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Productivity Improvement by Applying DILO (Time and Motion) and Lean Principles

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ABSTRACT
In recent years, service industries are struggling to improve their processes efficiencies. Lean principles and the methodologies are becoming a prime problem solving approaches to perform the operational processes with a minimum non-value adding activities resulting in reduced wait time, movements, defect rates and other delays in the process. This paper addresses the implementation of lean principles in a one of the service organizations. The main objective of this paper is to draw the As-Is process map, conduct process analysis to identify non-value added activities, capture the time using DILO (day in a life of…), simplify or eliminate the same and improve efficiency of the process. Through the application of lean principles the As-Is and To-Be process maps are constructed to improve the operational processes by identifying different waste and its sources of wastes. A noticeable reduction in processing time is observed in the process by simplifying and eliminating the non value added activities in the process. This case study can be useful in developing a more generic approach to design lean environment

Keywords **-** Lean, Process Analysis, DILO, Time and Motion, NVA, WIP

I. INTRODUCTION

Lean principles are based on the Toyota production systems developed by Toyota which focuses on eliminating wastes, reducing inventory, improving throughput, and bring employees attention to problems and suggest the improvements in a very simple and quick ways. The term Lean was first introduced by John Krafcik in 1988. The main goal of the lean is to eliminate the waste, and Toyota categorized into 3 Ms such as, Muda, Muri and Mura. While most people who have had contact with lean principles will have been made aware of the 7 wastes and Muda they often have not been introduced to Muri and Mura at all. Yet these wastes are often far more important to tackle than Muda and often are the underlying causes of the Muda that are observed within each processes. While Muda is the non-value adding actions within the processes; Muri is to overburden or be unreasonable while Mura is unevenness. Muda is any activity or task in the process that does not add value; a physical waste of individual time, resources and ultimately money. These wastes were categorized by Taiichi Ohno within the Toyota production system, they are; Transportation - the movement of product between operations, and locations, Inventory - the work in progress (WIP) and stocks of finished goods and raw materials that a company holds, Motion - the physical movement of a person or machine whilst conducting an operation, Waiting - the act of waiting for a machine to finish, for product to arrive, or any other cause, Over production - Over producing product beyond what the customer has ordered, over processing - conducting operations beyond those that customer requires, defects - product rejects and rework within your processes. To this list of the original seven wastes most people also add the following; Talent - failing to utilize the skills and knowledge of all of your employees, Resources - failing to turn off lights and unused machines, By-Products - not making use of by-products of the entire process. Lean concentrates on removal of wastes, but not just Muda, it also about removing Mura and Muri too. Lean provides numerous benefits including, reduced lead or cycle time, decreased work in progress (WIP), reduced cost, increased resource utilization, and improved quality employee morale. The set of tools used during the study are (i) Process Analysis, (ii) DILO and (iii) SECAR Analysis to identify the different wastes in the process and solutions deployed in one of the example service industry..

II. PROCESS ANALYSIS

Process Mapping is a workflow diagram to bring forth a clearer understanding of a process steps or series of parallel process steps in the process. It is also a graphical representation of steps, events, operations and relationships of resources within a process. This is a means of systematically diagnosing activity and information flow. This can reveal unnecessary,

complex and redundant steps in the process. This makes it possible to simplify and troubleshoot the issues that operational team is having. Can compare actual processes against the ideal and can see what went wrong and where to streamline. Process Analysis is performing the analysis on the process map activity steps. Typically, the steps are categorized into 3 types. They are: Value added activities (VA) steps are those which are essential, they physically change the product/service and the customer is willing to pay for them and are done right the first time. Any activity/step falls under any of the 7 wastes explained in introduction as waste and they are called as NVAs unless otherwise customer is ready to pay for those activities and first time right. Value Enabling (VE) steps that are those that not essential to the customer, but that allow the value-adding tasks to be done better/faster. In typical manufacturing environment, VE activities are not categorized at all but in Knowledge Process Center/Business Process Center it is very important to categorize value enabler as there would be dependency on the skills, trainings etc., to perform the VA activities. Non-value added activities (NVA) are those steps that are considered non-essential to produce and deliver the product or service to meet the customer's needs and requirements. The customer is not willing to pay for them. The NVAs are called as waste as per the lean concepts and the details of waste as categorized in 7 type of wastes. In the process map it is important to identify the process gaps, redundancies, unclear requirements and common problem areas in the process all the activities by categorizing the activities as VA, NVA or VE as per the definitions. Once all activities are categorized into value type (i.e. value-add, value-enable and non-value-add) as per the process analysis, it is imperative that we should have the time estimate for all the activities. As there was no automatic system to capture the time spend on different activities, author designed a macro enabled excel based tool called "Day In a Life Of…" (DILO) tool to capture the time spent on various activities. DILO is very similar tool as of time and motion tool and DILO is a macro enabled excel based tool which has all the activities that are performed by the finance access channels team of global technology access channels. The screen shots of the front and the report are depicted as below figure 1.

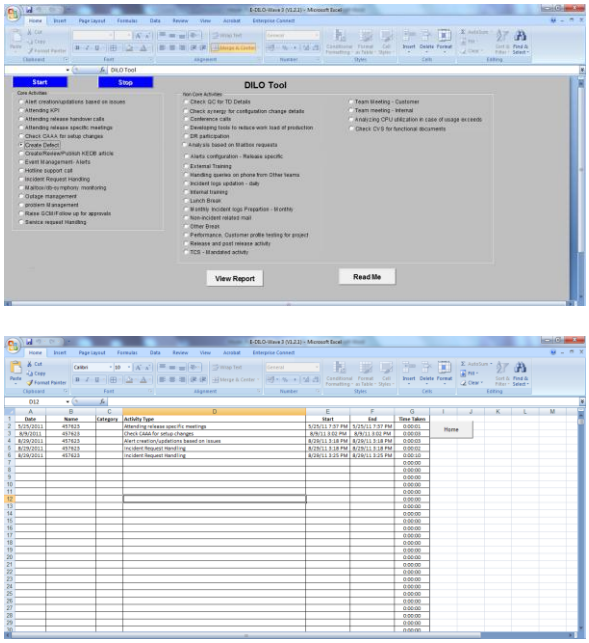

Fig 1: DILO tool front and report screenshot

This tool has been rolled out to the sample of operations team for a period of 1 month to get an average time spent on the various activities that the team performs on a daily basis. The details of value type and average time per activity are as per the given table 1.

Process Step	Value Type
db Symphony Ticket Remedy	VE
Ticket Assignment	VE
Incident logged in db Symphony	VA
Invoke Major IN Process	VE
Investigate	VA
Raise Remedy/GCM	NVA
Follow-up with GCM Approvers	NVA
Update db Symphony, Assign group	NVA
Prepare Resolution Plan	VA
Follow-up till closure	NVA
Inform/Seek Approval	NVA
Implement Resolution	VA
Communicate till Resolution	NVA
KPI Data Collection	VE
Update KEDB, Link/Create PMT	VE

Table 1: Value analysis of activities

From the data captured author performed the OPE (Overall Process Efficiency) analysis to gage the time percentage of time spent on various activities of value type.

III. OPE ANALYSIS AND FINDINGS

The analysis on the time percentage is computed as a OPE analysis.

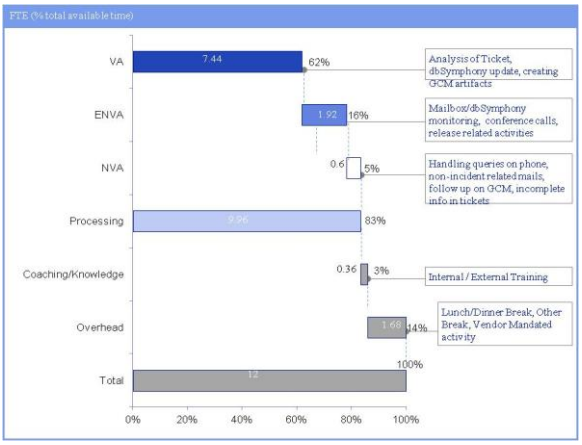

Fig 2: OPE analysis on the value type

It is observed that ~83% of available time is spent on processing activities, overall, ~62% of available time is VA and additional ~16% VE and overhead is ~14% of available time comprising of various breaks. Time spent on NVA activities is ~5%. To overcome the challenge of inefficiencies the improvements are proposed using the simple SECAR concept. SECAR is Simplify, Eliminate, Combine, Automate and Relocate – represents a handful of potential change levers one may engage, in order to leaner the process. It is a structure to guide the team through a series of questions to challenge each process step and generate improvement ideas based on what the customer values. Designed few improvement levers such as wok allocation tool, single source of data collection, standardization of approval process, introduction of knowledge articles etc., led to the efficiency gain in the operations team as depicted in the below process map.

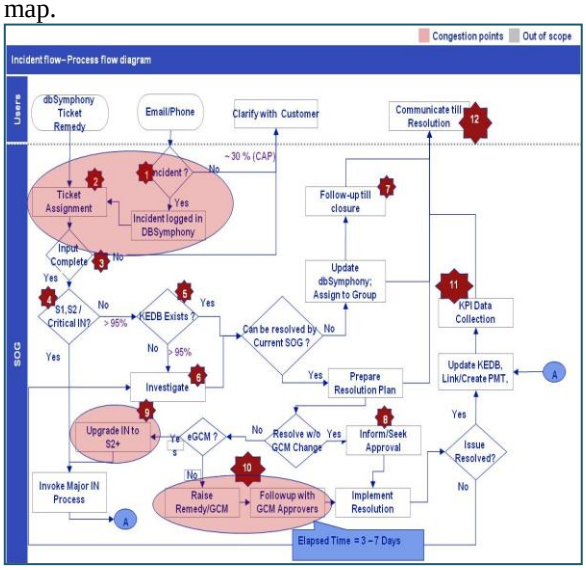

Fig 3: Process map with the improvements

IV. CONCLUSION

The application of lean principles with DILO helped a operations team in improving the efficiency. The present work provided is a practical application of lean principles helped reduction of overall non value added activities time. It focuses the reengineering of operations process by eliminating/simplifying non value added time and improving the process efficiency through process analysis. It may be concluded that the effective use process analysis and DILO will improve efficiency.

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