Case Study:

Lean Process Improvements in a Print Testing Enterprise (Part 1)

This case study presents the journey by the team in the Lean Project offered by the Singapore Institute of Technology (SIT). It illustrates the struggles and challenges faced by team members along the way and showcases how they have overcome the difficulties.

What was the problem?

In order to meet the quality requirements, the test process for the print device has to be very comprehensive covering all aspects of possible defects or failures that can happen in the life span of the print device. One of the test processes required a substantial amount of manual interruption by operators in between various test steps and different scripts.

One of the operation technicians described the problem as follows:

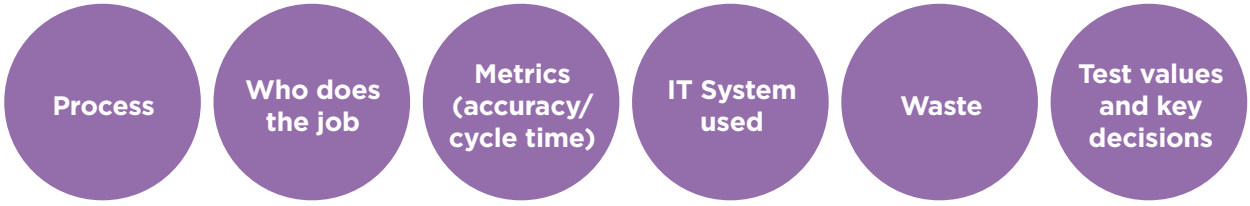
> **"As a middle person between operator and engineer, we get requests from engineers and arrange the test with operators. When the data output is not out, we get questioned by engineers. We also get complaints from operators. They complain the machine is too far. Because they have to keep going back there and come back to check on the paper and go back there. So make many trips."**

This process took up the most manpower resources with more than half of the entire test process in this lab. The management decided to take on the Lean journey with SIT, with the aim to achieve significant reduction in manual touchpoints during this specific process.

Lean was not new to many team members, especially those who were in the operation team. Kaizen and Kanban were constantly encouraged and implemented, but they were too focused on individual tasks or processes than looking at the entire test process. They also implemented Visual Management (VM), which did not sustain due to the reasons in the comments below.

> **"Actually, we had a bad experience. When implementing, we used a lot of time to prepare, but after one month, we started to hear complaints. They said it was very troublesome...they didn't like it. After half a year, we decided that we could not use it. So, it actually didn't work for us. Every day we would update, but in the end, we didn't see the benefit from doing that. We recorded this along with the time in our book, but we didn't know what to do with this data. It was just for the sake of collecting data."**

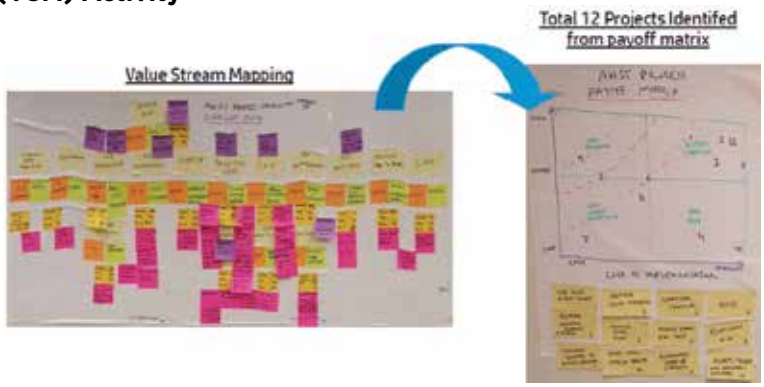
How has the Lean Project helped the enterprise solve the problem?



A Lean coach from the Lean Transformation and Innovation Center (LTIC), SIT faculty and the project team worked closely together across a few months to achieve the reduction in manual time reduction goal. At the same time, the coach transferred the knowledge on Lean principles and tools to the team members to augment their Lean thinking capabilities and reinforced their Lean culture. In this sense, the Lean Project was a blended learning programme based on an action learning approach, where the employees developed their capability not just from the classroom learning sessions, but also through working on and resolving a real work problem.

The most powerful learning came from the Value Stream Mapping (VSM) activity at the beginning of the project. During the VSM process, all the employees who were involved in the print test process gathered and put together all the steps required to complete the test from beginning to end. They analysed and discussed each step to identify wastes, which were problems to solve. They then used the payoff matrix to prioritise the problems that could generate a bigger impact while requiring less resource. Figure 1 below shows what the project team did during the VSM activity.

Figure 1 Value Stream Mapping (VSM) Activity



This activity enabled the project members to see the entire test process together and understand the issues faced by different teams. Two project team members described the VSM experience:

"VSM brings everything into context. With this activity, we get to go from a bigger picture down to a smaller picture. I think that part really helps a lot. It's easier to identify the area we need to focus. We know how to look at the issue in the bigger picture because all the activities are linked, and some of the problems cannot be solved from looking at the specific problem only."

"We have engineers as well as all the operation team members from technicians, trainers to operators. They're all involved. I think it's quite good because when we want to make some changes, it needs to start from the bottom; it would be easier to change."

The project team selected a few key problems and implemented countermeasures, which was summarized in the outcomes listed in Table 1 below. At the end of the Lean Project, the team has achieved the goal of significant reduction of the operator's manual time during the test process.

Table 1 Lean Project Outcomes

Projects	Description	Saving (%)	Other Benefits
Shop floor Layout optimisation	Relocate testers to reduce walking time during testing	More than 35% cost avoidance in total	Ergonomics
Visual Inspection (VI) optimisation	Reduce visual inspection time for incoming print		Ergonomics
Reduction of data entry (manual)	Reduce manual data entry through combining Excel files		Digitisation
Setup One-click test script	Remove manual selection of scripts (total more than 240 scripts) to run	More than 20% reduction in time	Error reduction (Quality)
Rework job tracking	Visualise and track rework status for each test process		Enabled Visual management

The benefits and impacts, as well as challenges and key success factors will be discussed in part II of the curation.

Millie Lee | Adjunct adult educator and researcher | Institute for Adult Learning Singapore (IAL)

Specialising in workplace learning, Millie has assisted enterprises with designing and implementing various workplace learning interventions. She has also coached and supervised new workplace learning specialists in their certification journeys and has been involved in IAL's research projects on topics related to workplace learning and assessment. Recently she worked closely with the Lean Transformation and Innovation Centre (LTIC) at Singapore Institute of Technology (SIT) to integrate Lean management and workplace learning programmes.

Mark Tan | Assistant Director | Lean Transformation and Innovation Center (LTIC)

Mark is in charge of delivering Lean training and project works with the industries, including SMEs. The Center aims to promote and develop Lean practices among local enterprises and drive adoption of Lean thinking, culture and mindset. Prior to joining LTIC, Mark was a Certified Lean Six Sigma (LSS) Black Belt (BB) practitioner mainly with the private sector (across both manufacturing and professional services) for more than 12 years, responsible for both local and regional process improvement initiatives.