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Evidence File for CSP-SM

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# Lean Agile and Scrum

## LO 1-1 - Describe the origins of Lean Thinking

The roots of Lean can be found in the Japanese company of Toyota. Th e origins of Toyota Production System date back to the beginnings of the twentieth century. Th e fathers of the system was Sakichi Toyoda, his sons: Kiichiro Toyoda and Eiji Toyoda as well as Taiichi Ohno, a manufacturing engineer. Sakichi Toyoda, who then worked in textile industry, invented a motor-driven loom with a specialized mechanism devised to stop in case of breaking off the thread. The mechanism became later a foundation for Jidoka (automatization with human manufacturing), one of the two main pillars on which Toyota Production System was built. Due to the application of a fault detection sensor, the defects stemming from human-related imperfections were reduced and the production capacity was elevated.

In 1910, Sakichi Toyoda “visited the United States for the first time and realized that the new automotive era just was beginning” (Ohno T., 2008, translation mine, ŁD). Yet, the Toyoda family needed 20 years to materialize their plans. In 1929 Kiichiro Toyoda arrived in the USA with the aim of scrutinizing the local companies in the automotive industry. He was particularly fascinated with the Ford production system, which in 1913 introduced the serial production of its automobile (the T model) (Kornicki L., Kubik S., 2008, translation mine, ŁD). Consequently, when Toyota Motor Company initiated their production, Kiichiro decided to implement some of the resolutions he had witnessed in the USA. The then Japan suffered

from reduced demand, therefore diverse automobiles were necessarily produced in smaller numbers on the same assembly lines. In order to compete in the mass production automotive industry, which had already been introduced in European and American companies, Toyota was forced to change the methods of production. Kiichiro Toyoda fully understood the fact that it was mandatory to create a fast and flexible process of production as a result of which the clients would obtain desired, high-quality and reasonably-priced automobiles. Kiichiro commenced preparatory work to produce in the Just-in-time system. The objective of the latter was to elevate the production capacity and reduce waste painstakingly.

In the 1950s Sakichi’s son, Eiji Toyoda, visited the Ford company. It seems that owing to the visit Toyoda together with Taiichi Ohno were capable of creating a system linking the two pillars of the TPS (Jidoka and Just-in-time) with the Ford assembly line.

Shortly after the previous improvement Taiichi Ohno advanced another concept called “pull-flow production”, an old practice in American supermarkets. Th e pull-flow production allowed to generate as many products as could be exploited in the successive process. In turn, it would facilitate the reduction of overproduction.

The Toyota Production System did not arouse interest in Japanese and American companies by 1973. Not until the production had to be reduced, were Japanese and American managers capable of noticing significant outcomes that Toyota had achieved (Graczkowski S., 2008, translations mine, ŁD).

Source - Th e Origins and Evolution of Lean Management System <https://www.jois.eu/files/DekierV_5_N1.pdf>

## LO 1-2 Explain the core concept of Lean Thinking and how they can be applied to Scrum

### Lean Principle

The 5 key principles of Lean Thinking are:

1. Identify value – Specify value from the standpoint of the end customer by product family
2. Map the Value Stream – Identify all the steps in the value stream for each product family, elimination whenever possible those steps that do not create value
3. Create flow – Make the value-creating steps occur in tight sequence so the product will flow smoothly toward the customer
4. Establish Pull – as flow is introduced, let customers pull value from the next upstream activity
5. Seek Perfection – repeat step 1 -4 until a state of perfection is reached in which perfect value is created with no waste

The core concept of Lean Thinking can be summarised:



Figure - Lean Thinking Principles

### Lean Principle & Scrum

The table below summarises how Lean Principles are applied to Scrum

|  |  |
| --- | --- |
| **Lean Principle** | **Application in Scrum** |
| Identify Value | * Product Owner works closely with customers to understand the highest valuable product backlog items and ensure product backlog is prioritised in descending order of value (Highest priority items at the top of the backlog) |
| Map the value stream | * The scrum events provide an basic value stream map to ensure continuous value delivery to customers * User requirement -> Sprint planning -> daily scrum -> sprint review -> increment -> sprint retrospective -> repeat * As scrum is an incomplete process, additional steps can be added to ensure the value stream is fit for purpose |
| Creating Flow | * Daily Scrum helps the team to ensure that product backlog items are flowing as expected within every 24hrs * Sprint review ensures value flows to the customer every sprint (1-4 weeks). Thus, creating continuous value flow to customers * Scrum with Kanban provides a more robust way of creating continuous flow with Scrum Teams |
| Establish Pull | * The Scrum team pulls the highest priority product backlog items from the Product Backlog into the sprint backlog when capacity is available to ensure customers are getting the highest value item delivered |
| Seek Perfection | * Scrum team conduct sprint retrospective every sprint to ensure that the team is continuously improving, finding ways to decrease waste, and deliver value better |

Table - Lean Principles & Application in Scrum

Sources

1. Lean Thinking and Practice - <https://www.lean.org/lexicon-terms/lean-thinking-and-practice/>

## LO 1-3 - Relate at least five wastes in product development to the seven wastes in Lean Manufacturing

|  |  |
| --- | --- |
| **Waste in Lean Manufacturing** | **Waste in Product Development** |
| Transportation | * Switching between tasks too often * Countless interruptions from colleagues * Stakeholder continuously changing what value they want |
| Inventory | * Undelivered code * Undelivered features |
| Motion | * Unnecessary meetings * Extra effort to find information |
| Waiting | * Waiting for testing to complete * Waiting for code review * Waiting for requirements * Waiting for resources |
| Overproduction | * Producing features that nobody is going to use * Producing underutilised & undervalue features |
| Overprocessing | * Unnecessary complex algorithms solving simple problems * Processing large about of data with no significant benefit |
| Defects | * Bugs |

Table - Waste in Lean Manufacturing and Product Development

Source

1. 7 wastes of Lean: How to Optimise Resources - <https://businessmap.io/lean-management/value-waste/7-wastes-of-lean>

## LO 1-4 Relate at least three agile development practices to lean practices

|  |  |
| --- | --- |
| **Lean Practices** | **Agile [Scrum] Practices** |
| Just in Time | * Ensuring the sprint product backlog has the most valuable product backlog items which are focused based on just in time sprint planning |
| Kaizen Continuous Improvement | * Sprint review provides the scrum team with customer feedback to inspect and adapt * Sprint retrospective ensure scrum team continuously improve individuals, interactions, processes, tools, and their Definition of Done |
| Build quality in | * Definition of Done * Test Driven Development * Behaviour Driven Development * Refactoring |
| Respect people | * Create shared working understanding * Create a People Culture * Create a continuous learning culture |
| Continuous Flow | * Continuous integration * Continuous delivery * Continuous deployment |

Table - Lean Practices & Agile [Scrum] Practices

Source

1. Lean Principles 101 Guide - <https://www.planview.com/resources/guide/lean-principles-101/>
2. Scrum Guide - <https://scrumguides.org/scrum-guide.html#sprint-retrospective>