"The Selfish Technology Gene," Discussion and Reply

To the Editor:

In their guest editorial, "The Selfish Technology Gene," (April 2008) authors Robert K. Perrons and Lew Watts provide an interesting scenario in which oil and gas companies would keep their technology investments proprietary. Arthur D. Little believes that this oversimplifies the current situation. The industry is characterized by a range of technology strategies **(Fig. 1)** and, while there may be a shift towards increased proprietary technology, the industry cannot afford to develop all its own technology in-house and will need to think carefully about which technologies should be proprietary.

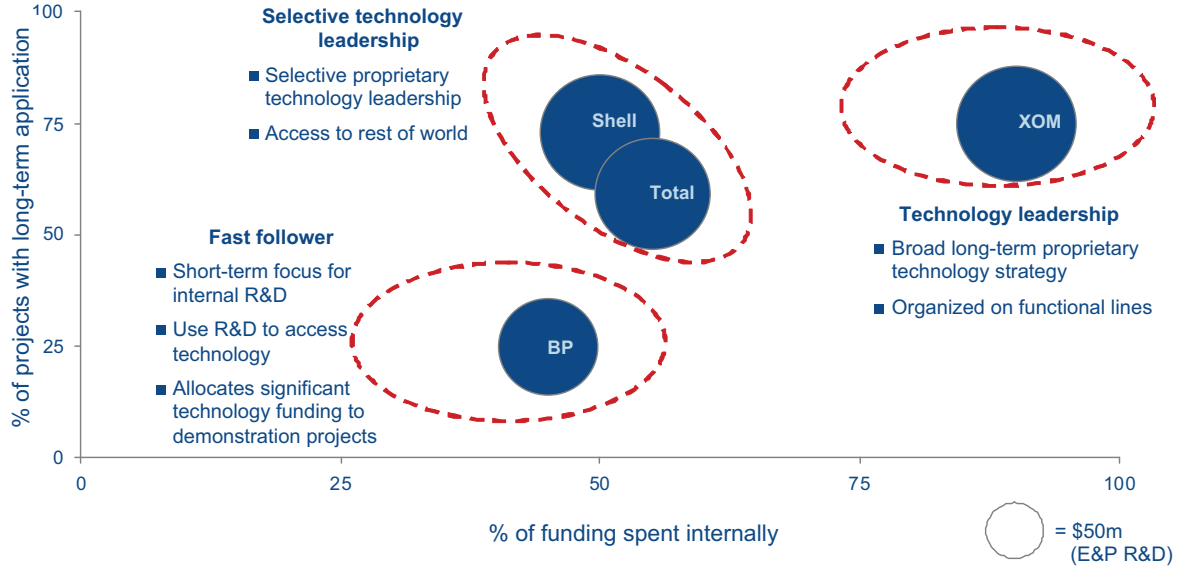
In our work on technology management, we have highlighted that companies need to balance ownership of their technologies with opportunities for value creation from their investments. Keeping technologies proprietary prevents companies from extracting the full value of their technology investments. Shell is a case in point—it has made significant progress in extracting value from its technology investments by making some of these commercially available.

Although third-party technology suppliers have not always been responsible for the invention of new technology, they have excelled at refining the technology. While this is often not counted as technological development, it has played a great part in bringing new technologies to the right price point and reliability, something the oil companies could not afford to do on their own. For this reason, we do not see service companies being threatened in the near future.

The comparison with investments for a fabrication plant for chip manufacture in the article is unhelpful. Microchip manufacturers keep their technology proprietary because it influences chip design and performance, key factors in an industry in which differentiation and performance are very important. But a barrel of oil is a barrel of oil. Oil and gas E&P companies sell commodity products, and technology investments serve to access resources or reduce production costs.

The key area where Arthur D. Little feels that technology will be kept proprietary is in the development of unconventional reserves. This is because there is considerable uncertainty about payoffs from this area and the potential for technology development.

Ben Thuriaux-Alemán, *Manager, Arthur D. Little, UK*
David Thompson, *Senior Manager, Global Energy Practice, Arthur D. Little*



Note: Long term is taken to mean a period over three years.
SOURCE: *ADL Analysis, Annual reports, ADL estimates, 2005–2006 data.*

Fig. 1—Technology strategies of some E&P companies.

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Authors' Response:

We thank Mr. Thuriaux-Alemán and Mr. Thompson for their response to our guest editorial. In our reply, we thought it would be helpful to begin by clarifying one fundamental point. Having worked in R&D organizations and in E&P operations, we are fully aware of the significant disadvantages that result from a single-minded focus on technology protectionism. In fact, one of us has recently called for major changes to oil and gas R&D and innovation in response to the challenges of climate change,* including significant increases in technology sharing. Our editorial was therefore not a prescription for what we consider to be the right course of action, but rather an attempt to shed light on a growing trend in the competitive world of E&P technology.

And while we fully agree that there is a broad range of approaches to technology strategy across the E&P sector, we have some difficulty with framing the strategies of international oil companies (IOCs) simply in terms of funding distribution. Moreover, with regards to the outsourcing or licensing of technology from IOCs to service companies, we would add that this is often in response to a delivery problem in the innovation chain—in other words, it is a pragmatic solution to the problem of cost-effective delivery. This is particularly true for hardware solutions in which IOCs lack some or all of the manufacturing and deployment capabilities required to deliver an innovation to the field. Under these circumstances, IOCs often use outsourcing or joint ventures with service companies to access technology. We accordingly suggest that this scenario applies to many of the Shell-affiliated initiatives to which Mr. Thuriaux-Alemán and Mr. Thompson refer.

Service companies play a valuable role—in fact, an essential and irreplaceable one—in the industry, and they will almost certainly continue to do so in the future. It was never our intention to suggest anything to the contrary. (And in the interest of transparency, it is also worth noting again that, prior to joining PFC Energy, Watts was a Senior Vice President at Halliburton, and was responsible for the company's R&D portfolio.) Instead, we were pointing out that the shifting strategic forces of the industry will probably be felt beyond IOCs and national oil companies (NOCs). The emergence of the "selfish technology gene" in the E&P landscape could quite possibly spur large service companies to increase their R&D investments, and the evidence does indeed suggest that this pronounced increase is happening.

However, while we agree with several of Mr. Thuriaux-Alemán's and Mr. Thompson's perspectives on the industry's technological evolution, we take strong issue with their characterization of the E&P sector as a simple commodity industry in which "a barrel of oil is a barrel of oil." This argument seems to imply that the customers of E&P companies are the people who buy oil and gas. But the reality of the situation is strikingly different: the most important "customer" for an E&P company is the organization that has the right to grant access to upstream assets—which essentially translates to a host nation's government or its NOC. As such, the E&P industry has often been characterized as a business-to-government (B2G) industry and, in this kind of operating environment, the ability to deliver advanced technology is both core to one's value proposition and a key differentiator in the marketplace. We emphatically agree with Mr. Thuriaux-Alemán and Mr. Thompson that "differentiation and performance are very important" in the semiconductor industry, but we are puzzled by their insinuation that these are not also defining features of the modern E&P industry.

Finally, IOCs will undoubtedly compete aggressively in the area of unconventional resources, but principally because access to conventional reserves is increasingly limited. If IOCs wish to avoid being squeezed into a segment of the market predominantly focused on unconventional resources in OECD countries, they will need to sharpen their B2G value propositions. Being selfish about technology may well be one of the key elements that aids and abets this change. JPT

Rob Perrons, *Shell International Exploration & Production*
Lew Watts, *PFC Energy*

*Watts, Lew. 2008: Climate Change: Technology to the Rescue? *The National Interest*. http://nationalinterest.org/Article.aspx?id=17696