitigate it. This is sensible, but it can also introduce challenges to the project's fundamental parameters—such as customer and market strategies. Again, this can lead to market changes, with all of the associated challenges. We are familiar with one situation in which a company's policy was to sell products ex-gate. However, working in a remote area with long supply chains involving asset ownership (rail cars and port terminal) meant that its marketing strategy had to be adapted to export sales.

These issues reinforce the logical premise that all factors must be weighed at the outset of any project.

Identify Supply Chain Risks

Balancing the risks associated with remote locations is crucial in determining the overall viability of locations. In fact, because supply chain risks can represent the biggest threats in remote locations, these assessments are essential to the decision-making process. There are several areas that deserve particular attention:

Make sure government-run institutions can deliver. Before investing in a remote country, it is essential that the

Supply chain factors relevant to an investment decision often emerge as a costly surprise to project owners.

government-run institution can deliver on any promise that it makes. For example, one company evaluated a location only to find that the chosen railway infrastructure was simply unable to cope with the needs of its project. Although the state railway promised to add capacity and build new lines, there was a definite risk that it would not happen. Recognizing the potential risk ahead of time allowed the foreign investor to negotiate safeguards into project agreements in order

to cover itself in the event the railway failed to deliver.

Evaluate the various transport routes. Determining transport routes requires some complex decision making, as each route will have its own risks. In one case, a company had to choose a route for the transport of petrochemicals from a central-Asian republic. The low-cost route was through Iran; the high-cost route was via Russia. Turkmenistan, Azerbaijan, Armenia and Georgia all represented medium-cost routes. Each choice had its own commercial and sovereign issues, and risk assessment proved exceptionally difficult. Following the transport-route assessment, however, the differences between the routes became clear; as was the final choice.

Weigh the choices between self-owned and leased supply chain services. Determining who will serve the various elements of your supply chain—and the associated risks—is a key decision in remote locations. This is especially true when it comes to major supply chain assets such as railways, pipelines and port terminals, all of which can be susceptible to government intervention in terms of ownership, taxation and operations.

Size up sovereign risks. Many risks, such as war, border closures and tariff and duty increases, are sovereign and are unavoidable. However, identifying these risks early and assessing their potential impact on the supply chain can help mitigate them—at least in some cases. For example, a typical risk-mitigation strategy is to identify a main preferred port terminal and a back-up in the event of transit restrictions. The transition from one terminal to the other should be smooth.

Identify Hidden Costs Early

When it comes to supply chains, significant assets sometimes lie outside project boundaries, costing millions or even billions of dollars. These can include pipelines, private railways, traction and rolling stock, terminals and bulk storage at ports. Estimating this type of supply chain infrastructure requires rigorous, and thus early, assessment. Beware, however, for while determining exactly what causes supply chain costs might seem obvious in the beginning, there can be hidden ramifications. Consider the following real-world examples:

- **Pipeline transportation.** One company knew that it would need to use a pipeline to carry its product. However, pipelines are not a common carrier across all locations, so the company had to build its own at a cost of \$1.8 billion.
- **Rolling stock needs.** A project calculation estimated that a 40-day round trip to port would require approximately 2,000 railroad wagons. However, the company found that railcars were in short supply as a large share of the existing fleet was damaged and in need of replacement. The company had to spend \$100 million to purchase new railroad wagons to secure rolling stock availability.
- **Product storage.** Corporate standards in one industry called for five days of outbound product storage. However, maintaining continual plant operations required that the storage facility for the finished product never became full, despite variability in the rail supply chain (train on-time performance) and abnormal supply chain disruption (for

example, weather). Variability linked to long-distance rail transportation was around four days, requiring a product-storage capacity of 24 days.

- **Rail-loading system.** A company's train-loading system was designed to fill one train a day (taking eight hours). However, it soon became apparent that the railway operator load time was four hours, and that if the wagon wasn't loaded the train would leave without it, resulting in an additional five-day wait. The 24-hour time limit was reduced to three hours.

Alternative supply chain decisions often require complex trade-offs to balance costs and risks

- **Technical equipment purchasing.** One project's strategy was to utilize previous plant design by buying technical equipment on the international market. However, the company realized that sourcing locally could reduce its capital expenditures by 5 to 15 percent, but would require adapting its engineering specifications.
- **Working capital for spare parts, raw materials and finished products.** Operating in remote areas means

that working capital for inventory must be higher due to elongated supply chains. For instance, long replenishment lead times require a change in strategy when it comes to spare parts—as it may become necessary to stock two critical spare parts instead of one. Also, it is wise to keep larger inventories of imported raw materials and finished goods due to the volatility associated with long-distance supply chains in underdeveloped countries.

Determine Overall Project Viability

These alternative supply chain decisions often require complex trade-offs to balance the costs and the risks—which can have a material impact on ROI. These types of trade-offs can be a simple capital expenditure (capex) versus operational expenditure (opex) issue; such as deciding whether to move fuel cross-country by pipeline (high capex, low opex) or by national railway (low capex, high opex). They can also be more complex.

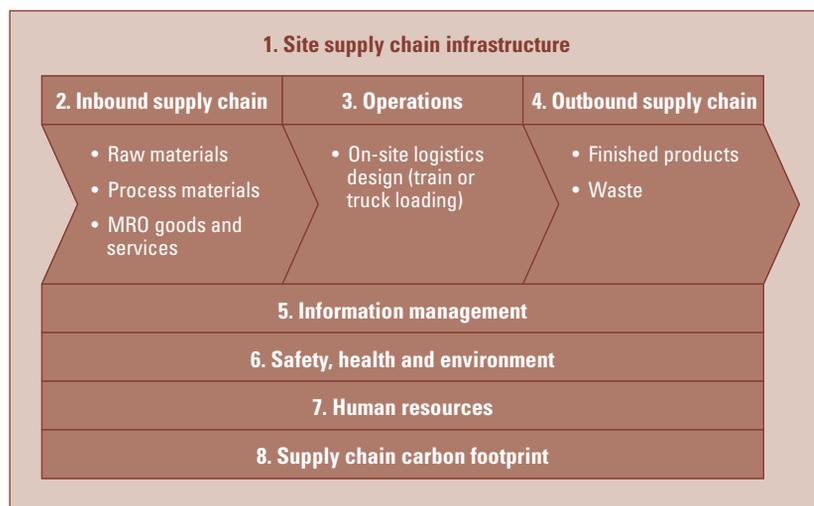
The decision whether to transport fuel by pipeline or by rail requires the assessment of all potential threats. For example, the choice to use a pipeline means factoring in potential leaks and environmental damage, catastrophic loss and terrorism, the possibility of privatization and the very real risk that it may never reach completion, resulting in a plant with no outbound supply chain. Choosing rail transportation involves the everyday operational risk of delays and cancellations, short-term risks such as weather disruptions and derailment, and non-ownership risks such as cost escalation and poor-quality service.

In one real-world example, we saw a pipeline capex of more than \$2 billion, while the alternative was to pay \$40 a barrel for oil transport. Needless to say, both options were showstoppers. The project owner had to reconsider the company's overall product mix and end-markets, and was forced to choose closer—but more difficult to penetrate—markets.

A Board-Level Issue

In too many cases, supply chain factors relevant to an investment decision emerge as a costly surprise to project owners. By definition, such factors are not obvious. This reinforces the fact that, for major projects, supply chain factors are of great strategic importance. These factors must be identified and fully assessed alongside the usual factors—such as market opportunity and capital-expenditures estimates—during the project evaluation and feasibility stages. An appropriate supply chain study should include an understanding of the supply chain environ-

FIGURE: Scope of a supply chain evaluation for investment in remote countries



Source: A.T. Kearney analysis

ment in the transit countries, the inbound supply chain, onsite operations (such as train and truck loading facilities), the outbound supply chain and enabling factors (see figure).

Conclusion

Because supply chain issues for major projects in remote locations are of

enormous strategic importance, they should be germane to a project's justification. Early identification of supply chain risks, costs and their inclusion in the overall viability assessment are critical and will go a long way toward supporting smooth execution of the project and return on investment.

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