

# Lean Revolution and the Human Resource Aspects

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**Abstract**—Lean Production System as a concept emphasizes the elimination of waste in order to ensure optimum utilization of all available resources for the realization of optimum benefit which is doing more with less. But, in a subtle and quiet push for cost saving in the guise of “Lean”, most acclaimed lean practicing organization attempt to over automate thereby eliminating to some extent the seven waste in physical production without ensuring elimination of intellectual resource waste which is the quantitative and qualitative underutilization of Human Resources. This paper takes a holistic look at the existing facts about the Human Resource optimization in Lean Production Systems.

**Keywords**—Automation, Human Resources, Lean Production, Management.

## I. INTRODUCTION

For over two decades now the “Lean” revolution has been a significant enabler in our manufacturing world and in the global business arena. The fronts in this wind of change have included higher stakes in performance, quality, customer driven product innovation, technology, cost effectiveness, globalization, and new human resource practices that together make up the “Lean” paradigm. To some, “Lean” is ‘doing good with less resources’ [1, 2] to others, “Lean” is not what organisation need to do, but what organisations should become by effective system design and implementation [3]. Simply put ‘It is not just an act, an action or a reaction but a process’. One thing is for sure there is a consensus that “Lean” is a very efficient and effective management system. Keeping it simple, lean is using less of just anything in order to produce more. In practice, that seems to be where most firms attempting to practice lean gets it wrong, they tend to be more concerned about the financial bottom line than the efficient reduction of real waste. Waste in overproduction, waiting time, transportation, Unnecessary Inventory, Inappropriate Processing, Excess Motion, Defective products (The Seven Wastes in physical production) and Quantitative and Qualitative underutilization of Human Resources.

The aim of this paper is to take an objective look at the extent of optimization of Human Resources in today’s practice in lean production. The idea is not to totally eliminate automation or to have excess staff; the idea is for adequate and efficient combination of quantitative and

qualitative human resources and automation. Using human resources to their full potential because of their unique and virtually irreplaceable contribution in the chain of production is a key factor that must not be overlooked.

## II. LITERATURE REVIEW

### A. Lean

Lean production is a complete system that welds the activities of everyone from top management to line workers, to suppliers, into a tightly integrated whole that can respond almost instantly to marketing demand from consumers [1]. The word ‘complete’ means total, it seems ‘perfect’. Obviously, there is no perfect system as the pessimists would be quick to point out. But, for the perfectionist, ‘there could be a near perfect system’. As an optimist, it is a sure bet that with a good lean management system with due regard and adequate use of suitable human resources, a real and truly complete system as envisaged by Womack, Jones and Roos in 1990 could be achieved.

What is suitable human resource? At what combination or ratio if any is human resource to Automation adequate? These are questions which a truly complete system of lean should have credible answers to. For any research on lean, the first question that need to be answered which would naturally lead to answers of its other constituents or components is ‘what is lean?’.

Lean in its original form sprouted from the rejuvenated version of Taiichi Ohno’s Toyota Production System. ‘Lean’ as a descriptive word for a production or a manufacturing system was first used by John Krafcik. When John Krafcik first coined the word lean, he did so in his article titled “Triumph of the Lean Production System”. The word ‘Triumph’ in the title of the article itself simply gives victory or final success to Lean Production System. In theory this could be true but in practice, it is not totally true because lean could be practiced in the extremes or without the basic concepts being followed and this could itself lead to failure. To avoid this pit fall, the foundation of any attempt at “Lean” must rest on the two pillars of Just-In-Time (JIT) and Jidoka. Just-In-Time is the technique of supplying exactly the right quantity, at exactly the right time and exactly the correct location while Jidoka is a series of cultural and technical issues regarding the use of machine and manpower together, utilizing people for the unique task they are able to perform and allowing the machines to self-regulate the quality [4]. These Two pillars were earlier stated in Ohno book as Automation (based on Sakichi’s loom) and Just-In-Time [5]. By definition Lean production can be said to be an integrated management system that emphasizes to a great extent the elimination of waste and the continuous improvement of operations for the optimization of the benefits derived from its immediate use of scarce resources. Todd (2000) defines lean production as “an initiative, whose goal is to reduce the

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waste in human effort, inventory, time to market, and manufacturing space to become highly responsive to customer demand while producing world class quality products in the most efficient and economic manner"[6]. It is an intellectual approach consisting of a system of measures and methods which when taken together have the potential to bring about a lean and therefore particularly competitive state in a company [7]. Lean production is also seen as an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability [8]. The principles of eliminating this waste in organizations includes, the principle of 'specifying value, identifying the value stream, flow, pull, and perfection [9].

As a socio-technical system, the worker plays a central role [10]. Social-technical systems clearly view people as a resource to be developed [11] and this is very essential to Lean. In fact, it is the focal point for the keys in Lean production. There are several keys to Lean Manufacturing, all of which relates to the people actually doing the work. Lean is an interlocking set of three underlying elements: Philosophical Underpinnings, Managerial Culture, and Technical Tools – a triangle, where human development is at the core. This Human aspect very often is overlooked as people tend to focus on the tangible aspects. But all must effectively work together for Lean to flourish [2].

#### *B. Human Aspects of Lean*

In Lean production, the worker plays a central role. People are viewed as a resource to be developed [11] and so workers are actually well trained as this is considered a critical element since only knowledgeable workers are able to meet the needs of flexibility and multifunctionality in a 'Lean production system'. So, Human beings are very important in the labour process [12], [13].

Lean production is seen by its antagonists as "Neo-Taylorism" [14], where time and motion studies accompanied with a near perfect line-balancing in a scientifically managed style are used to milk out optimality from the system. It is simply seen as an inhuman system by its antagonists.

Lean production by convention encourages the use of standardized work processes which are often documented and must be followed. This does not actually allow for employee's personal contribution or any sort of genius. It seems sort of puppet styled where the employee moves and acts as and at when told to. The employee's thinking cap is practically taken away. As bad as it seems, excessive automation actually makes it even worse. The idea of flexibility in Lean does not actually mean flexibility in the real sense of the word as in 'meeting expected target by doing things properly in your own way in what ever style you want'. In Lean production as it is practiced, it actually means 'working when and where required' [10].

The term multi-functionality or multi-skilling seems to be more like slave driving terms in Lean practice today as it simply means 'workers are expected to perform any number of tasks to get the job done' [10]. It is also a common practice in 'Lean organizations' today for business strategic terms such as 'Restructuring', 'Reengineering' and 'Rightsizing' to be used as justification for their profit oriented downsizing of staff which results in under-staffed lean systems. Such

under-staffed systems have their Human Resources far below the actual minimum number required and this is not acceptable in a truly 'Lean' system.

### III. JUSTIFICATION FOR STUDY

This study has been necessitated by the excessive global drive for profit by industries and practitioners of Lean where the term 'Lean' has been loosely used with a symbol of a red flag 'the danger signals'. This is mainly due to the fact that more emphasis in today's business environment is on cost reduction for a beautiful financial bottom line rather than eliminating waste in order to serve the customer better, more efficiently with better products and appreciably faster rate. With the emphasis on cost, the efficient management of the human aspect of Lean is taken for granted to the long term detriment of the organization, as well trained and experienced hands are made redundant by right-sizing and the effect of over-automation.

The self regulation to ensure quality which is known as Jidoka, has also been greatly weakened by over automation and less concern about the human resource aspect. It can be suggested that real human intelligence is being taken for granted to the detriment of the quality system checks and balances in Lean. Products such as edibles, consumables and automobiles are assessed for quality by automation without carrying out consistent and random verification and validation with human intelligence. The effect of over reliance on automation which is an aberration to the tenets of Lean is quite colossal. The magnitude of loss, the negative effect and chains of negative reactions can be mirrored in Toyota's recall of over 8.5 million vehicles as at February 2010 due to faulty accelerator pedals and breaking systems in some of their flagship models. According to Akio Toyoda the Toyota president in a statement delivered at the United States of America congress, "The firm's growth may have been too quick as priorities became confused". What better words could be used to illustrate the observations and signals from today's lean practice of neglect for the human aspect than the words of Akio Toyoda when he concluded that one of the major strategic faults in the present day Toyota System that led to the massive recalls is that "Toyota pursued growth over the speed at which they were able to develop their people and the organization and Toyota should be sincerely mindful of that". If suspicion that over automation and the drastic reduction in the use of real human intelligence was the cause of the quality system failure on standard break verification and validation, then the human aspect of Lean production should be given the highest priority as human intelligence is second to none in checks, verification, validation and general management in any world class system. For Lean production philosophy to work, there must be a balance combination of human resources and other resources in adequate ratio of human intelligence to automation.

### IV. POSSIBILITIES

Is there any hope? Obviously yes. This is because humans are the key to a sustainable lean practice. To make a supposed lean system truly lean, the Structure and Character of the Organization, Employee Involvement, Managing Employee Commitment and Work practices in the Organization are

main management and human aspects that must be focused on.

The Structure and Character of any organization is of great importance as this dictates the direction and actions within the organization. The organizational structure should be such that the middle managers become more participatory and involved rather than being just enforcers. By being more participatory and involved, they enable the workers by actually putting them through and being there directly or indirectly for them. They become real mentors that can be looked upon by their decisions and actions towards achieving a lean environment which is waste free. The Organizational Structure must be compactable with the main objective of meeting the needs of the customer. The value delivered to the customer must be maximized using an effective and well structured management system. This management system in Lean includes self managed work teams which deals with all the essential aspect on a product such as design, supply chain, manufacturing, quality assurance, customer relations and continuous improvement rather than reporting up a chain of command and waiting for some sort of bureaucratic directives which in itself is wasteful in terms of time and other unseen cost. The use of self managed teams with less vertical chain of command creates a leaner organization which a traditional hierarchical organizational structure can not realistically do. The use of rigid hierarchical organizational design is of great disadvantage to the effective practice of lean production [15]. Old styled hierarchical organizational practices exacerbated the separation between the various sections or part of a production system which ordinary should work with synergy for the benefit of the system itself [16]. Similarly, when product designers, process engineers, workers are isolated functionally, geographically, or across organizations, decentralization of authority becomes much more challenging, and the ability to effect changes through continuous improvement activities which is a major pillar of lean production becomes more difficult [17].

The Character apart from the organizational Structure which is embedded in it also has to do with the organizational culture and its work design characteristics. Work design characteristics for proper Lean implementation must be such that it relates to the motivation and satisfaction of employees. This should entail a balanced and proper analysis of Skill variety, Task identity, Task significance, Autonomy and Feedback information flow from the Job [18]. Cultural factors play a direct role in assisting or impeding the formation, design, implementation, and operation of manufacturing cells or self managed teams [19]. Organizational cultures which are behavioral norms, values or even shared assumptions [19] is a very strong barrier to change as most of the problems faced by companies attempting to implement Lean production system are problems related to people, not technical issues. The behavioral norms are ways in which organizational members are expected to act in order to fit in or survive within their organization [20]. Commonly shared organizational values and assumptions are what influences behavioral norms which lead to a general pattern of work related behaviors and attitudes that end up being entrenched in the long run as a culture in the organization. Knowing the values in an organization could enable you predict to an extent what people would say in an organization but not what they will do

although an already entrenched culture can tell you to an extent what their action or reaction might be in any given scenario. A good knowledge of the norms, the values and in general the Culture of an organization will be of immense value in the implementation of lean within the organization.

## V. METHODOLOGY

To achieve the set goals for this exploratory study, a test survey has already been carried out with Twenty five respondents who are workers in the Engineering, Finance, Administration, Medical and Research sectors from Europe, South America, Asia and Africa, it was almost a consensus that proper staff motivation is the most essential enabler of performance for human resource in Lean system although the meaning of proper motivation ranged from Good Pay Package, Good Working Environment, Better Work Process, Better Working tools and Equipment to Regular Training and Development. The actual research is intended to be more specific in the Human Aspects of Lean Production and be broader and larger in terms of the Industries and Culture of the research population and test samples to be used. The population samples include four manufacturing companies and one Service Company in the European Union and Africa. These companies will be visited over a period of 18 months to study their systems and to undertake data collection. It is expected that 3 months will be spent at the site/office of each of the company selected. Discussions with the companies are in progress on the questionnaire design as significant factors may be different for each company. However, it is expected from this research that a single type of questionnaire will be designed and used for both the manufacturing and service companies. This is to simplify the analysis of the data collected. In addition to the questionnaire design, structured interview will be conducted with Principal staff members of the companies from the functional managers to the Chief Executive Officers of the companies. The structured interview is to fill in gaps that the questionnaire could not adequately covered in the design but are essential to better understanding of the research area. The samples will be tested and analyzed using adequate soft system methodology including Statistical Package for the Social Sciences (SPSS).

## VI. CONCLUSION

Every Lean organization needs a broad, continuous, intelligent and self-reinforcing human resource. They are the initiative of the processes, they are the initiative of the business, they see the prospects and the challenges of the future, they are the hands of continuous improvement, they are the eyes of true quality and they are the true face of lean. Only the best suited human resource can continuously achieve the expected and only that is good enough for a sustainable Lean system. So, it is expedient that only the best fit is recruited or selected for employment. It is also of great importance that for the already existing work force, their job performance is well accessed, appreciated and celebrated. The human resource assembled as a work teams must be well built, capable, skilled, swiftly efficient, united, strategically autonomous, fully focused, brilliantly directed and adequately motivated. If all these are well done with a scoreboard to track its progress and its assessment metrics

which must point in a steady and consistent direction towards the ideal state, owned and used by the people who own the process [21], a consistent, self-driven and suitable human resource which in itself is lean will emerge for a successful implementation and sustenance of the lean production system.

The effective combination of human resource and automation is very important to ensure continuous qualitative improvement. What are the best ratios? Only the exact scenario and environment can dictate this but the watch word should be 'Prudence', Lean prudence with Human resource as the eyes for workable automation.

The findings from this study will hopefully make Lean production a suitable world class production system with a truly human face. The results of the study will also improve the already existing body of knowledge in production.

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