Accounting and profitability

Projects and investing

Production as a part of value chain

Production processes and production control

Production systems and organizations

Creating value

Production processes and production control

Case-examples

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In this exercise:

- Toyota production system
- Virginia Mason Production System
  - Reduction of waste
  - Workstation layout
  - Benefits of reducing waste

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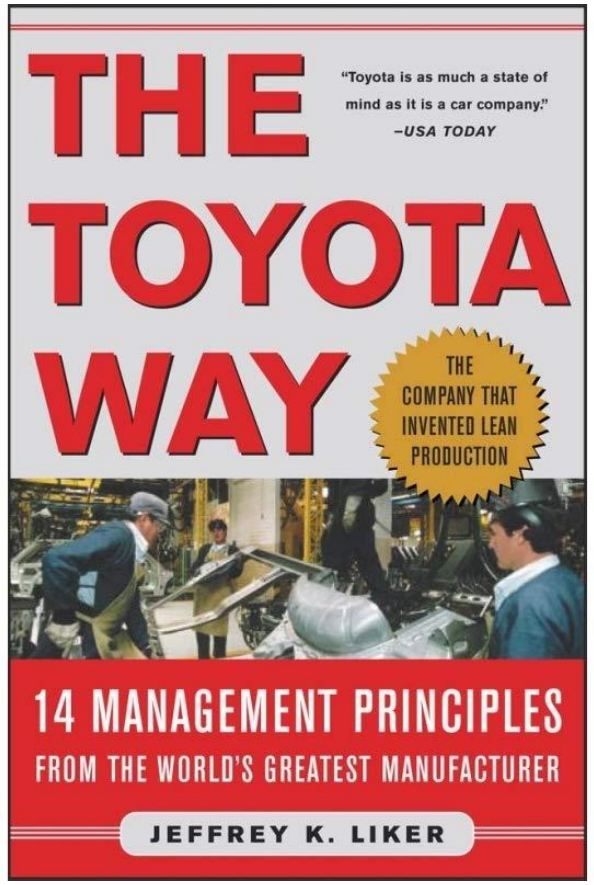
Toyota Production System (TPS): Production system without waste



Images:
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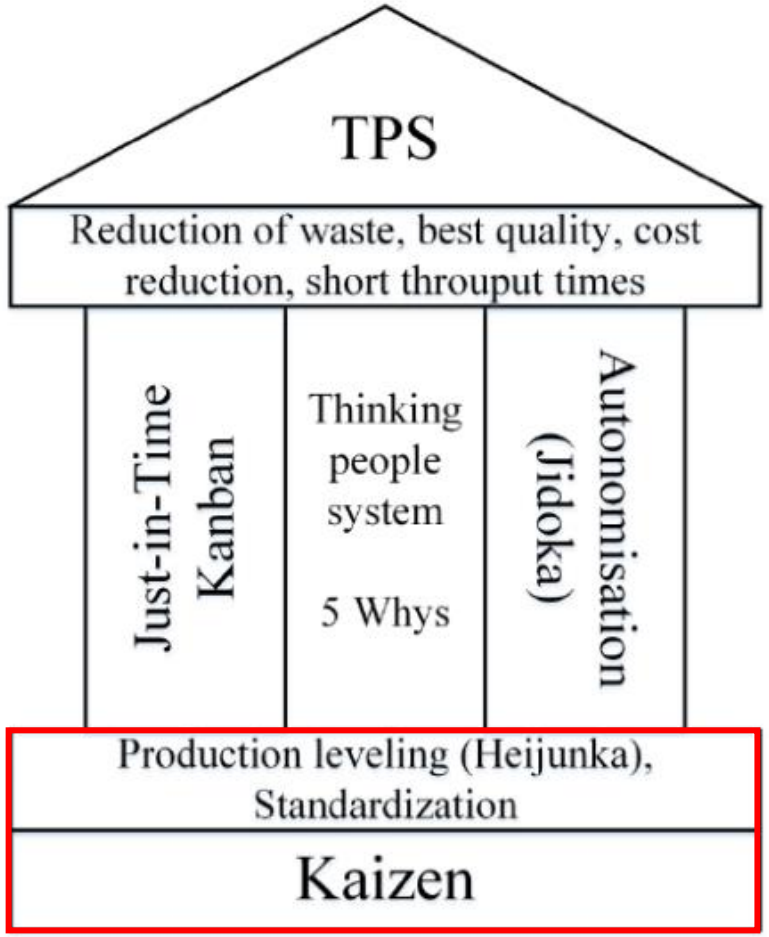
https://i.gr-assets.com/images/S/compressed.photo.goodreads.com/books/1436741874i/161789._UY800_SS800_.jpg

Founding principles

- **Production leveling (Heijunka)**
  - Production of intermediate products and procurement are executed in specific time intervals and same sized batches
- **Standardization**
  - Production system phases are performed the same way
  - Instructions how to perform phases are documented
- **Kaizen**
  - Continuous improvement which aims to improve the quality and efficiency of the production system



Fritze C. (2016) *The Toyota Production System - The Key Elements and the Role of Kaizen within the System* . s 4

Methods

Just-in-time (JIT)

Raw materials are always available when needed, without unnecessary storing

Kanban

Demand in the system's downstream starts production in the system's upstream

Autonomisation (Jidoka)

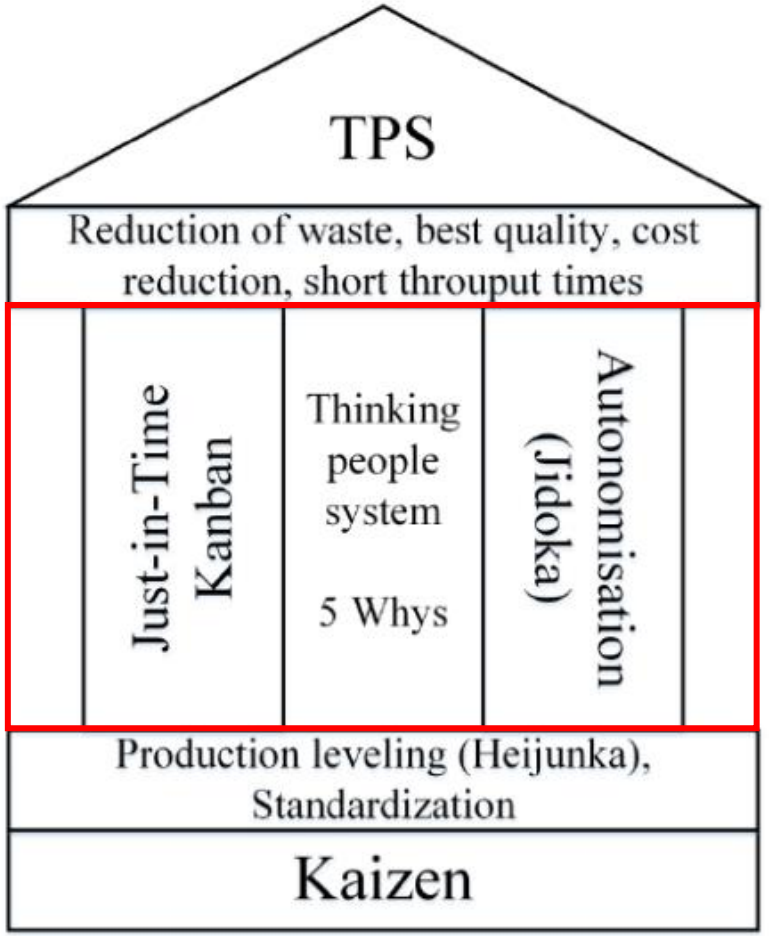
When a problem occurs in the production system, the production is stopped and the cause of the problem is sought

Thinking people system

Every employee is responsible for pointing out faults in the production system

5 Whys

When problems arise the root cause of the problem is sought by asking 'why the problem occurred?' multiple times

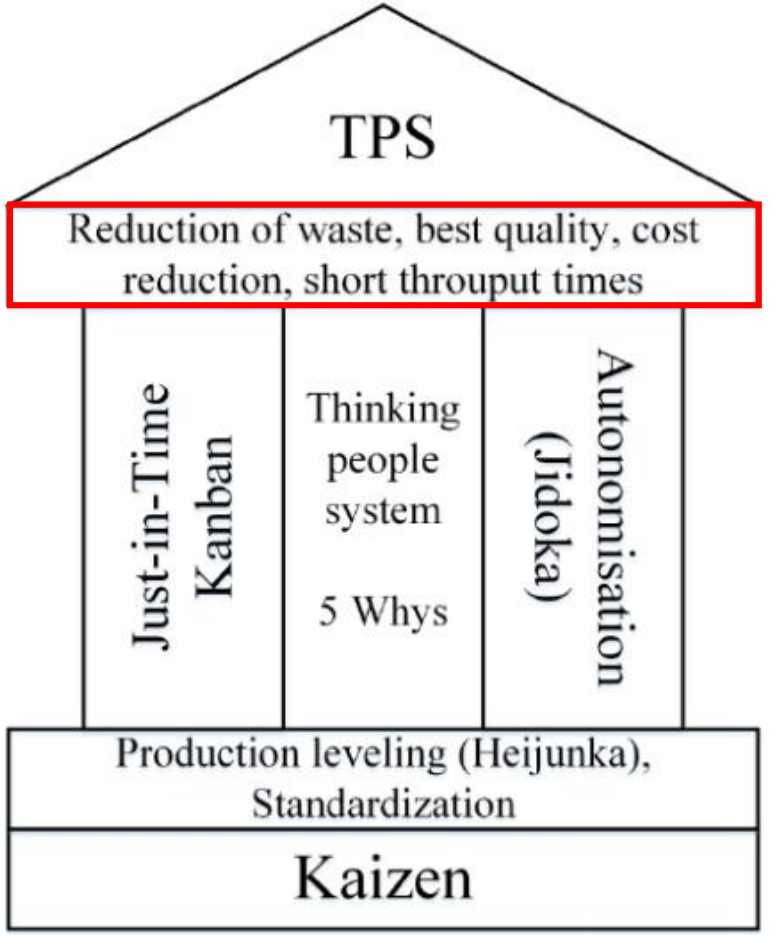


Goals

- **TPS aims to minimize waste, and by this reduce costs and throughput time, and improve quality**

- **Seven types of waste**

1. Overproduction
2. Waiting
3. Transportation
4. Processing
5. Inventory
6. Motion
7. Defective products



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Virginia Mason Production System

Virginia Mason™
INSTITUTE

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Kuvat:
https://en.wikipedia.org/wiki/Virginia_Mason_Medical_Center#/media/File:Virginia_Mason_Hospital_and_Pavilions.jpg
https://prnewswire2-a.akamaihd.net/p/1893751/sp/189375100/thumbnail/entry_id/0_vpicd7a5/def_height/2700/def_width/2700/version/100012/type/1

Virginia Mason Production System

- **Virginia Mason** is a private hospital located in Seattle Washington
- **Problems the hospital faced:**
  - Low-quality services and poor safety practices
  - Waste generated in service production
  - Increase in costs causing financial problems
- **Traditional methods for pinpointing and fixing problems**
  - Simple quality management methods
  - Educated staff
- **The traditional methods were not effective enough**
  - The methods did not include the whole organization

Kaplan G.S., Patterson S.H. (2008). *Seeking perfection in healthcare. A case study in adopting Toyota Production System methods.* Healthcare Executive. May/Jun2008, Vol. 23 Issue 3, p16-21. 5p. ISSN: 0883-5381

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Reduction of waste

- Hospital's staff visited production facilities in Japan
- **As a result new production system was created**
  - Virginia Mason Production System (VMPS)
- **Goal of VMPS was to improve service quality by minimizing waste**

Kuva: https://www.virginiamason.org/images/Enviromason/reducing-waste-l.jpg

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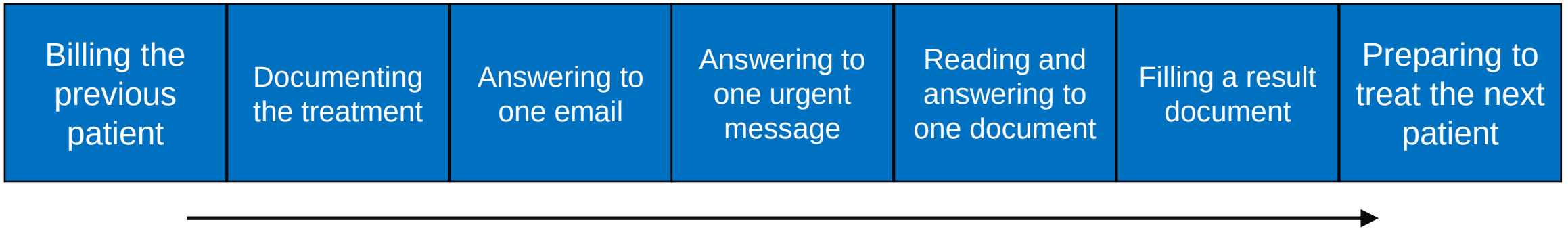
Workstation layout

- VMPS streamlined the work routine of physicians
- U-shaped workstations were placed in front of physician's offices
  - *Stations had predefined tasks that were completed in sequence*
- The U-shaped ‘production line type’ layout increased the production capacity by 10 %



Weber D. (2006). *Toyota-Style Management Drives Virginia Mason*. Physician executive. 32. 12-7.

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Benefits of reducing waste

- The hospital pinpointed the source tasks of waste
- Pinpointing the procedures allowed Virginia Mason to reduce waste and improve service quality

Type	(comes from)	Source
Over-production	| |	Over-documenting
Transportation	| |	Patient transportation
Over-processing	| |	Billing process
Inventory	| |	Medicine and supplies
Motion	| |	Accessing documents
Defective service	| |	Staff accountability
Waiting	| |	Large machinery

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Benefits of reducing waste

- 11-million-dollar savings in investments
- Over one-million-dollar savings in inventory costs
- The overall daily walking distance of staff reduced by 97 kilometers (60 miles)
- Half a million dollars saved in labor costs in one year

Type	(comes from)	Source
Over-production	| |	Over-documenting
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Assignment 3:
Production processes and production control

1. **Material flows and facilities (1-2 pages)**
   - What type of layout is utilized in your production system?
   - How would the process steps be aligned in your production system? (arriving raw materials, manufacturing tasks, customer flow, etc.)

     - Draw a process flow chart and briefly explain the tasks
2. **Production flow (1 page)**
   - Does your production system utilize push or pull control?
   - Estimate the throughput time and flow efficiency
3. **Minimizing waste (1 page)**
   - What kind of deviation of quality can be present in your production system?
   - Present ways to reduce deviation of quality

     - In other words, how can you ensure technical quality in your products?
   - How can your business minimize waste in production?

Assignment 3:
Production processes and production control

- **Submit your assignment to MyCourses as a PDF file**
- **Remember to give feedback:**
  1. How long did it take to do the assignment?
  2. What new did you learn?
  3. What should be developed in this exercise?
  4. General comments on the course so far?
- **Next week we will go through production as part of a value chain**