How Japanese industry beat off low-cost competition

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How does a Japanese company that pays its workers more than 20 times the going rate in China or Vietnam make a humble screw that is globally competitive? The answer is that it makes some of the biggest screws in the world.

Takenaka Manufacturing, an Osaka-based company that employs just 155 workers, has a global monopoly on the 15ft-long screws used by the nuclear industry, thanks to a quality-control system certified by US regulators. Others can make the screws but Takenaka has an industry lead in ensuring they are of the highest quality. It also keeps precise records of the date and temperature at which every unit was made.

One of many unglamorous niche manufacturers in Japan, Takenaka also dominates the market in anti-corrosive screws that cost up to 10 times the price of a conventional screw.

The fact that even a humble Japanese nuts-and-bolts maker can survive in a world where low-cost producers are supposedly sucking rich countries dry of their manufacturing base is a reminder that the game is not entirely up for high-cost producers.

In Japan, if anything, manufacturing has staged a comeback, as strong global demand, not least from China, has breathed life into steelmakers, shipbuilders and precision-instrument makers alike. Better sales and profits have underscored something that should have been obvious all along: Japan is still good at making things.

The tradition goes back a long way. In feudal Japan, craftsmen came above merchants in the pecking order. Today, Japan still prefers to make things than to sell them.

Ippei Takeda, president of Nichicon, which produces tiny energy-storing capacitors for mobile phones, stereo systems and air conditioners, says: “If you’re asking me can Japan survive as a manufacturing nation, my answer is: ‘Yes without a doubt.’ We sell about 46 per cent of our components to Japanese companies, which proves that this country is still making things.”

One does not need to look much beyond Toyota, which has pummelled US carmakers by building better cars, or Canon, which has consistently out-manufactured its rivals, to appreciate Japan's manufacturing
skills. But beyond these well-known examples are dozens, perhaps hundreds, of less visible medium-sized manufacturers that dominate specialist markets.

Through this strategy many Japanese companies, operating both outside Japan and - to a surprising extent - in their high-cost home base, have managed to stay competitive. In 2003, the number of manufacturing plants in Japan jumped sharply after 15 years of steady decline, according to figures from Japan's External Trade Organisation, an increase that was almost certainly repeated in 2004.

Last year, several manufacturers announced huge investments in Japan. In electronics alone - a sector that has been strongly challenged by low-cost producers because of the ease with which digital consumer items can be snapped together - several companies are investing in new plants in Japan with the aim of re-establishing their technological lead. Fujitsu said it would build a Y160bn ($1.5bn, €1.2bn) plant to make 300m semiconductor wafers, Sharp is spending Y150bn-Y200bn on doubling the capacity of its LCD factory in Mie prefecture, and Matsushita, owner of the Panasonic brand, is building a Y130bn plant to make cheaper plasma panels with better picture quality.

Certainly, Japanese companies have spent the past two decades shifting labour-intensive, low-value-added production to cheaper countries. But investments in leading-edge technology are still made predominantly at home. One indication of that is the number of manufacturing workers. In 2004, according to the Economist World in Figures, industry accounted for 31 per cent of employment in Japan against 28 per cent in South Korea, 25 per cent in the UK and 23 per cent in the US.

The resilience of Japanese manufacturers is due to several factors. First, for many industries, the lure of cheap wages is not as beguiling as commonly believed. In high-end products, such as steppers - expensive machines that etch computer-chip circuits on to silicon wafers - labour accounts for just 1 to 2 per cent of the final cost. In many manufacturing processes, labour costs are 5 to 10 per cent of the total. Even if savings from low wages are significant, they can be offset by negative factors, such as unreliable electricity supply or high transport costs.

In any case, much of Japan's labour-intensive industry, such as textiles and simple assembly, has long ago left the country. That happened less because of the siren call of cheap labour and more because of the shock resulting from the sharp currency appreciation that followed the 1985 Plaza Accord to bring down the value of the dollar.

Hiroshi Suzuki, chief executive of Hoya, a lens maker, also says the role of low wages in determining factory location is overstated. The main reason for Japanese manufacturers to move abroad, he says, is to avoid high domestic taxes.

If low wages are not always a decisive reason to leave, Japanese manufacturers have found some compelling reasons to stay. Chief among these is a “Japan-led” production strategy, epitomised by the
concept of "mother plants". Under this framework, advanced products and processes are developed at designated Japanese factories and then filtered out to offshoot plants at home and abroad.

Jim Abegglen, an authority on Japanese manufacturing, says the mother-plant set-up transforms China from threat to vital asset. The shift of manufacturing jobs to China, he says, has masked the success many Japanese manufacturers have had in refreshing their products and processes at home.

The mother-plant arrangement highlights Japan's skills in manufacturing over services, says the chief executive of one foreign logistics company. He argues that Japanese service companies flounder outside Japan because they cannot devolve authority and management to their overseas subsidiaries. In manufacturing, by contrast, that weakness can be a strength. A Japanese-owned factory, whether in Thailand, China or the US, replicates the mother factory in Japan. Often it is run by a Japanese national.

The second reason for manufacturing resilience can be explained by "cluster theory". High-value production in Japan depends not only on a good-quality workforce but also on a strong local network of specialist sub-contractors to provide parts and services. In turn, Japan-based industrial customers with exacting standards force manufacturers to make constant improvements. In the automotive, consumer electronics and precision machinery industries, such networks of companies feeding ideas to and from each other are perhaps more concentrated in Japan than anywhere else in the world.

One result of such exacting customers is quality control, in which Japanese companies excel. Mr Takeda of Nichicon says companies are prepared to pay a significant premium if a manufacturer can eliminate defects. "The unit price of a capacitor is very low. But if you have a single bad one you will ruin the whole piece of equipment whose final price may be $500 or even $10,000," he says. "You could spoil everything by trying to save a penny."

Hitoshi Mizorogi, president of Disco, a Japanese company that is the world's biggest maker of machines for slicing up silicon micro-chip wafers, says: "We have found nowhere in the world as good as Japan to base our kind of industry." Despite lower labour costs in other parts of Asia, Disco has yet to move any of its manufacturing operations from its factory near Hiroshima.

The benefits from suppliers and customers continually interacting is most evident in the electronics industry, where many important companies are clustered around Osaka and Kyoto in central Japan.

Kenji Furuhashi, chief executive of Hosiden, an Osaka-based electronic parts manufacturer that supplies larger groups such as Sharp and Sanyo, says: "If our clients have a problem [with the design of a new part] it is helpful that they have such a short distance to come to talk to us about it." In this way, he says, new products can be rapidly improved.

Many new components are custom-made for clients, another defining characteristic of high-cost manufacturers. Takenaka fashions 30,000 different specifications of nuts and bolts a year, 40 per cent of them customised.

Ken Sato, chief executive of Rohm, a Kyoto-based semiconductor and electronics parts supplier, says such close co-operation is one reason his company maintains a relatively high number of employees in Japan. Rohm employs a steady 6,000 workers at home, even as it has expanded its overseas workforce to 14,000, most of them in Asia. Mr Sato says that many of his Japan-based customers insist on crucial parts being made in Japan to ensure quality.

The cluster effect is boosted by the reluctance of many Japanese managers to cut local employment. Canon is committed to keeping 60 per cent of its manufacturing at home. One could argue that a strategy based on patriotism is bound to lead to perverse business decisions. But cluster theory suggests that the more manufacturers that decide to stay, the better for technological competitiveness.

A third reason for maintaining a manufacturing base at home is to keep secrets. As competition by low-cost countries intensifies, and the complexity of products increases, many Japanese companies say they are more likely to retain their technical lead if they keep their advanced production processes at home.
Makoto Umehara, chief executive of Citizen, a watchmaker that also produces electronic parts and machine tools, says: "I am keen to keep a lot of Citizen's factory processes in Japan because this is the optimum way to keep our secrets to ourselves. In our industries, knowhow is important. What we have, we want to retain."

Hoya's Mr Suzuki says many Japanese companies would rather deal with each other than with foreigners. "Other Japanese companies are more likely to share their resources and knowhow," he says. "If you get too closely involved with companies, say from the US or Taiwan, there is a good chance you will be creating competitors [by revealing technical secrets]."

One result of such suspicion has been a division of labour in which commercially sensitive technology remains in Japan and lower-end manufacturing takes place abroad. Canon produces basic photocopiers in China but toner cartridges in Japan. Many electronics companies make their chips, in which most of the intellectual property is stored, in Japan, but have the finished product assembled elsewhere. Even Wacoal, whose bras and panties are stitched together in Chinese factories, makes much of its specialist fabric and plastics in Japan. Thus much Japanese technology, from figure-enhancing plastics to tiny electronic capacitors, is hidden inside items ostensibly made in China or branded as a European or US product.

A case in point is the iPod. The phenomenal success of the digital music player is a big blow to Sony, the Japanese consumer electronics company that has allowed its domination of the personal stereo market, created with the Walkman, to slip to Apple. (In Japan, Sony's woes are generally attributed to its having forgotten its engineering roots.) But take an iPod apart and 82 per cent of the components are made by Japanese companies, says Jesper Koll, economist at Merrill Lynch, even though the bulk of that is produced outside Japan.

One could draw the conclusion that Japan is throwing its technology down the drain by allowing smarter companies with better branding to make all the money. But Mr Koll argues that Japanese manufacturers may have the last laugh. Fashions change, and Walkmen and iPods come and go, he says. But whatever turns out to be the next must-have gadget, the chances are most of the parts inside it will be made by Japanese companies.

Sources for charts: OECD Factbook 2005; Thomson Datastream; Jetro

Watch and learn to outperform the Swiss

The biggest makers of Swiss-style turning machines - highly accurate machine tools developed for the watch industry - are Japanese, writes Peter Marsh. Citizen, Star, Tsugami and Nomura Machine Tool are all bigger in this niche market than Tornos, the Swiss supplier that established the technology more than a century ago.

The four Japanese companies account for an estimated 85 per cent of the $1bn-a-year (€776m) global sales of Swiss-style machines, with Moutier-based Tornos accounting for only about 7 per cent. Just 5 per cent of all the Swiss-style machines sold last year went to the watch industry, with the rest used in making small and precise parts in sectors from jewellery to aerospace.

How the Japanese came to dominate an industry that originated in Europe says much about the country’s approach to technology development over the past 50 years. Joe Jablonowski, publisher of Metalworking Insiders’ Report, a US newsletter, says the Japanese machine tool industry has been “very good at grabbing a technology which they did not necessarily invent and then developing it, often much better than competitors”. Japan’s machine tool industry is the world’s biggest, last year accounting for just over 20 per cent of machine tool sales of some $45bn.

Citizen - one of the world’s biggest makers of watches - moved into machine tools in the 1930s by copying Swiss-style turning machines made by Petermann, another Swiss company later absorbed into Tornos. Today, Citizen has sales of some $300m a year from its Swiss-style machines and is the world leader in the field.

In the 1960s, Citizen became the first to apply computer controls to these types of machines. In the 1970s, the company, followed by the other Japanese machine makers, established its own software development
group. The companies pushed on with the new control ideas, which many in Switzerland thought would never work.

Tornos took an equivalent step only in the 1990s, hiring its own software engineers to play the Japanese at their own game. While Tornos has, like the Japanese, spread its sales efforts into fields such as medical equipment and electronics that require small and precise parts, it is generally considered to have been slower than its Japanese competitors in spotting the opportunities outside the watch business.

Robert Hausler, managing director of Suvema, a Swiss company that distributes Citizen machine tools, reckons Citizen is selling roughly twice as many machines a year as Tornos to the Switzerland-based watch industry. “We are selling 20-25 a year while my guess is that Tornos is selling fewer than 10. I don’t think Tornos can match our [machines’] accuracy.” However, he concedes that Tornos has far more machines - estimated at 6,000, most of them mechanically-controlled - installed in the industry than Citizen’s relatively meagre 150.

Mr Hausler’s claims about precision are rejected by Raymond Stauffer, chief executive of Tornos. “Citizen has sold a few machines [in Switzerland] but I wouldn’t say they are any more accurate than ours,” he says. He adds that Tornos, too, is benefiting from high watch industry investments. Taking the wider view, however, few would dispute that the Swiss company has lost out as the Japanese competitors have marched into a field it once regarded as its own.