Mapping Your Path – Using Value Stream Maps to Improve

2020 Washington State Government Lean Transformation Conference
Core Objectives

• Recognize and read a value stream map
• Describe the purposes of and differences between value stream and process maps
• Build and use value stream maps to improve
What is Lean?

It is WORK SCIENCE based on flow.

Goal: deliver maximum value to the customer using the least amount of energy.

Concept credit: Joanne Gaudet & France Bergeron
What is Flow?

To flow means to move along in a steady, continuous, predictable fashion.

In Lean, we pursue continuous flow, where value reaches the customer by passing quickly and easily through a steady sequence of value-added activities.
5 Lean Principles

- Define Value
- Map Value Stream
- Create Flow
- Establish Pull
- Pursue Perfection
How to Define Value

1. Identify product
2. Identify end-users
3. Ask end-users to define value and product requirements
5 Lean Principles

Define Value

Map Value Stream

Pursue Perfection

Establish Pull

Create Flow
Poll

When it comes to value stream mapping, I would say:

• I’m here to learn what it is.
• I know about it, but haven’t experienced it.
• I’ve participated in it.
• I’ve facilitated it.
What is a Value Stream?

All the materials and work it takes to create and deliver a product to the customer.

What is a Value Stream Map?

A drawing that shows the flow of material and information through the production process.
Why Draw a Value Stream Map?

1. See flow across the system – to find & remove barriers
2. Share understanding – to make better decisions
3. Clarify value – to identify waste
4. Connect each function to the customer – to keep them in mind
5. Evaluate the work from objective and quantitative point of view – to measure performance and changes
6. Manage and continually improve the system of work – to stay in business
Value Stream Map vs. Process Map

Value Stream Maps

- High-level (zoom out)
- Product and information flow

Process Maps (Flowcharts)

- Detailed (zoom in)
- Activities and decisions

Image: https://upload.wikimedia.org/wikipedia/commons/9/99/ValueStreamMapParts.png (Daniel Penfield)
## Value Stream Map vs. Process Map (Flowchart)

<table>
<thead>
<tr>
<th>Map element</th>
<th>Value Stream</th>
<th>Flowchart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity/step</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Who performs activity/step</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Rework loops</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Decision points</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Inventory &amp; queue points</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Defect rate</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Time elements</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Types of Value Stream Maps

Current State

Future State

Ideal State

Images: Copyright © 2012 Leanman
How to Build a Current State Value Stream Map

1. Map material flow
2. Map information flow
3. Add timeline and calculate process performance data
SIPOC Example: Licensee Data Entry
Map Material Flow

• Be the thing and walk the process – sketch reality
  • Identify major work activities: operator and process step
  • Identify inventory (inbox) queues
Material Flow Example: Licensee Data Entry

Licensee

Form reporting activity

Open & Batch Mail

Admin. Asst.

Scan & Log Forms

Scan Tech.

Enter Form Data

Data Tech.

Check Data in System

Senior Tech.

Release Data

Supervisor

Public Licensee Data

Public

Requirements:
- Easy to find
- Available w/in 7 days
- Accurate
Map Information Flow & Capture Data

- Be the thing and walk the process – try in reverse
  - Specify how the input is supplied
  - Identify electronic systems used to capture/transfer info.
  - Capture who gets information, how, and how often
Information Flow Example: Licensee Data Entry

Requirements:
- Easy to find
- Available w/in 7 days
- Accurate
Map Information Flow & Capture Data – cont’d

• Measure what’s happening
  • Capture data about time, quality, and customer demand
  • Note inventory and number of operators at workstations
• Identify quality issues and rework loops
• Optional: label the product between workstations
Data Example: Licensee Data Entry

Requirements:
- Easy to find
- Available within 7 days
- Accurate

Admin. Asst.: Open & Batch Mail
- Batch of Forms
  - C/T = 90 min
  - T/T = 7 min
  - IY = 90%

Scan Tech.: Scan & Log Forms
- Batch of Scanned Forms
  - C/T = 40 min
  - T/T = 5 min
  - IY = 95%

Data Tech.: Enter Form Data
- Batch of Entered Forms
  - C/T = 120 min
  - T/T = 15 min
  - IY = 97%

Senior Tech.: Check Data in System
- Batch of Entered Forms
  - C/T = 15 min
  - T/T = 8 min
  - IY = 93%

Supervisor: Release Data
- Batch of Entered Forms
  - C/T = 5 min
  - T/T = 5 min
  - IY = 100%

Licensee Database
- Forms
- Information

Public Licensee Data
- Database

Form reporting activity
- 18/day

Form Database
- 90 min
- 360 min

Licensee

Scan Tech.

Data Tech.

Senior Tech.

Supervisor

Licensee

Public

Requirements:
- Easy to find
- Available within 7 days
- Accurate
Add Timeline & Calculate Performance Data

• Draw timeline along bottom
  • Calculate process performance metrics:
    • Lead (total production) time: Cycle Time + Wait Time
    • Value-added time: Sum of value-adding Touch Time
    • Rolled throughput yield: Product of all Incoming Yields
Timeline Example: Licensee Data Entry

Requirements:
- Easy to find
- Available w/in 7 days
- Accurate
5 Lean Principles

- Define Value
- Map Value Stream
- Create Flow
- Establish Pull
- Pursue Perfection
Flow Analysis Example: Licensee Data Entry

Requirements:
- Easy to find
- Available w/in 7 days
- Accurate

Form Errors
Resorting Batches
NVA Work

Admin. Asst.
Open & Batch Mail
Scan & Log Forms
Enter Form Data
Check Data in System
Release Data

C/T = 90 min
T/T = 7 min
IY = 90%

C/T = 40 min
T/T = 5 min
IY = 95%

C/T = 120 min
T/T = 15 min
IY = 97%

C/T = 15 min
T/T = 15 min
IY = 93%

C/T = 5 min
T/T = 5 min
IY = 100%

RTY: 77.1%
VA/T: 40 min
L/T: 11.1 days
Solve Problems to Achieve Future State

Current State

Future State

- Produce to takt
- Eliminate waste
<table>
<thead>
<tr>
<th>Action taken</th>
<th>Operator</th>
<th>Process Step: Action taken</th>
<th>Operator: Role that performs this process step. List the number of operators if more than one. (Colors represent different roles involved)</th>
<th>Supplier or Customer</th>
<th>Start and end of process</th>
<th>Problem/source of waste and idea to improve</th>
<th>Database</th>
<th>Common Value Stream Mapping Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Time:</td>
<td>Operator</td>
<td>Total time required to complete a process step (includes touch time).</td>
<td>Time a product is actually being worked on.</td>
<td>Supplier or Customer</td>
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<td>Problem/source of waste and idea to improve</td>
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<td>Touch Time:</td>
<td>Operator</td>
<td>Percent of time that product from previous step is fit for use in current step (complete and accurate).</td>
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<td>Incoming Yield</td>
<td>Operator</td>
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<tr>
<td>- Comments</td>
<td>Operator</td>
<td>Additional information related to process</td>
<td>Time a product is actually being worked on.</td>
<td>Supplier or Customer</td>
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**Symbols:**
- **Supplier or Customer:** Start and end of process
- **Process:** Process Step: Action taken
- **Operator:** Operator: Role that performs this process step. List the number of operators if more than one. (Colors represent different roles involved)
- **Data Boxes:**
  - **Cycle Time:** Total time required to complete a process step (includes touch time).
  - **Touch Time:** Time a product is actually being worked on.
  - **Incoming Yield:** Percent of time that product from previous step is fit for use in current step (complete and accurate).
- **Comments:** Additional information related to process
- **Queue (waiting) time for product or service to enter next process**
- **Name of system that information flows to and/or from within value stream**
Common Value Stream Mapping Symbols

**Material flow to Customer or from Supplier**

**Physical flow**

**Rework** (location where defect starts rework)

**Electronic flow**

**Iteration loop** (between two processes or within one process)

### Summary Metrics

**Lead Time (LT):** The total time a customer must wait to receive a product after placing an order (or initiating the process).

**Rolled Throughput Yield (RTY):** The probability that a single unit can pass through a series of steps free from defects. To calculate, multiply the IY for each step.

**Handoffs:** The number of time a product changes hands in a process on its way to being completed.

**Rework Loops:** When a work product contains errors (incomplete or inaccurate) and must be sent back upstream to be fixed.

**Value Added : Non-Value Added (VA/NVA):** For an activity to be value-added, it must meet all three of these criteria:
1) The customer must care about it.
2) It must change the fit, form, or function.
3) It must be done right the first time.
A Non-Value Added step is anything that does not meet these three criteria.
10 Mapping Pitfalls & How to Avoid Them

It’s a mistake to:

• Map only in a conference room
• Draw what supposedly happens
• Dive too deep into details (tasks)
• Follow operators
• Correct operators
• Jump to solutions
• Skip metrics
• Map solo or “stitch” maps together
• Stop at mapping
• Focus on making a beautiful map using technology

So, instead:

• Go and see firsthand
• Capture reality
• Think “high-level handoffs”
• Follow the product
• Observe, inquire, and seek to understand
• Note problems (pain)
• Measure what happens
• Map whole process together as a team
• Use maps as launch pad for action
• Draw – in pencil – the messy truth, and keep it dynamic (change it as you learn)
Additional Resources

- **Learning to See** by Jim Womack and Dan Jones

- “Value Stream Mapping – Helping Your Team See the Future State”
  - 2012 Lean Conference Presentation by Sarah Stuart, Impact Washington
  - Link to YouTube video:
    - [https://www.youtube.com/watch?v=27OBzSEjHzA&feature=player_embedded](https://www.youtube.com/watch?v=27OBzSEjHzA&feature=player_embedded)
  - Link to slides: