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Value Stream

Key Learning Points

1. Describe the importance of a Value Stream.
2. Explain how to develop a Value Stream.
3. Utilize Value Stream Maps in improvement projects.

What is a Value Stream?

A value stream consists of all of the activities within an organization which must be completed to generate a service or product. Any process involving a customer is a value stream.

Value Streams are displayed in Value Stream Maps

Value Added

Transform or shape materials or information into something that meets customer requirements. These are activities the customer is willing to pay for.

Non-Value Added

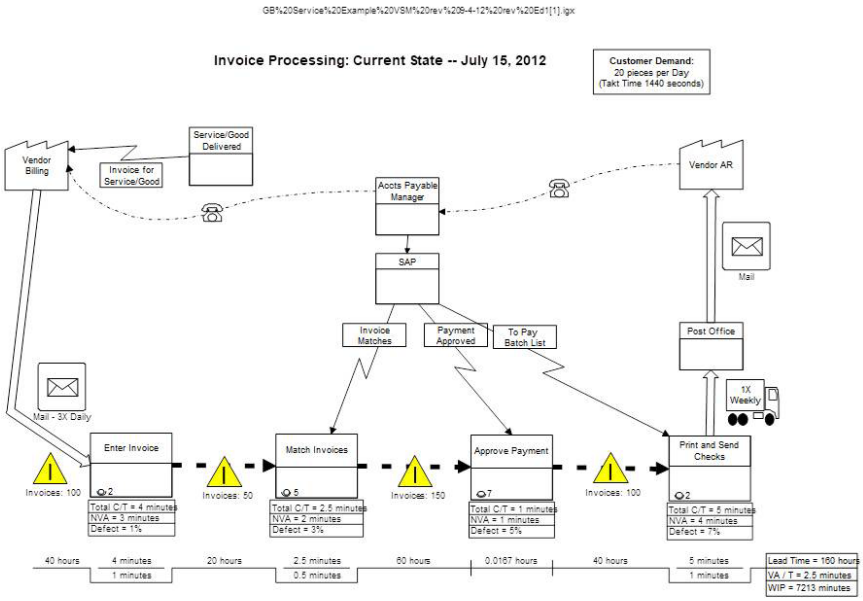
These are steps that are considered non-essential to produce and deliver a product or service to meet a customer's needs and requirements. The customer is not willing to pay for this step.

Non-Value Added But Necessary

These are necessary steps to the business, but they are non-essential to the

customer. They allow the value adding tasks to be done better or faster.

Value Stream Map



Key Concepts

- The exercise of completing a Value Stream Map reveals waste and sources of waste that you probably wouldn't notice on a day-to-day basis.
- Value Stream Mapping is a powerful tool for analyzing information and flow throughout or between organizations in order to identify and plan improvements.
- VSM provides clarity to reduce inventory and lead time, as well as helps to plan and identify lean rapid improvement events to increase effectiveness.
- VSM allows participants from different parts of an organization to gain an understanding of overall information and material fl ow.
- Making breakthrough improvements requires out-of-the-box, cross-functional thinking. You must be able to see the waste across the entire fl ow of work to gain clarity to eliminate it.
- VSM is a tool to help you visualize your current state in order to realize the future state.

Steps in Creating a Value Stream Map

1. Select and schedule the project team to include:
   a. Subject matter experts who understand the process.
   b. A Lean Expert to facilitate the mapping.

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c. Fresh eyes to question the status quo and bring new perspective.

d. The customer and suppliers, if possible, but at a minimum bring VOC-CTQ data.

2. Secure a room near the process area and gather butcher paper, post-it notes, markers, pencils, and data that has been collected in advance.

3. Gather as much data as possible before you start. You will verify the accuracy of any pre-existing data in the VSM process. Look for information on:

a. Cycle time (C/T): The time it takes to complete all work elements before repeating them. For example, the time it takes a shoe salesman to check a customers foot size.

b. Value added time (VAT): The time of work elements that actually transform the product in a way the customer is willing to pay for. For example, the one on one time a shoe salesman spends with a customer on the floor and not the time looking for shoe sizes in the stockroom.

c. Lead time (L/T): The time it takes a product or service to move all the way through a process or a value stream from start to finish. For example, the time from when a customer arrives at the shoe store until the time the customer leaves the store.

d. Work descriptions: Documented standard definitions or explanations of job roles and responsibilities.

e. Number of workers: The total number of specific employees scheduled for a given shift or time block.

f. Total working time per day (all shifts): Total number of available hours to be worked/scheduled in a day. Some businesses such as banks may have shorter hours on weekends, for example, closing at 1pm.

g. Demand: Measure and stratify demand for products or services by type, time of day, and day of week. For example, the arrival pattern of customers to a university cafe; depending on the time of year and class schedules, demand may be high in the morning and very low overall during summer months.

h. Capacity: Estimate both scheduled and theoretical capacity. Pay special attention to potential constraints and bottlenecks in the process.

i. Quantity of work performed: The total amount of measurable work or units, performed for a given period of time, for example, the total amount of time spent with a customer aiding them on a purchase.

j. Waiting or delay time: Total time spent waiting for an activity to be performed due to bottlenecks in the process or other causes of delay.

k. First pass yield: The percentage of time the customers need would be met the first time with no rework. Final yield is what a customer

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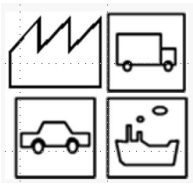
actually experiences, including rework.

4. Take a quick walk through the entire end-to-end value stream.
    a. Instead of starting at the beginning of the process, start at the end of the process and walk upstream. This way you will start with the processes that are linked most directly with the customer.
5. Begin drawing the map with the VSM team.
    a. Even if you plan on putting your map in a software program such as eVSM, iGrafx, or Visio, start off with a hand drawn version using low tech tools such as butcher paper and sticky notes.
    b. Move, eliminate, or add sticky notes as the team learns about the process. This methods allows for greater team interaction.
    c. Use a pencil in the beginning so that notes/lines can be erased. Use permanent markers to highlight the map once the layout begins to settle.
    d. Follow this order for creating the Value Stream Map.
        - Customer information
        - Supplier information
        - Order planning/scheduling/systems
        - Customer receiving
        - Supplier delivery
        - Production operations
        - Inventory
        - Information flow
        - Material/information movement
        - Timeline
6. Validate the map. Go to the actual process area, observe the process, talk to staff, and then update the map with what you have learned.

Common Symbols Used in Value Stream Maps

Customer or Supplier: Customers and Suppliers come in various categories and types. They can be people or an organization.



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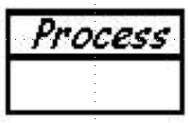
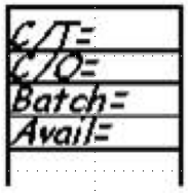
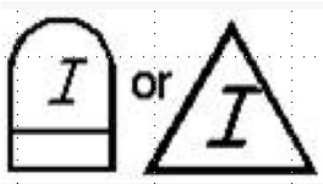
Process Step: A general rule of thumb is that a process box indicates a process in which the item (product or service) is flowing. Drawing one box for every single processing step would make the map unwieldy.



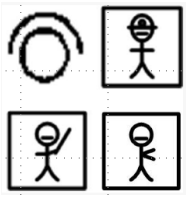
Process Data: Each process step will have a data box detailing the process data collected by the project team.



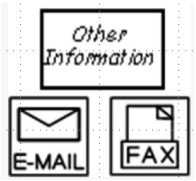
Inventory or Waiting: Any type of interruption or queue that delays products or services from reaching the customer.



Worker: Some icons use stick figures while others can be a view from top down; imagine that you are looking at the top of the workers head from the ceiling.



Other Information: Information is passed in many different forms such as verbal communication through phones or electronic communication devices, text messages, e-mail, or fax. All of theses modes can be represented by a unique symbol.



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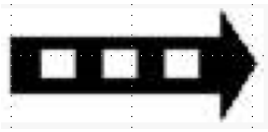
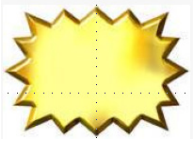
Value Decomposition: This allows you to compare the value added times or the processing times to total lead times.

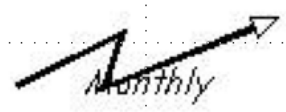
Push to Next Step: Push production is signified by a striped arrow. Pull production is signified by a solid arrow.



Kaizen Burst: At this point in the development of the Value Stream Map, it is an ideal time to identify known issues within the process and visually document them with what are called Kaizen bursts. Make sure the bursts stand out and draw attention to where issues exist. If using post-its, bright florescent colors work, or if using an electronic program, highlight the bursts in bright yellow.



Electronic Information: Remember that the value stream should also depict information fl ow. You will typically label the different information systems and vendors using a rectangular box at the top of the map.



Manual Information: Use a straight arrow to depict manual information fl ow.

Pull or Trigger: This is a process box or resource that, when available, triggers a signal to upstream processes to produce to feed the available capacity.

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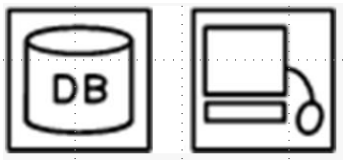
Database or Computer System: This may be either manual (paper) or electronic, and symbolizes where information is stored in the process.



Analyzing Value Stream Maps

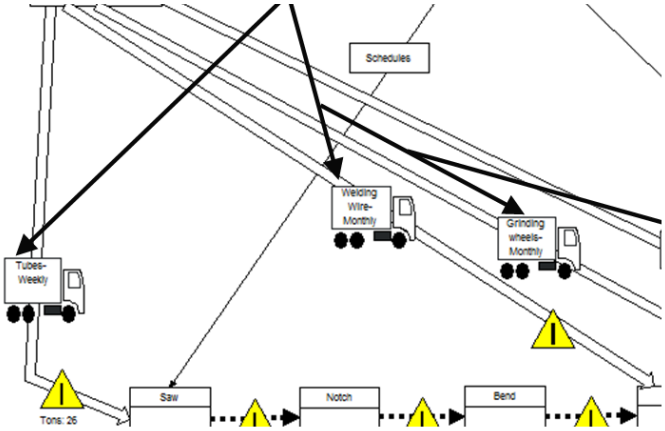
Once a value stream map is completed, it is time to analyze the information it contains.

Analyze the Supplier's Module

Supplier attributes to look at:

1. The frequency and method of transportation are important.
    a. Are deliveries at the correct intervals to reduce inventory? Should they be more frequent? Less frequent?
    b. Can some deliveries be combined to reduce freight?
    c. Can suppliers near your factory be utilized to minimize shipping times?
2. Can you consolidate some commodities to fewer suppliers that are more reliable?
    a. The Supplier Scorecard (supplier rating) must be reviewed for this action.

Example



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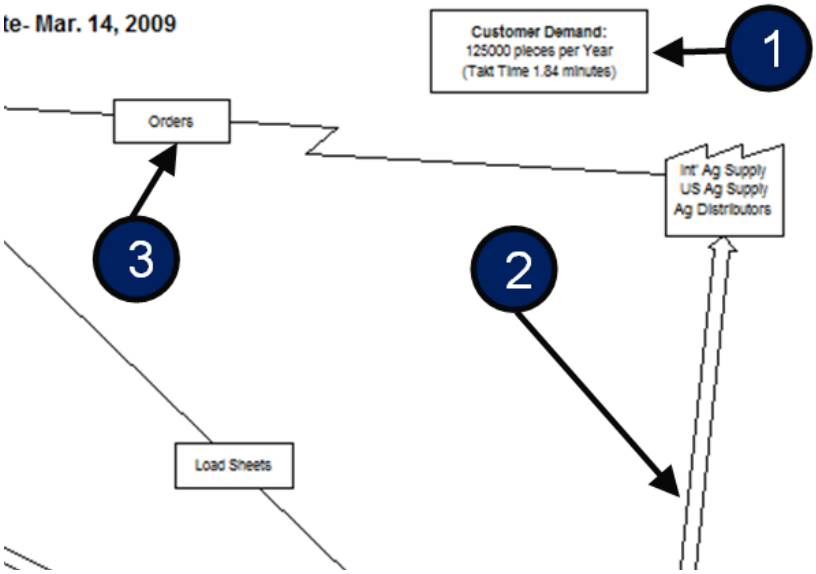
Analyze Customers, Demands, and Pull

1. How much day to day (week to week, month to month, etc.) variation in demand has been historically observed? (Demand variation will be a consideration when designing standard work)
2. How are goods/services shipped? The frequency and method of transportation are important.
    a. Can deliveries be consolidated to reduce freight?
    b. Can you consolidate deliveries to multiple customers to reduce freight?
    c. Are deliveries synchronized to the customer's Takt time as closely as possible (minimum waste)?
    d. What is the total cost per unit shipped for the various transportation modes available (truck, air, sea, etc.)? Don't forget to include customer penalties, customer service costs, etc. associated with late (or early) deliveries. Look for the optimal shipping mode based on total cost and customer satisfaction.
3. Are customer orders received in timely fashion for production scheduling (does the customer "pull value")?
4. Are there any possibilities for consigned inventory?

Example



Analyze the Process

Process attributes to look at:

1. Look for long cycle times, especially ones that are substantially longer than others. This could indicate process constraints and/or inefficient process steps.

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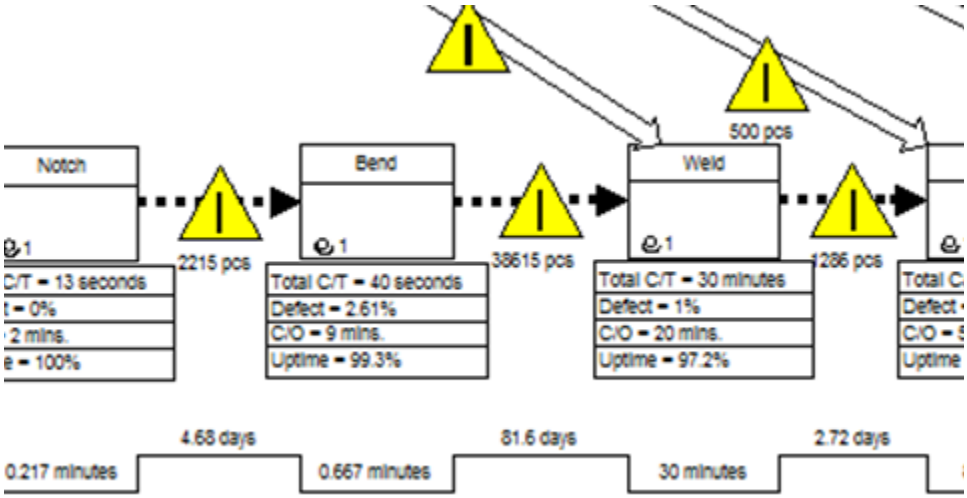
2. Look for long change over (setup) times. These are opportunities to reduce NVA.
   Look for a lack of balance in Available times from step to step. This points to opportunities to better balance production and reduce inventories because of batching.
   Look for large work-in-process inventories. This points to opportunities to reduce inventory waste and level the process.
3. Look for long waits and delays between process steps and long move distances.
4. These can usually be reduced or eliminated to remove waste from the process.
5. Look for low uptime percentages. These are opportunities to apply Total Productive Maintenance (TPM)/Reliability Centered Maintenance (RCM).
6. Calculate the daily capacity numbers (see subsequent slides) and compare them to customer demand. This helps you understand shortfalls in meeting customer demand.
7. Note the number of operators required. If a fraction, can this task then be combined?

Example



Complete VA/NVA Analysis

- Break down each major process step and the between step delay into their detailed components.
- Assign times that equal the total times for that step and the associated delay to each detailed element and place them in the appropriate column: value added (VA), non-value added (NVA), or non-value added but needed (NVA/N).

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- For example, in step 1 (Saw) the total cycle time for the step is 2 minutes (0.5 load, 1.0 machine cycle, and 0.5 unload). The delay between the Saw and Notch steps totals 2.03 days or 2923.2 minutes (5 minutes move, 2908.2 store, 5 minutes inspect, and 5 minutes move to notcher).
- Complete this for each activity in the process portion of the Current State VSM.

Note: It is not unusual for a value stream that has not had improvement efforts applied to it to have less than 1% value-added activity as shown in this example.

Example

Value Stream Management: Value-Added Decomposition Analysis

	Step (from Current State VSM)	Decomposition (detailed activity)	Times (minutes) VA	NVA	NVA/N	Why is NVA/N needed?	How to convert to NVA?
1	Saw	Load saw	0.5				
		Machine cycle	1				
		Unload saw	0.5				
		Move to hold area		5			
		Store		2908.2			
		Inspect			5	Defective product	Fix proccess
		Move to notcher		5			
2	Notch	Load press	0.01				
		Machine cycle	0.197				
		Unload press	0.01				
		Inspect			10	Defective product	Fix proccess
		Move to bender		5			
		Stage for bender		6724.2			
3	Bend	Get mat'l from staging			3	Staging too far from press	Move staging to POU
		Load bender	0.2				
		Machine cycle	0.267				
		Unload bender	0.2				
		Inspect			3	Defective product	Fix proccess
		Move to storage		5			
		Store		117496			
		TOTALS:	2.884	127148.4	21		
		PERCENTAGES:	0.0%	100.0%	0.0%		

Analyze the Final Stream

From the analysis of supplier deliveries, supplier capabilities, and process opportunities (long lead-times, inventory, down-time, unbalanced cycle times, long changeover times, etc.) identify with "Kaizen Bursts" opportunities for improvement.

Place these opportunities on the current state map as the example indicates. This will allow the team to review and prioritize activities that will enhance future state and accelerate efficiency improvements and waste reduction.

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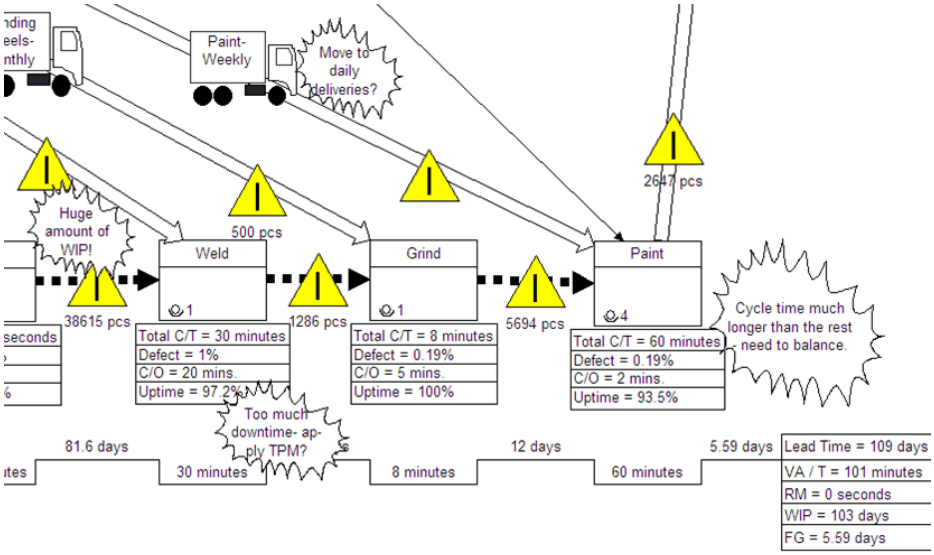
Example



When Should a Value Stream Map Be Used?

A value stream map should be used to:

- create a vision of the flow
- help see the sources of waste
- provide a common language for describing processes
- help avoid “cherry picking” lean concepts and techniques
- become the blueprint for lean implementation
- show the linkage between information flow and the physical flow of the product
- the current state helps to visualize the future state

Pitfalls to Avoid

One common pitfall in value stream mapping is to forget that you are following the “thing moving through the process,” not the task workers. Whether the thing is an item, information, or the customer, always document from the perspective of that thing. Remember, the value stream map is not the same as a process map.

Another pitfall is to not map the “as-is” process, but to map it “as you think it is,” or “as you want it to be.”

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