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The triumph of lean production

By Steve Schifferes

Globalisation reporter, BBC News, Georgetown, Kentucky

On the assembly line at Toyota's giant plant, Laura Wilshire is not happy.

There is something wrong with a seatbelt fitting on the Camry she is working on.

Laura pulls a cord, stopping the production line - and prompting her five fellow workers on trim line three to crowd round.

They soon see why it is not screwed in properly and fix the problem.

"I don't like to let something like that go," she says. "That's really important for people who buy our cars."

Workers at the Toyota plant in Georgetown, Kentucky, pull the cord 2,000 times a week - and their care is what makes Toyota one of the most reliable, and most desired, brands in the US.

In contrast, workers at Ford's brand-new truck plant in Dearborn, Michigan, pull the cord only twice a week - the legacy of generations of mistrust between shop-floor workers and managers.

Lean production

Pulling the cord, called "andan", is part of Toyota's "lean" production system, which means that it has been able to produce cars much more cheaply, and to a higher quality, than its US rivals.

In 1998, it took Ford and GM 50% more hours to make a car than Toyota - and the difference was so great that



Toyota workers talk about their experience on the assembly line

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“ Our philosophy is to think globally but act locally ”

Jim Press, President, Toyota North America

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GM did not make a profit on any of its cars.

Now GM is attempting to emulate Toyota by introducing a global manufacturing system of its own and has been closing the productivity gap.

GM's new manufacturing system is vital to its survival, says the man in charge of implementing it worldwide, Gary Cowger.

GM aims, like Toyota, to produce the same car by the same method in any of its production plants around the world.

"Looking at the new plants, you wouldn't know if you were in Lansing, Michigan, Russelheim, Germany or Shanghai," says Mr Cowger, GM's global vice-president for manufacturing and labor.

GM is also eliminating national boundaries in its development process. Instead, it is planning to design plants flexibly around a single type of vehicle, such as a small car, medium car or truck (SUV).

And it is also integrating the design of the car and the manufacturing process to gain efficiencies.

GM's global design centres will be dotted around the world: Korea (Daewoo) for small cars; Germany (Opel) for mid-size cars; Australia (Holden) for full-size cars, and Michigan for full size trucks and SUVs.

Each plant can quickly change the specifications of the models it produces to adopt to local conditions, although it shares a common platform, including engines and transmissions, across the range.

This combination of global manufacturing and design standards with local production is the key to the future, according to Mr Cowger.

Catching up

GM's new manufacturing system is part of a fundamental reorganisation of the giant company, introduced in 2004, which is already paying dividends in its North American manufacturing operations.

▶ [See how GM has caught up in productivity](#)

GM now has five of the top 10 most productive US assembly plants, according to Harbour Consulting, and has substantially

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LEAN PRODUCTION GLOSSARY



- ♦ **'Just-in-time':** System of delivering parts to the assembly line in a continuous flow, rather than stockpiling large volumes at the plant
- ♦ **Continuous improvement** Process of analysing problems and solving them on a daily basis
- ♦ **Personal responsibility** Each worker on a production line is given responsibility for each process he carries out
- ♦ **Flexible production:** Several different models can be produced on the same assembly line
- ♦ **Design for manufacture:** Making the components of a car easy to fit together on the assembly line

closed the productivity gap with Toyota.

In 2006, Toyota could build an average car with just 29 hours' labour, while it took GM workers 33 hours - a big improvement from 1998.

Mr Cowger says it has been tough, but already 90% of the 178 GM plants in 33 countries have adopted the new system.

However, the improvement in productivity in North America - crucial to GM's future - has also come through ruthless restructuring.

“ We are putting cost pressures on our suppliers, but costs are critical to our survival, and we are facing the same pressures as they are ”

Gary Cowger, GM global vice-president for manufacturing and labor

GM is cutting its US output by one-third and has cut its US blue-collar workforce by 80% since 1985, according to the Center for Automotive Research.

GM once produced one of every two cars sold in the US. Now it is down to one in four.

According to GM boss Rick Wagoner, who has taken charge of North American operations, the company has already saved \$9bn in costs.

Supplier relationships

Another key part of the new production is the relationship with parts suppliers, who typically provide 85% of the parts that make up a car.

Ensuring good-quality parts, delivered on time, is one of the keys to both reliability and efficiency. Missing a key component can bring the assembly line to a halt.

Toyota pioneered the "just-in-time" manufacturing system, in which suppliers send parts daily - or several times a day - and are notified electronically when the assembly line is running out.

More than 400 trucks a day come in and out of Toyota's Georgetown plant, with a separate logistics company organising the shipments from Toyota's 300 suppliers - most located in neighbouring states within half a day's drive of the plant.

Toyota aims to build long-term relationships with its suppliers, many of whom it has taken a stake in, and says it now produces 80% of its parts within North America.

GM has had a more difficult recent history with its suppliers, having spun off its parts subsidiary, Delphi, several years ago.

SUPPLIER BANKRUPTCIES



- ◆ **Dura:** October 2006
- ◆ **Dana:** February 2006
- ◆ **Delphi:** September 2005

GM says its supplier relationships are critical and it needs to bring them into its global manufacturing system. But it also admits that, with the company losing billions, it is squeezing the suppliers to lower their prices.

♦ **Meridian:** April 2005
♦ **Tower:** February 2005
♦ **Valeo:** January 2002
♦ **Federal Mogul:** December 2001
source: CAR

"We are putting cost pressures on our suppliers, but costs are critical to our survival, and we are facing the same pressures as they are," says Mr Cowger.

As a result, many suppliers like Delphi plan to shift much of their production out of the US, to Mexico or East Asia, where labour costs are lower.

According to Stephen D'Arcy of PricewaterhouseCoopers, China will eventually become the preferred location for most suppliers - once they can meet local needs.

Many US-based suppliers went bankrupt in the past few years, including Delphi.

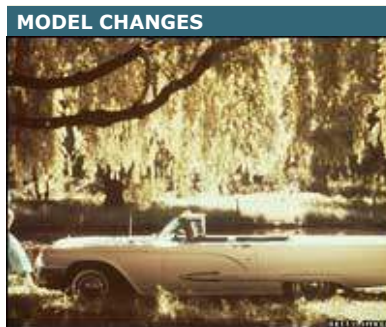
Closer to the consumer

One of the key advantages of the new "lean production" system is that it allows companies to get closer to consumer needs.

Toyota's North American President, Jim Press, says the key to their success is that they are customer-focused - and that requires quick reactions when consumer tastes changes.

"I think being nimble is really important. As the market grows and shifts so quickly, you have got to be able to respond and anticipate where things are going," he says.

Toyota says it can now develop a new model in 18 months, compared to the three years it takes GM.



MODEL CHANGES
♦ Models in 1955: 25
♦ Average model run: 62 months
♦ Models in 2005: 325
♦ Average model run: 25 months

source: *The Machine that Changed the World*

And its flexible manufacturing system and the company's co-operative culture means that "we roll our sleeves up and go to work and get the job done", says Mr Press.

Toyota also has a close relationship between the dealers who sell its cars and its plants.

The production run is adjusted at the Georgetown plant, and extra Saturday working is added, only when computerised orders from the dealer network show it is needed.

And individual buyers can alter what they want in their car - changing the paint colour or specifications - right on the production line, by notifying their dealers.

GM is also aiming at reducing the product cycle time - the length of time it takes from designing a new car to actually putting it on the road.

And by using a global design system, it can use existing Opel designs for its Saturn model in the US, or Holden (Australia) models for its new Pontiac G8.

And if GM has made strides in cutting costs, it perhaps still has some way to go before it starts making enough of the right kind of cars.

"Their problem is on the demand side," says Garel Rhys of Cardiff University.

"For too long, they took their eye off the ball, and they are now being caught out by changing consumer tastes.

"And there is still a problem of perception. Although their quality has improved, consumers don't yet recognise it, and Japanese cars can command a \$5,000 quality premium in the marketplace."

Culture change

At a deeper level, the question is whether GM and Ford - the companies that perfected mass production - can fundamentally change their culture to the new lean production system.

"I hope they make it - but I am not optimistic they all will be able to," says James Womack, an expert who has advised many global companies, from Tesco to Boeing, on the advantages of lean production.



The new boss of Ford introduced lean production at Boeing

Mr Womack says it has to be something that is inculcated in all the company's workers, from the bosses to those on the factory floor.

"This is not Japanese companies vs American companies, it is smart Japanese companies vs smart American companies," he says.

"GM has caught up on assembly plants, but Toyota is still ahead on suppliers, product development and a problem-solving approach to issues.

"For too long, managers at US car companies were in denial about their problems."

Toyota, for its part, says it does have a worldwide company culture that transcends Japan, according to Jim Press.

"I think we have a hybrid system where we take the best of every culture and distil that into a system that really works effectively in every country where we do business - and the ability to transplant that system throughout other countries is the key to growing globally.

"Our philosophy is to think globally, but act locally."

Toyota's only worry appears to be whether, as it expands so fast, it can maintain that culture - and its quality - intact.

Toyota's President, Katsuaki Watanabe, recently said in a newspaper interview that he didn't care if Toyota became the

biggest car company or not.

"What is important is to be number one in quality."

Have you been affected by the global changes in the car industry? Perhaps you work for a car company or a supplier and are worried about your job?

Or have you benefited by the shift of production to other regions? Send us your experiences using the form below:

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