

A Breakthrough Concept for Value Stream Mapping

1 – Traditional Means of Value Stream Mapping

Value stream mapping is a foundational technique in lean transformation in support of the following key lean principles:

- Value is what customers are willing to pay for - all else is waste.
- Value is created by processes – normally in a required sequence.
- Identifying value and waste is the necessary first step to eliminate waste and increase the velocity of value creation within an organization.

A value stream map visually depicts the creation of value from the first process to the ending delivery of products or services to the customer.

Value stream mapping involves going to the workers in the process to trace the creation of value and uncover both the amount of waste and the sources of waste. The value stream map includes not only the sequence of processes but underlying data about those processes. The data for example on cycle times, changeover times, downtime or yield can be compared to required production rate (takt time) to allow quantitative expression of the amount of waste in a process and an understanding of whether there is available capacity.

The traditional means of value stream maps are entirely manual. These may be sticky notes on a wall, rolls of butcher paper and manually filled in forms for data boxes to capture the numbers. This documents the current state and provides metrics that can guide in creating the future state. Once the map is complete, a second manual map is normally created as a future state and the kaizens identified that must be accomplished in order to implement the future state.

In the last few years, end-users have begun to capture the value stream map electronically. These early solutions are simple, essentially just capturing the manual data.

At first, this sounds good, simple and effective but there are challenges.

2 – Challenges for Value Stream Mapping

Let's look at some of the challenges for value stream mapping.

Complexity

Value streams of several processes are one thing, those of several dozen to a hundred or so processes are quite another. They are much more challenging to conceptually grasp visually and contain entail more data than can readily be absorbed.

A value stream may support many product variations in the product family. These high mix/low volume (HMLV) or mixed model value streams may include the following:

- Multiple “flow paths” so that some processes are required only for some products
- Changeover considerations between products
- Alternate routings
- Shared resources

For example, if you have 12 products in the product family, do you use the same cycle time for each one? If you use the highest one, then you may have a lot more capacity available than will ever be utilized. If you use an average, then you risk being over capacity if the products ordered are all ones with high work content.

To keep the value stream map simple, some practitioners recommend selecting only a representative product or two and using that as the basis for the current state and to identify improvement opportunities. This approach ignores the issues of product mix and while it may highlight some of the potential for waste elimination, other issues may never be identified.

Dynamics

Most value stream mapping exercises are a one-time event. They highlight a collection of opportunities from which improvements can be launched but the map itself is largely ignored once the opportunities are identified. Why?

- New product introductions, product retirements
- Product engineering changes
- Continuous improvement to processes
- Sales volume and mix change

The calculations of takt time and quantitative metrics for waste can become out of date quickly if the value stream supports a product line with constant change.

As a result, the value stream map is relegated for use as a conceptual guide for thinking only but of little value in any ongoing sense.

3 – Toward a Breakthrough Concept

There is a threshold at which the amount of data, level of detail, and frequency of change make value stream mapping impossible (or at least very impractical) to maintain

manually or with ad hoc graphical or spreadsheet tools. This is an ideal situation to apply technology.

The breakthrough concept is that the value stream map becomes far more than an “indicator” or a “roadmap” but is a comprehensive model of the actual performance of the value stream. The model must support:

- All end products with their entire bill of material structure.
- All processes with specific process capabilities for particular items or products.
- All demand expressed through the value stream to each process.

Once the value stream model is built, key lean metrics can be derived:

- Takt time reflecting the unique demand requirements by process
- Interval calculations to support capacity analysis and labor requirements.
- Takt and interval for shared resources.

Further, the value stream model can be extended to support:

- Kanban and supermarket sizing
- Production scheduling
- Lean accounting
- Sustainability for energy and environmental impact
- Sales and Operations Planning

As a *bonus*, companies truly committed to a lean strategy will take the time to compare the processes and their sequences as discovered by the manual current state mapping of a family to that of a computer generated map using the ERP data being used every day for business decisions. Technology opens new doors every day enabling companies to compete where they may not have previously competed – but all technology is completely depend on the quality of its data and the humans who maintain it!

Addressing the dynamic nature of constant change, the value stream model must support:

- Full database repository that stores data at all levels of detail to used for collaboration
- Integration with ERP systems, MES systems, spreadsheets or wherever current data resides reinforcing accuracy in the ‘systems of record’
- Rapid reconfiguration of value stream maps to reflect the latest changes.
- Easy creation and manipulation of what-if scenarios.

The benefits:

- Dynamic value streams that continually reflect the current operation
- Ability to truly manage by value stream
- Data driven decision-making

- Rapid what-if analysis

This can result in a breakthrough for lean transformation with accelerated time to benefit while delivering stability, standardization, and sustainability.