

## IMPLEMENTATION OF LEAN METHODOLOGY IN SOFTWARE INDUSTRY

A. PALANI\*

IRSHAD AHMED\*\*

### **ABSTRACT:**

While the concepts of lean production are frequently applied in service organizations there is little work that rigorously has examined implementing lean production in contexts other than manufacturing as well as lean production's impact on performance in these settings. This project is set to accomplish both tasks by investigating the implementation of a lean production system at an Indian Software Services. This project is combining a detailed case study and empirical analysis on the internal processes that the lean initiative influences. This case study like lean projects performs better than the non-lean projects in many cases. Building on this result this project studies the impact of the techniques on problem solving, coordination and standardization of work improve the way that the firm learns as well as it productivity. In so doing, we gain insight into how a company can build an operations-based advantage.

\* Assistant Professor, Department of Management Studies, Aalim Muhammed Salegh College of Engineering, Avadi - IAF, Chennai - 600 055, Tamil Nadu, India

\*\* Assistant Professor, Department of Management Studies, Aalim Muhammed Salegh College of Engineering, Avadi - IAF, Chennai - 600 055, Tamil Nadu, India

## **INTRODUCTION:**

Lean IT engages people, using a framework of Lean principles, systems, and tools, to integrate, align, and synchronize the IT organization with the business to provide quality information and effective information systems, enabling and sustaining the continuous improvement and innovation of processes. Lean IT has two aspects: outward facing, supporting the continuous improvement of business processes, and inward-facing, improving the performance of IT processes and services. As lean manufacturing has become more widely implemented across many service industries (healthcare, financial services, transportation, etc.) The extension of lean principles is beginning to spread to IT, which naturally impacts the performance of all industries. Industry analysts have identified many similarities or analogues between IT and manufacturing. For example, whereas the manufacturing function manufactures goods of value to customers, the IT function “manufactures” business services of value to the parent organization and its customers. Similar to manufacturing, the development of business services entails resource management, demand management, quality control, security issues, and so on. Moreover, the migration by businesses across virtually every industry sector towards greater use of online or e-business services suggests a likely intensified interest in Lean IT as the IT function becomes intrinsic to businesses’ primary activities of delivering value to their customers. Already, even today, IT’s role in business is substantial, often providing services that enable customers to discover, order, pay, and receive support. IT also provides enhanced employee productivity through software and communications technologies and allows suppliers to collaborate, deliver, and receive payment.

## **Green IT:**

Though not born of the same motivations, Lean IT initiatives are congruent with a broad movement towards conservation and waste reduction, often characterized as green policies and practices. Green IT is one part of this broad movement. Waste reduction directly correlates with reduced energy consumption and carbon generation. Indeed, IBM asserts that IT and energy costs can account for up to 60% of an organization's capital expenditures and 75% of operational expenditures. In this way, identification and streamlining of IT value streams supports the

measurement and improvement of carbon footprints and other green metrics. For instance, implementation of Lean IT initiatives is likely to save energy through adoption of virtualization technology and data center consolidation. Lean thinking has created substantial benefits for a variety of industries. Although it is not easily apparent, the same principles can be utilized in reducing lead times in all the functional areas of IT industry. Fundamentally, lean principles leverage the benefits of software engineering best practices to improve the work flow and the tactical management of the project. By managing the project more efficiently and reducing waste, tremendous performance benefits can be achieved.

### **Objective:**

- To Study the Efficiency of Lean Project in Software Development.
- Continual Improvement culture focusing on Identifying and Eliminating waste.
- Operations-based focus of activity and involvement.
- Increasing the Quality level by satisfying customer needs, delivering on time, less number of defects etc.
- Immediately respond to problems, changes or challenges that arise.

### **RESEARCH METHODOLOGY:**

**Target Respondents:** IT Professionals with experience of more than 2 Years are taken as samples. These respondents include Team members, Project Leads, Project Manager and other higher officials.

### **Setting and Methodology:**

The software services product delivery process can be broken into three steps: Advice, Design and Execute. Indian firms started their businesses with the execution of non mission critical projects, such as maintaining existing systems. Early work involved sending employees to the

customer's site to perform work at the customer direction. Steadily firms built processes to perform more work offshore (in India). Next they expanded in design. Design consists of taking a conceptual idea generated in the advice stage and building a model of a system that includes its components and their relationship to each other at an abstraction level that serves as the input for execution. Finally they began moving into advising –assessing a customer's stated and latent needs to guide their information technology strategy.

### **Lean Action Plan:**

The five-step thought process for guiding the implementation of lean techniques is easy to remember, but not always easy to achieve:

1. Specify value from the standpoint of the end customer by product family.
2. Identify all the steps in the value stream for each product family, eliminating whenever possible those steps that do not create value.
3. Make the value-creating steps occur in tight sequence so the product will flow smoothly toward the customer.
4. As flow is introduced, let customers pull value from the next upstream activity.
5. As value is specified, value streams are identified, wasted steps are removed, and flow and pull are introduced, begin the process again and continue it until a state of perfection is reached in which perfect value is created with no waste.

### **Sampling Population:**

The sample population for the purpose of our study consists of all the Software Professionals in various technologies who are currently employed in the role of Software Engineer, Project or Team Lead, Project Manager Etc. and with 2 to 3 Years or more than 3 Years of experience.

### **Sampling Frame:**

The sampling frame for the purpose of our study consists of all the software professionals in various technologies who are currently employed in the role of project leads or team leads or software developers and with experience of 2 Years or more than 2 years with the knowledge of Lean Concept used in their projects.

### **Sampling Size:**

The employees of companies who are Application Developer, System Analyst, and Application Tester. And they should be taking part or have recently taken part in managing Lean methodology in their Application Development process. Since our research hypotheses have to do with Implementation of Lean Methodology, at least some companies surveyed would need to have implemented that Process in order to evaluate the hypotheses. Since the population is too large and time limitation we have taken around 100 samples.

### **Data Collection:**

Data sources consisted of Primary and Secondary data.

- Primary data were collected from a structured questionnaire and the Sources of primary data include the Software project leads, team leads and developers with 2 Years or more than 2 years of experience.
- Secondary data were collected from the records of the technology used in existing system, Journals and online sources.

**DATA ANALYSIS :**

**Table -1 Designation of Respondents**

S. No.	Designation	Frequency	Percentage
1	Software Engineer	22	22
2	Senior Software Engineer	38	38
3	Project Lead	28	28
4	Project Manager	12	12
	Total	100	100

**Table -2 Problems in Software Development Process.**

Issues/ Problems	Always	Sometimes	Never
Lack in Information Flow	31	57	12
Interruption due to Emergency Work	24	53	23
Multiple Projects at a Time	36	47	17
Several Disruptive Design	28	57	15
Completion on Target Date	61	27	7
Project Delay	21	37	42

**Table -3 Lean Projects completed successfully, satisfying the User requirements.**

Options	No. of Responses
Successfully installed and satisfies the requirements.	80

Successfully installed and not satisfies the requirements.	6
Successfully installed with other issues.	11
Unsuccessful Install.	3
<b>Grand Total</b>	<b>100</b>

**Table -4 Lean approaches identifies the risks during the Design Phase of the Project.**

Options	No. of Responses
Strongly Agree	33
Agree	46
Partially Agree	15
Disagree	3
No Idea	3
<b>Grand Total</b>	<b>100</b>

**Table -5 Lean Process helps in the communication flow between the System and Detailed Design.**

Options	No. of Responses
Strongly Agree	28
Agree	40
Partially Agree	19
Disagree	3
No Idea	10
<b>Grand Total</b>	<b>100</b>

**Table -6 Lean tools make the Managers to understand the Employee skills and also assigning work to their team members.**

Options	No. of Responses
Strongly Agree	17
Agree	49
Partially Agree	22
Disagree	8
No Idea	4
<b>Grand Total</b>	<b>100</b>

**Table -7 Periodic Code Reviews/Multi-tiered review system helps in building code to the customer need.**

Options	No. of Responses
Strongly Agree	52
Agree	36
Partially Agree	12
Disagree	0
No Idea	0
<b>Grand Total</b>	<b>100</b>

**Table -8 Standardized Error Codes led to Zero Client Errors by making the developers to follow certain rules**

Options	No. of Responses
Strongly Agree	25



Agree	41
Partially Agree	31
Disagree	3
No Idea	0
<b>Grand Total</b>	100

**Table -9 Lean Methodology improves the core competencies of Software Development**

Options	No. of Responses
Strongly Agree	29
Agree	56
Partially Agree	14
Disagree	0
No Idea	1
<b>Grand Total</b>	100

**Table -10 Lean Process involves all levels of organization in Transformation Process**

Options	No. of Responses
Strongly Agree	22
Agree	48
Partially Agree	24
Disagree	4
No Idea	2
<b>Grand Total</b>	100

**Table -11 Lean Projects been successful in reaching the Goals/Expectations of the Organization**

Options	No. of Responses
Strongly Agree	26
Agree	56
Partially Agree	18
Disagree	0
No Idea	0
<b>Grand Total</b>	<b>100</b>

**Table -12 Lean Process is a visible evidence of Team and Employee Empowerment**

Options	No. of Responses
Strongly Agree	21
Agree	48
Partially Agree	28
Disagree	0
No Idea	3
<b>Grand Total</b>	<b>100</b>

**Findings:**

1. Lean Methodology Implementation performs better than Non-Lean Projects.
2. Lean Installation has succeeded in different technologies and all type of Projects.
3. Lean Approach helps in attaining the Objectives/Goals of the Organization.

4. Lean helps in developing the Core Competency of the Software Development and achieving the Customer Satisfaction.
5. Lean also helps in increasing the Performance and Productivity of the Product.
6. Lean helps in developing the Employee Empowerment and Team work. It also involves all levels of organization to know about their work process.
7. Organization maintains its stabilization during the Global Competition, Rapid Product Introduction, recession etc.
8. Majority of respondents said that Customer Satisfaction, Goal of the Organization, Quality Improvement and Flexibility to changes are the major benefits they attained by using Lean Process in Software Development.

### **Conclusions:**

To keep customers from changing their minds, raise the maturity of your organization to the level where it can reliably deliver what customers want so fast that they have no time to change their minds. Focus on value, flow, and people, the rest will take care of itself.

These assessments suggest the applicability of manufacturing-based principles to a fast-moving, high technology, service industry. Our Observations of the details of the implementation will hopefully provide the beginnings of a roadmap for other service industries seeking to apply the same ideas. Such details are the most important ( and most often under-emphasized) part of any lean initiative, and far outstrip the import of a strategic mandate that “we are doing lean”.

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