The Psychology of Lean Production

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Commentary on “Compatibility of Human Resource Management, Industrial Relations, and Engineering Under Mass Production and Lean Production: An Exploration” by Koji Taira

As one of the originators of the term “lean production” (although certainly not of the ideas behind the name, which I and my colleagues simply synthesised from the practices of a number of Japanese firms led by Toyota), it is a pleasure to observe the spread of interest in this concept to a range of academic disciplines including applied psychology. Ironically, the main point of my commentary will be that the analysis of lean production in comparison with the previous dominant industrial paradigm of mass production is perhaps weakest in the area of … applied psychology! However, before pursuing this point let me briefly summarise my view of the current degree of adoption of lean production.

At the time we were conducting our research at MIT in the late 1980s, we could find practically no examples in Western companies in which all of the key elements of lean production—in the primary work team, in overall organisation of physical production, in the product design team, in the method of dealing with suppliers, and in the method of dealing with customers—were in place. Knowing the long history of the diffusion of mass production from the USA to both Japan and Europe and the many wrong steps along the path, our greatest concern was that the most useful aspects of Japanese innovations would be ignored or rejected by managers, union leaders, and employees in Western firms.

In 1995, the situation is much changed and our worst fears have not come to pass. Indeed, in researching a new book, which I and my colleague Professor Daniel Jones are just completing, we found many examples of the introduction of lean production all the way across the firm in the USA, several examples in the UK, and initial success in a few well-known firms in Germany. What is more, we believe that the rate of diffusion is accelerating as firms discover that the substitution of lean production for mass production is one of the few alternatives open to them in the current era of low growth and economic stagnation.
On the other hand, the old mass production paradigm is still the dominant one in the bulk of industrial enterprises, as shown by a key indicator. The aggregate level of inventories, and in particular inventories of partially finished goods within the production process, has not fallen significantly in any Western economy when the level of inventories are adjusted for the business cycle. Inventories are the best output indicator to track because truly lean production, in which there is no rework, little scrap, and a continuous flow of the product from raw material into the hands of the customer, inherently has low inventories.

By contrast, surveys showing significant levels of “teamwork” and “empowerment” on the shop floor are in my experience largely worthless. Managers and union leaders now feel they are not conducting their affairs properly unless something that can be called a work team is in place, but the term is so diffuse that true empowerment is hard to distinguish from a situation where nothing has changed except that the foreman is now called the team leader.

In summary, diffusion is proceeding but not at the pace indicated by some of the input measures commonly used by human resources specialists.

Now to the interesting question: Why is a system that demonstrably produces better results from the standpoint of the customer and for the well-being of the firm so hard to introduce rapidly and universally? I believe this is largely a matter of “psychology” in the sense of the psychic needs of the workforce. Let me explain, based on my direct observation of attempts to introduce lean production in Western mass-production firms in the period since the publication of The machine that changed the world (Womack, Jones, & Roos) in 1990.

First, let us remember that the basic objective in converting from mass to lean is to reorganise work by transferring indirect tasks (including a substantial portion of what used to be called “management”) to the primary work team while linking the efforts of the teams working on a product so that the product moves quickly and without interruption from design to production launch and from raw material into the hands of the customer.

Because lean methods are much more efficient, the first conversion problem emerges immediately: fewer employees are needed to get the same number of products to customers. Management has two fundamental choices at this point: lay off workers or find new work by speeding up product development and finding new markets. The second choice is clearly the correct one because otherwise management is asking employees to cooperate in the task of eliminating their livelihoods. Lean production is by design a system that can only work with the active cooperation of the workforce so it should hardly be surprising when a firm makes a promising start but then cuts jobs and the initial progress melts away as the workforce drags its feet. Yet we see examples every day of firms that refuse to make job
guarantees and watch in bewilderment when lean methods are rejected on the shop floor.

If a firm makes appropriate guarantees that the transition to lean production will not cost jobs (although some firms like those in the defence sector may still have to lay off workers if their traditional market shrinks dramatically before they can develop new products for other markets), it has taken a necessary step, but not a sufficient one.

The next hurdle is the problem of careers, because the creation of horizontal work teams threatens traditional career paths (e.g. the product engineer, the quality expert, the logistics expert, the maintenance expert, the skilled machinist or welder) and the move to eliminate re-work and all manner of “fire fighting” by uncovering the root causes of production problems, threatens the self-image of many professions and skilled trades.

In my view, the career imperative is not just driven by the perceived need for a portable skill but by an existential need for self-definition. Most Western workers, when asked to describe “Who are you?” in one sentence will give an answer related to their primary skill (“product engineer”, “quality assurance specialist”, “welder”). None is likely to say, “A member of Product Team A”, and for the very simple reason that the primary work team has a short life, tied to the life of its product.

Japanese employees, when asked the same question will typically say “I’m a Toyota man” or “I’m a Matsushita engineer” which is a valuable advantage for Japanese firms. However, Western firms lack the primary identification to company, and need to give their employees some sense of who they “are” as they attempt a lean transition. In my and Dan Jones's article in the Harvard Business Review (March/April 1994) we try to provide this through the concept of the “alternating career” in which firms make clear to employees that their primary skill is vitally important for the success of work teams and that the firm will take on the responsibility of continually upgrading each employee’s skills through rotation from team assignments to functional assignments (that is, back to quality control or logistics) and by making every primary production worker a “process expert” through continuous training in lean techniques.

Even in firms guaranteeing jobs and thinking about the psychic need of employees for careers, there is an additional psychic hurdle to overcome centering on the concept of “responsibility”. In firms I have directly observed the ability of lean techniques employed by primary work teams to make the whole product development and production process transparent, so that the root cause of every problem can be identified, to raise concerns in the mind of primary workers. What life has taught many employees is that one of the best features of mass production is that problems are always a mystery and therefore no-one’s fault. Exposing problems, by contrast, suggests that someone will be assigned the blame and punished.
Punishment is clearly not in management’s interest because the inherent advantage of lean systems lies in the ability of work teams to identify problems quickly and fix them permanently. Thus the discovery of problems should be celebrated rather than punished. However, experience indicates that the management of a firm must practise this new theory for an extended period before the bulk of the workforce will begin to believe that the punitive practices of the past have been abandoned. Only then will they participate in problem solving with their full abilities and energy.

In summary, job guarantees, a new concept of careers, and a no-fault approach to a work team’s responsibility for the results of its efforts are needed in order to spur the rapid adoption of lean techniques across the industrial landscape.

What is much less clear to me, but which is also a testable hypothesis, is the common perception—particularly in Europe—that workers gain substantial psychic satisfaction from long cycle times in production operations and from the ability to fabricate or assemble an entire product. From my personal observations, I have concluded that workers gain substantial satisfaction from understanding the entire process needed to create a product, from being directly involved in redesigning and improving this process, from the immediate feedback on improvements that kaizen can provide, and from job rotation. However, the ability to actually perform each step for each product and to do so in a long cycle is rarely stated to be important by the employees I have observed.

So let me close this commentary with an offer: I would be delighted to talk with any applied psychologists who are interested in survey research on just which features of lean production—including the job, career, and “responsibility” dimensions—are psychically satisfying and which (if any!) are widely found to be undesirable and therefore in need of kaizen.

REFERENCES