Value Stream Mapping: How to See Where You're Going By Seeing Where You Are

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This experience report details my 2019 involvement with 3 organizations of 3 different sizes (small startup, small-to-medium enterprise, and giant enterprise) to illustrate how I've used a form of Value Stream Mapping to help them define their current state and leverage data collected in the process to confidently identify (often surprising) risks and opportunities.

1. INTRODUCTION

We're so used to taking the next step forward (or running in place!), we often don't realize that taking a step back to look at the big picture could show us a leap forward sitting right under our nose. The pace of change and increasing complexity can give us pause to the point of stasis, yet without informed action we can't improve. Value Stream Mapping (VSM) gives us the opportunity to see the hidden risks and potential that we miss in our day-to-day processes, and take clear and confident steps towards better.

I've been facilitating Value Stream definition and improvement as a technical leader for over 5 years, the past 2 as a consultant to companies of all sizes. Coming from my background as a systems and release engineer, enterprise transformation consultant, and startup CTO, I've seen unique and similar challenges at every organization stage and size.

Collaboration and open-minded unity have always been passions of mine. They're key factors in successful change but also become increasingly challenging to accomplish as scale and complexity increase. To progress towards improvement and new ways of working, we need to embrace new perspectives and new tools that will help build our overall and lasting confidence.

Using a case from a large enterprise client, I'll demonstrate how VSM improved clarity, alignment and confidence in a dramatically short window of time. I'll also compare and contrast the enterprise case for VSM against small-medium enterprise and startup examples to share how organizations of any size can benefit from VSM. Like you, these companies faced performance, complexity and alignment challenges and searched for the best, most productive way to move forward from them. I'll share how VSM revealed massive ROI in tackling these issues, and how it can provide clarity, alignment, and confidence so often absent in software development.

2. MAPPING THE ENTERPRISE LANDSCAPE

I was engaged by a Fortune 10 company to help improve their software delivery velocity. They produce a large, complex portfolio of hardware devices, integration software and user applications in a highly regulated environment. They had struggled with failed transformation efforts for over a decade and were stalled in a SAFe implementation that wasn't delivering results. Seeing recent progress in transformation and agility demonstrated by similar organizations, they had begun to invest in talent and strategies to adopt modern DevOps techniques across their portfolio. One of their new hires under this initiative engaged me after we met at a conference I spoke at, and saw a Value Stream approach as a way to visualize and simplify their complex situation, measure performance and constraints, and make strategic decisions towards automation with confidence and alignment.

In smaller organizations, I commonly work with senior executives directly who have typically bought into a Value Stream approach prior to the engagement. In an enterprise environment, I typically work with director or VP level staff, who have budgets, plans and roadmaps to justify to senior executives. This traditionally requires leveraging long-standing relationships, legacy vendors or considerable confidence in a Gartner or

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Forrester-endorsed approach, but in each case, the years and over a trillion dollars of failed transformation waste demonstrated a need for a fresh approach.

2.1 Introducing Value Stream Mapping

To address our enterprise client challenges, we needed artifacts, data and insight that would resonate with and appeal to the views and concerns of every level of the organization. The middle had to demonstrate a clear, fact-based understanding of the current state, derive insights to drive confident suggestions, and convince those above to approve action. Executives needed to quickly understand the opportunities and risks, and feel assured that due diligence had been done and requests were made with prudence. Contributing staff and stakeholders needed to feel confident in assessments and plans presented by those distanced from the work being done.

This is where the value stream map becomes an indispensable tool. By combining variable detail, data, and visual clarity, the map is quickly understood at a glance and is insightful upon deeper inspection. If you respond to graphics, the picture is there to see. If your focus is evidence, the data is clearly available. If you're looking for answers, the combination brings you confidence.

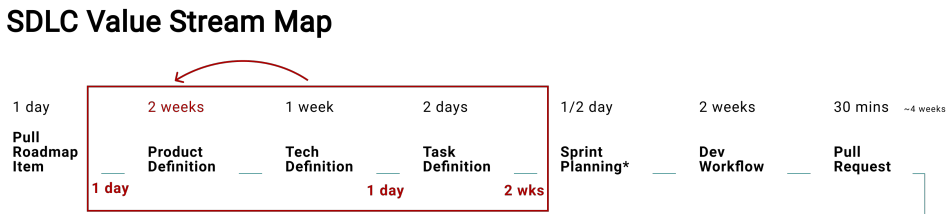

Figure 1: Modern Value Stream Mapping

The urgent desire for action in my client led mid-level leadership to seek a sizable transformation budget with the aim of improving their release cadence from its current SAFe 4-year release cycle, and 2-year iteration cycle. There was an assumption that a considerable (>10MM) investment in deployment automation would dramatically improve lead times and quality, but doubt from some stakeholders led them to me for analysis and validation. The resulting insights were surprising and incredibly valuable.

2.1.1 Organization attributes

- >70000 staff, 150M on software/year
- Hardware and Software production, 4-year release cycle
- Partially implemented SAFe, lots of complexity, documentation, and process, little value

2.1.2 Goals

- 30-40% Lead time reduction: Potential 60M in software savings
- 25M/year savings via DevOps, 5-8M spend on DevOps in 2020
- 3 months faster cadence for devices, 6 months faster for device software

2.1.3 Challenges

- Code Merging
- Regression Testing
- Manual Testing
- Static Analysis
- Performance Testing
- Security Automation
- Environment Creation
- Label Translation
- Interface Changes
- Tooling standards
- Issue Detection/Triage
- Test Data Generation

2.1.4 Enterprise: Current State

In this illustration, because of the high-level focus and scale of the value stream in question, lag and wait time doesn't factor prominently. To effectively reveal and diagnose waste, we dig deeper into specific areas or processes to reveal additional data. More examples of this follow with a comparison to a startup and smaller enterprise.

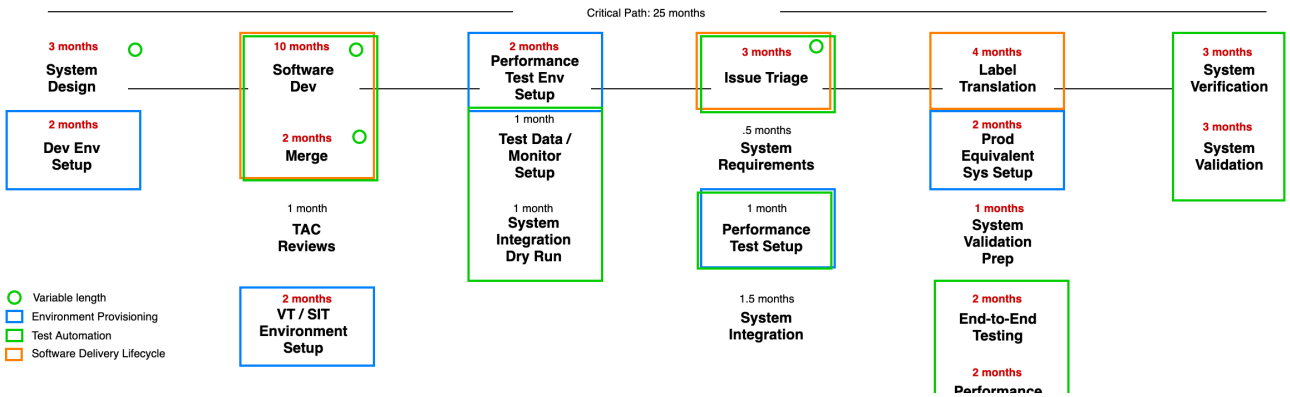

Figure 2: Timing established by surveying the group estimation 80th percentile duration of each step

You can see above three primary areas of concern appear in environment provisioning, test automation and the software development lifecycle. By identifying these 3 areas, we can prioritize further investigation based on most time spent, highest value to the organization, risk and other factors.

2.1.5 Value Stream Attributes

- 26 Steps
- 6 Primary Stakeholders
- 110 Contributors
- 25 Months Total Critical Path lead time
- 4 Environment Setup Steps
- 35 Discreet Primary Artifacts
- 66 Days Average Step Time
- 6 months on branching/merging

2.1.6 Top 3 Opportunities Identified

- Test Automation [Figure 2: Green]: saving >10months
- Automated Environment Provisioning [Figure 2: Blue]: saving ~6months
- Software Delivery Lifecycle [Figure 2: Orange]: saving ~8months

2.1.7 Secondary Improvements / Savings

- Opportunity cost: faster time to market
- Context switching of handoff delays
- Training time/cost: better onboarding
- Absence risk via improved governance
- Morale cost of friction and ambiguity
- Environment uptime/inventory via IAC

2.1.8 Top 3 Risks Identified

- Rework / Integration volatility: 35% average rework % (Forrester + Volk)
- Manual testing: Security, consistency, speed
- Large batch execution: SI/Program size is large

2.1.9 Experience Challenges

- We couldn't actually follow the value stream live as it encompassed 4 years of effort, the VSM engagement operated as a retrospective on the last iteration
- High complexity (4 streams intertwined, multiple levels of program/project representation)
- Our first time tackling such a complicated structure: SAFe is challenging to wrangle
- Keeping everyone engaged and energized while collecting specific/deep data is tough
    - Having the right people in the room at the right time needs to be a priority to maximize value
    - Be intentional about designing experience and value for everyone up front

2.1.10 Experience Outcomes

- 10s of millions of dollars savings via a fraction of a fraction investment in capital, and only 2 days of sustained effort

- We gained surprising visibility into process, dependencies, and complexity that were hidden by SAFe adherence. Insight into current cost and waste hidden within the development process
- We created a strong, data-supported case for specific, targeted investment that could align everyone from leadership to individual contributors. A clear illustration of issues and opportunities, easily understood by anyone at a glance
- Over 2 years of potential time savings across the 4-year release cadence

3. DIFFERENT ENVIRONMENTS, DIFFERENT FOCUS, SAME APPROACH

A value stream mapping engagement provides confidence and alignment in an enterprise environment. These two resources are more elusive and scarce as complexity, scale, distribution, and autonomy increase over time. In smaller and younger environments such as a startup or small-to-medium enterprise, the same challenges exist, though the largest pains differ according to the organization size and velocity.

In a nimble startup, high velocity and growth combined with product pivots can lead to a lack of definition and clarity. At this stage, most process is undocumented and evolving rapidly. Individual roles and responsibilities can change often. In a small or medium sized enterprise, new markets and acquisitions can dramatically increase challenges of scale and visibility. Companies in this tier often fall victim to documented yet outdated, heavy, and inaccurate process definitions never actually followed. As organizational structure tends to fall into departmental silos, large-scale visibility and painful handoffs are common.

It's important with each team and organization to survey their unique goals and pain points, however a general understanding of typical attributes can help establish context and expose variance to investigate further. To show some of these key differences in focus and challenge, let's look at one example of each to highlight contrast and commonality.

3.1 Mapping a Startup

I was engaged by a young startup to help them deal with increasing complexity, scale, and confusion. They had evolved from a proof of concept into a paid service with real customers, which required not just service obligations but also a path to future sustainable growth. As a VC-backed organization, their path required an ability to instill trust and excitement in investors, as well as staff easily poached by rival companies.

In an early startup, the pace, immaturity, and adaptation drive a need for definition and clarity. Without a clear and efficient process, waste and rework pile up. Ambiguity and variance can stress staff to the point of burnout or departure. Often their autonomy drives them to inaction for fear of making a mistake. A myopic focus on tech, sales, marketing, or hiring can lead to underutilized or unintegrated staff.

With one engagement we aimed to address a variety of challenges. Leadership was frustrated with low clarity and visibility on what was currently happening in the development lifecycle. Late participation from validating stakeholders (leadership/sales/marketing/customers) led to rework and dissatisfied recipients of the work. Overloaded senior technical staff were constantly distracted by code reviews. Undefined roles and ownership led to confusion, delays, and finger-pointing. This developing but inconsistent sprint process is common in a smaller organization and can be greatly improved with value stream analysis.

Startup: Current State: 4 Week Software Development Lifecycle

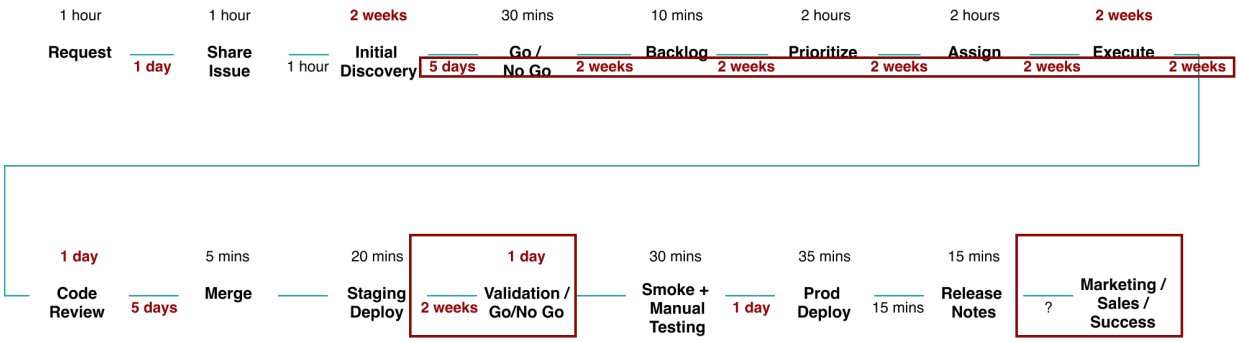

Figure 3: The current state reveals 3 clear opportunities. Red denotes any significant timing

Three clear opportunities arose from the current state:

1. Handoffs to oversubscribed staff were causing significant delays, as a single empowered individual could carry the work through multiple steps
2. Lack of process definition and ownership often resulted in completed work sitting unverified or undelivered
3. Marketing and support lacked definition and process, so customers were either missing changes or frustrated by them

The team I worked with went from being frustrated with the steady decline of their delivery capability and confidence to knowing exactly what would provide positive results via the data exposed. Leadership gained an appreciation for the complexity present in the current state and the factors affecting performance and trust. Visualization and measurement of the value stream allowed them to address gaps in understanding, clarity, and performance. Upstream contributors gained an appreciation for how their contribution affected roles and outcomes downstream. Downstream contributors gained an appreciation for how upstream issues were affecting them and how they could be involved and informed earlier to improve outcomes and confidence. The four-week highly variable cadence became a consistent weekly cycle. The same outcomes are surprisingly common in enterprise environments.

3.2 Mapping a Small / Medium Enterprise

Let's look at a larger organization, just over a decade old, with an established product and market. Their challenge was in building out a backlog of partner integrations, which, given their delivery cadence would take decades. I was brought in by their VP of Engineering to cut their delivery lead time and allow them to address the opportunities to grow their reach and market presence.

In a small or medium enterprise, the need for manageable scale and visibility in increasing complexity drives the need for a map. It eases onboarding by providing a clear view of the environment and how one contributes. It reassures partners of diligence and structure by revealing and communicating processes and performance. It brings newly acquired companies and teams into the fold by showing them how everything fits together and where they come in.

In an SME environment, growing complexity can provide a fog across the organization, hiding friction, risks, and opportunities. The value stream map we created was simpler than the enterprise case based on the smaller scope and project-based approach, but the simplicity hid a long and inefficient process, full of handoffs and delays.

SME: Current State: 12 months

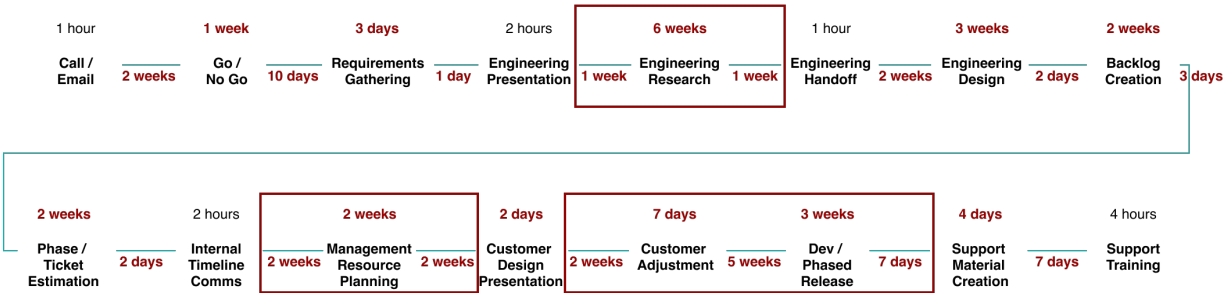

Figure 4: Current State Map highlighting 3 main areas of concern

Without addressing any of the steps in the process, simply by leveraging existing tools to automate handoffs and eliminating waste, this case saw a 9-month improvement in lead time, allowing for 4x as many partnership engagements each year.

SME: Future State: 3 months, with no step changes

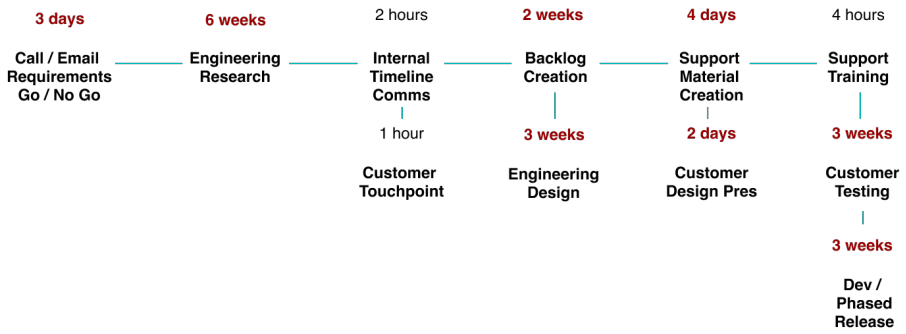

Figure 5: Future State Optimization: Vertical sections denote parallel activities

VSM provides insights and opportunities for action for everyone at every stage and size. When was the last time you found a scrum ritual or planning exercise that was equally valuable to both the CEO and the new hire? When was the last time you had a strategic tool that worked equally well in a startup and a Fortune 500 company?

4. OVERALL TECHNIQUES APPLIED

Visibility and Awareness. The core of value stream mapping is in visualizing a current or possible state of operation. Often teams will operate under the status quo indefinitely until catastrophe prompts them to evaluate their surroundings. A value stream mapping exercise is often spurred by such an event. We often start with a very high level value stream map to establish context and agree on a focal point or bottleneck hypothesis, and then iterate at higher levels of detail to uncover insights. This process can repeat until the team feels confident that they have enough data to proceed with a clear priority for improvement.

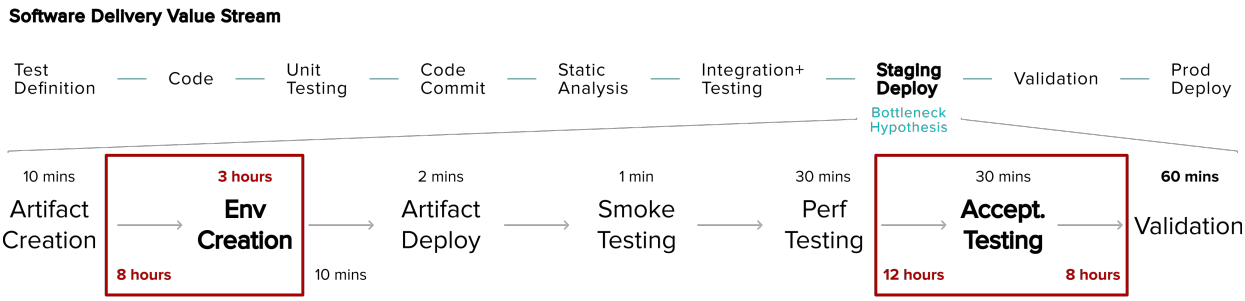

Figure 6: Example: Digging deeper to find specific bottlenecks

Psychological Safety and Inclusion. Beyond expertise, the value of a facilitator is the outside perspective, as well as political detachment. There is a lot of complexity and risk involved in assessing a current state. As much as some individuals crave the validation of assessment, others dread it. My role involved communicating differently to stakeholders and contributors based on their needs and perspectives.

To both groups: I emphasized the point that the system was being assessed, not themselves. That we arrived at the current state through no individual fault or factor, but a complex evolution over a long time. The framing for the exercise is to start from where we are and move forward. I shared the need for contribution and diversity throughout the engagement to build the most complete and accurate picture of the current state.

To leaders: I prepare them for the possibility that the exercise could result in subordinates raising concerns or dissatisfaction. I share that this is not a judgment on them but the stream itself and that we'd have bigger problems if the team didn't feel they could speak up. I also make it clear that without this map we'd continue to plan and act based on assumptions, which could have considerably worse outcomes.

To contributors: I communicated that this wasn't an opportunity to complain or point out who was right or wrong. I emphasized the need for varied perspectives and participation, and that this was their opportunity to (positively) share their experiences and understanding of what's happening.

Building on those ground rules, it's important to keep the group focused on 'current' state, as it's easy to fall into ideas or plans for the future and dwelling on past events. It's also easy (especially for engineers) to dive into too much detail, so it's important to keep participants focused on the goals for data collection, just enough to make confident decisions.

Iterative Investigation. I combined interviews, group discussions, and presentations back to clients in my process. High-fidelity individual perspectives provide deep context to offset broad and high-level information collected from groups, and by presenting my interpretation back to clients early and often, we narrowed the understanding gap and produced higher and higher fidelity outcomes and data.

Lean Collection. It's critical to manage the energy of the participating group and the cost of keeping them from production. To this end, my approach is focused on efficient and effective iteration when collecting data. I always start with steps and timing as the most valuable parts of a map and then add detail in layers atop that foundation as time and fortune allows.

Layered Detail and Accessibility. By breaking value stream maps into distinct levels of detail—from basic steps and timing to role and tool interactions at each step—I was able to communicate value and insights from the maps to varied stakeholders with data they valued. Those concerned with the high-level bottom line could view it without having to filter out unnecessary detail. Contributors looking for where they could impact the bottom line could see the inner workings of the value stream and where to focus their attention and efforts. Both groups could easily understand the map without training or even guidance, which compared to a typical traditional value stream map is extremely challenging.

5. KEY LEARNING AND TAKEAWAYS

Overall, the same challenges encountered by my clients affect the practice of mapping their value streams. Often the issues they are struggling with affect my work as well, but through the mapping process we all uncover a greater understanding and contribute our perspectives to creating a clearer view and better solutions.

Complexity is challenging to illustrate, analyze, and measure, but without trying you can't improve. Using a simplified, constrained structure (a linear stream) can provide beyond 100% of the benefit of traditional Value Stream Mapping for 1% of the investment, while avoiding added confusion and complexity.

Sharing the same view can build confidence, alignment, and clarity. Teams leave the exercise regardless of the deliverable outcome with a stronger sense of where they are, where they're going, the real enemies to fight against, and how they can contribute.

Our collaboration helped us discover unexpectedly higher value opportunities, and the data we collected as measurement validated the insights we uncovered. Many leaders have to make priority or planning decisions without data, which can lead to wasted time, effort and credibility when improvement doesn't move the needle. A Value Stream Map can provide data to support or debunk assumptions about next steps. Progress and goals are far more powerful when they're backed by evidence, and our maps provided not only concrete reinforcement for insights and decisions, but they presented them in a way that was quickly and easily understood by anyone viewing them.

For the time, effort and cost invested in each case, the return on investment has always been many multiples and in very short time frames. In each case the alternatives of struggling internally or hiring a larger, more holistic general consulting firm (even one focused on the latest DevOps techniques) would have taken months longer than our engagements at much higher cost.

Even if your organization hasn't yet participated in a VSM session, these cases and techniques demonstrate how you can reveal tremendous value in your organization, currently hidden away. Take a step back, visualize, and measure to challenge assumptions, gain clarity, and share it. Thinking and working in Value Streams removes a lot of uncertainty about where to focus, how to communicate, and represent flow.

A Value Stream Map doesn't need to be confusing, complicated, or take weeks to build. In all cases, initial mapping was created in a few hours. The key is building upon low-fidelity maps to collect more detail where valuable, rather than across the board.

I hope these illustrations leave you feeling inspired and empowered to look further into value stream mapping. There is precious little information available for VSM focused on software development, but it is quickly becoming increasingly popular and common.

As you can see with the examples above, it's quite rare to have teams look for value stream improvements beyond a current state assessment and without a serious urgent need. However, need often arises from an opportunity or unaddressed risk. Adopting a practice of VSM as part of our regular workflow would allow us to capitalize on opportunities and avoid risks before a problematic need arises. With VSM, we can adopt a regular cadence of reflection, inspection and adaptation that concretely and consistently helps us actualize our potential. Most people don't even know that value stream mapping exists and that such a tool is available to visualize, define, and navigate both current surroundings and future possibilities. As thinking in terms of value streams and mapping becomes more accessible and common, we will improve our ability to understand and manage increasing complexity and collaboration challenges, leading to faster, more sustainable and more positive outcomes.

If you're interested in more information about value stream mapping, check out https://thinking.visible.is for a starting point, templates and resources, and more content.