TOYOTA

"The Toyota Production System transcends physical and cultural barriers; it can be effective in other countries and cultures, if there is a will to implement it and if necessary conditions are fulfilled." So concludes an article published online by the Financial Times of London, which looks at how Toyota's management philosophy has contributed to global success. Research by the author, M. Reza Vaghefi, and his colleagues suggests that, among automakers, the positive effect of increased human assets upon sales is greatest at Toyota. The complete content of the article is reproduced here with the publisher's permission. It appeared in Mastering Management Online <http://www.ftmastering.com/mmo/index.htm>, Issue 7, October 2001, and was republished in the September 5, 2002 issue of FT.com.

CREATING SUSTAINABLE COMPETITIVE ADVANTAGE: THE TOYOTA PHILOSOPHY AND ITS EFFECTS

By M. Reza Vaghefi

The rise of the Japanese car manufacturers to positions of global dominance in the decades following the second world war is well known. In recent years, despite the well-publicised troubles of some companies such as Nissan, other Japanese car makers, most notably Toyota, have sustained and even increased their global competitive advantage. As M. Reza Vaghefi and his colleagues explain, this competitive advantage is based on a corporate philosophy known as the Toyota Production System. The system depends in part on a human resources management policy that stimulates employee creativity and loyalty but also, importantly, on a highly efficient network of suppliers and components manufacturers.

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In October 2000, Fortune published its annual rating of the most admired car makers in the world. Toyota was ranked first in the list, which included 14 manufacturers such as Ford and General Motors. This article investigates the factors that have been instrumental in advancing the productivity of such companies as Toyota, Honda and others in an industry that touches so many lives.

The fundamental reason for Toyota's success in the global marketplace lies in its corporate philosophy - the set of rules and attitudes that govern the use of its resources. A corporate philosophy, in the words of Fred J. Borch, former chief executive of General Electric, 'is the umbrella policy that guides all of the decisions and activities of the organisation.' The Toyota philosophy is often more generally known as the Toyota Production System.

Toyota and other foreign car makers have successfully penetrated the US market and established a world-wide presence by virtue of its productivity. Toyota's philosophy of empowering its workers is the centrepiece of a human resources management system that fosters creativity and innovation by encouraging employee participation, and that likewise engenders high levels of employee loyalty.

Although Honda and Nissan have earned a reputation for building high-quality cars, they have been unable to overcome Toyota's advantages in human resource management, supplier networks and distribution systems in the highly competitive US market. Much of Toyota's success in the US - and other world markets - can be attributed directly to the synergistic performance of its policies in human resources management and supply-chain networks.

The evolution of Toyota's network system approach can be traced to the period immediately following the second world war when the economic outlook was uncertain and human, natural and capital resources were in limited supply. Toyota's president, Toyoda Kiichiro and, later Ohno Taiichi, the real architects of the Toyota Production System (TPS), developed a highly efficient production system later characterised as 'lean production'. Toyoda's methods paralleled those of Henry Ford several decades earlier, although Toyota's approach to both product development and distribution proved to be much more consumer-friendly and market-driven.

Supply chain management

Engineering and component fabrication account for around 85 per cent of the direct cost of the manufacturing process associated with car production. Outsourcing plays an increasingly important role for both domestic and foreign car makers as companies attempt to 'externalise' many of these direct costs and minimise market risk, while at the same time realising the benefits of using specialised suppliers.

For a number of years in-house production has been in steady decline, for both domestic and foreign manufacturers. Among US car makers, General Motors continues to manufacture a high percentage of components in-house, while DaimlerChrysler outsources more than any other firm. Volkswagen, a German brand, produces on average less than 50 per cent of its automotive components in Germany. Indeed, in terms of country of origin, Volkswagen is as much a Mexican product as it is a German one. And, as international trade agreements such as Nafta continue to gain favour and provide regional comparative advantages, international outsourcing will accelerate.

Supply chain relationships among Asian manufacturers are based on a complex system of co-operation and equity interests. In both Japan and Korea, co-operation and asset concentration are encouraged, and antitrust prohibitions are far less restrictive than in the US.

Importantly, both government and culture play a major role in Asian manufacturing and distribution practices. Asian values, more so than in western cultures, traditionally emphasise the collective good over the goals of the individual. This attitude clearly supports the synergistic approach of supply chain management and has encouraged concern for quality and productivity.

To what extent have Asian manufacturers been able to transplant or superimpose this model of co-operation in the US? Some Asian manufacturers, such as Toyota, have been able to transcend western cultural and institutional barriers and superimpose Asian models of supply chain management and co-operation elsewhere. They have realised real advantages in both production and customer satisfaction in the US. Conversely, Asian manufacturers who have been unable to transcend these cultural barriers and who have been forced to adopt essentially western models, such as Daewoo, have performed poorly in the US market.

In commenting on Toyota's worldwide performance, Fortune recently proclaimed that the Japanese manufacturer 'defies gravity', an obvious reference to the company's sustained competitive advantage in the car industry. In large measure, this advantage is directly attributable to the precision with which Toyota has been able to schedule and co-ordinate the activities of its network of 300 components suppliers.

Toyota's prominence has not been easily achieved. In the post-war period, Japan experienced critical shortages of steel and fossil fuels, crucial for automobile manufacturing and distribution. Toyota re-entered the car industry - which was dominated at the time by US and European manufacturers - without government support. Prospects for world-wide expansion were not promising, in that any products of Asian (specifically Japanese) origin were generally stigmatised and regarded as being of inferior

quality. US markets remained highly ethnocentric, and discriminated against Japanese products for several decades following the war. Initial penetration of US markets remained difficult for Asian manufacturers until the mid- to late 1960s: brand acceptance was poor, product quality often was inconsistent, and distribution infrastructure was lacking.

Determining factors in productivity

Toyota's approach to product development and production was different from the path taken by other foreign manufacturers. First, Toyota made a strategic commitment at the outset to produce automobiles exclusively. Second, Toyoda Kiichiro believed the company would fare better if it selectively borrowed technologies and practices from established car makers without being bound by the restrictions that direct technology transfer would have imposed on the company. In effect, Toyota borrowed the best concepts and practices from elsewhere and then developed what was needed to satisfy customer demand. Customer satisfaction has remained the focal point of Toyota's strategic initiatives since the 1950s.

Several specific factors, or components, have been cited as underlying Toyota's success, including:

* A world-class network of suppliers in both Japan and, more recently, in the US.
* A highly efficient and effective just-in-time (JIT) inventory system that is heavily dependent upon the co-ordination of its supplier network.
* A state-of-the-art assembly system incorporating the latest robotic technology. Toyota plants in Japan and North America have both won the World-wide Platinum Plant Quality Award.

An effective and efficient human resources management system, the cornerstone of which is a high level of employee loyalty and commitment to quality.

The outcome of such strategic architecture, based on careful analysis of a company's resources and competencies, in addition to the orchestration of these strategic resources and competencies over time, can be seen in the measures of productivity for lean versus non-lean automotive companies, as shown in Table 1.

Table 1. Output of lean and non-lean automobile manufacturers 1993-1999 (units per employee per year)

Non-Lean Companies				Lean Companies			
Year	*GM*	*Ford*	*Renault*	*Volkswagen*	*Toyota*	*Nissan*	*Honda*
1999	13.61	9.6	12.42	25.71	23.59	17.3	19.49
1998	9.05	9.7	14.05	15.13	20.73	17.89	14.67
1997	9.15	10.33	11.65	9.99	24.59	16.07	21.02
1996	8.51	10.38	10.81	10.63	24.53	20.22	13.67
1995	7.97	15.72	10.85	8.87	22.95	15.47	16.32
1994	7.94	11.92	11.62	9.1	22.95	13.91	16.32
1993	7.55	11.71	10.8	8.3	31.29	15.54	17.24

Source: various issues of Fortune Global 500 and Ward's Yearbook, 1993-2000, Wards Automotive Yearbook 1993-2000.

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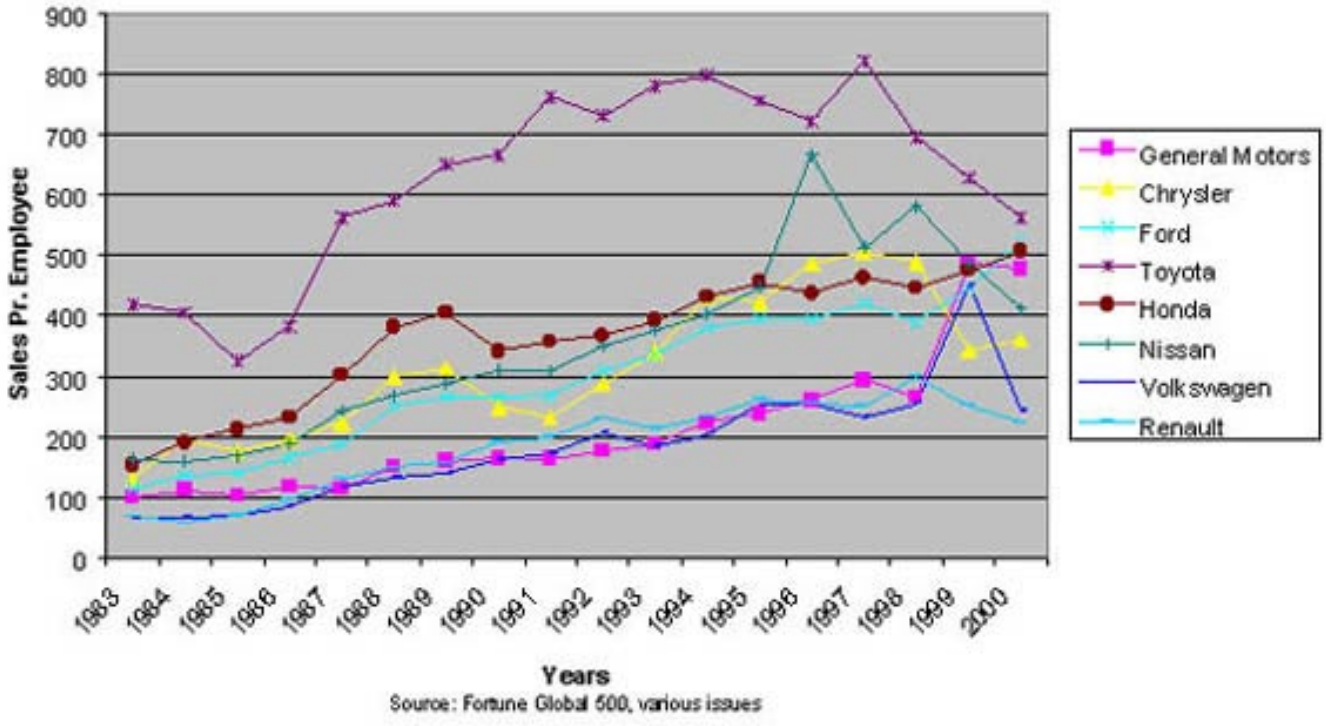
In a study by consultants J.D. Powers & Associates the quality of Toyota's products is compared with that of six other companies (Honda, Nissan, General Motors, DaimlerChrysler, Volkswagen and Ford). In the 2001 model year, Toyota's products ranked at the top, with fewer than the industry average of problems per 100 vehicles. This is complemented by a recent test of safety performance of pick-up trucks conducted by the Insurance Institute of America. In this study the Toyota Tundra received a 'Good' rating, while Silverado (GM), Dodge Ram (DaimlerChrysler) and Ford F150 (Ford) received either 'Marginal' (GM) or 'Poor' ratings.

An effective dealership network has proven to be very responsive to customer service demands. Relative to other Japanese and domestic manufacturers, Toyota has excelled in attracting women to its dealerships. According to Automotive News, women now account for over half of all new car and light truck sales in the US.

Determining the impact of additional assets

Simple data about productivity in terms of cars produced per year per employee at various companies, or each worker's contribution to total revenue (as reflected in Figure 1), confirms that Japanese car makers have provided an environment for their workers which enables the latter to be more productive. Shifting the focus of analysis from net income to sales, for example, shows more evidence of the effectiveness of the Toyota Production System.

Figure 1: Sales per employee ($ hundreds)



Source: Fortune Global 500, various issues

Let us look at the relationship between percentage change in numbers of employees (human assets) and percentage change in sales. When General Motors increases its human assets by 1 per cent, there tends to be an associated 0.09 per cent increase in sales, while each 1 per cent increase in Ford's human assets is associated with a 0.07 per cent change in sales. By contrast, human assets seem to be more easily converted to increased sales within Japanese companies. For every 1 per cent

increase in assets acquired by Nissan, there is an 0.32 per cent increase in sales; for Honda, each percentage point increase in human assets is associated with a 0.24 per cent change in sales. Toyota is most efficient at converting assets into new sales: there is a 0.35 percentage impact on sales for each additional 1 per cent of assets.

How long does this improvement last? Theoretically, the impact of additional assets on sales should not be ephemeral; typically, assets brought on line in one year will also have an impact on total company sales in subsequent years. To test for this effect, we estimated the relationship between lagged changes in assets and changes in sales for US and Japanese companies.

Perhaps surprisingly, there is no significant relationship for any of the US-based companies, showing little sign of a lasting effect. However, Japanese companies did show such an effect. A 1 per cent increase in assets for Honda and Nissan were associated with 0.34 and 0.40 per cent changes, respectively, in sales in the year immediately following the increased investment.

However, Toyota once again realises the highest second-year impact of increased assets on sales: a 1 per cent increase in Year One assets for Toyota was associated with a 0.51 per cent change in Year Two sales. The Toyota Production System, when compared with the production systems of rival companies, appears to allow for the relatively easy conversion of assets into sales, both in the year the additional assets are brought on line and also in subsequent years.

Conclusion

A workplace with high morale and job satisfaction is more likely to produce reliable, high-quality products at affordable prices. Toyota and Honda have institutionalised many successful workforce practices. Toyota in particular has done so not only in its own plants but also in supplier plants that were experiencing problems. The Toyota Production System transcends physical and cultural barriers; it can be effective in other countries and cultures, if there is a will to implement it and if necessary conditions are fulfilled.

The true judges of a product and the philosophical system that produced it are its consumers. Two the most important factors influencing consumer choices are quality and affordability. The latest data from consumer reports show how the big three US car makers have ceded market share to foreign brands. The domestic producer's share of the market has fallen below 60 per cent; Toyota, Honda, Nissan and Volkswagen dominate the remaining 40 per cent. Clearly, other companies in the global car manufacturing sector need to consider rethinking their approach to human resource management, supply chain management and the philosophy of production.