

# Japanese Perspectives on Manufacturing Strategy



Malcolm Jones, principle engineer at Industry Forum, has over 20 years experience in lean.

One of the less well known groups I studied with while undertaking my education in Japanese manufacturing practices was the TP Management Group at the Japan Management Association. TP Management, Total Productivity Management (not to be confused with TPM, Total Productive Maintenance), is an overarching policy deployment practice which incorporates Lean, TQM, TPM et al as required. In TP Management terms, these processes are means to actualise business strategy, not the strategy itself.

Like the Deming Prize for Quality and the JIPM TPM Prize, there is a TP Prize, but with far less prescriptive criteria. TP Management is based on a foundation of principles and in awarding the TP Prize the assessors are looking for innovative examples of the application of those principles. The winners of the TP Prize, inaugurated in 1985, include plants from Toshiba, NEC, Canon, Toyota Auto Body, Matsushita Electrical, Hitachi, Mitsubishi, Nissan Motor and Sekisui Chemical. In my own visits to TP prize-winning plants I saw examples of implementation at Matsushita Refrigeration, NEC Satellite Communications, Sony, Snow Brand Dairy products and Shiseido cosmetics.

One research paper, presented at a TP Prize conference in the 1990's has

greatly influenced my thinking about manufacturing strategy. As TP is a non-prescriptive approach, the researchers were interested in how companies chose to actualise the policy deployment process in their operations, and came up with 11 approaches, split into 2 categories. The two basic categories were 'programmes for actualising the business strategy' and 'programmes for strengthening the internal environment'. This mirrors Western thinking about strategy which distinguishes between market based approaches and competency based approaches.

In TP terms, Total Productivity is a function of both Product Power (the attractiveness of the product to the market – product innovation) and Resource Utilisation (the effectiveness of the processes to deliver the product – process innovation). Both are necessary and neither is sufficient, although the company's position in the supply chain may have an influence on where a company focuses its resources.

The competency (resource utilisation) based strategies identified were:

Programmes for Strengthening the Internal Environment:

1. Use TPM as the Base
2. Develop through JIT
3. Move from DC (Direct Costs) and FC (Factory Costs) to TC (Total Costs)
4. Build Integrated Partnerships with Customers and Supplier
5. Restructure to maximise the use of systems and human resources
6. Practise True Policy Management

The first three of these have a focus on the trilogy of Quality, Delivery and Cost. TPM is seen as the application of TQC type process to automated manufacturing based on equipment efficiency. In their interpretation TPM expands a TQM approach focused initially on improving quality by reducing variation to a focus on reducing costs and leadtime based on eliminating equipment losses (zero targeting). In its final TP led development, policy deployment is used to expand the focus to include customer, employee and social satisfaction indicators, improving product competitiveness through early management processes, expanding employee autonomy and incorporating environmental concerns through the Safety,

Figure 1: Upgrading through TPM

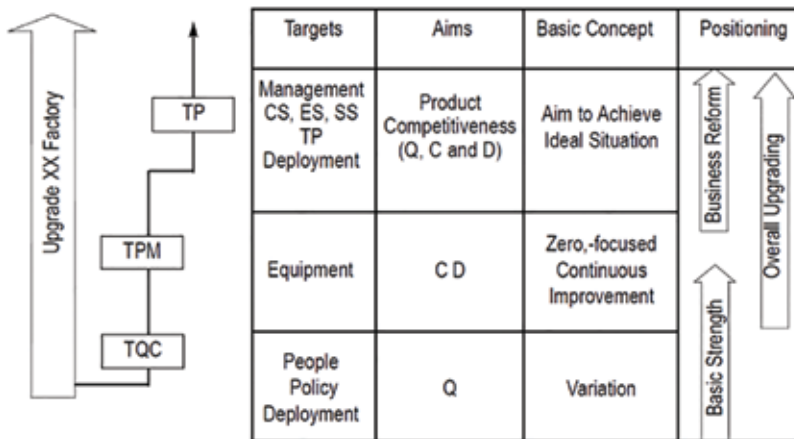
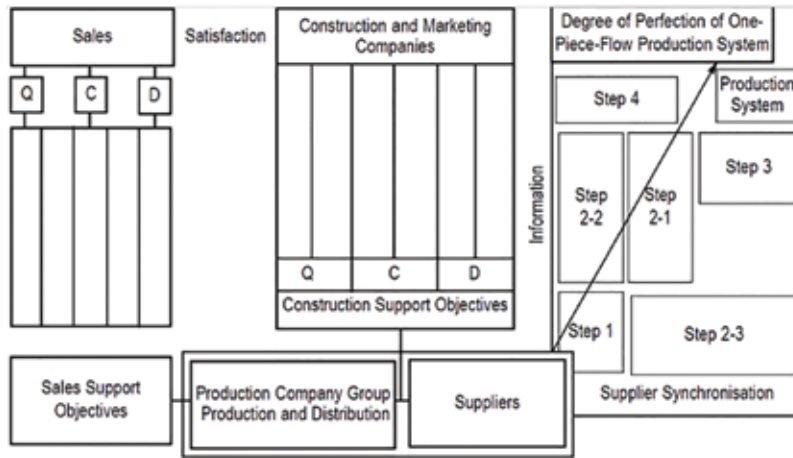


Figure 2: JIT Construction System



Health and Environmental Pillar activity.

In Western industry we see this approach being used most prominently in FMCG (fast moving consumer goods) and process industries. Used by consumer giants such as Unilever and Proctor and Gamble this approach has been combined with the supply chain approach, numbered 4 above, with Supply Chain being added as an explicit TPM Pillar activity.

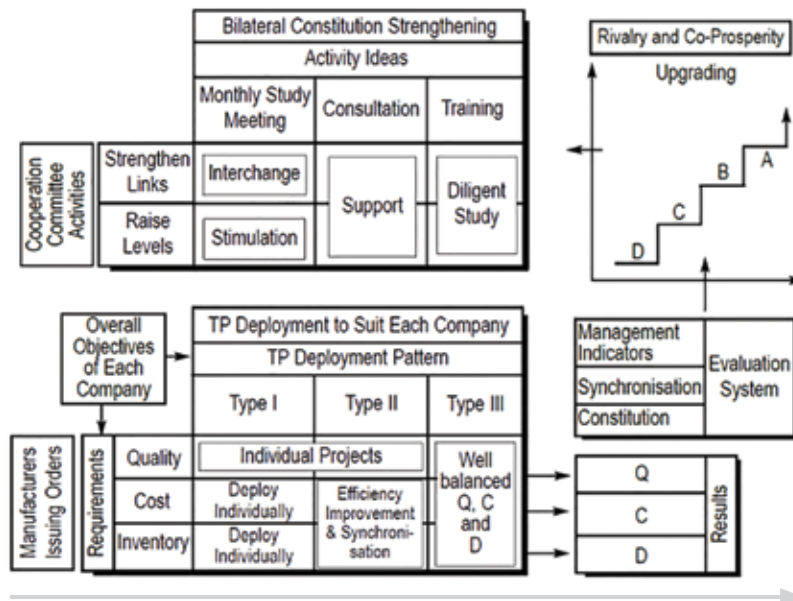
Again, if we think in Western strategy terms of those factors which are merely

qualifiers, rather than differentiators which give competitive advantage, then this makes sense in industries under intense cost pressure from retailers and consumers and required to produce at low cost with 100% effective availability. As the ability to produce the right quality at the right time is a mere qualifier in FMCG, quality and leadtime focused approaches in the factory have never gained too much traction in industries which are inherently lean in their flow production processes. The way the extended supply chain is managed does give competitive advantage in consumer industries, together with

a reliable low cost manufacturing base. The TPM concept of 'vertical startup', the problem free introduction of new products and equipment and rapid ramp up to production rate is also key in these industries where product innovation is also a key driver of competitive advantage and growth.

Although we can point to Western precursors, the JIT approach was developed in Japan, beginning at Toyota in the 1930s. Lean is best thought of as a Western description of this approach and the term 'lean' itself has struggled to gain currency in Japan itself. Those companies in Japan taking a JIT approach to leadtime reduction tend to focus on flexibility as the competitive feature of their Lean systems. One example is in Japanese modular house building. It is common for a Japanese family to move in with relatives while an existing house is demolished and a new one put up on the same site. This has led to demand for modular housebuilding where major structures are pre-fabricated in the factory and then assembled on site, reducing the time the family is without their own home. Although design is modular, each house is unique and the demand for short leadtimes has led to the development of Lean systems which reduce the total leadtime from sales to construction.

Figure 3: Supply Chain Optimisation

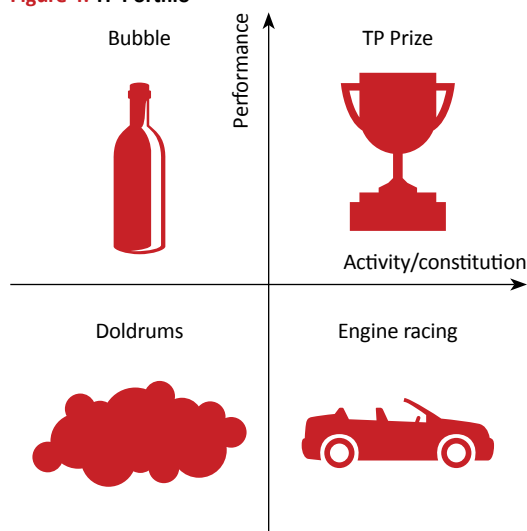


Lean is ubiquitous in Western engineering industries, particularly in automotive and aerospace, but here it is a qualifier, not a differentiator. This has led to the development of alternative forms of lean – Agile Manufacturing and Quick Response Manufacturing for example, but these are fundamentally lean approaches with the emphasis on flexibility which we see in the Japanese development of JIT. One area where Lean has proved to provide competitive advantage is in the US healthcare industry and this is being mirrored in the socialised healthcare systems of Europe.

As a result of the lack of intrinsic differentiation to be derived from Lean production systems, suppliers to OEMs tend towards a value adding strategy where modules rather than components or materials are supplied and the ability to add value to a module is used to differentiate. This focus on the product

Japanese management accounting in advanced manufacturing companies has tended to focus on driving the behaviour required by the company's chosen strategy

Figure 4: TP Portfolio



This is an example of the link between Lean and Systems Thinking as developed by Jay Forrester and his colleagues at MIT. The fundamental principle of systems thinking is that you cannot optimise a system by individually optimising its parts. It is probably fair to say that the accounting principles derived from the mass production management strategy of GM in the 1950s have hung on longer than the mass production system principles themselves and accounting is in some sense playing catch up with operations. Value Stream Costing and other activity based accounting approaches which aim to directly apportion costs and reduce misleading allocations are central to these efforts.

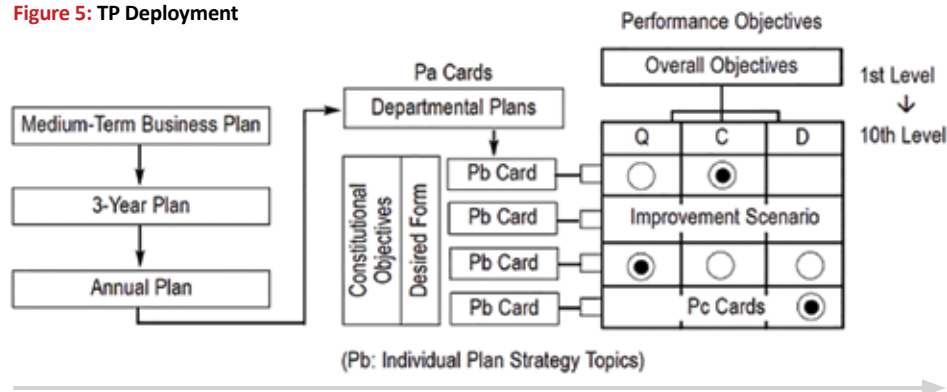
power, not just resource effectiveness, is used to secure ongoing business, as this form of differentiation also increases the barriers to entry for lower cost suppliers.

Although Lean and TPM can both be seen as cost reduction strategies, Lean in the elimination of waste and TPM in the reduction of losses, the cost reduction approach identified by the JMA researchers is based on reviewing management accounting processes. Japanese management accounting in advanced manufacturing companies has tended to focus on driving the behaviour required by the company's chosen strategy. One example I have seen is the allocation of indirect costs to products based on set-up times in a company where the strategy is based on small batch flexibility.

The cost reduction strategy identified here however is based on what Western accountants have called Value Stream Costing, a switch from trying to optimise costs in specific areas to optimising overall cost, even if that means sub-optimal costs in some area – insufficient recovery of some equipment asset costs for example.

After considering these three approaches to Quality, Delivery and Cost Improvement the researchers went on to identify three further extensions of these, the first of which is extended supply chain management. The approach here is an extension of the overall optimisation approach to include the upstream and downstream supply chain, forming a true partnership from supplier to customer. Using the logic of systems thinking described above, where optimising individual operations leads to a sub-optimal system, this requires the sharing of data between all parties, following a gain sharing philosophy. This necessitates an unusual level of transparency between the various parties in the supply chain, but this has the added benefit of reducing demand amplification, the phenomenon whereby variations in the actual end customer demand are amplified by the supply chain transactions, creating far greater variability in the final production schedule.

Figure 5: TP Deployment



The fifth approach is termed restructuring, but this is deceptive in Western terms. The approach outlined here is based on aligning company systems with business objectives and emphasising the development of human resources. The closest parallel in Western business literature might be the concept of the Learning Organisation and indeed one compelling characterisation of the development of Toyota in the 20th century was its ability to function as a learning organisation.

The development of the learning organisation, and in particular formal lessons learned systems, is only one part of this approach, the other being the alignment piece which is based on monitoring the links between the attainment of business objectives and the development of the company's constitution. The most sophisticated versions of this system see companies tracking both their constitutional strengths through assessments such as The 20 Keys or even ISO 9001, 18001, 55001 etc, actual performance in meeting their business targets and the constitution building activities. The TP Portfolio is a diagram which links activity and performance and illustrates if a company is in a performance 'bubble' where the results are not the result of activity controlled by the organisation, but rather by external factors out of their control, or indeed in the 'engine racing' zone where there is intense activity but poor results due to misalignment with the strategy.

The final competency based strategy is based on a full blown Policy Deployment system using TP Management concepts and the 'catchball' process of agreeing objectives at various levels in the organisation.

This is most often seen in Western manufacturers in the form of the X-Type Policy Deployment matrix, originally developed by Ryuji Fukuda. These however tend to be based solely on performance objectives and omit the alignment with constitutional objectives which is characteristic of TP Management.

These are six generic manufacturing strategy approaches and each company needs to modify and

**Figure 6: Supply and Demand Trends**



combine as required by the overall business objectives of the company. One way of looking at how to develop your own strategy is to compare your own situation with the general development of manufacturing over the last 60 years.

The graph below illustrates how in aggregate terms the world has changed from one in which there was more demand than supply and where Quality and Delivery could be seen as differentiators to one where supply exceeds demand and Cost and Innovation are now seen as differentiators and Quality and Delivery merely qualifiers.

In markets where quality is still a differentiator, an approach such as Six Sigma, improving quality through reducing variation may be appropriate. This is not considered in our Japanese examples except as a precursor to TPM as the companies surveyed were no longer active in markets where Quality is an important differentiator. If delivery performance, particularly in terms of the extended supply chain is a differentiator in your marketplace then an extended Lean/Supply Chain approach could be valuable.

In markets where price is still a differentiator, then a well developed TPM approach can give significant benefits, especially when including Supply Chain development in an FMCG environment.

Advanced TPM approaches can also be beneficial when product and process innovation are key differentiators in over supplied markets. Where overall costs are an important consideration, new accounting approaches aimed at optimising total costs are especially useful. Mature Lean organisations may also wish to reflect on the opportunity for developing advanced policy deployment system to ensure that their systems are aligned with changes in the market place

The strategy development process is based on first deciding what markets to be in and then what capabilities are required to deliver value to that market. This is sometimes described as 'where to play and how to win'. The approaches outlined above are 'ways to win' and which combination is developed will depend on where you decide to play.

I have not detailed any of the market led approaches based on product innovation, but one alternative is to recognise your current capabilities (how you win) and then investigate new markets where these winning characteristics enable you to join the game. This can be as one of three types of innovation led companies – need seekers, who actively engage with the customer; market readers, who closely watch markets and competitors; and technology drivers, who launch innovative products in new markets based on their strength in R&D.