
ANALYSIS OF LEAN PRODUCTION**Dr.Saima Kamran Pathan****Dr.Hakim Ali Mahesar****Dr.Sobia Shah****ABSTRACT**

There has been a polarized debate about Lean Production that whether it is humanizing or dehumanizing production system. The aim of the study is to find flaws in Lean Production. As Lean Production was considered a successful post-industrial system until the late 1980s, but 1990s appeared as an era of mixed response, from which questions were raised against its negative sides. This study supports the issue of dehumanizing Lean Production System. In the beginning, the system was appreciated for its approach towards workers and its flexibility. However, in early 1990s the system came under much of the criticism. Toyota Production System or Lean Production was for a long time been believed as a method which had humanized the workplace by employee involvement techniques such as empowerment, participation and teamwork. However recent studies suggest that Lean Production is a dehumanizing method of production which carries on the tradition of worker exploitation for production. However, it seems to disguise itself under the concept of employee involvement and empowerment.

Keywords: Lean Production, Dehumanization, Ford Production System

INTRODUCTION

The lean production has remained source of current debate on humanizing and dehumanizing production system. The study supports the issue of dehumanizing Lean Production System. Lean Production System, a Japanese business practice is an approach to eliminate the wastes from production at the same time by being flexible. The study was conducted with the intention of finding flaws in Lean Production. Lean Production was believed a successful post-industrial system until the end of 1990s, which has been implemented by various organizations worldwide. However, 1990s appeared as an era of mixed response from which different questions were raised against its negative sides.

In prior production system i.e. Ford Production System, large amounts of raw material was purchased to avoid the problems of shortage and to avail the benefits of economies of scale. Goods were produced and stored in bulk in order to fulfill the demand of increasing market. Apart from all these things, Ford Production System lacked flexibility as being a rigid, standardized and fixed system. Furthermore, Ford Production System was criticized for its dehumanizing methods of production which had made workers lives routine, boring and unimaginative and it deprived workers of the pride of workmanship. After World War II, Toyota Production System was developed by Ohno Taiichi of Toyota Motors which emphasized on teamwork and worker participation. This study discusses an overview of Lean Production then differentiates Lean Production with Ford Production System with a view to emphasize those problems of Ford Production System for which Lean Production was proposed as a solution. The study concludes in the last that it found Lean Production as a dehumanizing system of production.

OVERVIEW OF LEAN PRODUCTION SYSTEM

Ford Production System is the foundation to Lean Production System. Since Ford Production System is considered a breakthrough in industrial production by its proponents, Jones (2001:298) articulated “One of the most influential advances in technology in this century was the introduction of mass-production technology by Henry Ford”. Further Bhuiyan & Baghel (2005:763) added to it “Henry Ford systemized lean manufacturing during the early nineteenth century when he established the concept of mass production in his factories”. Jones (2001:326) moreover, strengthened the point of proponents that, “some theorists have described these refinements as a logical extension of Henry Ford’s progressive manufacturing, and Ohno Taiichi once said that if Henry Ford was still alive he eventually would have done what Toyota has done”. However Ford Production System was adopted and further developed by Taiichi Ohno at Toyota Motor Company who pioneered Toyota Production System, currently known as Lean Production System. Then the term learn was coined by Krafcik in 1988 for Toyota Production System (Shah & Ward 2007). Womack, Jones & Roos then (1990 cited in Shah and Ward 2007:787) described Toyota Production System as “Lean Production”. The basic theme behind Toyota Production System was

to eliminate the waste to increase productivity (Ohno, 1988) by making “workers responsible for the enhancement of productivity and product quality” (Fairris & Tohyama, 2002:529). Shah & Ward (2007:791) define Lean Production as, “Lean Production is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability”. Lean Production aims to eliminate the waste of all kinds of resources used in an organization i.e. manpower, money, machine, material, time and space and producing larger variety of products in small quantity to customer rather than few varieties in mass production.

Initially, the system faced employee resistance in its implementation at Toyota Motors due to increase in workers’ responsibilities and tasks. Their jobs were redesigned from one worker one machine to one worker many machines but eventually workers accepted the system as a challenge and adopted it successfully. The Oil Crisis of 1973 gave this system recognition as many companies were in loss nonetheless Toyota Motor Company endured successfully (Ohno, 1988).

LEAN PRODUCTION V/S FORD PRODUCTION SYSTEM

Similar to the evolution of money which started from the use of different things such as agricultural commodities, silver, gold then paper money and gradual move to plastic money, the same way we have craftsmen production system leading to Ford Production System/ mass production and then to Lean Production to find the best possible ways of doing production. The study endeavours to discuss the problems which led the businesses from Ford Production System to Lean Production. Figure-1 describes main characteristics of lean production.

The foundation of Ford Production System is established upon the concepts of standardized production whereas Lean Production System is a specialized production system (Jones, 2001). Ford Production System produces on large scale (mass production) (Gertler, 1988) whereas Lean Production System aims to produce variety of products in limited numbers (Genaidy & Karwowski, 2003). Ford Production System takes advantage of economies of scale of production which also helped to spread fixed costs over large quantity of goods. Ford once made 50,000 left side doors to avail the

benefits of economies of scale (Jones, 2001). Whereas Lean production is described to go for economies of scope but uses other methods to reduce cost. Ford Production System supports “highly unionized labor” system whereas Lean Production System is associated with the concept of “increasingly non-union labor” (Gertler, 1988:421). Ford Production System advocates and uses division of labor to gain advantages of specialization as every worker becomes master of his tasks by repetitively performing his job but Lean Production System gives the philosophy of flexible worker where workers are multi-skilled (Minchin, 2007) ‘generalist’ (Gertler, 1988:426) and able to find out the problems and solve them on the spot.

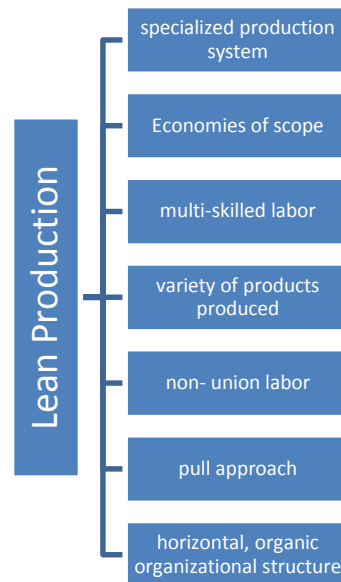


Figure-1: Main characteristics of lean production

Ford Production System emphasizes on quantity and loses quality as fixed workers become bore of their tedious and repetitive jobs on the other hand Lean Production System gives its workers enough freedom to find new and effective ways to perform their jobs. Ford Production System does not give workers independence for decision making as said Lean Production allows much freedom and control to workers regarding their jobs. Ford Production System is a

rigid system with dedicated machines which turn it into a fixed system because dedicated machines cannot be used to produce variety of products but Lean Production, being, flexible system uses flexible machines that can be used to produce variety of products by changing their setup or reprogramming them. In Ford Production System, inspection is done before goods are shipped to a customer but Lean Production makes every worker responsible for production and inspection so that worker has to send defect free goods to next worker.

Ford Production System has vertical and mechanistic organizational structure whereas Lean Production System has horizontal, organic organizational structure (Jones, 2001). Lean Production System emphasizes to have few reliable suppliers that are able to provide raw material as and when required to implement JIT inventory control system (Gertler, 1988) and for that purpose, it gives them information regarding production processes whereas Ford Production System, however, stresses on maintaining large buffers to prevent organization from the situation of stops in production i.e. just in case production (Jones, 2001). Organizations use push approach in Ford Production System but pull approach is implemented by organizations using Lean Production. Therefore, study shows that Lean Production System brings solutions to the given problems of Ford Production System but still it is not a complete and best system of production in terms of labor. How? Let's discuss this.

LEAN PRODUCTION: A DEHUMANIZING SYSTEM

Initially the system was appreciated for its approach towards workers and its flexibility. However, in 1990s the system came under the criticism. Toyota Production System or Lean Production was for a long time been believed as a method, which had humanized the workplace, again by employee involvement techniques such as empowerment, participation and teamwork. However, recent studies suggest that Lean Production is a dehumanizing method of production which carries on the tradition of worker exploitation for production. Though it seems to disguise itself under the concept of employee involvement and empowerment, holding the fact that Lean Production System does not give employees much control and freedom over their work rather it pressurizes them more for concurrently performing their jobs as well as for being involved in improvement efforts of the

organization. Workers are demanded creativity under pressure although creativity is the matter of mental freedom. There may be very few people able of being creative under stress. As Conti and Warner (1993 cited in Benders and Morita 2004) discuss that workers in Toyota Motors have tough timetable with standardized jobs and yet they have to come up with the ideas or solutions of problems. Vallas, (1999:87) argue that employee involvement point towards “quantification and standardization of work methods” to achieve quality goals and that again is the part of Ford Production System. Vallas (1999) further asserts that Total Quality Management and Employee Involvement projects may be more of a superficial nature to an organization to have it as a symbol rather than an actual change taking place within an organization. Figure-2 shows the physical and non-physical effects of lean production system on labor.

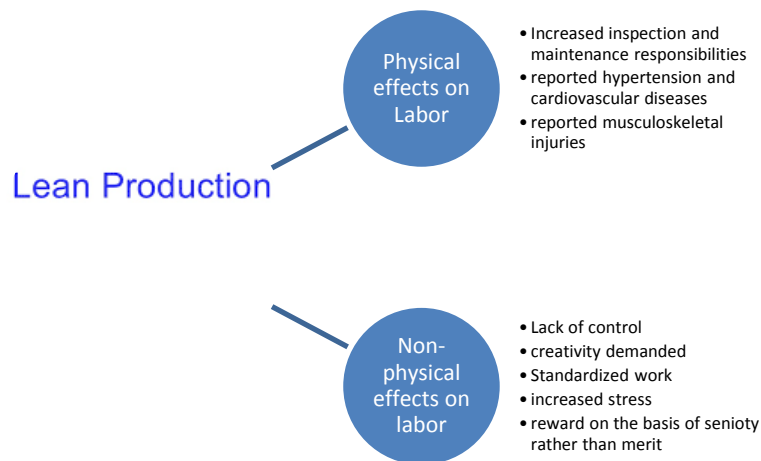


Figure-2: Effects of lean production system on labour

Toyota production system takes advantage of employees' skills to reduce costs and improve quality of products; as union workers at Nissan in Australia complained that management is only concerned about getting quality products in least time (Minchin, 2007). Womack, Jones, and Roos (1990 cited in Genaidy & Karwowski

2003:319) indicated that “Lean Production is organized around the transfer of the maximum number of tasks and responsibilities to production workers”. This suggests that shop floor worker’s responsibilities have increased from performing their job to inspection and maintenance within their work area. This benefits the organization as it reduces the inspection and maintenance costs but overburden the workers as workers’ task demands are increasing. Worker is expected to perform his best to fulfill zero defects goal of the organization.

Although, Lean Production System is found critical of supervision and final inspection as it advocates prevention of defects albeit in Lean Production System, the blue collar workers are still performing the jobs of the supervisors who watch over the production but the number has decreased. Workers are nevertheless performing the standardized jobs with specified job descriptions (Delbridge, *et.al.*, 2000), however, they are now responsible for absentee workers’ tasks also. “Process standardization, with interdependencies resulting from Lean Production’s focus on flow, teamwork and short cycle times” ultimately reduce the worker autonomy (Treville & Antonakis, 2006:100). Burawoy (1979 cited in Vallas 1999) gave a different view that Lean Production simply eliminates the role of supervisor or visible supervision by making workers supervise not only to themselves but to other workers as well, under the umbrella of teamwork. Other important elements of Lean Production are teamwork and quality circles. Grenier (1988 cited in Vallas 1999) at a study concluded that quality circles metamorphosed the contradictions existing between management-workers to worker-workers.

That’s because the workers are watching each other’s mistakes and keeping check over production matters i.e. doing the job of management so management does not need to apply strict control over workers. Therefore, now workers have conflicts with each other rather than with management and it serve another hidden purpose of management that workers do not have unity to rise against management.

Since Knights & McCabe (2000) described teamwork is not liked by all the workers such as some workers may get enchanted to it, some may get worried of its intervention in their lives and some get confused of it as it attacks on standardization in the organization.

Teamwork, therefore, becomes a dilemma that you are responsible not only for your part of job but you are also responsible for the other members. Hence, workers are over-burdened with responsibility of other worker's performances, because rewards and incentives are given on team performances not on individual basis.

To keep workers motivated, Toyota offers Employment security i.e. "lifetime employment and Profit-sharing" (Genaidy & Karwowski 2003:320; Fairris & Tohyama 2002), association of salaries with company's returns (Jones, 2001) and "pay steeply graded by seniority rather than by specific job function" to its workers in Japan (Genaidy & Karwowski 2003:320). Such system of pay increase again leads to the conclusion that *injustice* is done to those workers who are hard working. So the worker is not rewarded on merit basis but on the basis of an old system which favours the age. The older a worker is the more pay he takes. So what would motivate a person to participate and do hard work when the worker does not get rewarded for his efforts and he has to wait for his turn for increments and promotions? It simply shows that an individual's efforts are not fruitful in such system. This gives an idea that Lean Production System does not reward a worker on the basis of his individual personality traits and characteristics. If a person does not like to work in teams so this may cause him not to be able to perform his job satisfactorily because your project depends not on individual efforts but group efforts.

What if some workers want individual recognition and identity for their efforts? Lean Production in that case may be unable to fulfill the individual recognition and identity needs of the workers. That leads this study to the conclusion that lean is really a callous system. This system does not consider individual desires and needs but emphasize on group work so that organization can achieve its objectives.

Vidal (2007) argues that increased employee involvement does not essentially represent increased job satisfaction but that may cause stress and anxiety to workers. Motivation and job satisfaction are largely the result of a worker's individual approach and attitude since not all the workers are intrinsically motivated by the same techniques. Hence, there is direct relationship found between job satisfaction and participation of those workers who are enthusiastic and eager to contribute their ideas. Quite the opposites are those people who do not

desire for empowerment, for them the more participation means more stress.

Furthermore, Vallas (1999:74) criticized “new dualism” in which organization divide the workers in two categories: core and contractual workers. Only core workers get the advantages of workplace flexibility. Flexibility has become much like a fad that if the rival organizations are applying it, so an organization has to surely go for it. Even Prechel explored that initiation of Total quality management has shifted operational control from middle level management to top management (1994 cited in Vallas 1999). It denotes that total quality management concept tightens the control and centralize the production department in order to emphasize the quality race. Furthermore, Lawler *et.al.*, (1992 cited in Vallas 1999) insinuated that the use of tools of total quality management such as statistical process control may bring workers under severe strict control. Although Genaidy & Karwowski (2003:322) have quoted few references in their study which supported the argument that Lean Production System has negative effects on workers but simultaneously criticized the validity of results.

Another important concept of Lean Production is Just in Time, an inventory control system which was developed to eliminate the unnecessary stock of material and finished goods. Just In Time not only eliminate unnecessary cost of material handling but it makes worker’s jobs more tough and frustrating (Vidal, 2007) as it does not allow workers to rest a minute but worker has to work like a machine. Landsbergis (2003) summarizes that Lean Production gives less autonomy in decision making to worker on the contrary it intensify the job strain. Yet, there is moderate rise in worker’s skills and control on their job (Genaidy & Karwowski, 2003) but high job pressure is developed (Benders & Morita, 2004). An assembly line worker explained about maltreat with human in an interview with Leslie & Butz (1998:364) that human are also considered “input” along with machines for the organization i.e. part of that “waste” which needs to be reduced. It might keep workers afraid of losing their jobs anytime and how can workers feel committed and loyal to such organization which does not give them job security? In order to decrease the ratio of employee turnover, Toyota production system gives salary increments and other benefits on seniority basis so that

longer an employee works within the organization, more benefits and increments he will be able to avail (Lee & Peccei, 2008).

Lean production not only has psychological effects on workers but it contains physical outcomes on the worker's health. Since these given negative psychological effects have significant bodily consequences on workers' health. Difference of opinion exists on the physiological effects of Lean Production on workers. The opponents argue that job strain owing to less autonomy and high task demands in Lean Production may cause "hypertension and cardiovascular disease" (Schnall 2000 cited in Landsbergis 2003:63) and "musculoskeletal injuries" (Landsbergis and colleagues 1999 cited in Genaidy & Karwowski 2003:318).

Worker's safety is at immense threat during restructuring and "spatial reorganization of the shop floor" (Leslie & Butz 1998:360). Worker injuries were reported after working space has been squeezed to use minimum space and short cycle for production. Proponents argued that "the injuries reported were not due to the short cycle of the Toyota Production System. Rather it is a matter of correctly implementing the Lean Production strategies" (Genaidy & Karwowski, 2003:318). When an organization cares a lot for reducing waste and quality matters, it must take care of the very important resource i.e. human resource that help organization achieve quality goals.

Katayama & Bennett (1996:12) discussed that Japanese manufacturing plants are themselves making modifications in implemented Lean Production Systems. One of the important reasons is that Japanese workers find tiresome work and long working hours discouraging. Treville & Antonakis (2006:100) assert that "according to the Job characteristics model, Lean Production jobs simply cannot be intrinsically motivating". In fact, Lean Production System's offered intrinsic motivational factors are favourable for the organization itself rather than to workers. Hasle *et.al.*, (2012) find mixed results and associate the failure of system with the lack of standard model for lean production.

Vallas (1999:76) summarizes it so well as, "Since post-Fordist theory focuses one-sidedly on the former group - the "survivors" of the process--- it overlooks the very different fate that may befall workers who become its "casualties".

CONCLUSION

This study found that Lean Production System is a system wearing the cloak of humanization, but in reality it does not consider workers as much as advocated by its proponents. Lean Production System is, as also seen by its opponents, the expansion of Ford Production System. Yet it is still in the development phase as it needs further improvement especially from the point of view of production workers. Since, Toyota itself has been modifying its system time by time. Therefore, it is important that organizations must consider if the proposed system suites their conditions and human resources. It is concluded during the study that Lean Production System lacks proper form of intrinsic motivational methods as well as it has to improve it extrinsic factors. Extrinsic factors like increments and promotions, if, done on the merit basis may well motivate people. Whenever an organization works for a change in its structure and job design of workers, workers' health and safety should be a priority. Employees should be involved in the process of restructuring and job design. Employee feedback can play a very helpful role during implementation and modification phase in an organization.

REFERENCES

- Benders, J., *et.al.*, 'Changes in Toyota Motors' Operations Management'. *International Journal of Production Research*, 42(3), (2004).
- Bhuiyan, N., *et.al.*, 'An Overview of Continuous Improvement: From the Past to the Present'. *Management Decision*, 43(5), (2005).
- Burawoy, M., *Manufacturing Consent: The Labour Process Under Monopoly Capitalism*. (University of Chicago Press, 1979).
- Delbridge, R., *et.al.*, 'Shop-Floor Responsibilities Under Lean Team Working'. *Human Relations*, 53(11), (2000).
- Fairris, D., *et.al.*, 'Productive Efficiency and the Lean Production System in Japan and the United States'. *Economic and Industrial Democracy*, 23(4), (2002).
- Genaidy, A. M., *et.al.*, 'Human Performance in Lean Production Environment: Critical Assessment and Research Framework'. *Human Factors and Ergonomics in Manufacturing*, 13(4), (2003).
- Gertler, M. S., 'The Limits of Flexibility: Comments on the Post-Fordist Vision Of Production and its Geography'. *Transactions of the Institute of British Geographers*, 13(4), (1988).

Grenier, G., 1988. 'Inhuman Relations: Quality Circles and Anti-Unionism In American Industry'. *Clinical Sociology Review*, 9(1), (1988).

Hasle, P., *et.al.*, 'Lean and the Working Environment: A Review of the Literature'. *International Journal of Operations & Production Management*, 32(7), (2012).

Jones, G. R., *Organizational Theory*, (New Jersey: Prentice-Hall, 2001).

Katayama, H., *et.al.*, 'Lean Production in a Changing Competitive World: A Japanese Perspective'. *International Journal of Operations & Production Management*, 16(2), (1996).

Knights, D., *et.al.*, 'Bewitched, Bothered and Bewildered: The Meaning and Experience of Team Working For Employees in an Automobile Company'. *Human Relations*, 53, (2000).

Lawler, E., *et.al.*, *Employee Involvement and Total Quality Management: Practices and Results in Fortune 1000 Companies*. (Jossey-Bass Inc. Pub., 1992).

Lee, J., *et.al.*, 'Lean Production and Quality Commitment: A Comparative Study of Two Korean Auto Firms'. *Personnel Review*, 37(1), (2008).

Leslie, D., *et.al.*, 'GM Suicide: Flexibility, Space, and the Injured Body'. *Economic Geography*, 74(4), (1998).

Minchin, J. T., 'The Assembly Line and Cars Come First: Labor Relations and the Demise of Nissan Car Manufacturing in Australia'. *Labor History*, 48(3), (2007).

Ohno, T., *Toyota Production System: Beyond Large-Scale Production*. (Cambridge: Productivity Press, 1988).

Prechel, H., 'Economic Crisis and the Centralization of Control Over the Managerial Process: Corporate Restructuring and Neo-Fordist Decision-Making'. *American Sociological Review*, (1994).

Shah, R., *et.al.*, 'Defining and Developing Measures of Lean Production'. *Journal of Operations Management*, 25(4), (2007).

Treville, S. D., *et.al.*, 'Could Lean Production Job Design be Intrinsically Motivating? Contextual, Configurationally, and Levels-of-Analysis Issues'. *Journal of Operations Management*, 24, (2006).

Vallas, S. P., 'Rethinking Post-Fordism: The Meaning of Workplace Flexibility'. *Sociological Theory*, 17(1), (1999).

Vidal, M., 'Lean Production, Worker Empowerment, and Job Satisfaction: A Qualitative Analysis and Critique'. *Critical Sociology*, 33, (2007).

Womack, J. P., *et.al.*, *The Machine That Changed the World*, *International Journal of Human Factors in Manufacturing*, (New York: 1990).