

Value Stream Mapping

from the current
state (VSM)

to

the future state
(VSD)



Paris, February 2010
Version 1.0

Table of content

- **Overview of VSM and a reminder of the Lean concept**
 - Terminology
 - Fundamental reminders of the Lean concept
- **The VSM/VSD approach**
 - Where to start?
 - Big steps
 - Summary
- **Vocabulary**
- **Bibliography**



Value Stream Mapping

- "Value Stream Mapping" is also known as::

- *Material and Information Flow Mapping* or *Material and Information Flow Analysis* : **MIFA**,
- **Value Chain Analysis**.

- The Value Stream has its own vocabulary:

- **Mapping :**

- Visualize the flow of value creation along a process,
- Identify and collect information about various stages.

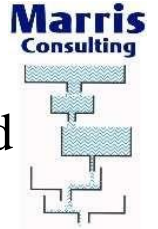
- **Flow :**

A flow moves through successive tasks from a starting point to its endpoint. The Toyota concept has identified 3 types of flow:

- Physical flow of materials,
 - Information flow,
 - Flow of people/processes.
- } Flows addressed by VSM

- **Value :**

- **Added value:** it refers to activities that transform materials, services, or information in a way that meets customer expectations and adds value to the final product or service
- **Non-Value Added:** these activities that consume time, resources, and space but do not contribute to the final product or service..



Value Stream Mapping (VSM) is a tool used to capture the current state (Mapping) and design a future state (Design) of material and information flows at a global level

- The VSM (Value Stream Mapping) is deployed in three distinct phases:
 - **Mapping the current state, capturing and understanding the existing processes**
 - **Defining the future state, envisioning the optimized process for the future**
 - **Building an action plan that is developed to guide the transition from the current state to the desired state.**

*« It seems that perfection is reached not when there is nothing more to add, but when there is nothing more to take away »
Antoine de Saint Exupéry*

- VSM is a uniform and structured method that encourages multidisciplinary teamwork.

The purpose of VSM (Value Stream Mapping) is to design a just-in-time production system



*The expression **production au plus juste** translates to...*

Derived from the book "The Toyota Way" by Jeff Liker

... increased efficiency and standardization through continuous improvement processes...

... a philosophy that enables the company to have processes that produce less waste...

... that human beings are the central element....

OHNO Taiichi
“Produce only what the customer demands”

... a workforce where each individual thinks, decides, acts, and takes responsibility together with others....

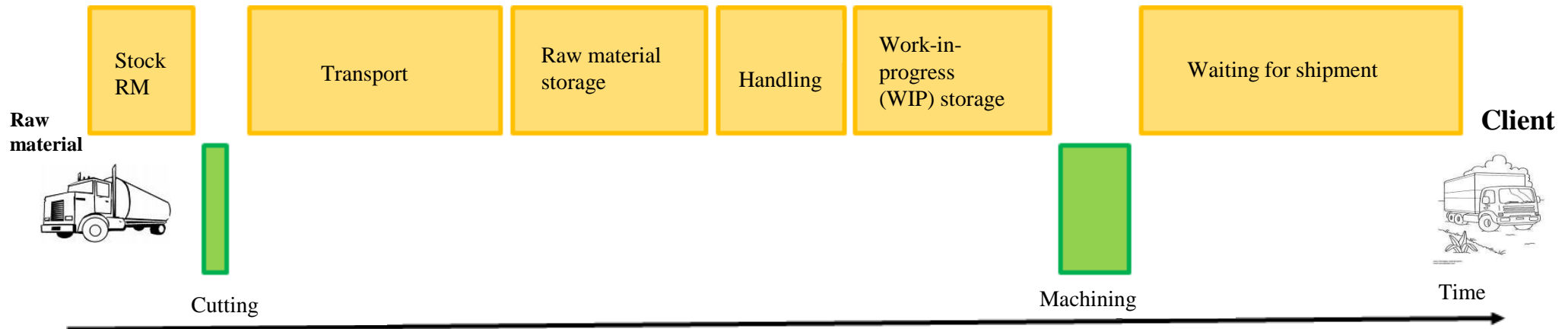
... structures both internal and extending beyond the scope of the company ...

... priorité donnée aux clients ...

... the search for the principle of pull flow using Just-in-Time (JIT) delivery. ...

The customer only pays for the value-added steps in a product or service.

Source Formation Lean Claude Bonmoure



- The lead time, or transit time, of a flow is divided into **value-added and non-value-added steps**. The value-added steps constitute only a small portion of the production process, yet they are the ones for which the customer pays in order to obtain **satisfaction of their needs.**
- Non-value-added times are considered as obvious wastes (cleaning a mold, positioning a piece, etc.) or hidden wastes (double handling, disposing of waste, etc.), as well as unconscious wastes that are difficult to measure (underutilization of human potential, management errors). These wastes are referred to in the Lean concept. : **MUDA.**

Our role is to identify the causes of waste and eliminate them.



The VSM/VSD tool can structure a Lean approach for material and information flows..



Chasing the MUDA

...



How to minimize obvious waste and eliminate hidden waste?



... while applying the LEAN concept...

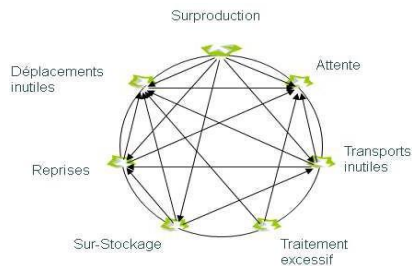
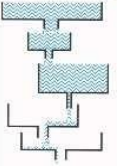
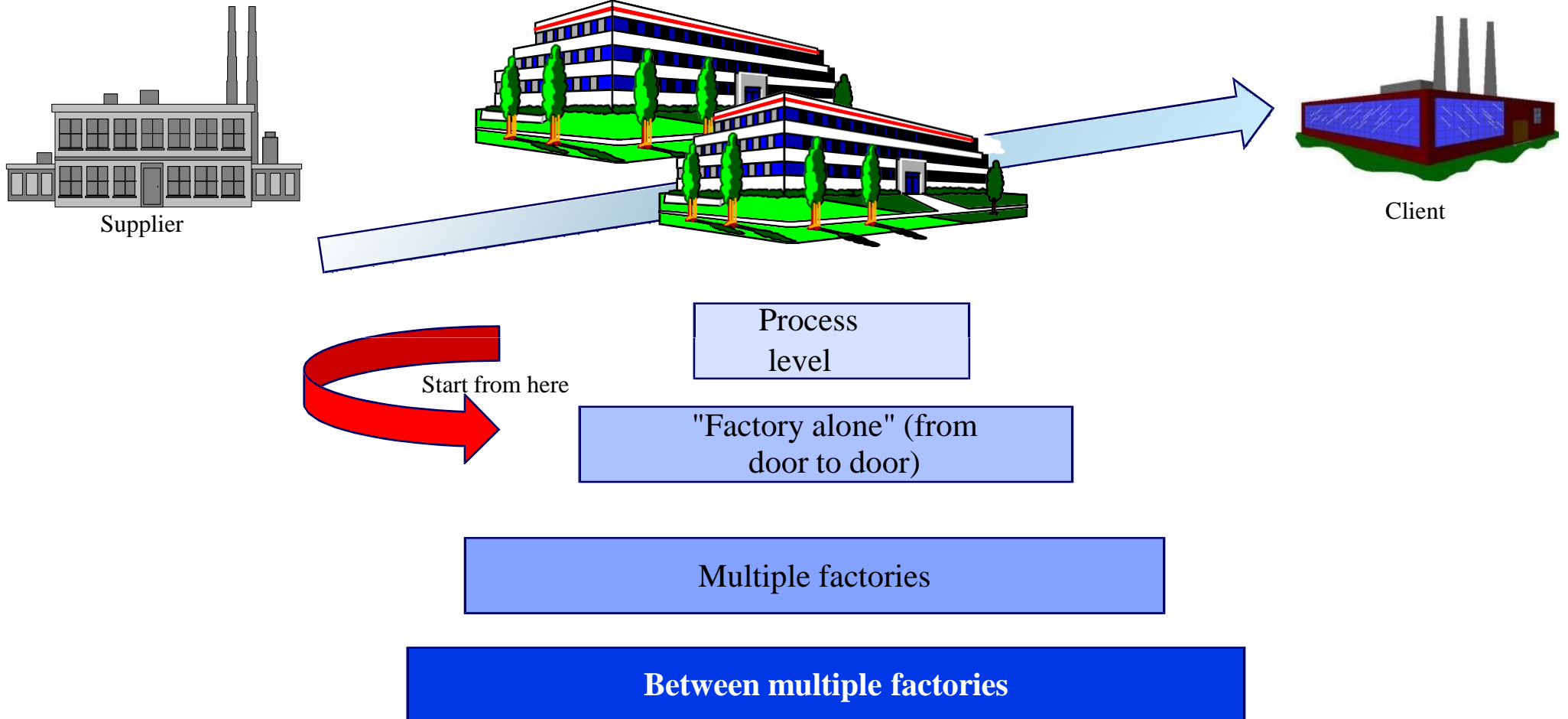


Table of content

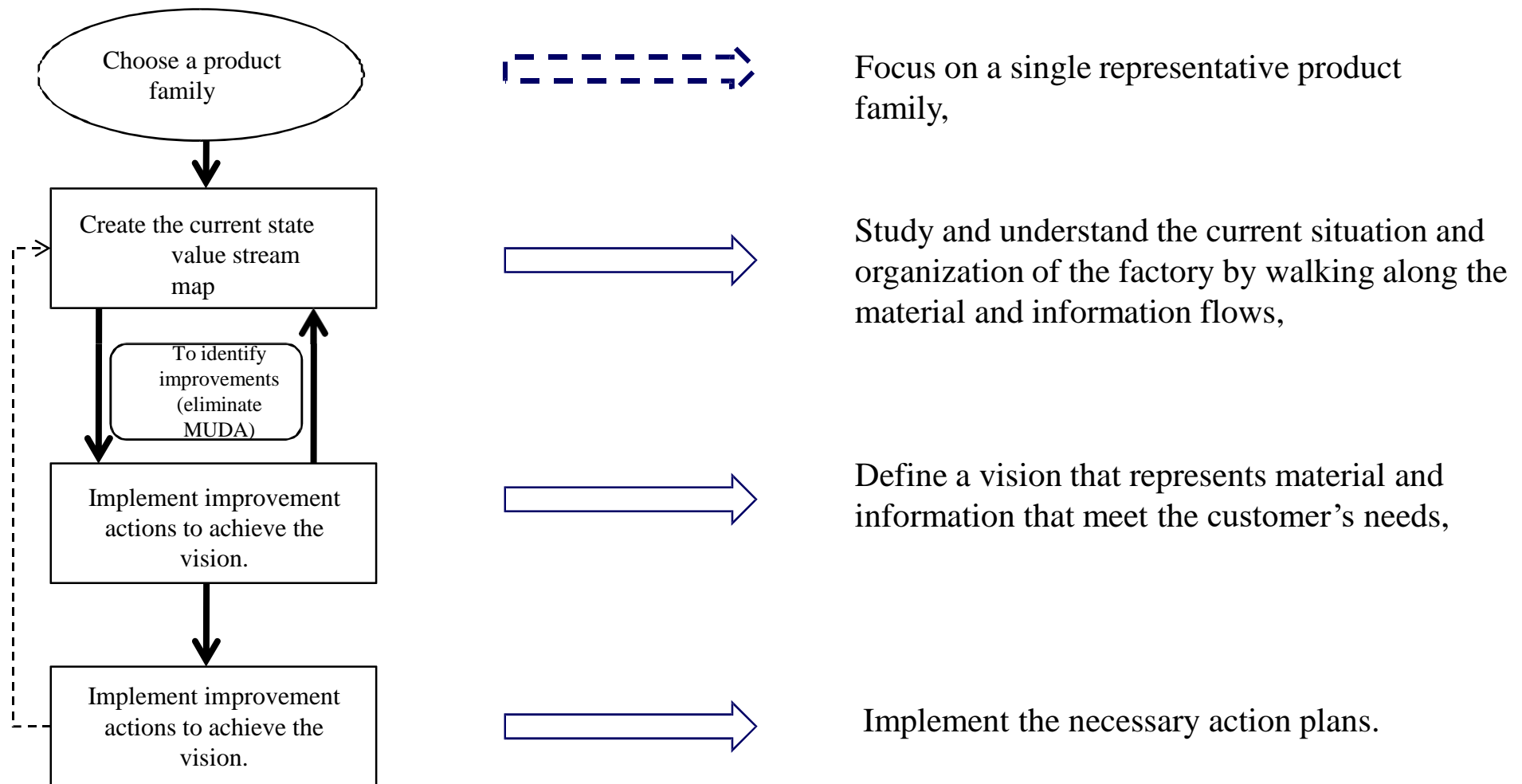
- **Overview of VSM and a reminder of the Lean concept**
 - Terminology
 - Fundamental reminders of the Lean concept
- **The VSM/VSD approach**
 - Where to start?
 - Big steps
 - Summary
- **Vocabulary**
- **Bibliography**



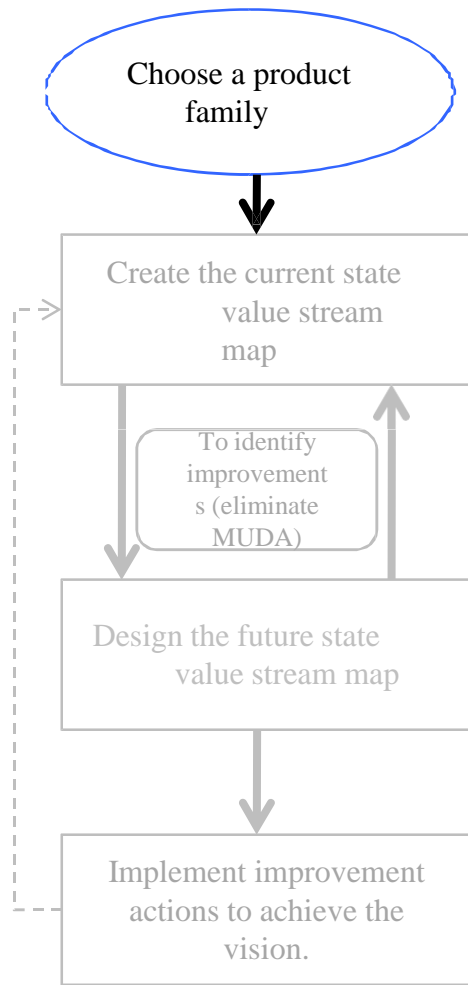
Value Stream Mapping (VSM) enables the study of the entire flow from the input of materials to the output of the product.



The VSM/VSD process follows 1 initial step and 3 significant phases, all equally important.



The choice of the product family



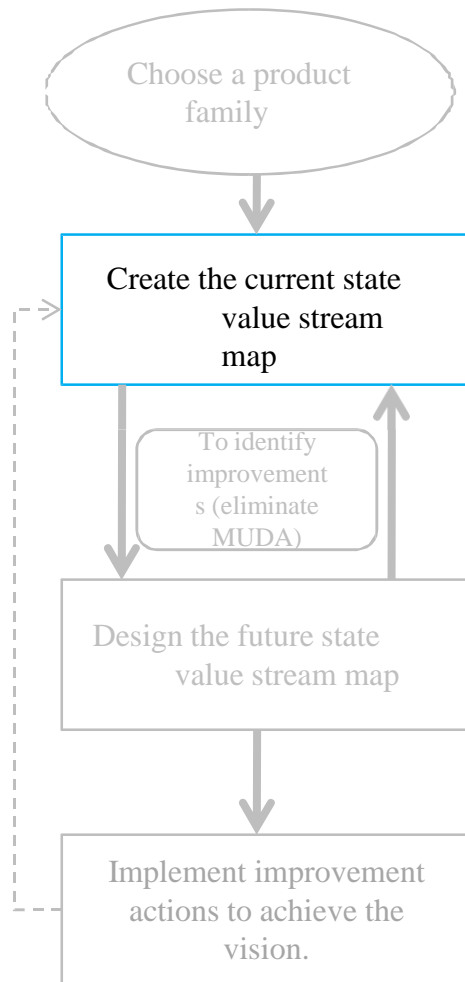
Focus on a single representative product family,

		PROCESS						
		1	2	3	4	5	6	7
P R O D U C T	A	x		x	x	x		
	B	x	x	x	x	x		
	C	x	x	x	x	x	x	
	D	x		x	x		x	x
	E		x	x		x	x	
	F	x	x			x	x	

} Possible product family



Mapping is a crucial step.



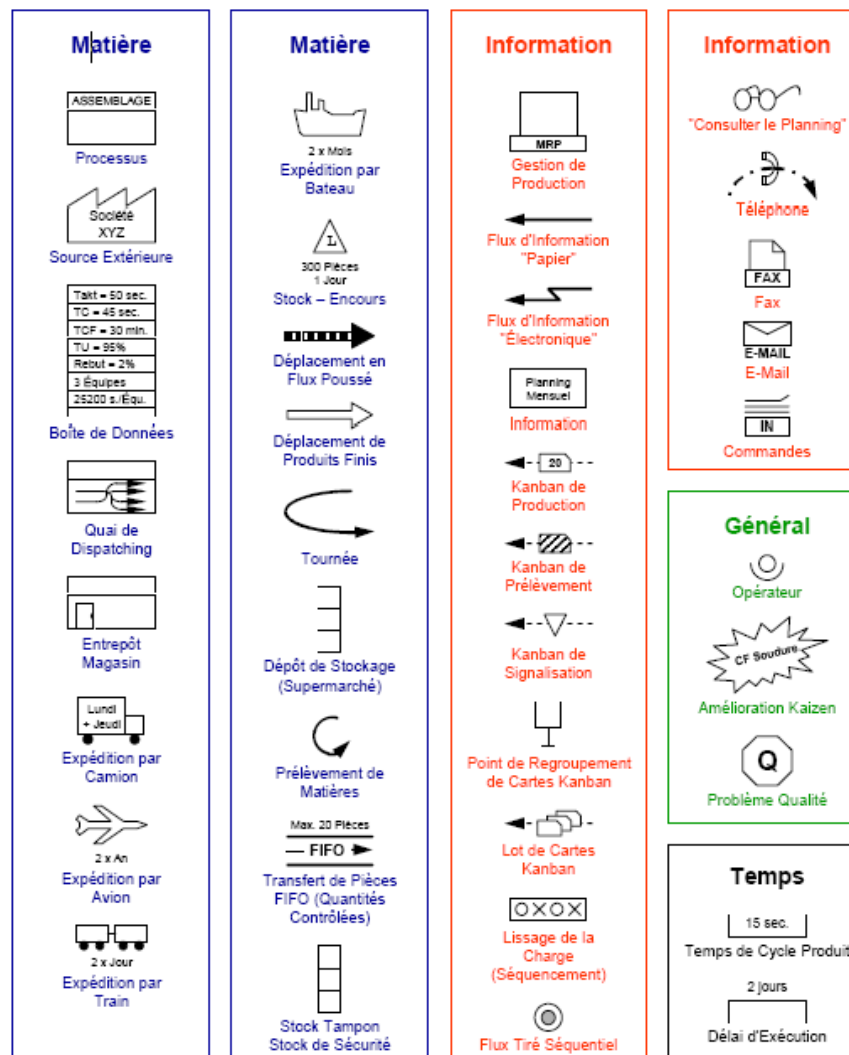
Study and understand the current situation and organization of the factory by walking along the material and information flows,

- Write down customer information and data (volume, order frequency, etc., ...),
- Describe the flow of materials, from the storage before shipment to the raw material receiving storage, and draw the map by hand using standard symbols,
- Only consider current data and information from the field, then complete the map by adding cycle times, number of operators, TRS,...),
- Complete the map with information flows, including those from suppliers and customers (planning, production schedules, ...),
- Calculate lead times and the duration of the value-added flow.

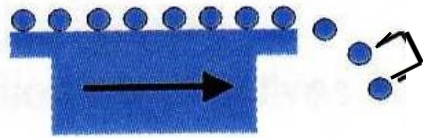
Do not forget to involve all stakeholders involved in the flows



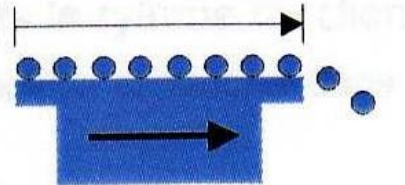
Mapping is represented by symbols that facilitate a clear understanding of the flows.



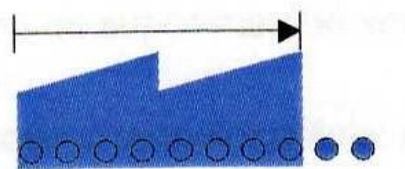
The notion of TIME needs to be explicit



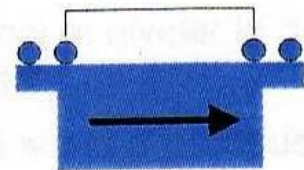
- **Cycle Time:**
Time-lapse between the exit of the first product and the exit of the second product,



- **LEAD TIME, LT :**
- **Cycle time in the process:**
Time required for a product to go through the entire process , Ou



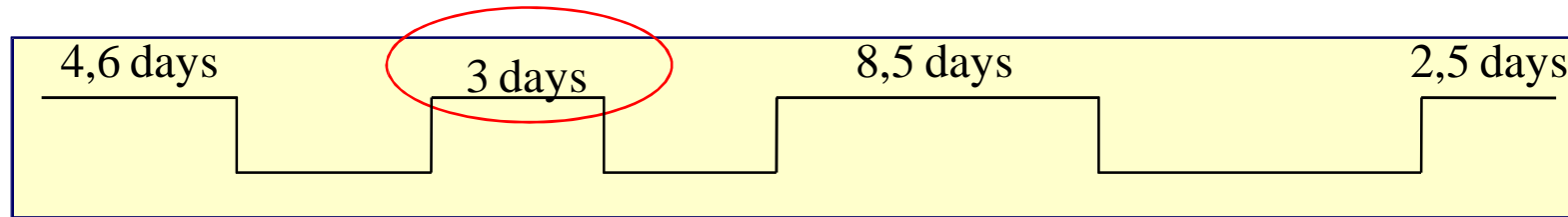
- **Rotation time:**
Time required for a product to pass through all the processes in a value stream,



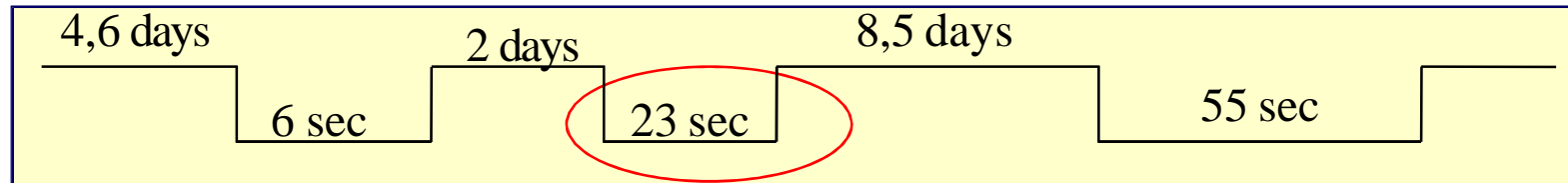
- **Series changeover time:**
Time is required between the exit of the last product type A from a process and the entry of the first product B into the subsequent process.

Each value-added operation is characterized by an execution time and waiting time between 2 phases

- Write the lead time between each value-added operation on the current map.



- Write the value-added time of each operation

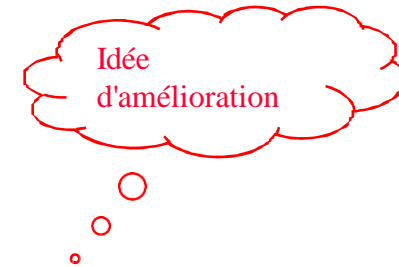
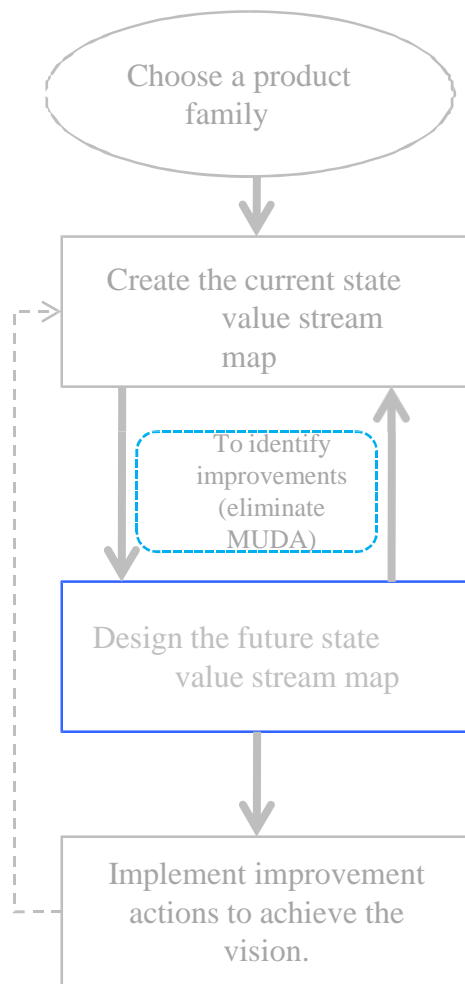


- Add up the lead times and value-added times and write the totals at the end of the timeline.

Lead Time: Traverse time = 18,6 days
Value-added time: 1mn 24 s



La vision future doit être orientée et adaptée selon les exigences client



Define a vision that represents material and information that meet the customer's needs:

- **Identify and record all sources of waste, MUDA,**
- **Identify and record improvement ideas.**





We will focus our flow optimization efforts on four major improvement axes.

- Typically, the search for waste is conducted following seven guidelines.:
 1. Produce following the rhythm of market demand or customer demand (takt time).
 2. Produce for shipment or store in a supermarket,
 3. Establish a continuous flow wherever possible,
 4. Create a supermarket system based on the principle of pull flow,
 5. Plan production from a specific and single point: the regulating process, bottleneck, or pacemaker,
 6. Produce in small batches and level production at the regulating process, bottleneck,
 7. Implement rhythmic withdrawal from the regulating process, bottleneck.

- **Concretely, we focus on four major axes.:**
 - 1. Produce according to customer demand (Takt Time)**
 - 2. Establish a continuous flow of production (piece by piece)**
 - 3. Implement pull systems,**
 - 4. Level production to optimize work in progress (WIP).**

Directive 1: Produce by the rhythm of market demand or customer demand: Takt Time

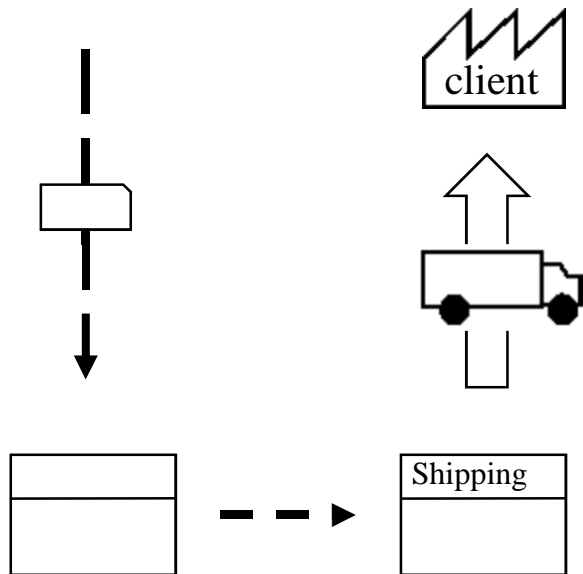
- The ideal pace is called "**Takt Time**" (from the German word "Takt" meaning rhythm or beat). It represents the rate at which customers purchase the product.
- It allows for synchronizing the production rhythm with sales,
- The production level of the factory is based on the actual customer demand rate,

$$\text{- Customer's rhythm} = \frac{\text{Effective working time per day}}{\text{Customer demand per day}}$$

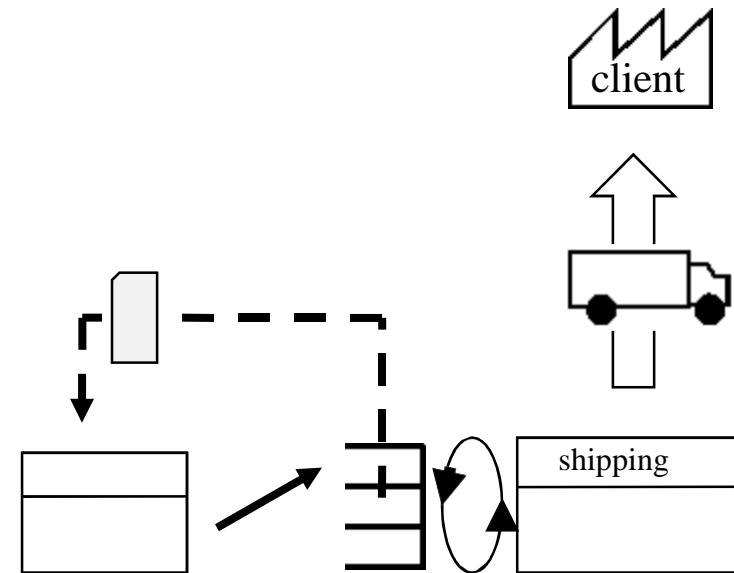


Directive 2: Produce for shipment or store in a supermarket.

Choice between 2 systems



Produce for shipment

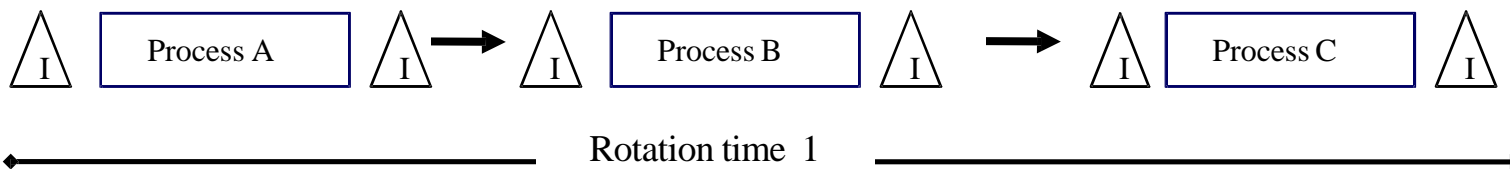


Supermarket with a pull-based flow

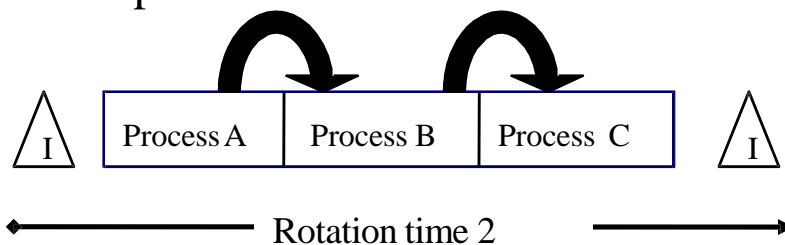


Directive 3: Establish a continuous flow wherever possible

▪ Push-based production



▪ One-piece flow production



Conséquences sur les performances de production du déploiement d'un flux en pièce à pièce

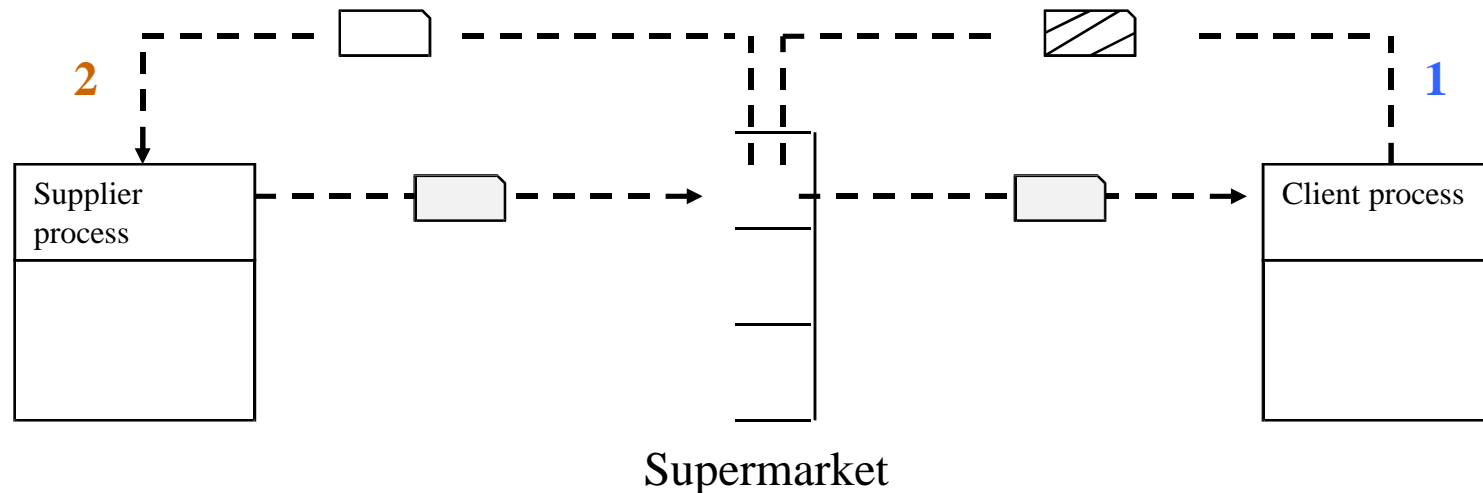
Performances	Evolution
Niveau de stock d'encours	↘
Distance parcourue par les produits	↘
Espace occupé	↘
Temps machine alloué	→
Productivité opérateur	↗
Durée de mise à disposition des produits finis	↘
Taux de défaut dans les produits finis	↘
Taux de défaut en production	→
...	

Quelles sont les limites d'un dispositif de production en pièce à pièce

- La constitution d'un flux de production en pièce à pièce est difficile quand des machines aux cadences de production très différentes concourent à la fabrication d'un même produit.
- Elle est également difficile lorsqu'une partie du processus de fabrication est sous-traitée
- dans ces deux cas, il est nécessaire de prévoir des stocks de découplage...
- L'existence de stock de découplage reste souvent plus un héritage du passé qu'un réel besoin de l'entreprise

Directive 4: Create a supermarket system based on the principle of pull flow.

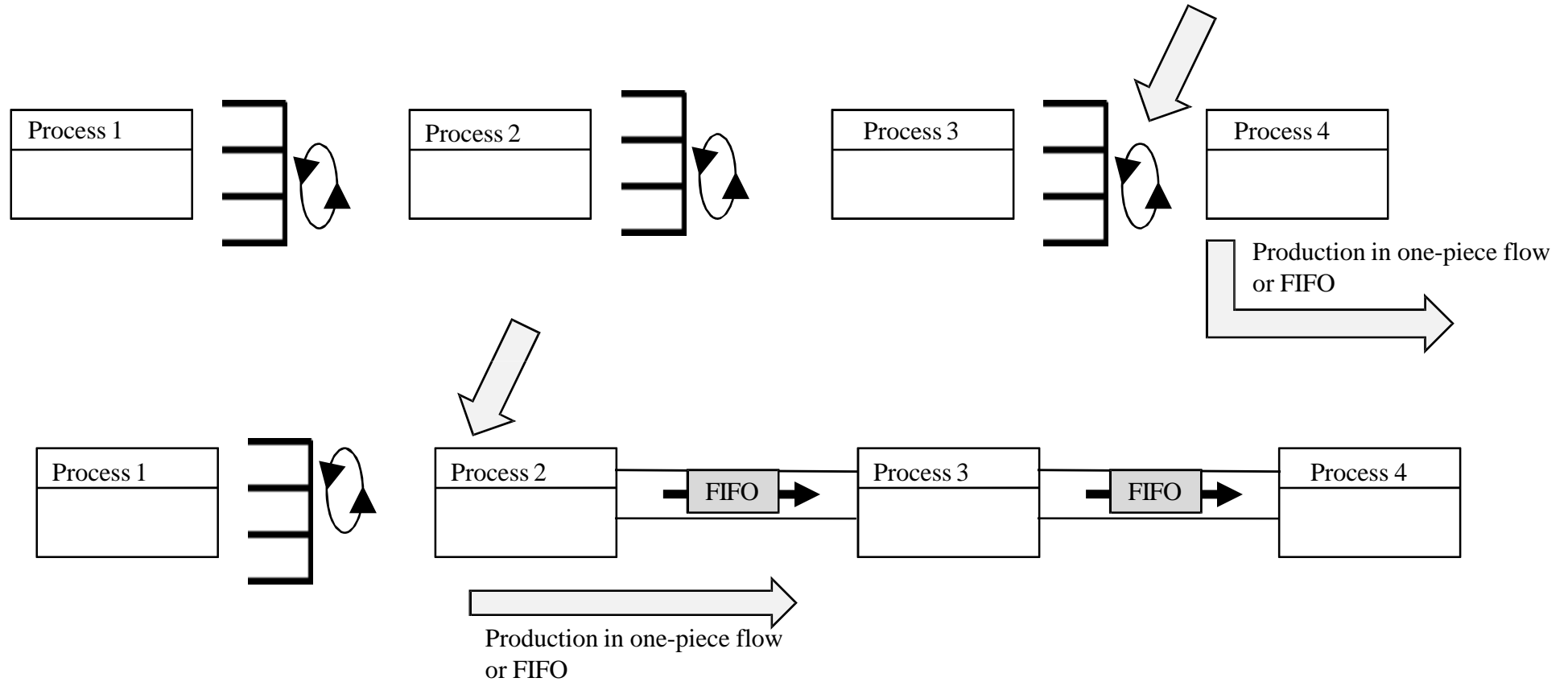
- 1 The customer process goes to the supermarket and withdraws what they need
- 2 The customer process produces to replace the product that has just been withdrawn



The objectives sought are :

- regulate the flow between the different sectors of production, the supplier's process does not require planning as it occurs automatically.,
- long-term elimination of the supermarket.

Directive 5: Plan production from a specific and unique point: the pacemaker process or bottleneck process



Directive 6: Produce in small batches and level production at the pacemaker or bottleneck process

Definition of lot sizes:

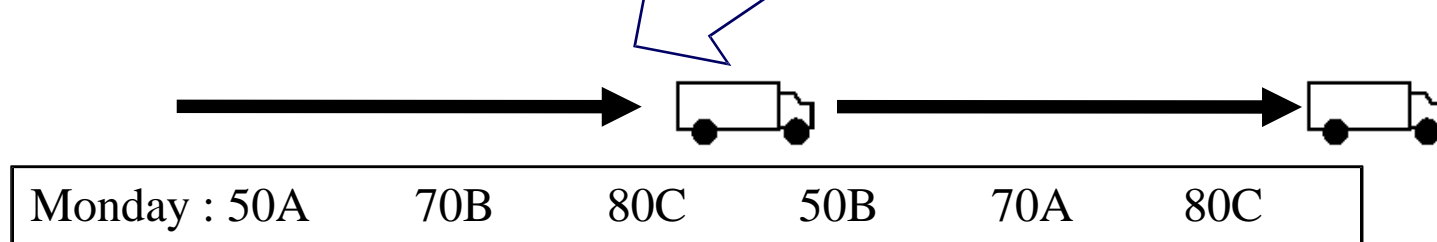
EPEI = Every Part Every Interval

Production Plan	
Monday :	400A
Tuesday:	100A, 400B
Wednesday:	200B, 200C
Thursday :	400C
Friday :	200C, 200A

Smaller lot size (<EPEI)

Production Plan	
Monday :	140 A, 100B, 160C
Tuesday:	100A, 200B, 100C
Wednesday:	
Thursday:	
Friday :	

Each day, a little bit of all the parts



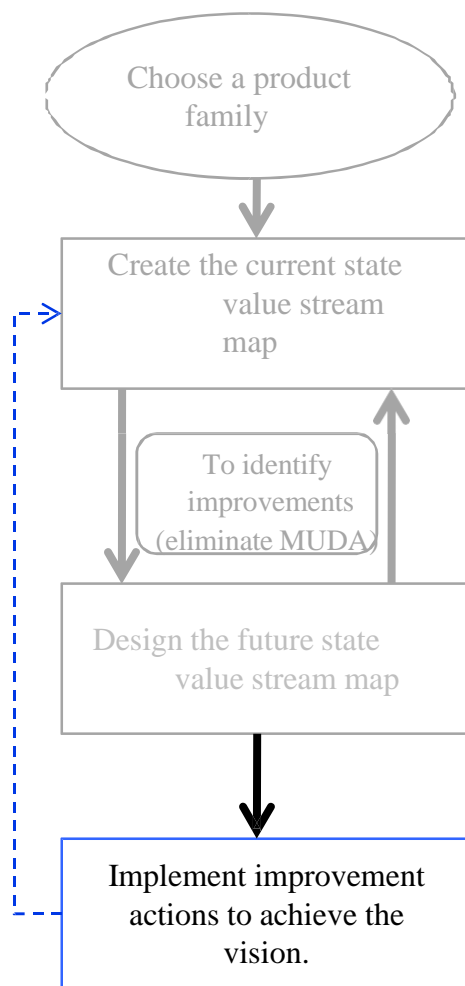
A little bit of all the parts with each delivery



This type of production entails short changeover times.



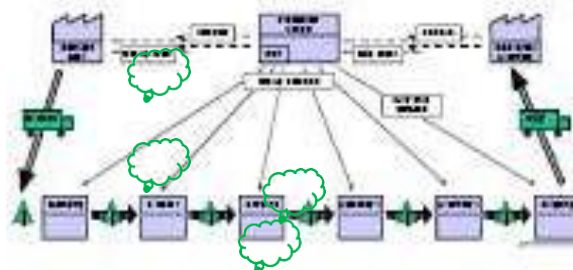
VSM/VSD process is a continuous improvement approach



Implement the necessary action plans.
According to the previous 7 directives:

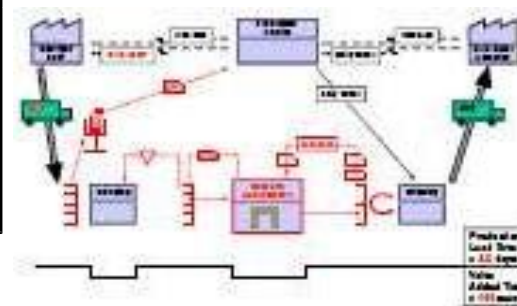
- Identify future projects,
- Prioritize the projects and create the schedule,
- Identify project leaders and participants,
- Allocate resources,
- Initiate a PDCA,
- Conduct follow-up meetings at the improvement sites (GEMBA).

The main expected benefits are focused on improving lead times, productivity, and optimizing space.



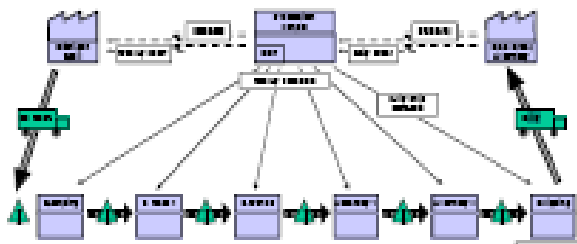
Identification of dysfunctions / MUDA (waste)

Future situation map

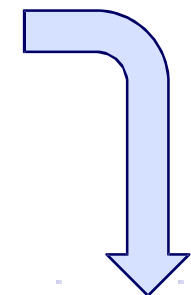
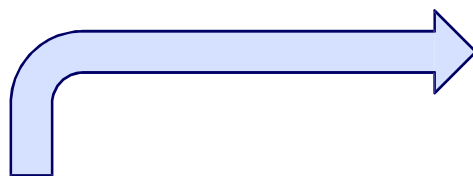
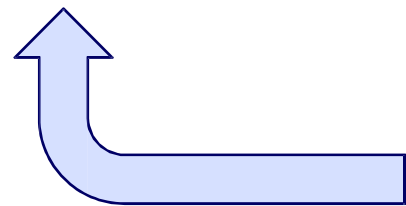
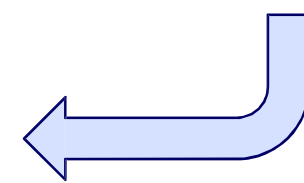
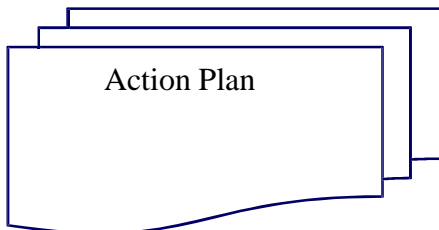


The main expected gains are focused on:

- Improvement of Leadtimes,
- Increased productivity,
- Optimization of space



Actual situation map



Waste does not add value and slows down processes.



VSM/VSD is designed to support the rationalization process of an organization: LEAN.

VSM / VSD

- Helps visualize and understand all processes,
- It mainly focuses on material and information flows,
- Identifies waste,
- Enables overall improvement instead of isolated and individual solutions,
- Provides a common language for all stakeholders.,
- Obtains the buy-in of stakeholders working on the process.

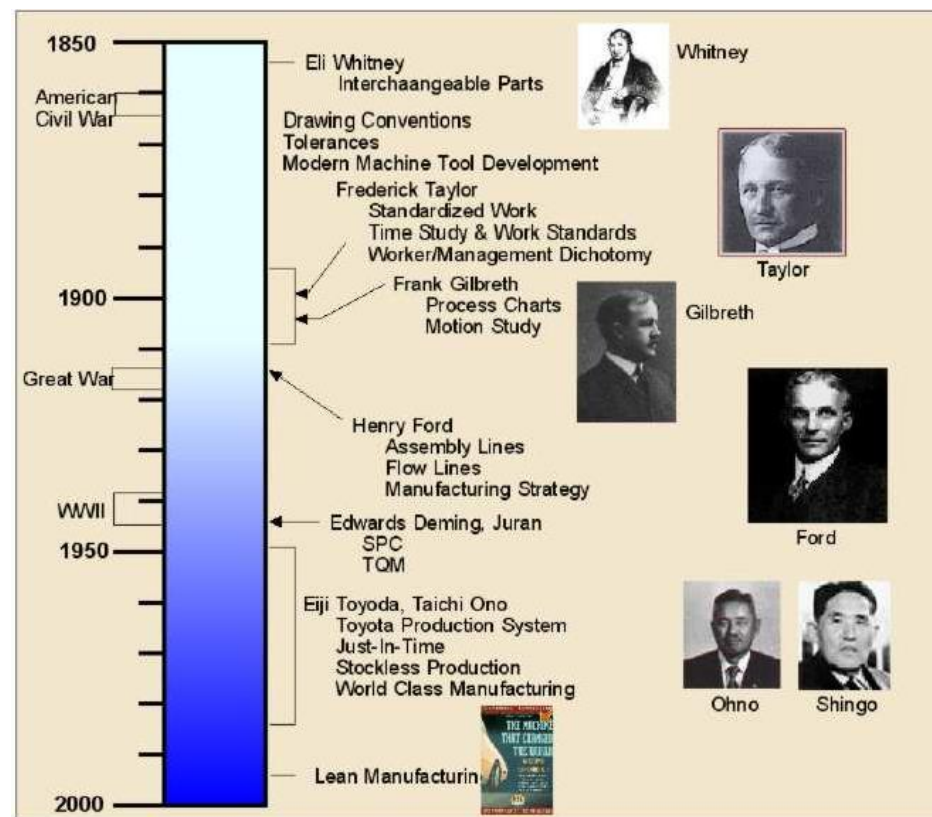


Table of content

- **Overview of VSM and a reminder of the Lean concept**
 - Terminology
 - Fundamental reminders of the Lean concept
- **The VSM/VSD approach**
 - Where to start?
 - Big steps
 - Summary
- **Vocabulary**
- **Bibliography**



Some definitions

- GEMBA

Japanese term for "the place where the action takes place," is often used when referring to the production area or any place where a value-creating process is executed.

- KAIZEN

(改善) change for the better" or "continuous improvement" in Japanese. Kaizen involves the active participation of all individuals to bring benefits to everyone and create lasting change. It encompasses all the small improvements made by employees to enhance SQCDM.

- LEAD TIME

A fundamental concept in lean methodology. It refers to the time it takes to produce a product from the entry of raw materials to the shipment of the finished product.

- MUDA

Muda is the literal translation of "waste" in Japanese.

The 7 "Muda" refers to any activity that consumes resources without adding value for the customer. The 7 identified wastes (muda) in Lean are Overproduction, Inventory, Waiting, Transportation, Motion, Defects, and Processing waste.

Table of content

- **Overview of VSM and a reminder of the Lean concept**
 - Terminology
 - Fundamental reminders of the Lean concept
- **The VSM/VSD approach**
 - Where to start?
 - Big steps
 - Summary
- **Vocabulary**
- **Bibliography**



Here are some references and books

- The TOYOTA model, Jeff LIKER
- Seeing to better manage, Mike ROTHER and John SHOOK,
- Basic website: the lean portal