

IN DEPTH

Rolls-Royce Powers Ahead In High-Wage Countries

British Industrial Giant Is Betting That Its Brains Can Match the Brawn of Lower-Cost Competitors

By DANIEL MICHAELS
Alesund, Norway

WHILE many American and European manufacturers transplanted production to low-wage countries in Asia and Latin America in recent years, British industrial giant Rolls-Royce PLC has taken a contrarian course. It gravitates to high-wage hot spots.

The turbine producer has factories in England, the U.S. and Germany, where it recently bought into an engine maker for more than \$2 billion. In Asia, Rolls focuses on Singapore, where salaries dwarf those around the region. But few places can rival the operating costs around Alesund, a coastal town nestled amid fjords and fisheries.

Here, a can of soda costs about \$4, an ordinary pair of jeans sells for \$150 and hourly wages are roughly 75% higher than the European Union average. Yet Rolls runs a profitable marine operation, relying on a mix of science, local savvy and an expensive staff who can harness both. Thanks to similarly strong results across its jet-engine and energy divisions, Rolls is cranking production up higher than it ever has. Over the past five years, Rolls's revenue has jumped 55%. In the first half of this year, it posted a net

faces a shrinking pool of science, engineering and math students pursuing technical careers. In Alesund, Rolls has been forced to offer perks like free sailing lessons to retain workers plus relocate staffers from other countries to fill technical positions.

Those forces could undermine Rolls's ability to keep jobs close to home. Of more than 6,000 recent applicants at its nuclear-power division in the U.S. and Britain, for example, less than 10% had appropriate backgrounds to merit even an interview, officials say. "The skills we need to build our business just aren't there in the breadth and depth we need," said Ken Fulton, human-resource director for Rolls's nuclear unit.

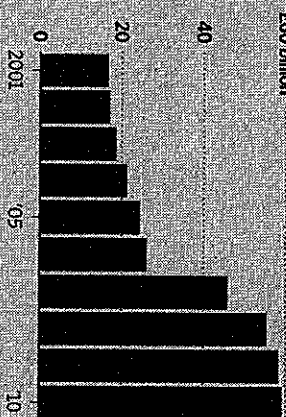
In response, Rolls is training hundreds of apprentices annually and has partnered with 28 universities world-wide. It is also opening far-flung facilities, such as a new factory in Singapore, where Rolls for years has maintained jet engines.

Executives say the Singapore assembly plant will meet booming Asian demand, link into a new network of local suppliers and tap a highly educated work force. But the billion-dollar investment, slated to open soon, is also a big leap. It marks the first time Rolls will produce outside the U.K., one of its most prized technologies: titanium jet-

Rising Orders

Rolls-Royce order book

\$50 billion



Note: Firm and announced orders. Source: the company

terprise, AVIC, and GE secured a major role in China's first large jetliner program. "We want to be a participant in China, not just sell products there," says GE Aviation spokesman Rick Kennedy.

Rolls, in contrast, has shifted little high-value work to emerging markets. Instead, it is among a handful of companies, including Whirlpool Corp. and Caterpillar Inc., that are bringing home or keeping valuable jobs

can Chamber of Commerce in China recently found that 85% of its members rate China's enforcement of intellectual property rights ineffective.

Rolls-Royce officials decline to publicly discuss their views on China's protection of intellectual property, saying only that they focus on countries that foster investment. "If you want to do complicated, high-value engineering, you've got to have a good supply of skilled people and support from governments," said Mr. Rishon.

That support is vital because China and India are educating armies of engineers to help home-grown industrial firms boost the value of their products. Christian Murck, president of the American Chamber of Commerce in China, predicts Chinese engineers "will come up the curve faster than people anticipate."

As these future competitors advance, Rolls faces huge downside if its productivity or workmanship slip. That risk hit home last Nov. 4, when a Rolls-Royce engine on an Airbus A380 jetliner blew apart departing Singapore. The Qantas Airways superjumbo, with 466 people on board, landed safely. Investigators later blamed a minute manufacturing defect. A Rolls-Royce spokesman said "lessons have been learned" and noted that

profit of \$342 million (\$1.3 billion), compared with a \$331 million loss a year earlier because of currency fluctuations.

Its ability to defend its turf in the brutally competitive international shipbuilding sector offers lessons in how manufacturers from developed "post-industrial" economies can counter the rise of new economic powers such as China. While Rolls has thrived by targeting niche markets, maintaining elite manufacturing jobs in high-cost countries has broader implications for battered Western economies.

Rolls is betting that its brains can match the brawn of lower-cost competitors. But the engine maker's aggressive expansion faces a growing threat. It is struggling to secure enough highly skilled employees. Even paying lavishly, Rolls battles for talent against employers ranging from banks to software companies, many of which pay even better. And in many developed countries, it also

engine fan blades. The components must be manufactured to tolerances smaller than a human hair, using advanced processes not yet found in the former British colony. To support Rolls, Singapore's government is helping train 500 new hires.

Developing skills while containing cost "is walking a tightrope," said Chief Executive John Rishon in a recent interview. "We wrestle with those issues all the time."

The talent shortage is hitting Rolls just as its peers are expanding aggressively into low-wage countries. French aerospace group Safran SA runs subsidiaries in Morocco and Latin America. European Aeronautics Defence & Space Co. is building Airbus jetliners in China. General Electric Co., Rolls' biggest competitor, will soon open a major research center in Brazil to complement labs in China and India. GE's aerospace division in 2009 established an electronics joint venture with a Chinese state-owned aviation en-

in western countries. Most of these producers emphasize know-how and manufacturing efficiency over labor cost. That goes even for mass-market products such as plastic coolers, which Coleman Co. now makes in Kansas rather than in China, says Harold Strkin, a partner at Boston Consulting Group. He recently published a report predicting an American manufacturing resurgence over coming years thanks to such companies, and sees similar potential in Britain.

Manufacturing at home avoids a growing problem for major corporations in China and other developing markets: protection of intellectual property. Top executives from companies including GE, Microsoft Corp., Kawasaki Heavy Industries Ltd. of Japan and BASF SE and Siemens AG of Germany have criticized China for failing to safeguard foreign companies' proprietary information, costing them billions of dollars. The Ameri-

such an incident last occurred on one of its engines in 1994. Rolls said the incident cost it \$56 million.

To sharpen its competitive edge, Rolls is boosting both the efficiency of its factories and the value of its products. In Norway, for example, Rolls's marine division is targeting big-money opportunities in the global offshore petroleum industry, which needs increasingly advanced equipment to help find and extract oil trapped far undersea.

Last year, Rolls completed the \$350 million acquisition of ODIM ASA, a Norwegian firm that makes complex gear for subsea surveys and other grueling deep-ocean work. One of its systems, dragged by a specially designed ship, is a 400-ton grid of seismic probes that can spread to the size of 800 football fields. ODIM's rigs complement Rolls's engines, allowing the company to offer a range of price equipment that it fits into ship hulls bought from other producers.

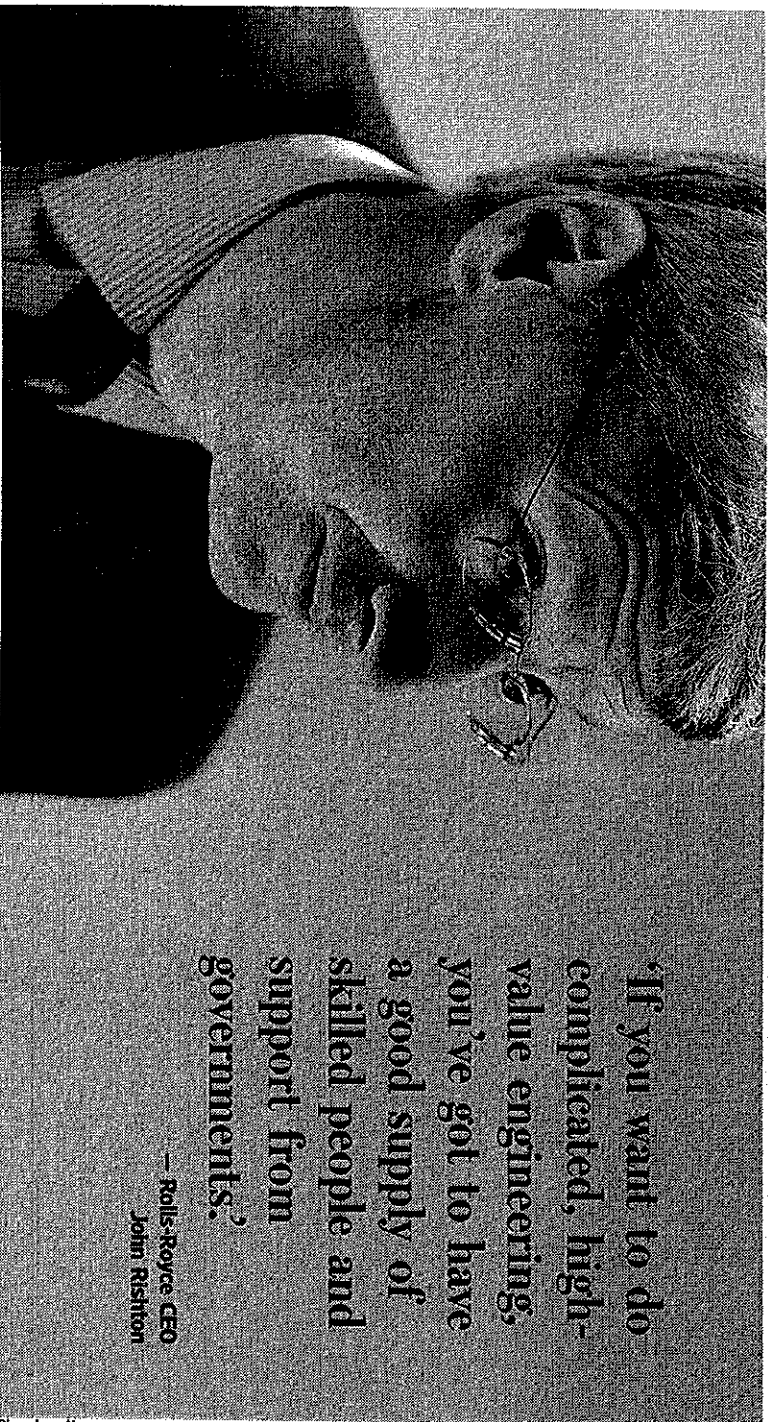
Even propellers are getting re-engineered to boost power and cut drag. At a Rolls factory on the remote Norwegian island of Hareidlandet, workers program computer-controlled machine tools to sculpt blades for thruster pods that can hold a massive ship stationary in churning waters. The systems let supply vessels pull much closer to oil rigs in rougher seas than previously possible.

Ship owners pay a premium for the Norwegian gear because it reduces collisions and allows faster loading, which cuts costs.

"We aren't very good on cost per man hour, so we have to be better on technology," said Per Egil Vedlog, a design manager at Rolls's merchant ship division.

Yet demand for specialized staff who can harness such technology outstrips supply in Norway, a world shipbuilding nexus. Rolls's design unit handling offshore vessels, based in Alesund, has 20 vacancies among 150 positions, says general manager Yjar Garshol. Mr. Vedlog in the merchant ship unit opened a new office 150 miles from Alesund just to tap a wider labor market for his 50-person team.

Norway is a world leader in advanced shipbuilding largely because operating in brutal North Sea and Arctic conditions has made its ship owners particularly demanding. But the country also levies heavy taxes that increase the cost to Rolls of each em-



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Bloomberg News

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ployee, while an elaborate social security system complicates hiring and firing. Norway's strong currency eats into profit margins.

Rolls responded by automating some factory work and outsourcing low-value manufacturing. It buys ship hulls, which can account for only about 40% of the value of a completed vessel, from yards in countries including China and Malaysia. Rolls also opened design offices in Croatia and China, which now draft most of its routine blueprints, while experts in Norway do custom engineering.

Demand for designers back in Alesund is so strong that Mr. Garshol in the offshore division relocated 10 Croatian staffers and their families from the sunny Adriatic coast to wintry Norway. Several Dutch transplants have struggled to adjust to rural Scandinavia. Positions remain unfilled.

"Very often now, people are saying they can't handle the pressure" from extra work, said Mr. Garshol. To address the problem, he rotates project managers into less intense positions and offers perks including free weekend cottages for staffers and their families.

Rolls's situation is similar in the U.K. Roughly 25% of companies seeking experienced engineers or technical staff in Britain struggle to fill vacancies, according to a survey by the Institution of Engineering and Technology, a professional society. Many potential hires are going into finance. Starting salaries for investment bankers and fund managers last year were roughly 50% higher than at engineering and industrial companies, according to Britain's Association of Graduate Recruiters.

Preserving even a limited amount of high-end manufacturing in advanced economies can help stem a vicious cycle of industrial exodus that plagues parts of the U.S. and U.K.

Each specialized marine or aerospace manufacturing job creates around three more jobs nearby at suppliers, maintenance operations and in services such as design or finance, according to studies. Until the recent economic crisis, many ad-

vanced economies had looked to service industries, such as finance and information technology, as substitutes for vanishing manufacturing employment. But the spillover job creation from such services is "effectively trivial," says John Bryson, a professor of enterprise and economic geography at the University of Birmingham in England.

Rolls's aero-engine business, for example, has kept a network of suppliers in the English industrial city of Derby, where Charles Rolls and Henry Royce's original Silver Ghost motor car began production in 1908.

Within a few years, Rolls-Royce was also making engines for airplanes and boats. Even as the company's Bentley and Rolls-Royce luxury car brands grew, it remained at heart an engine—and engineering—company.

Auto production was later spun off and Rolls-Royce now licenses its brands to car makers. Rolls itself focused on using the basic turbo-jet design, in which a gas-fueled inferno spins a turbine, and developed similar systems for generating electricity and powering ships. In 1999, Rolls significantly expanded its marine division with the acquisition of British industrial group Vickers PLC, which had big operations across Scandinavia. The deal also brought Rolls's marine division to Singapore, where its jet-engine business was growing quickly. A decade later, Rolls moved its global marine headquarters to the city-state to better tap booming maritime demand across Asia. But the division's industrial base remained in Norway.

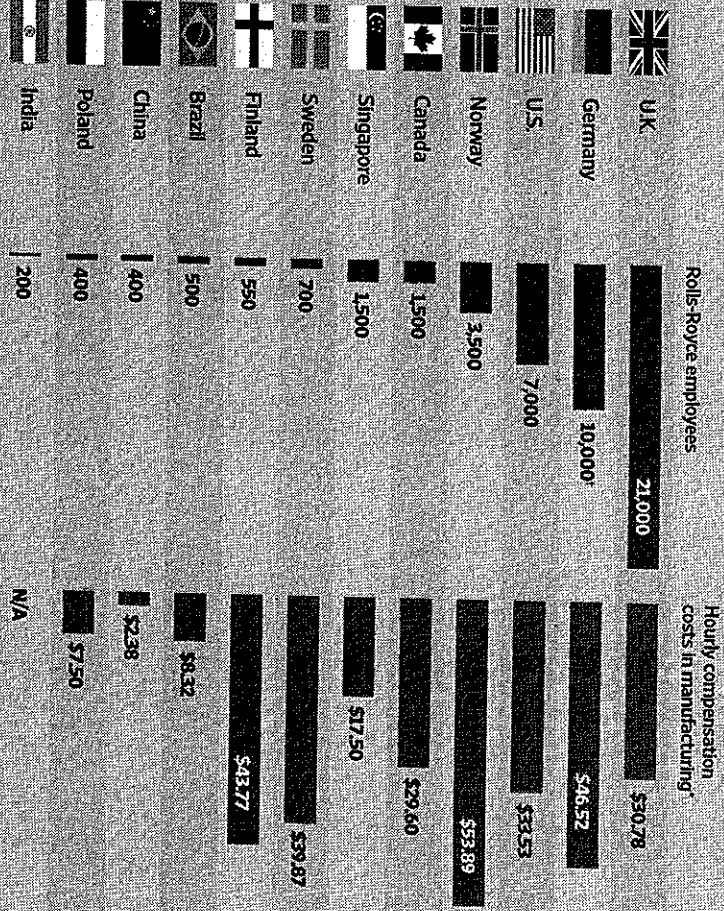
Today, Mr. Garshol in Rolls's offshore unit says staffing shortages have forced him to decline contracts worth tens of millions of dollars and occasionally tell customers a project is weeks late. "It's very hard to explain to customers in parts of the world with unemployment," he says.

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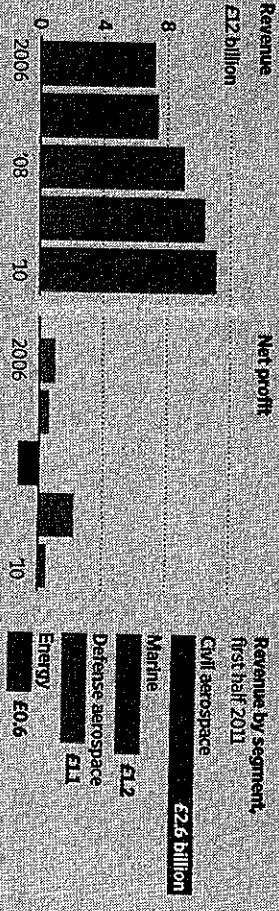
ONLINE TODAY: Watch a video about Rolls-Royce's high-tech shipbuilding operation in Norway at WSJ.com/Business.

A Different Strategy

While competitors have flocked to low-wage countries, Rolls-Royce's staff is concentrated in some of the world's highest-cost labor markets



Its business is growing despite the higher labor costs.



Revenue by segment, first half 2011

- Civil aerospace: £2.6 billion
- Marine: £1.2
- Defense aerospace: £1.1
- Energy: £0.6

*In U.S. dollars, for 2009, except China (2008). After recent Tojoman acquisition is finalized. Sources: the company; U.S. Bureau of Labor Statistics (compensation)