

Introduction

Sometimes it seems that organizations think they have to choose between implementing Lean or Agile to improve their processes. However, it is not correct to say that one methodology is better than the other. The question that needs to be asked is where we should apply Agile and where we should apply Lean? This article reviews the differences and similarities of both methodologies and where you should adopt Lean and where Agile. Lean is the most appropriate methodology to create stable and predictable operational processes, while Agile is the most appropriate methodology for product development. Because most organizations have both types of processes, they also benefit from both methodologies and become more agile and predictable at the same time.

Each organization has the same challenge: "How can we provide products and services with maximum value for our customers; how can we lower our costs; how we increase productivity; how can we develop people; ...?" In order to achieve this, organizations must constantly work to improve their processes and develop the organization, also called 'Continuous Improvement'. Within the domain of Continuous Improvement various methodologies have been introduced over the past decades: TQM, Kaizen, TOC, Lean, Six Sigma, Agile, Each of these methodologies contains various principles and techniques. There seems to be little overlap, although they all promise great improvements. How is that possible?

Lean values and principles

Let's first go back to the early 90s, when Womack, Jones and Roos published two successful books entitled 'The machine that changed the World' (1990) and 'Lean Thinking' (1996). Both books address the revolution in manufacturing represented by the Toyota production system. They compared this way of working with the traditional mass production systems that were used by other companies in the Western world. They described in their book 'Lean Thinking' the following five principles:

Lean principle	Description
Value	Define what is of value to the customer
Value Stream	Identify the value stream and eliminate Waste
Flow	Create a constant flow
Pull	Deliver based on demand
Perfection	Continuously improve the process

Table 1: Lean Principles

Toyota visualized its values, principles, way of working and the most important tools in the Toyota House of Quality. The roof of the house expresses the goals of the organization (Best Quality – Lowest Cost – Shortest Lead Time – Best Safety – High Morale). The lower part of the house addresses a number of necessary elements which are the foundation of the organization, such as Kaizen, Genchi genbutsu (Go and see at the shopfloor) and Teamwork. The house has two pillars. The first pillar is about optimizing the processes which includes crucial elements like 'Just In Time' and 'Waste elimination'. The second pillar is called 'Respect for People'. It is about leadership and the development of the people working in the organization. To become a Lean thinking company, one has to change permanently the attitude and behavior of its management and employees.

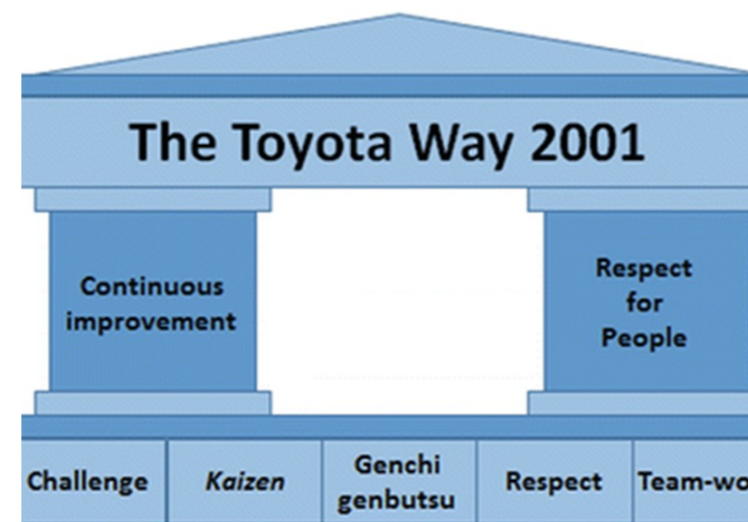


Figure 1: Toyota House of Quality (2001)

Agile values and principles

Within the field of project management and Continuous improvement, Agile is one of the biggest revolutions in the last decade. In 2001 a group of 17 software developers published the Agile Manifesto in which the starting points of Agile were elaborated. The Agile Manifesto sought to change the traditional software development approach, drastically reduce development time and improve quality. Nowadays, Agile is not only used in software development but has become one of the most practiced project management approaches. There are four fundamental Agile values:

1. 'Individuals and Interactions', over processes and tools.
2. 'Working Products', over comprehensive documentation
3. 'Customer Collaboration', over contract negotiation.
4. 'Responding to Change', over following a plan.

Within an Agile organization, the customer is the focus of the development process; employees have a positive attitude; changes are seen as a chance rather than a threat and activities should be aligned with business needs. There is a good balance between standardized work and the ability to answer to special customer wishes. Instead of a large organization and stuck employees, self-organizing teams will improve agility and speed within the organization. These teams have their own result area, are accountable and empowered. Techniques that contribute to an Agile organization are Short Interval Management and Scrum. Within the Agile Manifesto 12 principles have been defined:

Principles behind the Agile Manifesto:

1. **Satisfy the customer**
Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. **Welcome change**
Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. **Deliver frequently**
Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. **Work together**
Business people and developers must work together daily throughout the project.
5. **Trust and support**
Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. **Face-to-face conversation**
The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. **Working product**
A working product is the primary measure of progress.
8. **Sustainable development**
Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. **Continuous attention**
Continuous attention to technical excellence and good design enhances Agility.

9. **Maintain simplicity**

Simplicity--the art of maximizing the amount of work not done--is essential.

10. **Self-organizing teams**

The best architectures, requirements, and designs emerge from self-organizing teams.

11. **Reflect and adjust**

At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Source: *Agilemanifesto.org*

Lean and Agile are very similar...

Let's first review the similarities between Lean and Agile. Both methodologies have a clear customer focus ('Customer Value' and 'Satisfy the customer'). Nothing is more important than meeting customer requirements and expectations. Products delivered must create value for the customer which is the most important goal of development and production processes.

Both methodologies provide for regular checks of the results and working method in order to evaluate possible improvements and simplification of the process ('Continuous Improvement'; 'Continuous attention'; 'Reflect and adjust'; 'Maintain simplicity'). Both methodologies incorporate stand-up meetings with the team, around visual management boards and they work according short interval management ('Kaizen'; 'Face-to-face conversation'; 'Self-organizing teams'). Within Lean these efforts are called Kaizen events and within Agile these are called Sprints.

Also, both methodologies expect the delivery of objects in the least possible number of lots, because it is the most efficient way and it will reveal quality issues at an early stage ('Deliver frequently'). Within Lean this is mentioned 'One Piece Flow', while within Agile this is mentioned a 'Product Increment'.

Another similarity between Lean and Agile is the strong focus on employee development and working in teams. Both emphasize that development of people is more important than applying tools ('Team-work'; 'Work together'; 'Trust and support').

But Lean and Agile are very different...

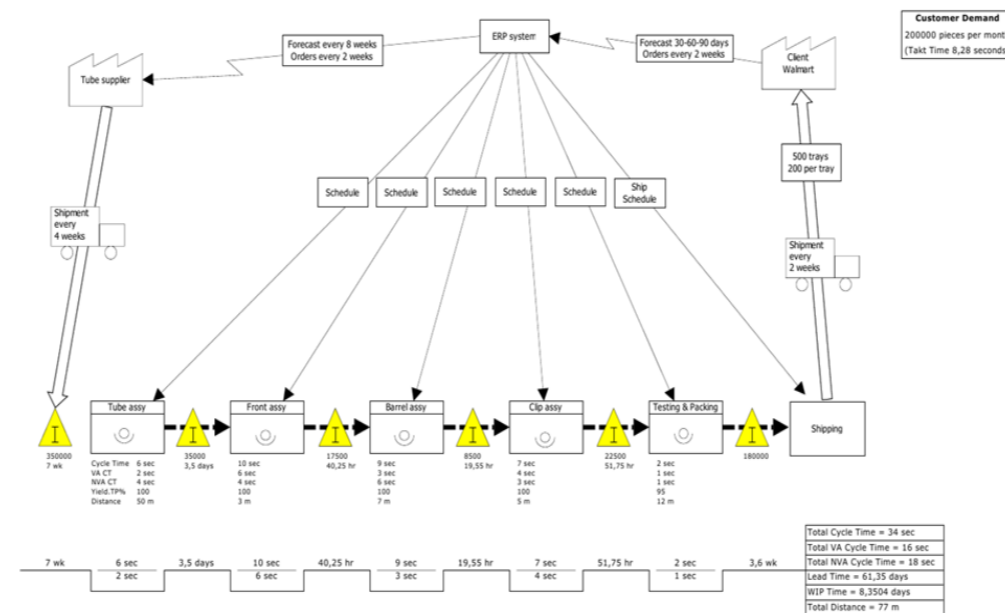
The main difference between Agile and Lean, is that Agile concerns the optimization of the development process, while Lean concerns the optimization of the operational process. In most cases the development process concerns one unique product, while the operational process concerns a series of products. the end-goal is not.

The focus within a Lean environment is to deliver as many high-quality products or services as possible, in the most economical way possible. Within a Lean environment the product or service and the operational process are predefined, and employees working in the delivering process are well trained and follow standard work instructions. Even, if we consider different variants of the product, they are all predefined. Within a Lean environment it is the objective to avoid variation and iterations, while in an Agile environment there is a lot of room to discover and investigate to come up with the best solution. During the Agile development process, factors are continuously reviewed and changed according to new information or feedback.

Lean principles and tools are being applied in environments like production, logistics, services, healthcare and in government, with the common goal of reducing turnaround time and operational costs while at the same time improving quality. The Agile methodology finds its origin in the creative and development environment, like software and new product development.

Lean techniques

Let's take a closer look on the different techniques that are typically applied in Lean and Agile. The Lean improvement toolbox contains a large set of techniques. The most powerful tool is called 'Value Stream Mapping' (VSM). The objective of Value Stream Mapping is to reduce Lead Time and to eliminate Waste. Value Stream Mapping is a technique that is used to analyze the series of activities to deliver a product or service. Value Stream Mapping can be applied to nearly any value chain. It links all activities together in one visual representation. As such it provides the bigger picture by illustrating the complete flow and all its connections, which is not only limited to the operational process but also includes material flows, information processes and business processes. Within the visual representation it is possible to distinguish Value Added Activities from Non-Value-Added Activities.



Many other Lean techniques are somehow connected to the Value Stream Mapping technique, like implementing Kanban systems, Work balancing, Volume and Type leveling, Quick Change Over, etc. Applying these tools will increase Flow and Pull in the process which will result in shorter Lead Times and lower stock. Although improving quality is not the primary focus, an efficient and Lean process will result in less failures and mistakes and, as such, higher quality.

Another focus of Lean is creating a safe and professional work environment where everything is self-explanatory. Techniques used to create such an environment are 5S, floor marking, identification of equipment and work-in-process, shadow boards for tooling, Andon lights, Kanban racks, visual displays for quality and on-time delivery, etc. These are the basics for preventing quality issues, for facilitating stand-up meetings and for executing Kaizen events. Within a Lean environment, employees are given the opportunity to learn from others by working in teams with colleagues, suppliers and customers. Short interval management, like Kaizen events, facilitate quality improvement projects as well as development of individuals.

Agile techniques

The most powerful technique within Agile is Scrum. Scrum finds its origin in product development and is commonly used in software development. Nowadays, Scrum is used more and more in development projects outside the IT-sector. Product development applying Scrum progresses via a series of iterations that are called 'Sprints'. The duration of a Sprint may vary between different organizations, but is commonly one to four weeks. The advantage of Scrum is that it is very adequate for handling changes in requirements and that it focuses on delivering an operational or shippable version of the product at the end of each Sprint.

Scrum teams are supported by specific roles, like the 'Scrum Master' (SM) and the 'Product Owner' (PO). The Product Owner is responsible for the product or service and is representing the Voice of the Customer. His most important task is prioritizing the product requirements that must be achieved. The role of the Scrum Master is to ensure that goals, scope, and product domain are understood by everyone on the Scrum team as well as possible. It is also the role of the Scrum Master to ensure the team follows the Agile values and principles. The responsibilities of the Scrum Master include prevent distractions, removing obstacles, finding resources and skills, establishing an environment where the team can be effective, addressing team dynamics, ensuring a good relationship with the Product Owner as well as with other stakeholders. The role of the Scrum Master differs in many ways to the traditional project manager role. The role of the Scrum Master is not to provide day-to-day direction to the team and he

the team and shelters the team from outside distractions. This allows the team to focus during the Sprints on achieving the defined goals.

The Scrum project management is done by the Scrum team itself. As a self-organizing team, they are responsible to complete all Sprint items during the Sprint. Each person contributes in whatever way they can and helps other team members if needed to complete their deliverables. Scrum teams consist of skilled and motivated team members, who have a high sense of ownership, decision-making power, take ownership, communicate regularly, share ideas and work together on the same objective. Self-organizing teams prove to work very efficient, because they spend less time on project management and more time on development activities and completing work.

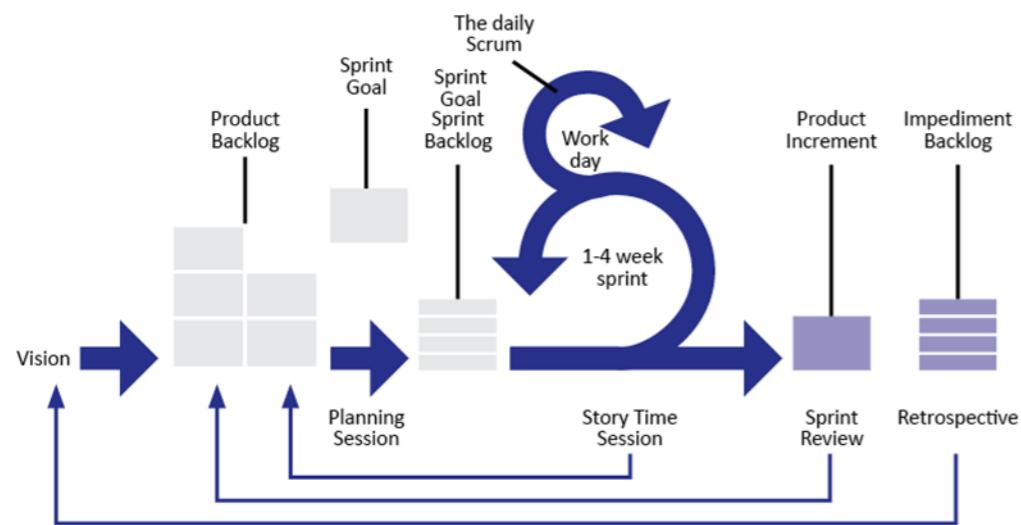


Figure 3 - Graphical representation of SCRUM

Need to apply Agile or Lean?

We cannot say that one methodology is better than the other. The question that needs to be asked is where we should apply Agile and where we should apply Lean? Agile is the most appropriate methodology to apply to the development processes, while Lean is the most appropriate methodology to create stable and predictable operational processes. Since, most organizations have both types of processes, it can benefit from both methodologies. A car manufacturer also needs to develop new cars and an IT-organization benefits from standardized processes for providing services and administration. Take a look within your organization and review where you should apply Lean and where you should apply Agile.

About the Author

Having graduated from the University of Twente (Enschede, the Netherlands) in 1994, Theisens (1969) developed his experience of process improvement as a consultant in the automotive and high-tech industry at Texas Instruments, Sensata Technologies, Thales and several other companies. During a period of 20 years he was given the opportunity to help a broad range of organizations deploying Continuous Improvement initiatives in a wide range of industries.



In a production plant in Mexico he led several 5S programs, Kaizen initiatives and a Lean transformation. In several plants in Europe and Malaysia he executed and coached around 50 Six Sigma breakthrough projects. At an automotive engineering department he supported the introduction of Design for Six Sigma.

Currently Theisens is Managing Director and Master Black Belt of a Consultancy and Training company in the Netherlands that is specialized in 'Business Improvement' and he is a guest lecturer at the University of Twente. Theisens is also founder of the LSSA – Lean Six Sigma Academy®.

About the Lean Six Sigma Academy

Lean Six Sigma Academy (LSSA) is the Scheme Owner for Lean Six Sigma. LSSA designs the training and certification standards for Lean Six Sigma and has developed a series of training materials for each belt level of Lean Six Sigma, including books, presentations, syllabi and exams. Being an open, professional and quality-driven Lean Six Sigma knowledge Community, LSSA supports the development of training, curriculum and certification of Lean Six Sigma in various branches to the global market.