

Value Stream vs. Process Improvement

The Hierarchy of Process Discovery

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What is the difference between value stream and process improvement? Many organizations are struggling with this very question. Focusing on just one will sub-optimize any continuous improvement efforts. It is important to understand the synergies between value stream and process improvement in order to ensure the success of improvement practitioners. Being able to lead improvement efforts in both arenas requires knowledge of the appropriate methods and tools to employ at the proper time.

Value stream improvement differs from process improvement in that it focuses on improving the flow between processes while process improvement focuses on reducing the variation within processes. This may be an over simplification but it permits the understanding of the basic premise in both approaches. If these basic tenants are first understood, then hybrid approaches can be applied. Many organizations and practitioners fail to understand the difference, and thus sub-optimize their improvement efforts thru lack of understanding of the core principles.

The Hierarchy of Process Discovery

There are at least three levels in the hierarchy of process discovery. The highest level is the value stream or flow level. The value stream level focuses on examining work across organizations, functions and processes. The goal is to optimize the flow by eliminating waste and disconnects between the processes. This improves the effectiveness of the entire value stream by minimizing the lead time. The core tool to document value streams is value stream mapping.

The next level is the process level. The process level focuses on looking at work within a process, function or department. The goal is typically to increase the efficiency and quality within a process for better productivity of the resources within the process. The core tools to document processes are process maps, process flow charts and process level swimlane diagrams.

The lowest level is the task level. The task level focuses on how the steps are performed within a process. The goal is to standardize the way work is performed in order to minimize variation and maximize process efficiency. The core tools to document tasks are standardized work, standard operating procedures, workmanship standards, job aides and work instructions.

Process Improvement

People typically focus on the process or task level because that is the world in which they live. They focus on what is in the area of their own influence and thus what they have control over. It is less common to look across their processes to maximize the effectiveness of the value stream. This is partially due to the fact that people are organized by function rather than work flow, trapping the work in functional silos. In a transactional environment these silos are even stronger than in a manufacturing environment, as they are forged from education, careers and positions that align the individuals within silos. Focusing only on the process or task level leads to an over reliance on local utilization of resources, efficiency and productivity. This reliance, along with batch and queue processing, leads to sub-optimization of the value stream. Optimizing efficiencies and productivities is in itself not bad, unless it leads to

behaviors that negatively affect the value stream level. This typically occurs when striving for productivity leads to overproduction and large batches, which in turn leads to longer value stream lead time and waste.

Six Sigma is considered to be primarily a process improvement methodology. As stated above, typical process level improvements seek to maximize efficiency and productivity. Additional process level improvements focus on reducing variation and improving quality within processes. When done in conjunction with the value stream, process improvement can be an enabler to flow. In many cases the waste within the value streams are symptoms of process level issues.

Value Stream Improvement

As stated above, a value stream is a collection of cross-functional processes. Value stream improvement is centered on improving the flow of product and services across these processes. The quintessential tool in value stream improvement is value stream mapping. Value stream mapping is the only mapping tool to focus specifically on what is transpiring between the processes. The ground breaking book *Learning to See* [Rother and Shook] is appropriately titled because it allows people to see their process in an entirely different light. Value stream mapping promotes system thinking by focusing on what is best for the entire organization rather than just a single process. *The Complete Lean Enterprise* [Keyte and Locher] outlines value stream mapping for transactional processes. A value stream map can be the basis for the development of a transformation plan for the entire value stream.

A swimlane diagram can be used at a value stream level if the lanes represent different processes or departments. If the different swimlanes represent people or positions then the swimlane is on the process level. The value stream level swimlane can serve as an entry level value stream level mapping tool that displays the hand-offs between departments. While it can be amended to include the lead time, it lacks detail on the reasons for the lead time between the processes that a value stream map provides.

A hybrid mapping approach has emerged to leverage the simplicity of the swimlane but also provide some of the details that a value stream map provides. This approach is used within transactional value streams and is thus called Transactional Value Stream Mapping (TVSM) or the Makigami approach [Koch]. The Makigami approach has built upon traditional hybrid swimlane mapping to provide additional details in a structured manner for transaction processes. Additional details include the type of information flow and the information technology systems, the time analysis and waste and problem identification. Makigami also offers a step-by-step approach to creating a transactional swimlane. This approach, combining the simplicity as well as the additional details within the map, has led to its increasing use by practitioners for transactional applications. The same recommendations to staying at a value stream level for process discovery apply Makigami as well.

Within the value stream or flow level there are a number of different levels. The highest level value stream is the enterprise level. The enterprise level maps the flow of work across organizations. This typically includes the supplier, core organization and the customer. The book *Seeing the Whole* [Jones and Womack] is a core resource

that describes enterprise value stream mapping. Enterprise Value Stream Mapping (EVSM) focuses on addressing disconnects between organizations and on optimizing supply chains. In an enterprise value stream map each of the process boxes represent an organization's different locations.

Next comes the high level value stream. The high level value stream is the highest level within a single organization. It maps the flow of work between parts of the organization. In many high level value stream maps the different parts of the organization are in different locations. In a high level value stream map the process boxes are different functions. An example high level value stream may span across the following functions of a single organization:

- Research and Development
- Design and Engineering
- Sales
- Manufacturing
- Distribution

These high level functions of one organization may or may not be in a single location.

Next comes a process level value stream. The process level value stream indicates the flow of work between processes. The process level value stream is also called a four wall value stream, as it is contained within the four walls of a single location. The process boxes in a process level value stream map comprise a single process. Keep in mind that a process is a collection of steps performed by people within the organization. An example process level value stream may span the follow processes of a single location:

- Turning
- Heat Treating
- Grinding
- Honing
- Assembly
- Test

The process box in this value stream map represents the entire process and not the details. There may be more than one process value stream level depending on the perspective of the mappers.

A common pitfall is for teams to include the steps of a process, instead of the entire process, as a process box, when the responsibility for a process box is a person rather than a department. In this case, the team has confounded a process map with a value stream map, negating the benefits of the value stream level. In this situation the team can lose sight of the flow of the value stream by focusing too much on the details. This may prevent the team from making large scale, value stream level improvements. In these cases the team should perform a process level value stream map to diagnose the situation and prioritize the opportunities. Process improvement should then be leveraged as directed by the value stream analysis.

Lean is considered primarily to be a value stream improvement methodology. While Lean is much more than the method of value stream mapping, improving the flow is a core tenet of Lean.

As stated above there may be more than one process level value stream and deciding which one to attack is an important scoping element in the value stream mapping effort. Used to consider the level or depth of the value stream, a block diagram is a simple graphical tool that outlines the main value stream steps in a serial fashion. The steps outlined in a block diagram are the actual steps that will be included as the process boxes in the value stream map. When selecting the appropriate level the team should limit the number of steps to no more than 10-15, mono flow, if possible. This rule of thumb was developed to simplify the map so that the team can see the flow and see the waste in the value stream map.

An easy way to ensure that the map is not at too low of a level is to ensure that each process box represents a department or organization and not a person. If two consecutive processes are within a single department the level selected is more than likely at too low of a depth to start. It is recommended that the project team start at the highest level feasible that corresponds with the business case and is under the project team's circle of influence. It is better to err on the side of starting too high than too low. If the team starts at a level too high, they can always drill down on a portion of the value stream and develop a lower level scope. If the team starts too low they may become inundated with the detail and not be able to see the big picture.

Highlighted in Figure 1 is an example block diagram for the internal personnel hiring process. You can see the various process levels of the value stream for sample organization. In this case the project team decided to focus on the process level that outlines the internal hiring process. This is the lowest process level value stream. As you can also see the depth that the team decided to focus on represents nine process steps in the process level value stream map. Going any deeper would cause the team to confound the steps 'within' a process with the steps 'between' the processes. Since the goal of value stream is to focus between processes, any effort to dive into a departmental process should be avoided at this point. The team may even have the opportunity to consolidate a few of the steps (Review and Post Req and Review Responses) if it is decided that these particular steps are completed independently by personnel within the same department. Alternatively, the team could have selected the higher level value stream, however in this case, they decided that would be outside the challenges outlined in the business case. The steps outlined in the block diagram will dictate which parts of the organization need to be represented by the mapping project team.

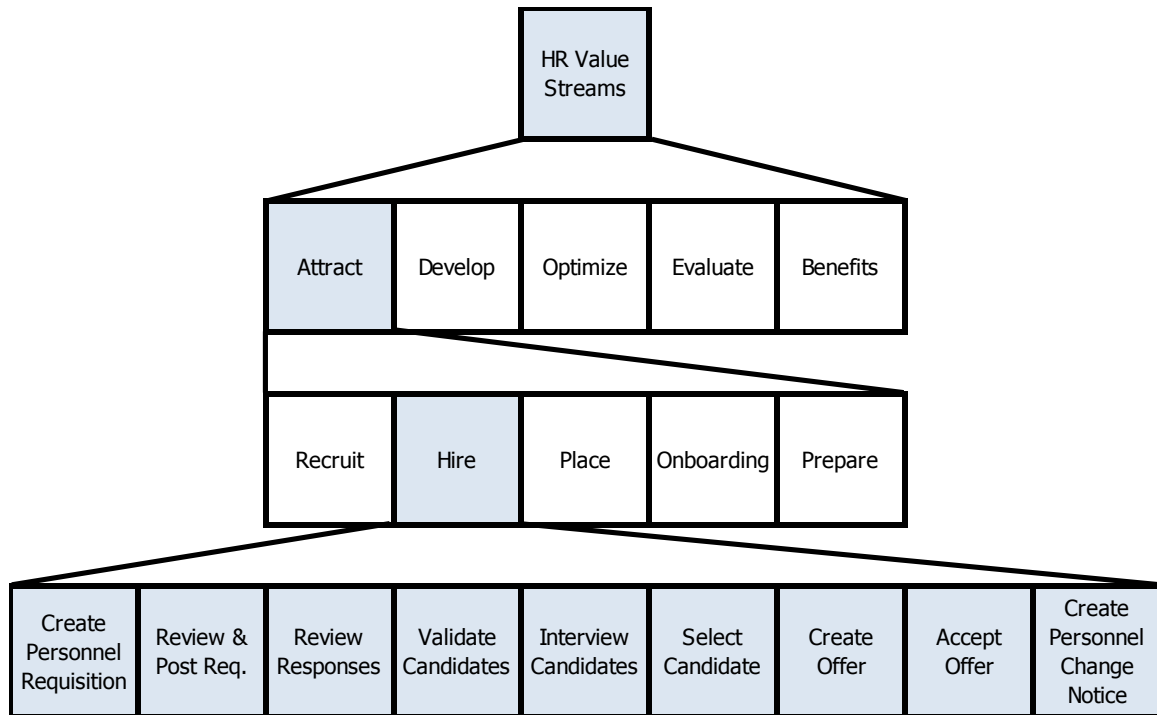


Figure 1. Example Block Diagram – Hiring Process

Synergies Between Value Stream and Process Improvement

At first glance, process improvement and value stream improvement appear to be conflicting. As stated above, it is easy to conceive of a situation where striving for process level efficiency leads to overproduction, larger batching, longer lead time and overall sub-optimization of the value stream. This occurs when process improvement is conducted in a vacuum, outside of the context of the value stream. At the same time there are situations when value stream improvement will halt until issues are addressed within the process. In many cases the value stream wastes observed are symptoms of root cause issues within the process. This is the case when there is variation in the process leading to delays, work-arounds and general interruptions in flow on the value stream level. In these situations, flow cannot be improved until the process level variations are addressed. There is a correlation between process variation and value stream flow. This correlation is at the crux of the relationship between Lean and Six Sigma. Organizations need a Lean value stream approach to assess the entire value stream and a Six Sigma type process improvement approach to drill down the process issues inhibiting flow. If a value stream approach alone is leveraged, a team may lack the substance to eliminate the variation with the processes that may be the root cause of the flow issues. If a process improvement approach alone is leveraged, a team may at best lack the direction required to make systematic improvements and may at worst sub-optimize the value stream.

Understanding the differences between the hierarchy of process discovery is critical to optimizing continuous improvement efforts. The value stream level focuses on looking at work across organizations, functions and processes. The process level focuses on looking at work within a process, function or department. The task level focuses on looking at how the steps are performed within a process. Understanding

the linkages between each level is required to ensure that sub-optimization does not occur. Starting at a value stream level enables a project team to develop an integrated, top down, strategic transformation plan for the entire process by leveraging both Lean and Six Sigma.

References

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Donald P. Lynch, Ph.D. received his BS in Mechanical Engineering from Michigan Technological University, MBA from Eastern Michigan University, Ph.D. in Mechanical (Industrial) Engineering from Colorado State University and a post Graduate Certificate in Lean Six Sigma from the University of Michigan. His professional career includes positions in engineering, quality, design, management and consulting at Ford Motor Company, Diamond Electric Mfg., Visteon Corporation, SKF USA, The University of Michigan and University of Detroit-Mercy. He holds (6) American Society for Quality certifications including Six Sigma Black Belt (CSSBB) and is an ASQ Fellow. He is also a University of Michigan Certified Black Belt and Lean Specialist (manufacturing and office) and an International Quality Federation (IQF), Visteon Corporation, International Society of Six Sigma Professionals (ISSSP) and SKF Certified Master Black Belt (MBB). Don also holds certifications from the Institute for Lean Innovation as well as Kepner-Fourie in Critical Thinking. As a four-time Lean Six Sigma MBB Don has completed projects, developed programs, consulted and instructed in all areas of Design for Six Sigma, Traditional Six Sigma and Lean including manufacturing, office, transactional, product and process design, systematic innovation as well as critical thinking. He has deployed continuous improvement programs for organizations in Asia, Europe, South America and the U.S. in a number of industries. He has certified over 150 Black Belts, has led over 20 Black Belt waves, has mentored over 15 Master Black Belts and has facilitated over 25 kaizen events in a 15+ year career in Lean Six Sigma. Has completed numerous projects in a wide variety of process areas on (4) continents. He has authored over twenty-five papers, magazine articles, journal entries and presentations on Design for Six Sigma Traditional Six Sigma, Lean Continuous Improvement and other related areas. In his current position he is a Senior Lean Six Sigma Master Black Belt and Deployment Champion with SKF USA. Don is also an Adjunct Professor at the University of Detroit-Mercy and a guest Lecturer and Conference Leader, Consultant and Co-Director of Lean Six Sigma programs for the University of Michigan College of Engineering and Integrative Systems and Design.