

VALUE STREAM MAPPING

ABSTRACT:

A major activity in the journey towards lean is the effective management of the flow of products and services through the series of the activities involved in providing value to the customer, known as the value stream. This requires a detailed understanding of all the processes involved so that non-value-added activities can be identified and eliminated. Value stream mapping is a technique that can aid in developing this required knowledge. This paper provides a detailed introduction to value stream mapping through the review of three articles on the topic. The articles are specifically ordered such that each article utilizes the techniques introduced in the previous article. In addition to overviews of the contents of the three articles, this paper also provides explicit recommendations for each article and describes how the techniques introduced can be incorporated into my work.

INTRODUCTION:

This paper presents the results of the analysis of three articles that describe value stream mapping and its basic tools and concepts. All three articles are results of work conducted by the Lean Enterprise Research Centre at Cardiff Business School in Cardiff, UK. Each article discusses a different aspect of the subject, and therefore the expectations of each article are different. The articles are specifically ordered such that each article utilizes the techniques introduced in the previous article.

The first article, entitled "Competing against ignorance: Advantage through knowledge" [1], introduces the Value Stream Analysis Tool (VALSAT) and describes how it can aid in increasing knowledge of the value stream. I expect to gather in-depth knowledge of this tool, including its purpose, applications and advantages.

The second article, entitled "The seven value stream mapping tools" [2], describes a toolkit consisting of seven tools that, when used together, provides an effective framework for identifying and eliminating wastes. I expect to develop an understanding of these tools and how they can aid in the journey towards lean.

The third article, entitled "From current state to future state: Mapping the steel to component supply chain" [3], describes how current state and future state mapping can aid in lean improvement. I expect to be comfortable with constructing these maps and learn how to achieve the transformation from current state to future state.

Article 1: Competing against ignorance: Advantage through knowledge

The first article is entitled "Competing against ignorance: Advantage through knowledge" [1]. This article describes the use of a technique called the Value Stream Analysis Tool (VALSAT) and discusses its advantages and disadvantages.

The article begins by discussing the types of improvements companies want to make. Fourteen large UK organizations were given a list of ten propositions and asked to rate the importance of each of the propositions. The results were then tabulated to determine the average importance of each improvement to the group of organizations as a whole. It was noted that the importance ratings would no doubt change over time, and therefore "a dynamic analysis, prioritisation and focusing tool, which if possible should be capable of using both tacit and subjective information as well as explicit or quantifiable information" [1], is needed. This tool will provide an organization with detailed knowledge of its value stream or supply chain.

The tool described in the paper, VALSAT, meets all the above criteria. This tool is just a modification of Quality Function Deployment (QFD) whereby the WHATs represent the improvements required based on customer needs, and the HOWs represent possible techniques to achieve these improvements. The article does a good job of detailing all the steps to follow in using the tool to determine which of the HOWs to undertake so that the most important WHATs are resolved. In short, the selection of the appropriate HOWs is determined by the importance of the WHATs, customer assessments on how the company is currently performing on each of the WHATs, how good the HOWs have to be and how difficult it is to implement each HOW.

The article then provides a case study of a Kenyan textile manufacturer to describe the practicality of the tool. It was shown that using the tool resulted in great benefits to the company. Next, current research projects utilizing the VALSAT are listed to show the wide range of industries supported by the tool. These include both manufacturing and service industries.

The article concludes by listing some of the advantages and disadvantages of the VALSAT. It can be seen from the article that the advantages far outnumber the disadvantages, further proving the usefulness of the tool.

This is a good article that clearly describes the VALSAT. However, the concepts introduced might be a little difficult to comprehend those unfamiliar with QFD. Therefore, I recommend that novices read an introductory article on QFD prior to reading this article. Those already familiar with QFD can just skim the article to get a good understanding of the tool.

Article 2: The seven value stream mapping tools

The second article is entitled “The seven value stream mapping tools” [2]. This article describes a toolkit consisting of seven tools that, when used together, provides an effective framework for identifying and eliminating wastes.

The article begins by stating that the difference between a supply chain and a value stream is that a supply chain encompasses all of the activities of all the companies involved, whereas a value stream only refers to the specific activities which actually add value to the product or service. Next, the three types of activities, with examples, are presented, followed by an excellent description of each of the seven basic wastes.

The article discusses problems with existing tools for analyzing value streams. The main problem identified was that each of these tools was too limited in scope and did not integrate well with one another in order to provide a comprehensive view of the value stream. The seven tools presented in the article were specifically designed to eliminate this problem.

The first tool, process activity mapping, aids in developing solutions to reduce waste. The second tool, supply chain response matrix, aids in identifying the activities constraining the process so that these activities can be targeted for improvement. The third tool, production variety funnel, is similar to IVAT analysis and helps one understand how products are produced. The fourth tool, quality filter mapping, aids in identifying where quality problems occur. The fifth tool, demand amplification mapping, aids in analyzing the increase in demand variability as one travels up the supply chain, otherwise known as the bullwhip effect. The sixth tool, decision point analysis, aids in identifying "the point in the supply chain where actual demand pull gives way to forecast-driven push" [2]. Finally, the seventh tool, physical structure, aids in developing a high-level understanding of the supply chain.

The selection of "which tools to use in what circumstances is done using a simplified version of the value stream analysis tool (VALSAT)" [2], which was introduced in article 1. Weightings are developed to determine the usefulness of each tool for identifying each waste. The weightings utilized in the analysis are dependent on the industry being considered, with some wastes being more relevant in some industries than on others.

This is an excellent paper that I recommend everyone read. In particular, the first section, where the three types of activities and seven basic wastes are described, is a must-read. The rest of the article can then be skimmed to gather a sufficient understanding of the tools.

Article 3: From current state to future state: Mapping the steel to component supply chain

The third article is entitled "From current state to future state: Mapping the steel to component supply chain" [3]. This article describes current state and future state mapping and how they can aid in lean improvement. Information is provided in the form of a case example, in this case a steel to component supply chain, hence the title.

The article states that the main weaknesses with the tools described in article 2 are its micro-perspective and "its lack of visual nature" [3]. This article integrates the tools described in article 2 with others and depicts the information gathered in the "learning to see" style [4] to provide a visual picture of the value stream. This is known as material and information flow value stream mapping. There are four steps to this approach. The first step is to select a product family. Next, a current state map should be developed. The third step is to develop a future state map. Finally, a plan to achieve the future state should be constructed.

Developing a current state map involves four stages, described in detail in the article. These are: "(1) gather details about the customer's requirements; (2) detail the physical flow with all processes, data boxes and inventory triangles; (3) map the supply of materials; and (4) map the information flows and determine push and pull system" [3]. These stages are described in detail in the article, and a diagram listing all the different mapping symbols utilized is provided. The current state map for the first-tier component supplier in the case example is provided, with details thoroughly explained.

The article then talks about future state mapping. The seven improvement guidelines covered in class are presented, along with a description on how the guidelines were converted to questions in order to retrieve required information for improvement. The future state map for the first-tier component supplier in the case example is provided, with details thoroughly explained.

The article then takes a step back to describe the process of developing current state and future state maps for the entire steel to component supply chain, before concluding by listing five issues to be considered when moving from current state to future state. These are described in detail in the article and should act as an effective guide to achieving the desired future state.

The only things lacking in the article are information on which product family to select and how to account for different cycle times in the product family. Otherwise, readers will come away with an in-depth knowledge of value stream mapping and be comfortable with developing current state and future state maps. This article is a must-read.

INCORPORATION:

Each of the articles provides good techniques that can be applied in my work. The VALSAT introduced in article 1 is basically a slight modification of QFD which is a good tool for selecting the appropriate solutions (HOWs) to any kind of problem (WHATs). The seven value stream mapping tools described in article 2 are an integral part of creating effective current state and future state material and information flow value stream maps and might come in useful for the value stream mapping class project I am currently working on at Raytheon Aircraft Company. I would have also considered developing a value stream map for my senior project conducted at PlasticFab if article 3 had provided some information on how to account for different cycle times for each part number in the product family, cargo shrouds in this case.

SUMMARY:

Reading the articles helped clarify my understanding of value stream mapping. I now have good knowledge of the various value stream mapping tools and how to select which ones to use when. I have also gained confidence in developing current state and future state maps, and I now know some of the issues that need to be addressed when constructing a plan to achieve the desired future state. Finally, reading the articles has also reinforced my knowledge of general lean concepts learned in class such as the three types of activities, the seven basic wastes and the seven improvement guidelines.

REFERENCES:

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