



THE ART OF KANBAN

Streamlining your business

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INTRODUCTION

You may not be familiar with the word **kanban**, but you are likely familiar with the process. Many businesses and homes already use an organizational system loosely based on kanban without even knowing it.

At its most basic, kanban is a system that uses visual cues to move and produce materials so that inventory is maintained at optimal levels.

Consider this scenario:

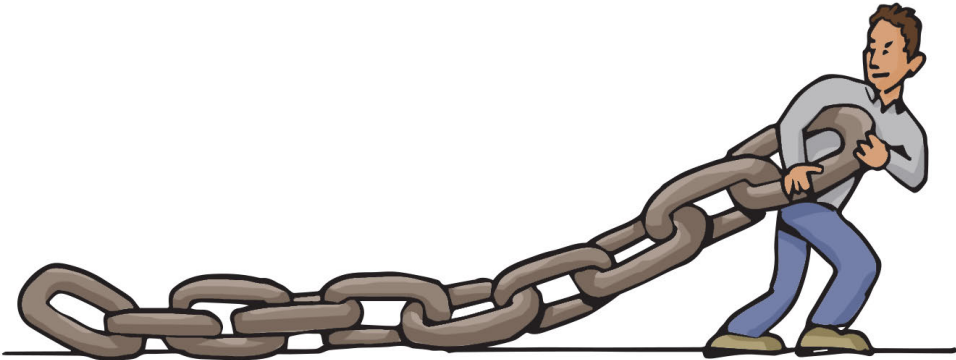
You like to eat a certain kind of cereal for breakfast, so you always keep several boxes on hand. When your first box runs out, that's a sign to put cereal on your shopping list so you buy more before you're out of breakfast food.

This example is incredibly simple, but it's a real-life way of using a visual cue—the empty box—as a signal to take action and get more cereal. This principle can be used on a much larger scale in a manufacturing environment. An organization just needs to create cues and rules that make sense for its operations.

In manufacturing, a kanban system manages the **Just in Time (JIT)** production method, which aims to produce the amount of a product demanded by the customer when it's needed and in the required quantity. Kanban is often called "**demand scheduling**" or a "**pull system**" because rather than using traditional methods of production based on demand forecasting ("push" production), production is "pulled" from downstream based on actual customer demand.



Imagine your production system as a chain. If the chain is pushed from one end, it will become slack or bunched up in places (these places represent bottlenecks or lag time).



On the other hand, if you pull the chain from one end, it remains taut and straight (eliminating bottlenecks and lag time).

The word kanban comes from Japanese and means “sign” or “billboard.”

In a kanban system, a visual cue of some sort—often a card or an empty bin—is used to signal to workers when production or movement of items should occur.

A simple kanban system used in many manufacturing environments relies on both cards and bins. In this system, one bin is placed on the factory floor, one at the store (the location where the materials for your manufacturing process are stored), and one at the supplier.

When a bin is empty, employees see a card (often placed at the back of the bin) that has all the details of the material on it. This kanban card is then sent along with the empty bin to the store, where the bin will be refilled based on the information specified on the card. The same process then happens at the store. As the store’s bins are emptied, they go to the supplier to be refilled.

This system helps materials and products flow smoothly through processes, reducing wasted time and materials. Kanban has been referred to as the nervous system of Lean manufacturing as it can manage all the processes in a facility by providing instructions to each work area.

THE ORIGINS OF KANBAN

Kanban originated at Toyota in Japan in the 1940s and 50s. Leaders at Toyota studied the stocking techniques used by American supermarkets. Supermarkets have a unique in-store stocking technique that always provides adequate amounts of products on the shelves without storing excess inventory. This works because customers know they can always return to the store for more, so they tend not to buy large quantities of an item at once.

Company leader **Taiichi Ohno** determined the same principles could be applied to a manufacturing environment. He introduced kanban cards to Toyota's factory floor as a way of managing production using a pull system. Rather than stocking large quantities of inventory, the company used a kanban card system to move materials from the supplier to the stock room to the production line, all based on customer demand.

In addition to reducing extra inventory, the kanban system reduced the amount of work in process (WIP) at one time. This meant cars moved through the system more quickly.

It took several decades for the kanban system to spread around the world, but by the 1980s, American companies such as General Electric were using a kanban system with much success.



Taiichi Ohno. © Creative Safety Supply

THE BENEFITS OF KANBAN

It's true that a kanban system can reduce inventory, which is beneficial for a number of reasons:

- **Fewer costs associated with storing inventory.**
- **Less space needed to store inventory.**
- **Less likely inventory will become obsolete before you can use or sell it.**

The benefits related to holding less inventory aren't the only benefits of a kanban system, though. Kanban can also do the following:

- **Prevent overproduction**, one of the costly wastes highlighted by Lean.
- **Improve the flow of goods and materials**, both within and between processes.
- **Make the process of production visual**, which means fewer questions and less confusion.
- **Make it easier to respond to demand changes**, since production will automatically slow or speed up as demand does.
- **Allow the line operator to control when production occurs.** This is beneficial for two reasons: the operator is given authority, which can better utilize his/her knowledge and talents, and managers will have more time to seek out and improve problems with the processes.

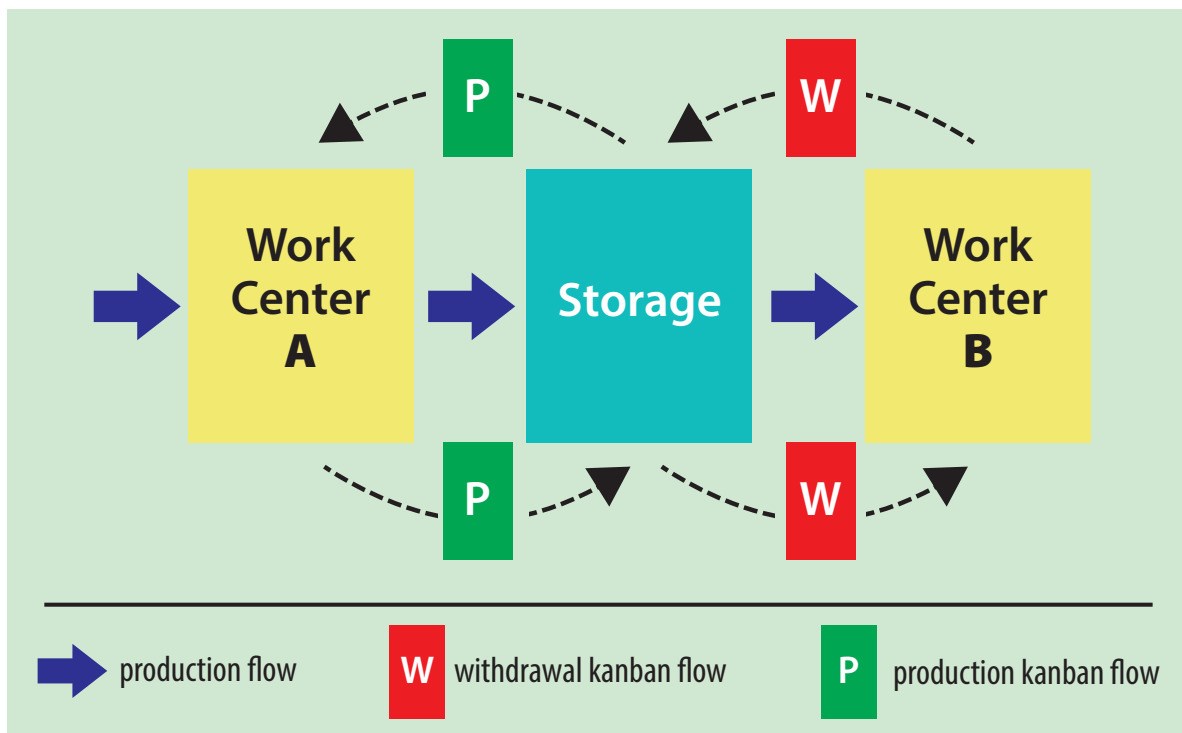
When implemented throughout a manufacturing facility, a kanban system connects processes so that the business runs more smoothly, involves the appropriate people, eliminates waste, and saves money.

TYPES OF KANBAN SYSTEMS

We've touched on several basic types of kanban systems. Now we'll look at these systems in a bit more detail. Some systems use kanban cards as signals, some use empty bins, and some use both. This guide does not include all possible types of kanban systems, but does cover some of the most common options.

TWO-CARD SYSTEM

A **two-card system** uses two kinds of kanban cards: production and withdrawal kanban. Say you have three main locations at your factory: the production line, an area where finished goods are stored, and a location where customer orders are processed and shipping takes place.

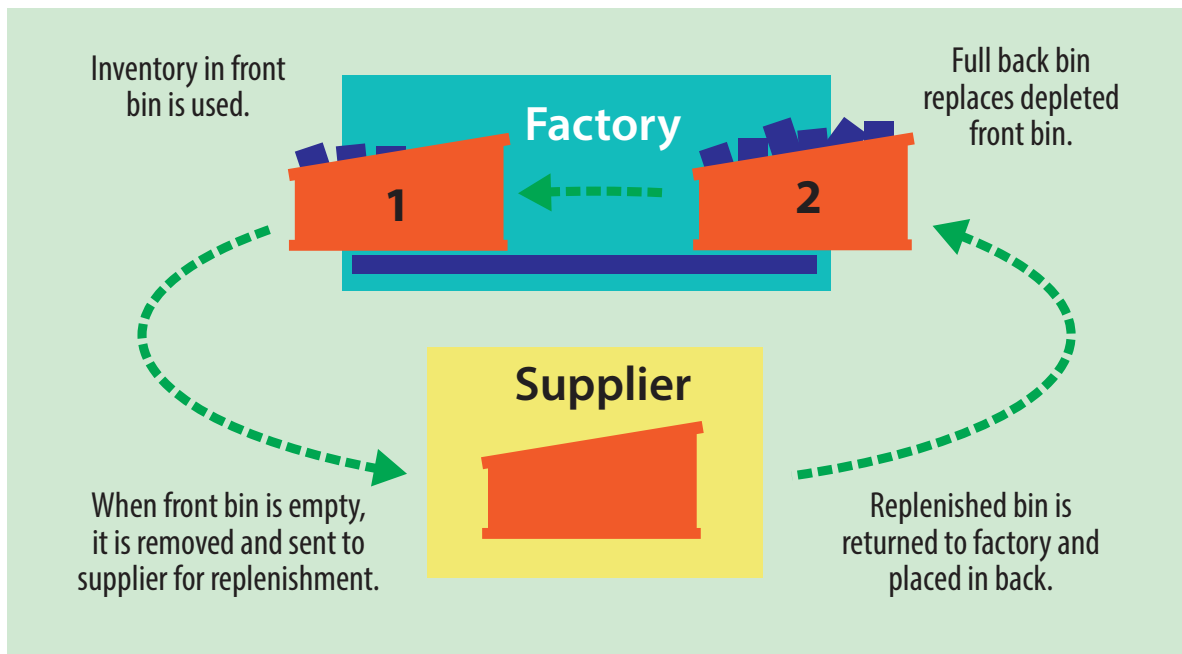


When shipping receives an order, it will send a withdrawal kanban card to the storage area indicating products are needed. This will trigger the movement of the product from storage to shipping. Then the storage area will send a production kanban card to the production line that signals the item is running low and production of additional products should begin.

This system has two loops—shipping to storage and storage to production—and each uses its own type of kanban card as a signal.

TWO-BIN SYSTEM

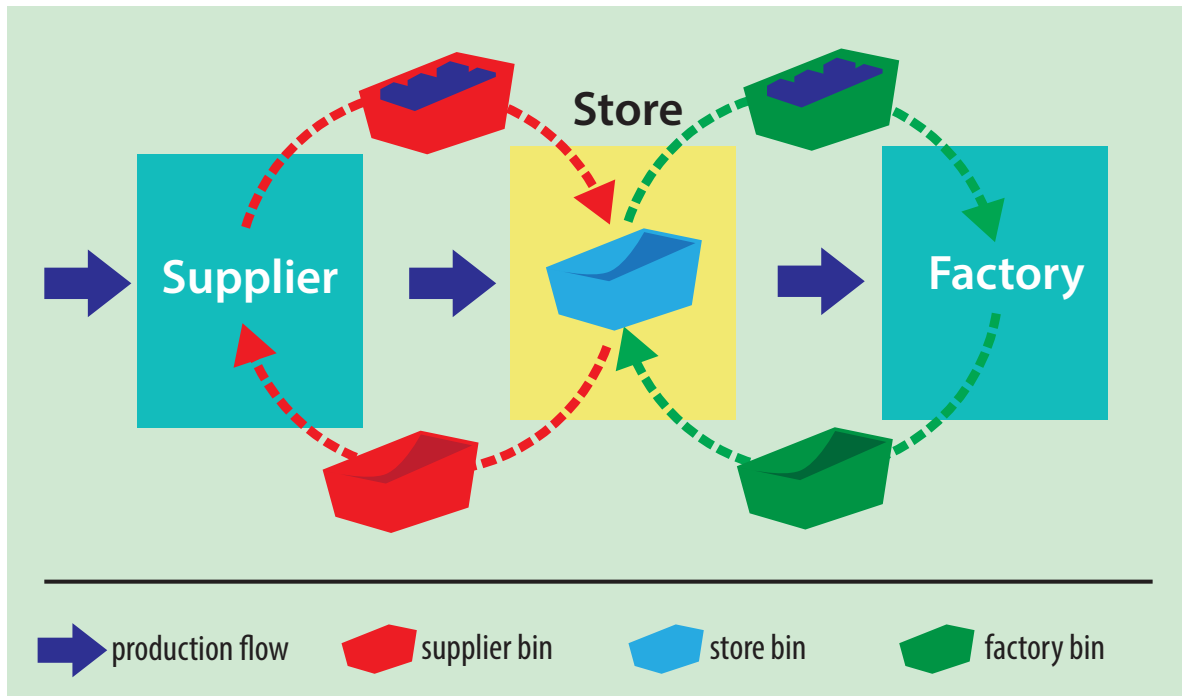
The **two-bin system** is often useful in storage areas where employees obtain materials to complete their tasks. In this system, two bins of the same size are filled with a material and placed one in front of the other, perhaps on a shelf. When the first bin is empty, the employee who takes the last item removes the bin and places it in a designated location where the person responsible for reordering or obtaining more materials will know to get more of that item. The full bin from the back of the shelf is then pulled forward. Once the new materials are received, they will be placed in a bin behind the full bin. In this way, materials never run out.



Two-bin systems can use kanban cards as well. These cards are usually affixed to the back of the bin and list instructions or reordering information. When cards are used, the card from the empty bin can be placed in a designated location to signal reordering (instead of moving the empty bin itself).

THREE-BIN SYSTEM

At the beginning of this guide we briefly discussed a system where one bin is kept at the factory, one at the store (storage area), and one at the supplier. This is an example of a **three-bin system**.



When the factory needs parts, it sends its empty bin to the store where it's refilled. The store then sends its newly emptied bin to the supplier. The supplier swaps that empty bin with a full one and sends it back to the storage area. This cycle continues as bins are emptied throughout the process.

In this system, each bin usually contains a kanban card with detailed information about the material that needs to be replenished. Since the bins move to a location outside the company in our example (to the supplier), having this information listed on a card is important.

E-KANBAN

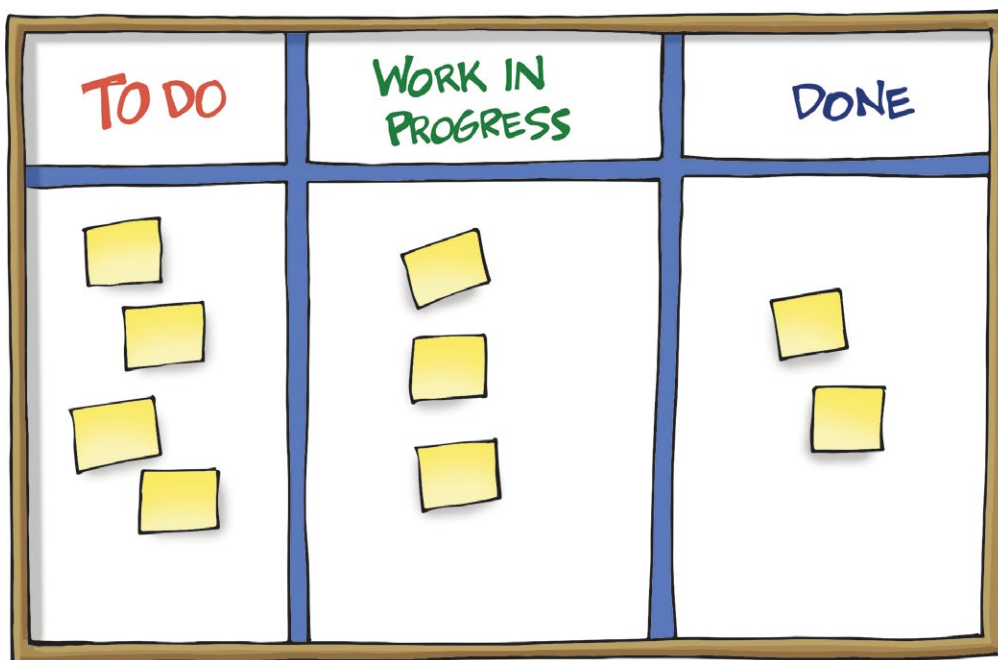
Many companies continue to use traditional physical kanban cards to manage production. These cards are often placed in protective plastic holders so they don't get lost or damaged.

New technologies have led to the evolution of kanban systems, though, and now businesses often use an **electronic kanban system** (or **e-kanban**). This system involves placing barcode labels on bins or materials and then scanning those barcodes to indicate movement and signal the need for more of an item.

Requests for more materials from internal and external suppliers are then submitted electronically. For example, some systems automatically generate an email request that's sent to the supplier when a particular barcode is scanned.

KANBAN BOARD

A **kanban board** is a visual tool used in many industries, not just manufacturing. A basic kanban board has columns such as "To Do", "In Progress," and "Done." Cards or sticky notes are used to represent the work that needs to be completed or products that need to be created. These cards/sticky notes are placed in appropriate columns and move to the right as they move through the process.



A work area on a production line can use a kanban board in a central location to depict all the products that need to be created or assembled. This can help everyone see the workload.

An office can use a kanban board to show what tasks need to be completed, who is working on them, and the priority level of those tasks.

An individual can even use a kanban board to help manage a to-do list to make sure he or she isn't working on too many things at once.

IMPLEMENTING KANBAN

Is Kanban for You?

Kanban can result in significant benefits for your business, but rushing into implementation can lead to a mess. Before you get started, you should think about whether kanban makes sense for your operations.

Some businesses experience large fluctuations in demand over the course of the year. For example, you might produce goods that are sold primarily around the holidays. When this is the case, it can be more difficult to use kanban scheduling, as you might run into situations when sudden demand exceeds the capacity of your system. In these cases, traditional demand forecasting might be a better option or you may need to spend additional time customizing your kanban system.

Kanban also relies on the ability to have materials delivered to you regularly by your suppliers, often without much notice. If transportation of materials from your suppliers to your business is unreliable, implementing kanban can be more challenging.

Take a look at your current production methods and identify any major issues like these that could pose obstacles to kanban.

Have a Good Foundation

Before you implement kanban, it's a good idea to take a step back and organize the workplace. **5S**, a systematic method for organizing and cleaning, is a good place to begin. 5S, which stands for **Sort, Set in Order, Shine, Standardize, and Sustain**, is in large part a visual system. Everyone is assigned certain organizational tasks, and when something is out of place, it's usually noticeable.



If you don't have an organized workplace, it's easy for kanban cards and other signals to get lost or overlooked. Make sure you have a solid Lean foundation and a functioning visual workplace before you begin. Starting out in this way will help you in the long run; kanban is a visual system, too, so kanban and 5S work well together.

The Art of Kanban

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Choose and Design a System

The type of kanban system you use will depend largely on the needs of your business. It will also depend on whether you plan to implement kanban company-wide or only in certain work areas.

Seek input from others in the organization when designing your system. Forming a team with people from different parts of your processes can help you design a system that works well for everyone and is accepted by workers without too much resistance.

Determine what signals you will use—cards, bins, barcodes, or something else—**and what rules will govern those signals.** It must be clear for employees what they should do when they encounter these signals. Then obtain the materials you need to create your system. These could include an industrial label printer that allows you to create barcodes, customized kanban cards, bins, and floor marking tape.

If you plan to use cards, **decide what information will go on those cards.** Each card is going to be specific to your workplace, and cards might even vary significantly from one work area to another, depending on their purpose.

A typical card on a production line that obtains materials from a supplier might look like this:

PART DESCRIPTION				PART NUMBER	
4 mil poly bags				S-149283	
QTY	5000	LEAD TIME	3 bus. day	ORDER DATE	3/4
SUPPLIER	ULINE			DUE DATE	3/7
PLANNER	D. Francis		CARD 1		
			LOCATION	D55	

This card contains the **part number** and a **brief description** of the part. It also contains the **location** where the part is used, the **quantity** of parts in each container, and what **number** kanban card it is (it might, for example, be one of four kanban cards for a particular part, if you keep four bins of that part on hand).

Other kanban cards, such as those used in two-bin systems, might just contain a **description** of the item, the **quantity** contained in the bin, the kanban card **number**, and **information about reordering**. Your kanban cards will be unique to your business. Just make sure they include enough information so employees know what they need to do when they encounter them.

At this point you might also be wondering how kanban works on a larger scale. We've looked at examples of small systems with a few cards or bins, but what happens in a large manufacturing facility that needs many cards or bins?

This is when you'll need to **learn how to calculate the ideal size of your kanban system**, which takes into consideration how much of each item you'll need on hand at once. Books on the subject and many Lean consulting companies can help you do this.

Basically, you will need to determine how many bins/cards you should have to keep materials moving smoothly without running into shortages or having extra materials. The number of cards or bins impacts how quickly products move through your system, and if you shrink this number, things will move more quickly. This isn't inherently good or bad; it will depend on the needs of your business.

Kanban systems can be adjusted as you go, so don't be afraid to **make changes if necessary** to find a good balance. **Seek feedback** from your employees and aim to **continuously improve** your kanban system.

CONCLUSION

When people think of Toyota as a company, they often think of success. What many may not realize, though, is that that success isn't solely about innovative vehicle designs, but rather about improvements to the production process. Toyota leaders discovered one of the best ways to reduce costs is to create a production system pulled by customer demand, and in doing so eliminated wastes such as excess inventory and lag time that weren't adding value for the customer.

When using a kanban system, you also don't have to worry about running out of the materials you need. When materials in one area run low, the system alerts people to take action to replace them. You will also be able to reduce the space and money used for storing materials and you won't need to worry about those materials becoming obsolete while in storage. Instead, the kanban system keeps materials fresh and supports the constantly changing needs of manufacturing.

Kanban is a simple idea that can make the manufacturing processes of even complex organizations run smoothly. A kanban system also proves useful even outside manufacturing, serving as a scheduling tool in offices and an inventory control tool at home, in warehouses, at hospitals, and elsewhere.

Shifting to kanban scheduling may take some adjustment, but it can result in significant benefits for your business, your workers, and your customers.

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