Scrubtinising Lean Thinking and Agile Methodologies from Practitioner’s Point of View

Sunil Kaushik, Vinay Avasthi and Ashish Bharadwaj

University of Petroleum and Energy Studies, Dehradun – 248007, Uttarakhand, India; sunil.kaushik@rediffmail.com, vavasthi@upes.ac.in, ashish@upes.ac.in

Abstract

Software projects are notorious for missing deadlines, schedule slippage and budget overrun. Dynamic market also makes tough for software companies to deliver the project meeting requirements and deliver the value to client. Agile and Lean Thinking have appeared as savior for these problems. Principally, Agile Methodologies are used for increasing flexibility, delivering the software fast and Lean Thinking helps in delivering value by eliminating waste. This paper studies both Lean Thinking and Agile Methodologies to find similarities, differences from an industry practitioner’s point of view. Practitioner scrutinizes both Lean Thinking and Agile Methodologies and recommends the need of a new framework that has benefits of both frameworks.

Keywords: Agile Methodologies, Lean Thinking, Software Engineering

1. Introduction

Intelligent products, smart services are buzz words of current era. To stay competitive these products are services that are required to respond quickly to dynamic market needs. Providers of such products are to be flexible and swift to cater to ever changing requirements. This development has led to light weight processes that can work with small feedback, fast development cycles, including the customer throughout the software delivery process. Agile Methodologies have been such lightweight processes that increased ability to respond to dynamic market changes. Agile Methodologies provide maximises customer satisfaction, more flexibility and produce higher quality in less time accelerating delivery of features relevant to the customer. Agile Methodologies makes organizations to respond to the volatility so fast and is used for success of organization. These methods, in contrast to plan driven methods, have focused on iterative and frequent releases, working software and customer collaboration. Proponents of lean manufacturing suggest to apply Lean Thinking to handle such challenges. These two methodologies are different from plan driven development processes that follows Waterfall model that require a clear requirement, by accepting requirement changes and rely heavily on documentation.

Both paradigms claim to be responding to customer needs in a rapid way. Focus of the study is to find the contrast in Lean Thinking and Agile Methodologies.

2. Background

2.1 Understanding Agile Methodologies

Four pillars of values behind Agile Methodologies have resulted in 12 principles. The values can be described in Figure 1.

Figure 1 shows that precedence is given to customer satisfaction, velocity and effectiveness over documentation, negotiations.

Agile Manifesto is based on twelve principles:

AM1 Satisfy Customer.
AM2 Welcome changing requirements, even in late development.
AM3 Deliver working software frequently.
AM4 Cooperation between business people and developers throughout the project.
AM5 Trust motivated individuals and build projects around them.
AM6 Enable face-to-face conversation.
AM7 Measure progress by delivered working software.
AM8 Maintain a constant pace of delivery.
AM9 Technical excellence and good design to high quality product for easy scalability and maintenance.
AM10 Simplicity.
AM11 Self-organizing teams.
AM12 Continuous reflection.

2.2 Understanding Lean Thinking

Lean Thinking has 7 main principles to provide guidance on delivering software faster, better and at a lesser cost$^5-7$. The 7 principles are described below:

- LT01: Eliminate waste: Anything not adding any value to customer or product should be removed.
- LT02: Amplify learning: Learning can be termed as getting better understanding of customer needs, solutions and testing strategies. Processes and practice should support and provide environment for learning.
- LT03: Defer commitment: Delay the commitment of irreversible decision till last moment and option for change should remain open till last moment.
- LT04: Deliver as fast as possible: Minimize delivery time turnaround time from requirement gathering to final delivery of software.
- LT05: Respect people: Create a team of technically excellent people, provide them reasonable and realistic goals and trust them on getting the job done.
- LT06: Build quality in: Ensure that defects are not injected in first place and they should be eliminated as soon as they are discovered.

![Diagram](image-url)

Figure 1. Agile Methodology Values.
• LT07: Optimize the whole: Optimize the whole value stream i.e. from receipt of a requirement to software deployment and avoid sub-optimization.

3. Comparing Lean Thinking and Agile Methodologies

This section compares the Lean Thinking and Agile Methodologies from IT project delivery perspective. Most of the activities in an IT project can be categorized in the Planning, Execution, Control and Deliver\textsuperscript{10}. This paper does not look at both of the methodologies from controlling perspective. With Author’s personal experience in the Software Industry, following dimensions have been categorized in Table 1 for the Planning, Execution and Deliver activities. Various tool kits provided by Lean Thinking and Agile are usually part of the controlling exercise and are out of scope for this study.

Table 1. IT project Planning, Execution and Delivery Matrix

<table>
<thead>
<tr>
<th>Planning</th>
<th>Execution</th>
<th>Deliver</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Specify Value by Customer Focus</td>
<td>• Pace of Development</td>
<td>• Delivery and releases</td>
</tr>
<tr>
<td>• Quality of the Product</td>
<td>• Requirement Changes and Flexibility</td>
<td>• Learning</td>
</tr>
<tr>
<td>• Managing the flow</td>
<td>• Motivation and People Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Co-operation in different teams involved</td>
<td></td>
</tr>
</tbody>
</table>

3.1 Planning Phase

3.1.1 Specify Value by Customer Focus

Value different meanings in different context and itself is a field of research, commonly called as value-based software engineering\textsuperscript{11}. Lean Thinking and Agile both are customer focused and strive hard to satisfy the customer. Lean Thinking assumes that customer satisfaction can be achieved by performing tasks that add value and removing the waste non value adding activities. It focusses on everything that delights the customer, not necessarily asked explicitly\textsuperscript{12}. However, Agile assumes that customer is interested in working software and he can be satisfied frequent deliveries. Both principles, prima facie, appear to look at the customer satisfaction from different perspective. Agile objective of frequent delivery can be easily achieved by removing waste activities, as indicated by Lean Thinking. Hence, Lean Thinking and Agile Methodology echo each other on customer focus.

3.1.2 Quality

Lean Thinking (LT06) provides quality of the product by removal of defect as soon as it appears. This hypothesis is based quality of the product is measured by absence of defect\textsuperscript{13}. Agile Methodology Principle (AP09) focusses on providing a high quality by achieving Technical Excellence. Usually, it is thought that product made by excellent technical processes is of high quality. Agile Methodologies maximise customer satisfaction with a positive impact on product quality\textsuperscript{14}. On the other hand, Lean Thinking advocates Product Excellence by conforming to the specification and showing absence of defects. Lean Thinking is proponent of Quality Control whereas Agile Methodologies stress on Quality Assurance. Both of the paradigms differ on Quality aspect.

3.1.3 Managing the Flow

Lean Thinking stresses on considering the complete cycle and taking decisions. Lean Thinking principle ‘Optimize the Whole’ (LT07) focusses on End to End cycle and encourages optimizing complete flow instead of sub optimizing the small iterations or stages. It proposes to prioritize the customer needs and take care of these needs from inception to delivery.

3.2 Execution Phase

3.2.1 Pace of Development

Agile Methodologies (AM08) provides the platform to deliver to product/services at a constant and sustainable pace indefinitely. Though, there is no such principle found in Lean. This does not mean that Lean does not postulate pace. Lean Thinking stresses on eliminating the waste which is resistance to the motion or pace. Lean Thinking coupled with Kanban can offer pace by pulling the unfinished product form one stage to another.

3.2.2 Requirement Changes and Flexibility

Lean Thinking (LT03 – Defer Commitment) emphasizes on providing the option delay the commitments such as Technical or functional as far as possible to decide on irre-
versible actions. On the other hand Agile Methodology (AM02) embraces the change even late in development. Agile Methodologies and Lean Thinking are essentially the same because both welcome the change even late in development. Lean and Agile holds the key decisions and options. Agile welcomes the change in requirements but, by providing options and taking decision unless any irreversible decision, Lean Thinking enables us on how to acquire better requirements in beginning to reduce volatile requirements.

3.2.3 Motivation and People Management
Agile Methodologies (AM05) has a prerequisite to build a team around the enthusiastic and self-motivated individuals and to support the team by providing a conducive environment so that they can provide a successful delivery. Also, Agile Methodologies suggests that team should manage it self, pick their own tasks and responsibilities. Lean Thinking (LT05) emphasizes on strong technical workforce by a leader who have mutual trust and achieve goals by letting them decide and how to do it. Both paradigms talk about giving autonomy to team members. Lean Thinking highlights on empowering a multifunctional team under a leader, stops informal hierarchies while Agile Methodologies does the same thing and also encourages team to decide their task and openly share information and comment on functionality of project. Agile Methodologies revolves around the team and Lean Thinking encompasses all the stake holders i.e. Team Manager, Project Director and external stakeholders such as functional and business team members.

3.2.4 Co-operation in Different Teams
Agile Methodologies (AM04) requires Technical team, Business team and Project Managers should work together throughout the project. Working cohesively can be achieved only if all team have cooperation. While Agile suggests co-operation, colocaton and work in tandem but Lean Thinking does not speak on these areas explicitly. However, Lean Thinking stresses on seeing the whole principle assumes that a fair amount of co-operation already exists in the teams.

3.3 Delivery Phase

3.3.1 Delivery and Releases
Agile Methodologies (AM07) suggests that project progress should be measured by the delivered working software. A working code contains more value and importance than documentation such as design document. However, Lean Thinking principle (LT04) strongly focusses on minimizing the turnaround time i.e. minimizing the time between request receipt and delivery. These two paradigms look entirely different. On a deep dive, both paradigms look to be addressing same point. Lean Thinking stresses on reducing the cycle time with background idea that incomplete work does not add any value to customer. The incomplete work is regarded as a waste. Lean Thinking in its first principle (LT01) strongly recommends removing the waste. Thus, Lean Thinking is totally in line with the idea of Agile stresses on measuring the progress by delivered working software. Similarly, Agile Methodologies (AM03) stresses on frequent deliveries inducing elimination of waste arising from incomplete work (LT01) and reducing the turnaround time (LT04) to continuously learn and reflect (AM12) the learning (LT02) in the future deliveries.

3.3.2 Learning and Improvement
Agile Methodologies (AM12) promotes the environment where in team deliver the current iteration by correcting and learning from mistakes done in past iterations. This stresses on constant thinking and of efficiency but also builds teams confidence by reflecting the efficiency. Lean Thinking (LT02) evolves the idea of learning the process, defects and customer needs during the development process to get the better understanding of customer wants, potential changes in architecture, development and quality strategy and risks involved. Lean Thinking (LT02) goes to extent of achieving better results by implementing the knowledge and lessons learnt.

Both paradigms essentially stresses on following:

- Learn from past mistakes or right deeds to plan new actions. Setting the benchmark and defining the process.
- Feedback mechanism and augmenting the actions by implementing the feedback.
- Creating and transfer knowledge to team members

4. Conclusion
Lean Thinking from Agile Methodology are highly relevant today because both help industry in responding to the changes rapidly and focus on evolving the prod-
uct or software services. This paper sees Lean Thinking from Agile Methodology perspective and vice versa. Agile Methodology and Lean Thinking agree on the primary product, welcoming change. Both have some differences which are highlighted in the study. Industry is in dire need of a new framework that include benefit of both Lean Thinking from Agile Methodology. Industry would be benefitted by flow related aspects of Lean Thinking that radicalized the manufacturing industry and Quality aspects of Agile Methodology.

5. References