



Best practice pays off

European chemical companies are losing ground to their US competitors in the area of cost effectiveness says **Paul Barshop**, where best practice has become a key factor

The market valuations of chemical companies are strongly driven by their returns on invested capital, according to a recent study by McKinsey on Finance. Companies can therefore improve their market valuations by either increasing the net income from

their capital assets or by reducing the cost of creating these assets.

Since 1990, when chemical companies from Europe and the US had comparable performance, the cost effectiveness of capital projects carried out by US chemical companies has steadily increased relative to their European competitors. Currently,

European chemical companies spend on average 6% more than US companies to create equivalent facilities.

The cost difference exists because European chemical companies are not as effective in designing and constructing chemical plants as US producers. This gap in capital cost effectiveness is not caused by differences in construction labour wages or construction labour productivity. These factors are accounted for in Independent Project Analysis's (IPA) cost benchmarking methods. If relative wages and productivity were not controlled for, the gap would be even higher. Furthermore, when IPA evaluated projects carried out in Europe by both US chemical companies and European chemical companies, the European companies still spent on average 6% more than the US firms.

To understand the reasons for the differences in cost effectiveness, IPA evaluated data collected over the past 15 years from more than half of the largest European and US chemical companies. The analysis shows that the performance difference is driven by US companies that have successfully introduced best practices in their capital project systems to produce greater cost effectiveness in their investment programmes. Some of these best practices include activities such as front-end loading (FEL) (see box), team development, and value improving practices. Few of their European counterparts use these practices.

FEL is the practice that has the greatest impact on project outcomes. On average, US chemical companies have improved the quality of FEL over the past 12 years, while the level of FEL for European chemical projects has remained the same.

Better FEL results in better cost performance because improving the project definition reduces the number of changes that occur during its execution, when changes cost more. It also enables a project team to design and plan for a more efficient project.

FEL is just as important to project success in Europe. In IPA's sample of European projects, those that achieve a higher quality of FEL during project definition have lower capital costs.

If European companies were to implement best practices, capital cost performance would improve. However, implementing project best practices is not a simple task. IPA data analysed for this study show that 50% of all companies' first attempts to increase capital effectiveness by using best practices failed. To be successful, a company must transform the way it operates by implementing new project procedures for the engineering function and other company functions, particularly business (defined as the group with profit and loss responsibility). Two key ingredients are necessary for the

transformation: the motivation to change and collaboration between business and engineering.

For many of the US companies, a combination of factors spurred the adoption of best practices for capital projects, starting in the late 1980s. Pressure from the US equity markets to improve financial performance forced companies to improve return on capital. Companies responded by cutting capital spending and by outsourcing many of the project activities previously done in-house. This resulted in a reduction in the size of many engineering organisations. Also, many chemical companies were dissatisfied with the capital stewardship of the engineering organisations. Engineers tended to act autonomously and resist significant business involvement in the design, planning, and execution of capital projects. The twin threats of downsizing and demand for better alignment with business needs was sufficient motivation for many engineering companies to start to adopt best practices.

The second key ingredient for successfully implementing best practices is the support of business. This is crucial, because capital effectiveness is not just about the competency of the engineering organisation. The capital investment process is (or should be) owned by business. Fundamentally, as the process owner, business must agree to the changes proposed by engineering that are necessary to implement best practices.

Business must fulfil three primary requirements to enable the engineering organisation to deliver excellent results.

First and foremost, business must provide project teams with clear business objectives. Clear business objectives translate into better project cost performance because they remove ambiguity. In a process plant, ambiguity drives up costs because the process design is over-specified to cover a larger range of operating conditions than is necessary. When business objectives, and therefore project objectives and priorities, are unclear, engineering will take a more conservative approach to the design and execution of a project.

IPA data confirm this conclusion. Projects that have clear business objectives at the end of the scoping and selection phase are typically 5% more cost effective than projects that do not have clear business objectives, even when the quality of FEL is the same.

Second, business must not only provide clear objectives but must also stay engaged during project definition to answer questions promptly, consider alternatives, and make decisions about objectives and priorities. Without this interaction, engineering cannot properly align the project objectives with the business objectives.

IPA's front-end loading

Front-end loading (FEL) is a process by which a company translates its marketing and technology opportunities into capital projects. The objective is to align project objectives with the business need and to develop the most efficient process design and execution plan to achieve the project objectives. FEL continues until the 'right' project is selected and is not finished until a full design-basis package has been completed. It defines what will be done, how it will be done, who will do it, when it will be done, and what resources will be needed.

IPA's FEL index, which measures the

completeness of a set of activities at any time during the project definition phase, is composed of three equally weighted factors: the completeness of work on a set of site-specific items; the status of project execution planning; and the status of project engineering for the facility.

Each factor covers many specific activities, including the completeness of geotechnical investigations, level of schedule development, and status of piping and instrumentation diagrams. In all, over 100 activities are evaluated to assess the quality of FEL.

And third, business must have the discipline to minimise changes to objectives and priorities near the end of project definition and especially during project execution. The consequence of late changes is engineering and/or construction rework, which, in turn, increases the project cost. Even if a change reduces overall capital cost, the amount of cost reduction would likely have been greater if the change had been made earlier in the project.

Pressures, similar to the ones faced by US companies ten to 15 years ago, are forcing European companies to find ways of improving return on invested capital. Every effort by European chemical companies to reengineer their project systems to incorporate best practices has failed to translate into improved capital effectiveness. The common stumbling block has been a failure to obtain the business collaboration necessary to make the new practices effective.

Many companies in Europe are repeating the failures of their US counterparts in deciding how to make the engineering function more effective and accountable to business. Some European companies have gone so far as to essentially dismantle their project groups and turn all responsibility for capital project development to the busi-

ness units, who then outsource most of the work to contractors. This strategy will fail in Europe, just as it failed in the US. At a minimum, a company must retain the engineering competency to perform certain key activities during the project definition phase and to control the tasks that can be turned over to contractors.

The solution is not to weaken engineering. Rather it is to forge genuine cooperation between two strong and competent functions – business and engineering.

The gap in cost performance between the US and Europe only opened up after US companies realised that genuine cooperation between strong functions was crucial. With this understanding, US engineering companies were allowed to rebuild competencies and respond effectively to the challenge of implementing best practices.

European chemical companies have the opportunity to learn from the past. With a strong engineering function and support from business, they can quickly regain the ground lost over the past decade by effectively implementing project best practices. ■

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