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A REVIEW OF OPTIMIZATION TECHNIQUES IMPLEMENTATION IN PRODUCTION INDUSTRIES

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Abstract:

Implementation of lean is necessary for high-value manufacturing and is complementary to strategic decision making regarding manufacture. However lean can be difficult to implement in specific organizations. One of the difficulties is deciding which of the many lean tools to apply and when to apply them. A complicating factor is change management. Lean implementation is a transformational process and needs to support organizational development alongside process improvement. We develop a method based on risk management to identify which lean tools are most appropriate for a specific organizational setting. This permits the situational and contingency variables to be accommodated in the lean transformation. The method is demonstrated by application to a small manufacturing organization with a high-variety low-volume business model. The unreasonable facility layout of a production line directly or indirectly leads to low production efficiency is ver y common in Chinese manufacturing workshops, facility lean layout system of a production line is researched and designed. By analyzing the influencing factors of the facility layout system, optimization objectives and constraint conditions of facility layout system are summarized. A function model and a design structure model of the studied lean facility layout system are built. Based on the in-depth analyses of the mathematical model designed to denote the layout optimization design of a production line, a prototype lean facility layout system of a production line is developed..

Introduction:

The garment industry was led by fashion and retailing and the emphasis was on technologies in the demand-related parts of the supply chain. India ranks among the top target countries for any company sourcing textiles and apparel. Indeed, apart from China, no other country can match the size, spread, depth, and competitiveness of the Indian textile and apparel industry. Moreover, the global elimination of quotas at the end of 2004 has greatly enhanced the opportunities for sourcing from India. India supplies over US$13 billion worth of textiles and apparel to the world markets. And exports are growing rapidly as more and more buyers around the world turn to India as an alternative to China. In 2005 – spurred by the global elimination of quotas – shipments to the EU soared by 30% and those to the USA shot up by 34%. These increases are remarkable, given that EU imports from all sources rose by only 8% while US import growth was just 6%. Consumer spending is slowing down all over the world. Retailers are looking for real innovation from their suppliers. They want really new garments made from new fabrics and yarns. They want new services to offer their customers. Competition in the late 1990s will be based on the capabilities and core competences of textile and clothing companies and on the building of long-term supply relationships. There are many opportunities to be addressed. Textile and clothing machinery will continue to be improved but the most interesting technologies for the 2000s are in the areas of fibres, fabrics, measurement.

Approaches to Lean Implementation:
Lean implementation involves selecting appropriate tools from the lean arsenal to achieve process excellence. However there is a danger of focusing overly on the tool benefit and striving for process excellence but neglecting the sustainability of the lean tool within that specific work culture. Every time a new method is implemented there is risk introduced to the organization both an opportunity and a threat. On the one side is the benefit of the technique and on the other side is the detriments Lean are a strategy developed for production improvement. It originated in the mass production setting of the automobile industry, specifically the Toyota Production System. It is primarily focused on the minimization of waste of any form When wasteful action is eliminated the result is that less effort, space, and capital are required and lead time is reduced whilst quality increases and the cost of quality decreases From its manufacturing roots, lean has subsequently expanded to business practice generally Lean management is becoming the standard for systematic productivity improvement

2.0 Literature Review:

[1] A. Portioli, M. Tantardini, 2007,the traditional mass production had its problems. Workers hated it: no one wanted to be in a factory. Unions fought constantly to reduce work hours. Many works of art satirized mass production, including Charlie Chaplin in his classic movie Modern Times. But mass production could not be applied to all plants and thus, the Japanese, in particular the Toyota car factory, had to develop their own model, which would be called the Toyota Production System (lean production or lean manufacturing) cites the Toyota Production System as a process of continuous waste elimination. After World War II, the Japanese industry had a very low productivity and huge lack of resources, which, of course, prevented it from adopting the mass production model.

Om PrakashYadav (2014) Service companies have been implementing Lean only in recent years. In this research three third party logistic companies and seven companies of the financial sector have been thoroughly interviewed and showed a few interesting aspects on the way they implemented Lean. They are implementing Lean in high volume low variety processes and focus on back office activities, which are most similar to manufacturing. Increasing the productivity of the tertiary could give an impulse to the development of this sector and to the growth of the economy. Services represent the future source of growth for developed nations and it is in their best interest to understand the underlying causes of the low productivity growth despite operations is the area where most service people work -and the area where labor productivity increase can have the larger impact- there are still very few research works on service operations.

Md Abu Sayid Mia , MdNur-E-Alam (2017) Lean manufacturing is an applied methodology of scientific, objective techniques that cause work tasks in a process to be performed with a minimum of non-value adding activities resulting in greatly reduced wait time, queue time, move time, administrative time, and other delays. This work addresses the implementation of lean principles in a footwear manufacturing industry in order to evaluate present Process Cycle Efficiency (PCE) and lead time prior to developing an improved strategy to bring the improved PCE and to reduce the lead time. At the present state, the PCE was found 15.28% and after the implementation of lean tools, it would be 34.05% at the future state where lead time would also be

reduced by 55.09% evaluated by Pareto analysis and value stream mapping tools. The production flow was optimized by minimizing several non-value added activities and time such as bottlenecking, machine breakdown, queue time, waiting time, material handling time, etc

3.0 Methodology:

Many other authors also agree that Lean principles are valid for both manufacturing and service companies but we believe that for a successful implementation it is important not to focus only on the differences among industries, but, most of all, on differences among processes (value streams in the Lean terminology). In fact, within the same industry there are companies competing on the base of very different processes, and different use of resources. For example, if we compare large Law Firms in Canada and in Italy, the offer of services is quite similar in range and variety, so it could seem that they should have a similar service delivery system. But if we take a closer look, we see that in Canada companies are structured with a more rigid allocation of resources to the different type of service offering, with a kind of sub systems with resources dedicated to a subset of services. Therefore each sub system has a narrower set of services to deliver. This means that if we take a look at this deeper level, resources in Canada handle a much lower variety and higher volumes than in the Italian Law Firms. The processes have quite a different structure. In general, within a company there are low volume high variety processes, and high volume low variety processes. The management of these two types of processes is quite different. In manufacturing, Lean started in the automotive industry and then spread to white goods and electronic appliances, i.e. to large volume production. Starting point for implementation is in virtually all cases the internal production process, from raw material to finished products. Then implementation spreads to the external production process, going upstream to suppliers and downstream to distributors.

Lean implementation in services:

Fist of all we started by interviewing about 600 service companies on the phone, to understand whether they were adopting Lean or, at least, implementing any Lean technique. Out of the 600 companies contacted, less than 2% claimed they were adopting any Lean technique. Financial services (Banking and Insurances) are the ones where Lean is more known, and where an increasing number of companies are implementing Lean. Healthcare organizations are starting to learn something about Lean, but implementations are rare; in tourism, rental, hotels and restaurants none of the companies contacted were implementing Lean. Because Lean implementation in services has just started, it is important to understand how to make it successful. What to start from, and what possible similarities and differences there are from manufacturing Therefore we decided to deepen the knowledge through structured interview in the few service companies that were implementing Lean 10 companies agreed to participate to the research: 3 pertaining to third party logistics and 7 from the financial sector (banks and insurance companies).

Results and discussions:

The process that we had selected for mapping was manufacturing. In this sector we focused to improve the production rate of the production line and to reduce the fatigue of the worker. We mapped the processes from releasing of raw material to finished goods. We studied about the flow of materials between various floors. Collection

of data and mapping of existing state The second step was collecting all the data from various floors and to draw the existing state map. We collected the time taken for transfer of raw materials from cutting floor to production floor and for doing operations Existing state map In existing state map, the design of the product was issued by the design engineer to the cutting floor. In cutting floor the designs were given to the operators to cut the raw material. After finishing the cutting process the material release order was issued by the production manager. Then the material is transferred to the production floor.

Total number of products produced per shift was 19600. Two shifts running per day.. Totally 5 workers required per shift for transfer of materials from cutting floor to production floor. Total number of pieces transferred by one employee was 3920 per shift. Number of boxes transferred by one employee was 39.2 say 40 boxes. Load carried by the worker per shift was 40*3.2=128 kg. Total load carried by worker was 128*2=256 kg. (Both loading and unloading). 80 times back bone of the worker was strained. This leads to severe back pain of the worker within 10 years if he does the work continuously.

Application Of Industrial Techniques For Better Productivity:

The productivity and efficiency before and after applying the Industrial engineering technique this is true today Millions of dollars are wasted each and every day in organization, through lack of awareness of this need to constantly improve productivity. Most of it can be stopped. By using method, time, capacity and production study, it is possible to improve productivity while reducing wastage. Two important attributes have been considered, one is possible standard method for each process and another is considerable time. Time study took to record the actual individual capacity of each worker. The time has been recorded to make each process for each and every worker to find out the optimum number of operator and helper, type of machines, basic and standard pitch time and individual capacity

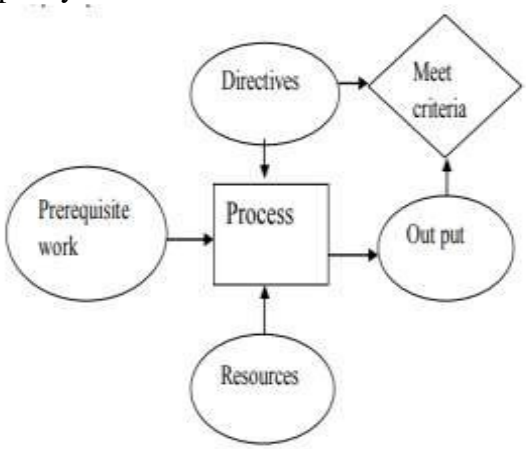
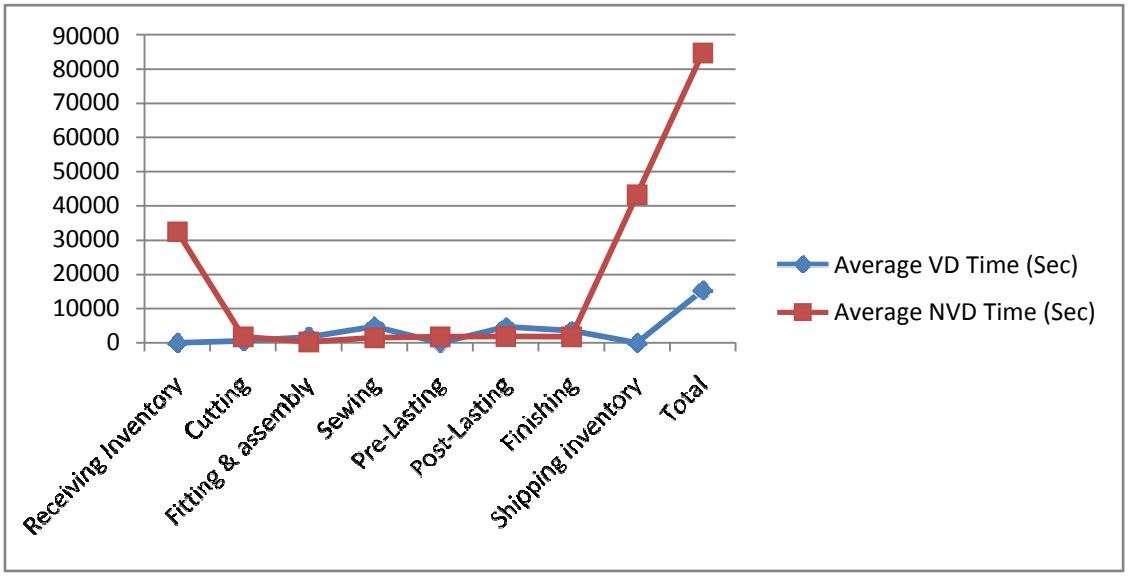


Figure :Activity Definition Model

The lean construction technique is new in Nigeria, few professionals in the construction industry know about it. The implementation process tends to be tedious. It involves training in both management and production using new materials. Therefore this assessment is pilot assessment cannot be compared with organized implementation process. The Last planner tested was assessed base on its contribution in achieving the objective of the project. The assessment was scaled as highly impressive as compare to initial traditional method. The Last Planner was assessed high due to its impact to the project objective, by maintaining the schedules.

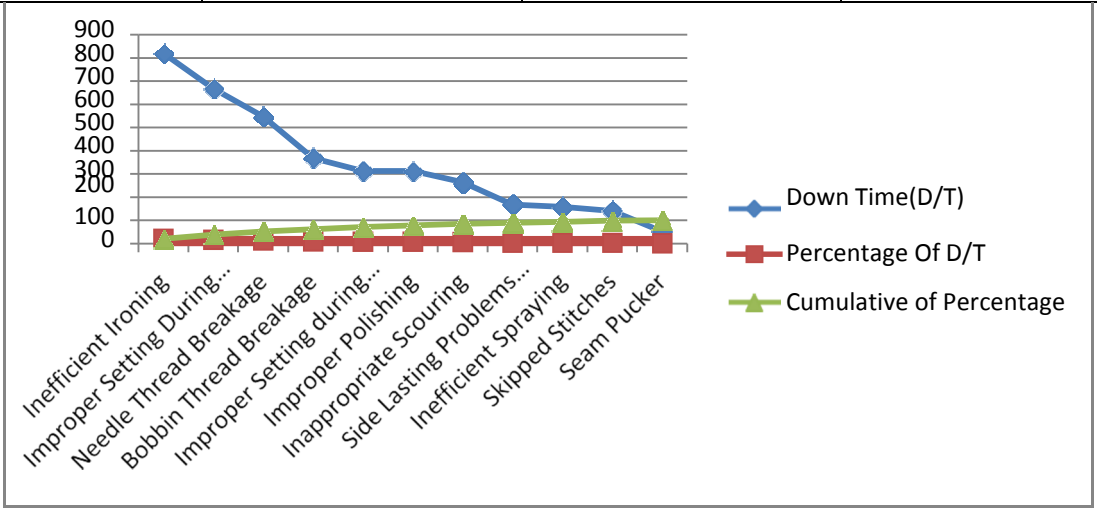
Processing Stages	Average VD Time (Sec)	Average NVD Time (Sec)
Receiving Inventory	0	32400
Cutting	600	1800
Fitting & assembly	1680	300
Sewing	4775	1525
Pre-Lasting	0	1770
Post-Lasting	4683	1857
Finishing	3532	1748
Shipping inventory	0	43200
Total	15270 (15.28%)	84600 (84.72%)



Causes of delay times for pare to analysis of casual shoe production line

Causes Of Delay Times	Down Time(D/T)	Percentage Of D/T	Cumulative of Percentage
Inefficient Ironing	819	21.16826	21.16826
Improper Setting During Toe Lasting	666	17.21375	38.38201
Needle Thread Breakage	546	14.11217	52.49418
Bobbin Thread Breakage	367	9.485655	61.97984
Improper Setting	312	8.064099	70.04394

during Seat Lasting			
Improper Polishing	311	8.038253	78.08219
Inappropriate Scouring	263	6.797622	84.87981
Side Lasting Problems Due to Feather Edge Stitching	169	4.368054	89.24787
Inefficient Spraying	157	4.057896	93.30576
Skipped Stitches	141	3.644353	96.95012
Seam Pucker	53	1.369863	100



Conclusions:

However there has been little to no documented application or study of risk management in the lean implementation field. We have shown that it is possible to integrate risk management and lean management. We further developed a qualitative method where lean tools may be prioritized for a specific organizational setting. We applied this method to a case study. The case study provided implications for similar high-variety low-volume manufacturers as well as alternative operation modes.

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