



Adding kaizen to your kanban

Making it visual can help your organization create prioritized project pipelines

By Fabrice Bouchereau

In most companies, the day-to-day priorities of keeping production lines running, meeting shipment commitments and interfacing with suppliers and customers are urgent matters that need to be dealt with immediately. Industrial engineers have a wealth of knowledge and a plethora of tools that can be used to streamline and improve processes. They should be change agents, but unfortunately much of their time is spent doing routine work and “fighting fires.”

Nearly 20 years in the industry has revealed that many organizations struggle with identifying issues that need to be addressed through improvement projects. They often want to improve their operations, but they don’t know where to start. This is somewhat surprising given the overabundance of problems that many organizations face; yet it is likely that the sheer number of problems is what makes it hard for organizations to prioritize and select the ones most in need of attention.

The approach described in this article, kaizen kanban, provides unique solutions to this problem. It complements and enhances the effectiveness of quality and continuous improvement initiatives that may already be in place in an organization by helping them identify opportunities for improvement in an efficient and value-added way.

Kaizen kanban is an innovative adaptation of traditional quality tools and methods. For example, concepts derived from SIPOC (suppliers, inputs, process, outputs, customers) diagrams and FMEA (failure mode and effects analysis) are integrated within process mapping activities, which significantly increases the depth of analysis within the process being examined.

Then, logical and well-known approaches are employed to prioritize the opportunities for improvement that have been identified and categorize them within the appropriate type of kaizen event. This approach provides an effective method for coordinating project selection that efficiently feeds the deployment of improvement projects across an organization using a visual communication approach.

What is kaizen kanban?

The Japanese word kaizen is commonly used to describe a team approach to break apart a process quickly and rebuild it in order to function better. It is a philosophy that advocates continual process improvement.

Kanban is the Japanese word for “signboard” or “billboard.” Traditionally, kanban cards are used to signal to workers what to build next or what parts to retrieve.

Like traditional kanbans, kaizen kanbans, or improvement display boards, are visual communication tools and should be made visible to all levels of employees within the organization. The difference is that instead of telling operators what to build next or what parts to retrieve, the cards tell improvement teams what preapproved projects are most relevant to current

business needs and are next in line for implementation.

When most people start their careers as industrial and systems engineers, they dream of making an impact, of working on major projects that change the course of companies and elevate organizations to the next levels of safety, quality and profitability.

But things usually don’t work out exactly as planned. Most ISEs and their peers do get involved in change management, but they become firefighters. They develop skills that allow them to react quickly and address the burning issues of the day. Many of them enjoy being a superhero and saving products, processes and people. Being a firefighter can be fun. It can bring instant gratification and give you incredible stories that you can use to impress family, co-workers and potential next bosses.

But after being involved with change for years, some ISEs are lucky enough to have their responsibilities change. They become less about reacting to crises and more about being proactive and strategic in nature. Numerous well-branded organizations invest large amounts of time and money in training initiatives to equip employees with the tools necessary to become effective change agents.

Most of these organizations tended to favor mainstream methodologies such as lean, Six Sigma and project management, which complement and reinforce classroom learning by requiring all participants to apply their newly acquired skills to actual projects.

But doing is learning, and completing projects is fundamental in developing a student’s ability to understand and apply lean, Six Sigma and continuous improvement methodologies. Many participants in these programs struggle to complete their first project, just as I did, and often for the same reasons. I will illustrate with examples from my own journey.

I was first exposed to Six Sigma in 2001 in a mandatory introductory course offered by my employer. Three days before the start of class, I was asked to identify and charter two projects as part of my green belt certification pre-work. I had no idea what a project charter was, and I arrived at the class empty-handed, fearing I was in trouble and feeling inadequate.

A few years later I accepted a position at another company and found myself in a similar situation. Two weeks before my start date, while on the road moving cross-country, I received an email informing me that I had been registered for a black belt course and that I was expected to have two black belt projects chartered within a week.

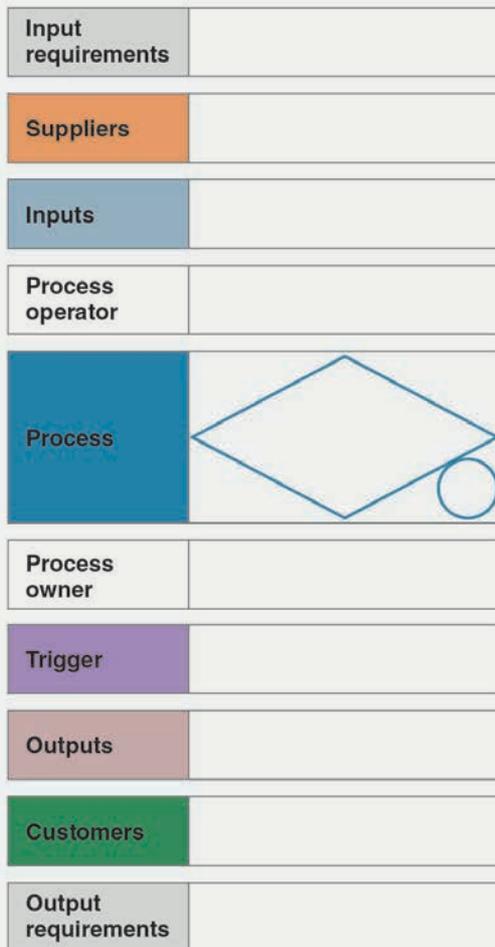
How could the company expect me to identify opportunities for improvement if I had never set foot in the plant?

Since then I have witnessed countless organizations that had the same expectations of employees who were about to start their training. Invariably these candidates felt set up for failure and often arrived in class with a high level of anxiety and even resentment.

FIGURE 1

Capture the information

The enhanced SIPOC box, or ESB, is the key to kaizen kanban.



Countless hours observing smart, motivated trainees stumble as they started their first project revealed two main contributors to this situation that usually lead to project failure: poor project selection and a lack of facilitation skills.

This realization led me to develop a faster and better way to address these gaps by complementing traditional problem-solving methods with a step-by-step facilitation approach to identify improvement opportunities for entire value streams, compile them in a prioritized project pipeline and set up improvement display boards. These boards, or “kaizen kanbans,” must be linked to key business objectives and must be visible to everyone.

The methodology

This approach builds on a process map developed on a wall to capture and display the suppliers, inputs, outputs and customers associated with each step in a process. For a kaizen kanban, this process map usually covers the entire organization. However, the same principles can be applied to an entire department if it is well-scoped.

A traditional SIPOC tends to focus on high-level process maps with fewer than 10 steps, and thus the information shown is often too general. It often fails to clearly show the linkages between suppliers, inputs, outputs and customers and the process step they relate to.

Our enhanced SIPOC methodology enables you to capture the information needed for a SIPOC visually and associates it with each corresponding process step.

The tool that makes all this possible is the enhanced SIPOC box (ESB), which is shown in Figure 1.

The following sections provide a step-by-step recap of how the team should use the ESB to capture layers of information one iteration at a time.

First, start by filling out an ESB for each step of the process map by writing in the process step details on the blue section of the ESB labeled “Process.” Make sure you follow the verb-noun structure and make adjustments as needed. Note that the “Process” section of the ESB can be used to show process steps and/or decisions.

Organize the ESBs in sequential order and connect them using the same connectors used with a regular process map.

Capture the information for the process owners and process operators for each of the process steps during the second iteration, putting this information in the ESB. This step is a facilitation enhancement to traditional SIPOCs that does not require the process owners and operators to be identified for each step.

Note that from a facilitation perspective, specifying the process operator and the process owner makes it easier for everybody to visualize who does each step and eliminates a lot of discussions when it comes time to identify suppliers and customers.

In the third iteration, identify the outputs and customers for each step and add them to the corresponding section of the ESB for each step.

In the fourth iteration, identify suppliers and inputs for each step and add them to the appropriate section of the ESB.

The fifth iteration is an enhancement to traditional SIPOCs in which “triggers” are identified and added to each process step. Triggers cause something to happen or let the operator know the conditions are right to proceed to the next step.

The best way to identify them or realize one is missing is to work backward from the last process step to the first and ask the process owners to identify the signal that lets them know everything is in place for them to execute their step. If a trigger exists but doesn’t come from one of the previously identified steps, the map may be incomplete; a discussion should take place with the subject matter experts, and the necessary updates should be made to the map.

Every time a trigger is found to be missing, the team should add a starburst directly on the process map to indicate an opportunity for improvement. The absence of a trigger indicates

potential delays in starting the next step, as the operator of that next step has no way of knowing the previous step was completed.

The sixth iteration is an enhancement to traditional SIPOCs that is essential in setting the team up for success when the team members create the FMEA in the steps to come.

The team reviews each of the inputs/outputs and adds detailed specifications that must be met to ensure the material received by the operator is exactly what was expected. Put this information in the corresponding “input requirements” and “output requirements” boxes in the ESB.

For example, if the input is water, clearly defined requirements could specify a volume, temperature and/or purity. Specifying the volume of water can help reduce the likelihood of spills.

Failure modes and effects analysis

After the team members clearly defined the input and output requirements for each process step, they have a much better understanding of the current state of the plant. They also have all the information they need to analyze how the various steps could fail and the impact each potential failure could have on the overall process.

FMEAs are traditionally completed in a group setting with one person capturing the information on a laptop or whiteboard, while the other team members come up with each potential failure. This process is time-consuming, places stress on the scribe and leads to team member disconnect due to its slow speed.

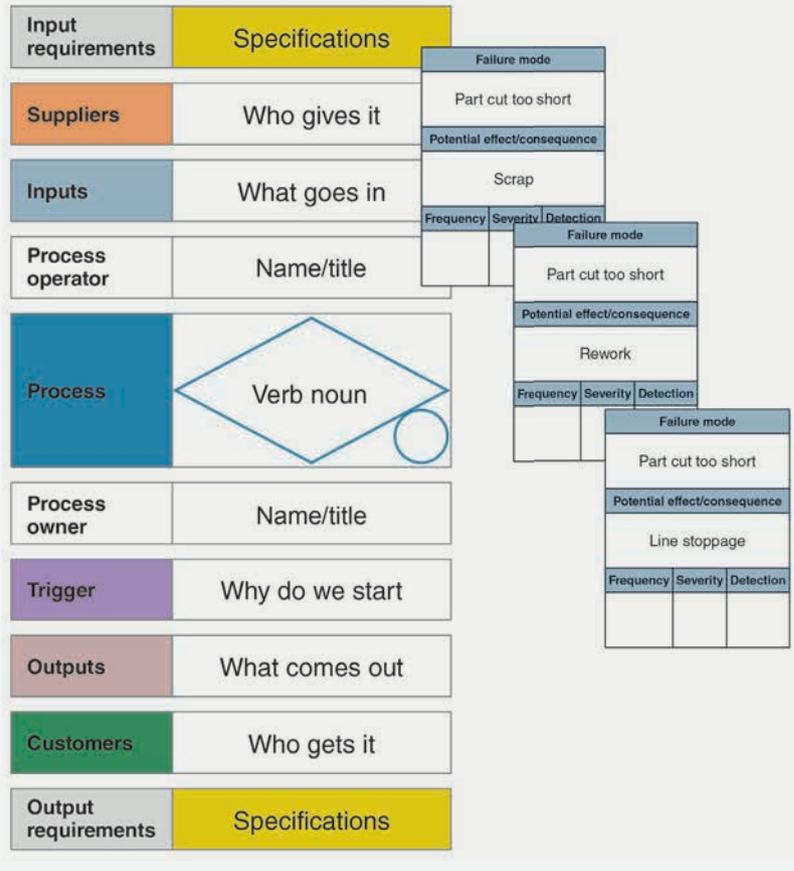
The failure box (Fbox) was developed as an alternate approach that allows the entire team to be engaged and speeds up the process by leveraging the clearly defined requirements captured in the ESB. This builds the FMEA directly on the previously created map using the following steps.

For each step on the map that was

FIGURE 2

A box for everything, including failure

Fboxes created for each consequence can help your improvement team decide which issue to tackle first.



previously expended using an ESB, use an Fbox to capture the answer to the following questions:

- What could go wrong in this step?
- What could prevent this step from being completed?
- How could we fail to meet a requirement?

Each failure mode may result in one or more effects or consequences. An Fbox should be created for each consequence. For example, the failure mode “Part cut too short” has three potential effects or consequences: scrap, rework and line stoppage.

Team members tape the Fboxes next to the corresponding ESB for each step on the map, as shown in Figure 2.

Determine which effect to address first based on the risk priority number

(RPN) calculated for each step using the formula: $RPN = \text{Frequency} \times \text{Severity} \times \text{Detectability}$. Assign a numerical value as the answer to each question and place it in the corresponding location on the Fboxes.

Leverage the Pareto principle to select the top 20 percent of the steps with the highest RPN that should resolve 80 percent of the issues.

For each of the failure modes in the top 20 percent, write a problem statement.

At this point you have identified opportunities for improvement and have translated the most critical ones into potential project problem statements. Team members may be eager to start executing these projects one after another based on the RPN ranking.

We encourage you to adopt a mindset of continuous improvement using a

FIGURE 3

A little help with that decision

A PICK chart is a two-by-two decision matrix that can help your teams decide which projects will have the most benefit and be easiest to implement.



two-pronged approach: kaikaku for fast and significant improvements and kaizen for slow and steady improvement.

Kaikaku means “radical change” and is used in reference to a business concept that aims to make fundamental and radical changes to a system or organization. It is a revolutionary approach to change, the sustainability of which is difficult to maintain without continuous improvements, such as those accomplished through kaizens.

Kaizen is a philosophy that advocates the continuous improvement of processes. It addresses systemic and organizational opportunities for improvement by having employees at all levels of a company work together proactively to achieve regular, incremental improvements to the process.

This creates an engine for improvement powered by the collective talents within the organization. Kaizen is evolutionary and focused on incremental improvements.

Your staff members may be determined to show how committed they are to embracing change and taking the company to the next level. From their perspective, only initiatives with a large impact on process performance would result in a significant return on investment, in other words, something they

could boast to management about.

They all expected to start with a radical change, or kaikaku.

We recommended resisting this temptation and focusing on earning quick wins to gain credibility and buy-in with small, easy, low-risk and low-cost process improvements, things that can easily be evaluated with small and quick experiments. In due time the team will have the opportunity to complete a radical change.

Use the PICK chart shown in Figure 3 to prioritize projects and ensure the company focus is on the projects with the highest benefit-to-effort ratio. The acronym PICK comes from the labels for each of the quadrants of the grid:

- Possible (easy, low payoff)
- Implement (easy, high payoff)
- Challenge (hard, high payoff)
- Kill (hard, low payoff)

Ideas written on sticky notes by team members are then placed on the grid based on the payoff and difficulty level. In the interest of reducing the subjectivity sometimes associated with the use of a PICK chart, we developed and use a more objective system to determine x (difficulty) and y (payoff) coordinates for each idea.

FIGURE 4

The x’s and y’s have it

Use these scores to calculate the difficulty (x) and payoff (y) of potential improvement ideas.

For the x coordinate:

Duration	Score	Resource type	Score
Short	1	Individual	1
Medium	5	Localized team	5
Long	9	Cross-functional team	9

For the y coordinate:

Delay	Score	Impact magnitude	Score
Long-term	1	Localized	1
Midterm	5	Departmentwide	5
Short-term	9	Plantwide	9

The implementation difficulty value (x coordinate) for any one idea is calculated using the formula: Difficulty = Duration score × Resource type score.

The y coordinate, the benefit value resulting from any one idea, is calculated using the formula: Benefit = Delay score × Impact magnitude score.

See Figure 4 for the scores to be used in calculating these x and y coordinates.

As a company progresses through its lean transformation, team members will be at different stages in their lean journey; therefore, it is important to match individuals only with projects they can do and that are important to the company.

Per the lean handbook, improvement needs to be organized on five levels in most, if not all, organizations on a lean journey in order of increasing scope and depth.

- **Individual (point kaizen):** Conducted at the individual workstation level to reduce waste and improve workplace organization, inventory and tool location, work sequence and/or ergonomics.
- **Work teams (minikaizen):** Undertake improvement projects affecting their collective work area of a cell or on a line segment. Examples

include work flows, cell layout, line balancing, 5S and quality improvements.

- **A kaizen blitz** is an event carried out in a local area, but it involves more time and outsiders. These events address more complex issues than what the work team can handle comfortably. For many companies,

blitz teams are the prime engine for improvement. For this type of improvement, the team forms for the specific purpose of the event and disbands thereafter.

- **Flow kaizen teams** typically work across a full value stream, taking weeks or months for a project. They are the prime engines for creating future states. Their targets are those set out in a future state. These teams are multidisciplinary and have cross-functional members. Flow kaizen projects usually address process, system and organizational issues.
- **Supply chain kaizens** leverage part-time representatives from participating companies within the value stream. They are focused on optimizing the entire value stream so that all within the supply chain can benefit from improvement. These teams usually have a project manager, typically from the original equipment manufacturer (OEM) company, and are supported by champions and consultants.

We recommend assigning point kaizens to team members who are learning

the basics, as it will allow them to see the complete process cycle faster. Smart management teams reserve supply chain kaizens for more experienced practitioners.

When you first start with improvements you may find it difficult to differentiate among short-, medium- and long-term goals. It is best just to start and then sort things out as you go.

To facilitate the selection and assignment process, create visual display boards of prioritized projects. This can easily be accomplished by preparing an index card for each kaizen with the kaizen name and the problem statement, as shown in Figure 5.

Use wall-mounted folder holders to create the structure to place the kaizen cards. Emphasize that there are five types of kaizen by creating five columns of file folders and labeling each one with a different kaizen type. Figure 6 shows an example.

Compiling the kaizen kanban boards fulfills the goal of identifying and prioritizing projects in a visual management board display. It improves project selection for new practitioners, and the process of creating the board itself is a lesson in applied facilitation.

While a kaizen kanban does not solve the issues, it provides management the context and background needed to make informed decisions. ❖

Fabrice Bouchereau is a senior industrial engineer and lean project manager for ProcessZen Consulting. The industrial and systems engineer has nearly 20 years of experience managing lean, quality and continuous improvement projects. He has a B.S. in industrial and systems engineering and an MBA in international business and marketing, both from the University of Miami. He is certified in production and inventory management (CPIM) and is a licensed professional engineer, project management professional (PMP) and Six Sigma black belt.

FIGURE 5

Remember, kanban is visual

To make your kaizens visual to your entire organization, create display boards of prioritized projects.

Kaizen title:

Problem statement:

FIGURE 6

The finished kaizen kanban board

Placing the kaizen cards in wall-mounted folders helps emphasize the five different kinds of kaizens and keeps your staff up to date on progress.

