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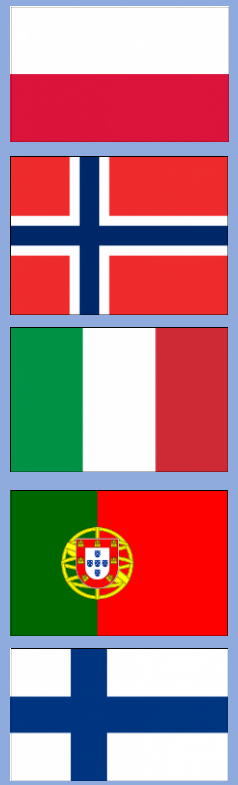
Chapter 3
Lean tools implementation in office and knowledge work

Dorota Stadnicka, *Rzeszow University of Technology*
Rui Sousa, *University of Minho*

„Innovative Learning Approaches for Implementation of Lean Thinking to Enhance Office and Knowledge Work Productivity”

ILA-LEAN Project No 2016-1-PL01-KA203-026293
2016-2018

2018



2

Project Title

Innovative Learning Approaches for Implementation of Lean Thinking to Enhance Office and Knowledge Work Productivity

Project Number: 2016-1-PL01-KA203-026293

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Chapter 3.1. Review of lean practices, methods and tools used in office and knowledge work

„Innovative Learning Approaches for Implementation of Lean Thinking to Enhance Office and Knowledge Work Productivity”

ILA-LEAN Project No 2016-1-PL01-KA203-026293
2016-2018

Objective

The objective of this chapter is to make a review of different lean practices, methods and tools, which can be implemented in office and knowledge work.

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CONTENT OF THE CHAPTER

1. A goal of the chapter
2. Lean tools in large companies
3. Lean tools in SME
4. 5S method
5. Standardization
6. Visualization
7. TPM
8. Andon
9. Poka Yoke
10. Kanban
11. FIFO
12. VSM
13. Takt Time
14. Just in Time
15. One piece flow
16. Matrix of competences
17. TQM
18. Team work
19. Pareto analysis
20. Kaizen
21. Gemba walk
22. 8D Report
23. A3 Report
24. 5 Why?
25. Hoshin Kanri

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GOAL OF THE CHAPTER

The goal of this chapter is the presentation of lean tools which can be implemented in office and knowledge work, together with practical examples.

First, research results from the literature concerning the lean tools implementation in companies are presented. Then, each lean tool which can be implemented in office and knowledge work is described shortly .

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LEAN TOOLS IN LARGE COMPANIES

5S	97%
FIFO	82%
5xWhy?	79%
Work standardization	79%
Poka Yoke	79%
Team Work	76%
Kanban System	71%
TPM	71%
Kaizen	68%
Visual management	63%
Value Stream Mapping	58%
RCA (Root Cause Analysis)	53%
Just in Time	47%
Taktu Time	45%
SMED	45%
One piece flow	42%
3P (Production Preparation Process)	39%
U-shape line	34%
Gemba walk	32%
Andon	26%
OEE	24%
TQM	24%
Milkmancourse	16%
Global 8D	16%
ChakuChaku	16%
Gemba/Gembutsu/Gengitsu	13%
7 Mudaidentyfication	11%
Hejunka Box	8%
Jidoka	8%
A3 problem solving	5%
HoshinKanri/Policy deployment	3%
Kaikaku/Reengineering	3%

Percentage of the companies which implemented a certain lean tool

Data from 46 large companies

Stadnicka D., Antosz K.: *Lean in Large Enterprises: Study Results.* World Academy of Science, Engineering and Technology, Issue 82, October 2013 Paris, International Journal of Social, Management, Economics and Business Engineering Vol:7 No:10, 2013, str. 31-37.

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LEAN TOOLS IN SME

5S	29%	3P	6%
5xWhy	20%	Gemba walk	6%
SMED	16%	U- shape line	6%
Team Work	16%	One piece flow	6%
Work standarization	14%	Gemba/Gembutsu/Gengitsu	4%
RCA (Root Cause Analysis)	12%	Milkman course	4%
TPM	12%	Andon	4%
Global 8D	10%	Just in time	4%
OEE	10%	4M/6M+E	4%
Visual Management	10%	Jishuken	2%
Kaizen	10%	Hejunka Box	2%
Poka Yoke	10%	Chaku Chaku	2%
FIFO	10%	Takt Time	2%
TQM	8%	Kaikau/Reengineering	0%
Value Stream Mapping	8%	Hoshin Kanri	0%
Kanban System	8%	A3 problem solving	0%
Jidoka	6%	7 Muda identification	0%

Percentage of the companies which implemented a certain lean tool

Data from 49 SME companies

Antosz K., Stadnicka D., *Lean philosophy implementation in SME – study results.* 7th International Conference on Engineering, Project, and Production Management (EPPM 2016), September 21-23, 2016, Bialystok, Poland. Procedia Engineering, Vol. 182, 2017, Pages 25–32.

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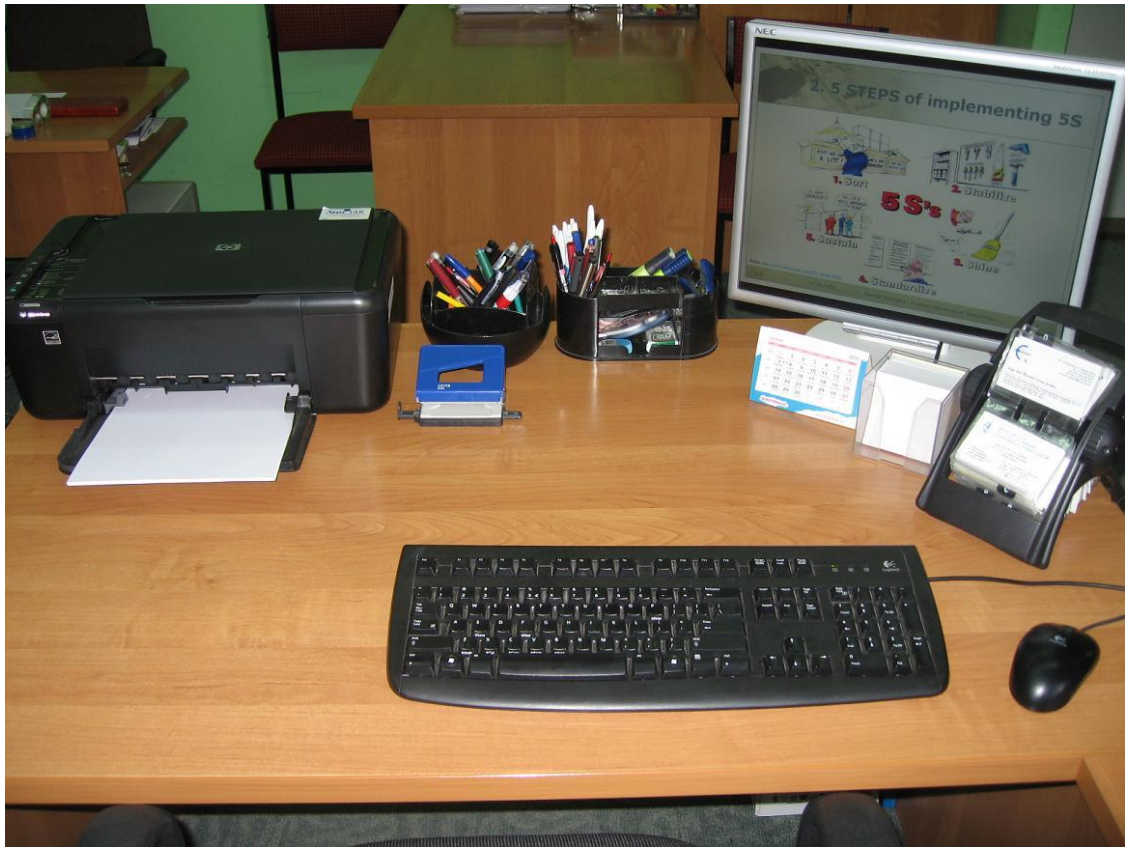
5S METHOD



What do we really need to perform todays work?

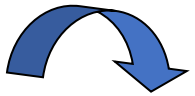
5S METHOD

SORT

Clearly distinguish needed items from unneeded and eliminate the later

SET IN ORDER

Keep needed items in the correct place to allow for easy and immediate retrieval

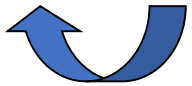


SUSTAIN

Maintain established procedures

STANDARDIZE

The method by which Sort, Stabilize and Shine are made habitual



SHINE

Keep the workplace neat and clean

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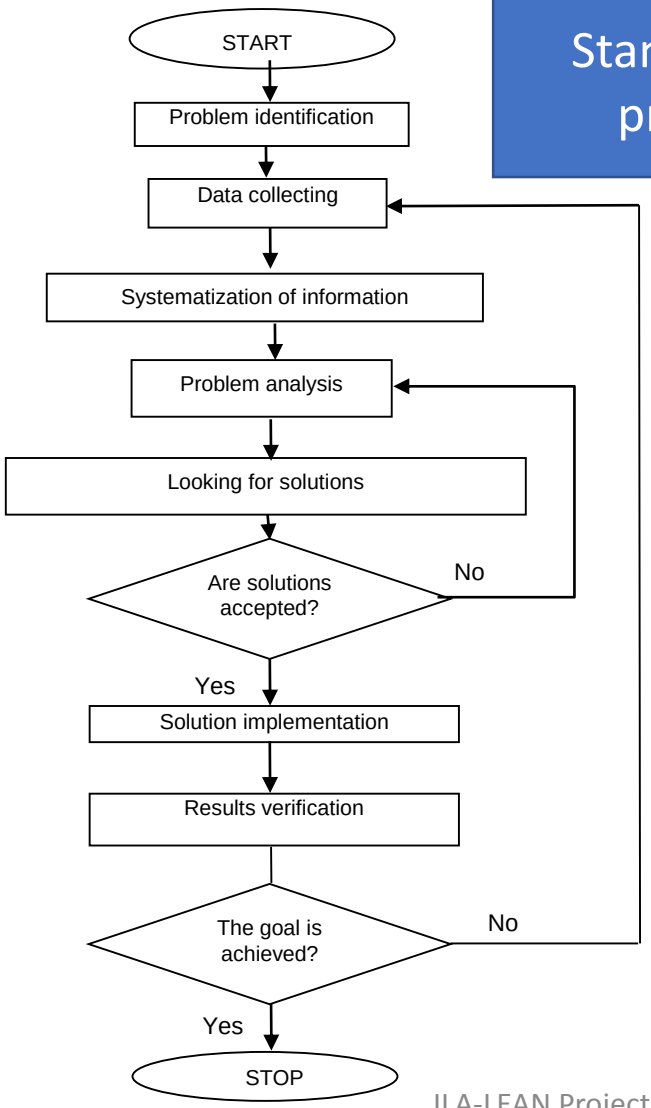
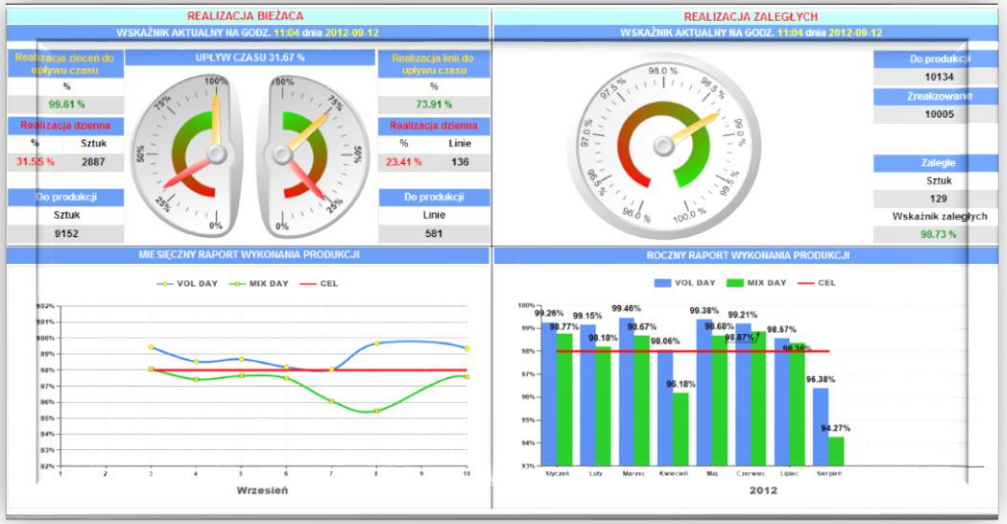
GO TO CHAPTER 3.2

STANDARDIZATION



Standard work procedure



Standard forms

- To register customers' requirements
- To register performed activities
- To register results of an inspection
- To present achievements
- For communication between departments

Standard KPI

Standard time

- To perform an activity

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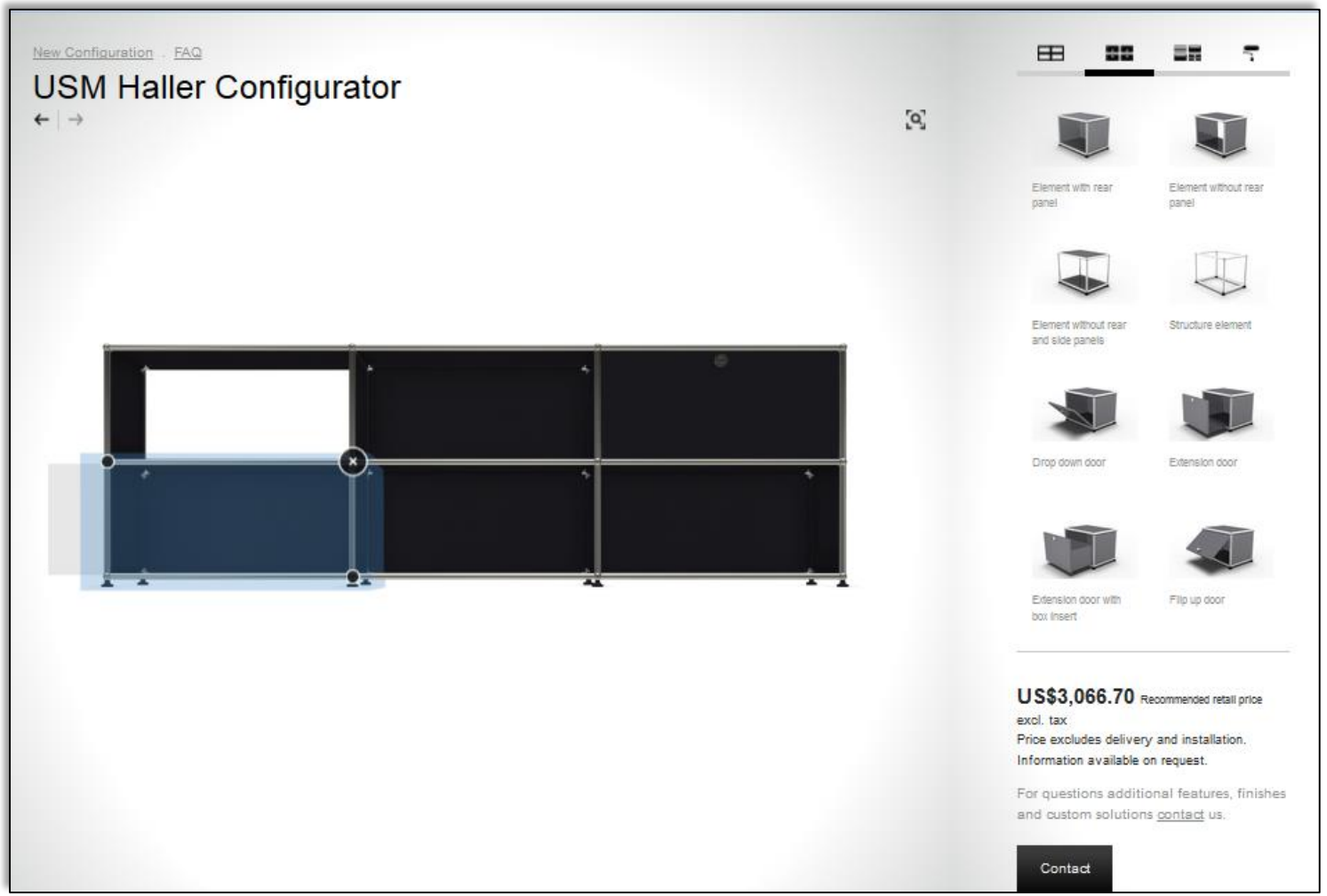
STANDARDIZATION

Product configurator



http://www.usm.com/en-us/configurator/

STANDARDIZATION

Achievements board

INFORMATION AND KNOWLEDGE VISUALIZATION

"**Data** are raw. They are symbols or isolated and non-interpreted facts."

"**Information** is data that has been given meaning through interpretation by way of relational connection and pragmatic context."

"**Knowledge** is information, which has been cognitively processed and integrated into an existing human knowledge structure. Knowledge is dynamic."

Knowledge in the world may be:
(1) external representations reflecting aspects of knowledge the head,
(2) cultural and cognitive artefacts appearing as sensory stimuli and perceptual inputs, which are automatically processed and interpreted by the cognitive system in terms of knowledge.

Knowledge is owned by a **person**, a **group of people**, or by a **society**.

Aspects of knowledge may be externalized, for example, its structure by means of structure **visualizations**.

S.-O. Tergan and T. Keller (Eds.): *Knowledge and Information Visualization*, LNCS 3426, pp. 1 – 23, 2005. © Springer-Verlag Berlin Heidelberg 2005

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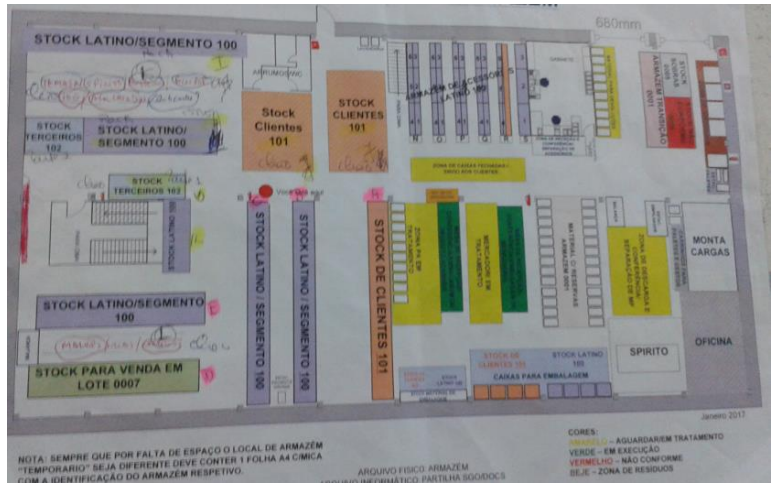
VISUALIZATION IN OFFICE

A picture with the wardrobe content



A scheme of the working areas with colors

Different colours of file binders for different clients

TO DO list and status of tasks realization

"Visualizations are cognitive tools aiming at supporting the cognitive system of the user."

S.-O. Tergan and T. Keller (Eds.): *Knowledge and Information Visualization*, LNCS 3426, pp. 1 – 23, 2005. © Springer-Verlag Berlin Heidelberg 2005

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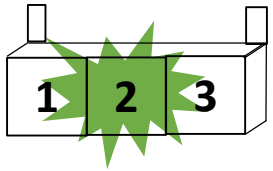
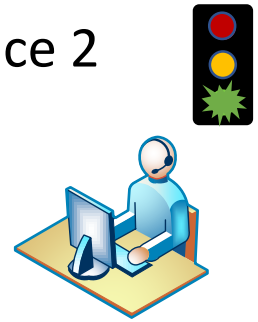
ANDON



Clients

Customer service 1

Customer service 2



Customer service 3

Andon is a Japanese word “lamp” and it is an overhead signboard with rows and numbers corresponding to, for example, work-stations.

Andon is a tool of visual management that highlights the status of operations.

An Andon system can also signal an abnormal situation.

Lean Lexicon. A grafical glosary for lean thinkers. Forth Edition. Lean Enterprise Institute, Cambridge, MA, USA, 2008.

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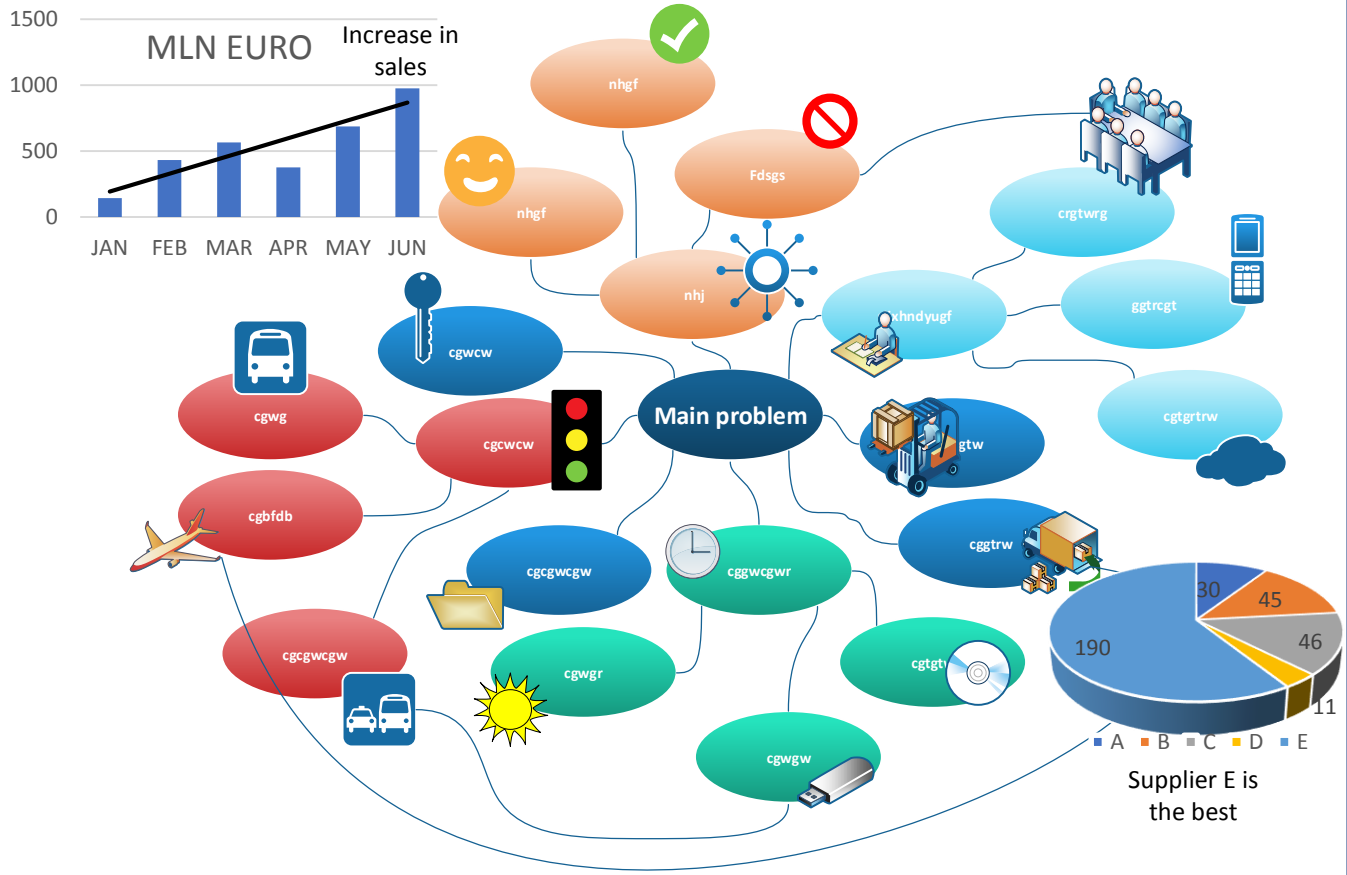
INFORMATION AND KNOWLEDGE VISUALIZATION

A visualization may help overcome problems that are due to the limitations of working memory in both capacity and duration of the stored information.

Sweller, J., & Chandler, P. (1994). *Why some material is difficult to learn.* Cognition and Instruction, 12 (3), 185-233.

Concept Maps is a graphical tool that enables anybody to express their knowledge in a form that can be easily understood by others.

S.-O. Tergan and T. Keller (Eds.): *Knowledge and Information Visualization*, LNCS 3426, pp. 1 – 23, 2005. © Springer-Verlag Berlin Heidelberg 2005 .



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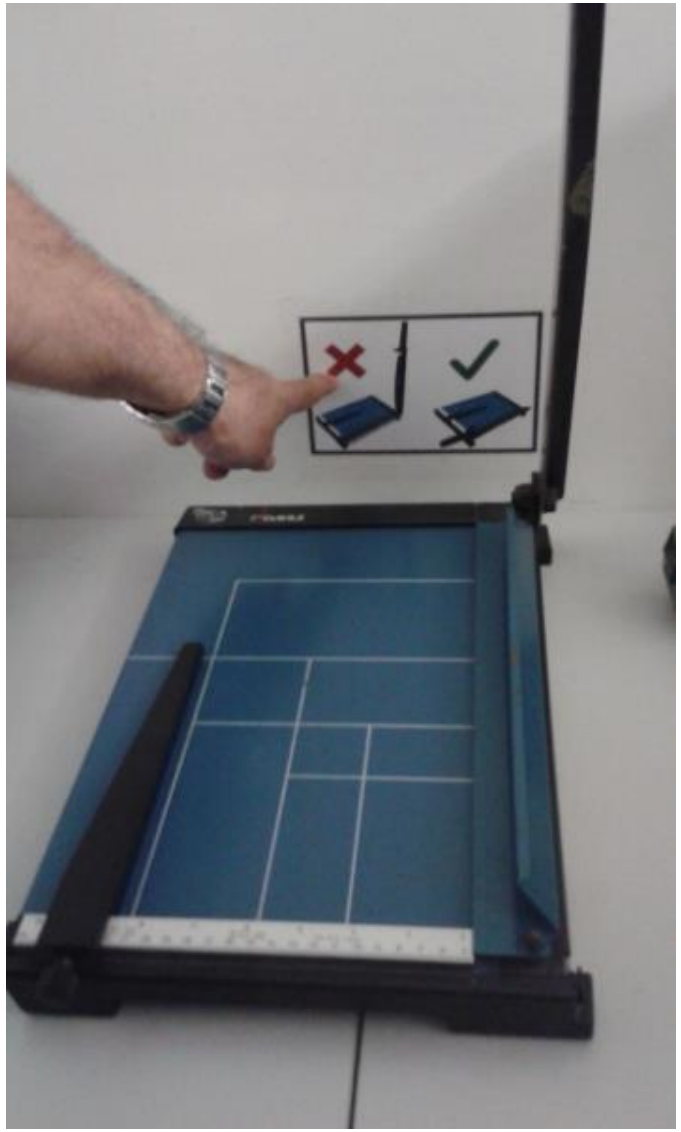
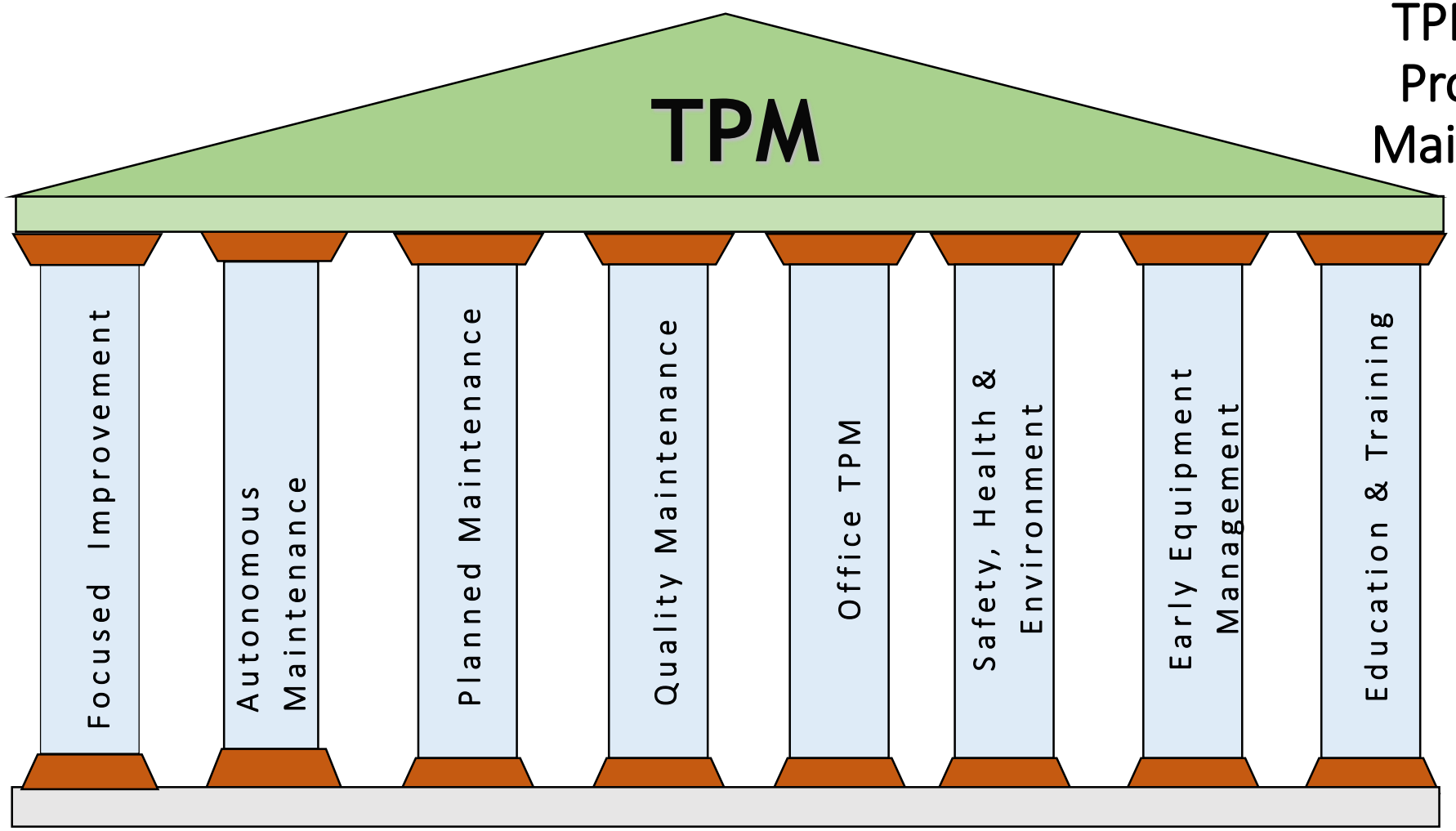
VISUALIZATION
SAFETY FIRST



TPM

TPM - Total Productive Maintenance



Borris S., Total Productive Maintenance: Proven Strategies and Techniques to Keep Equipment Running at Maximum Efficiency. McGraw-Hill, New York, 2006.

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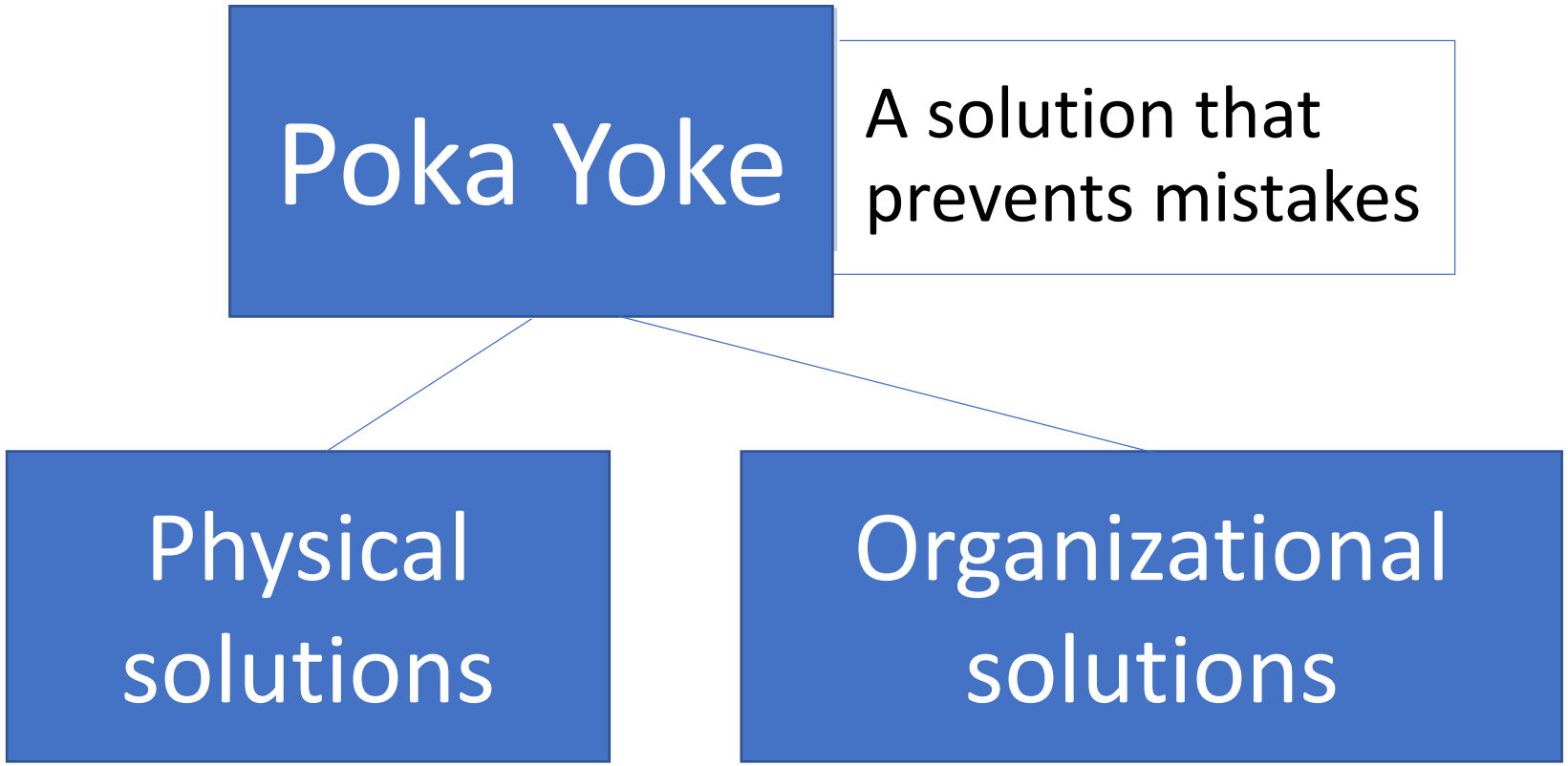
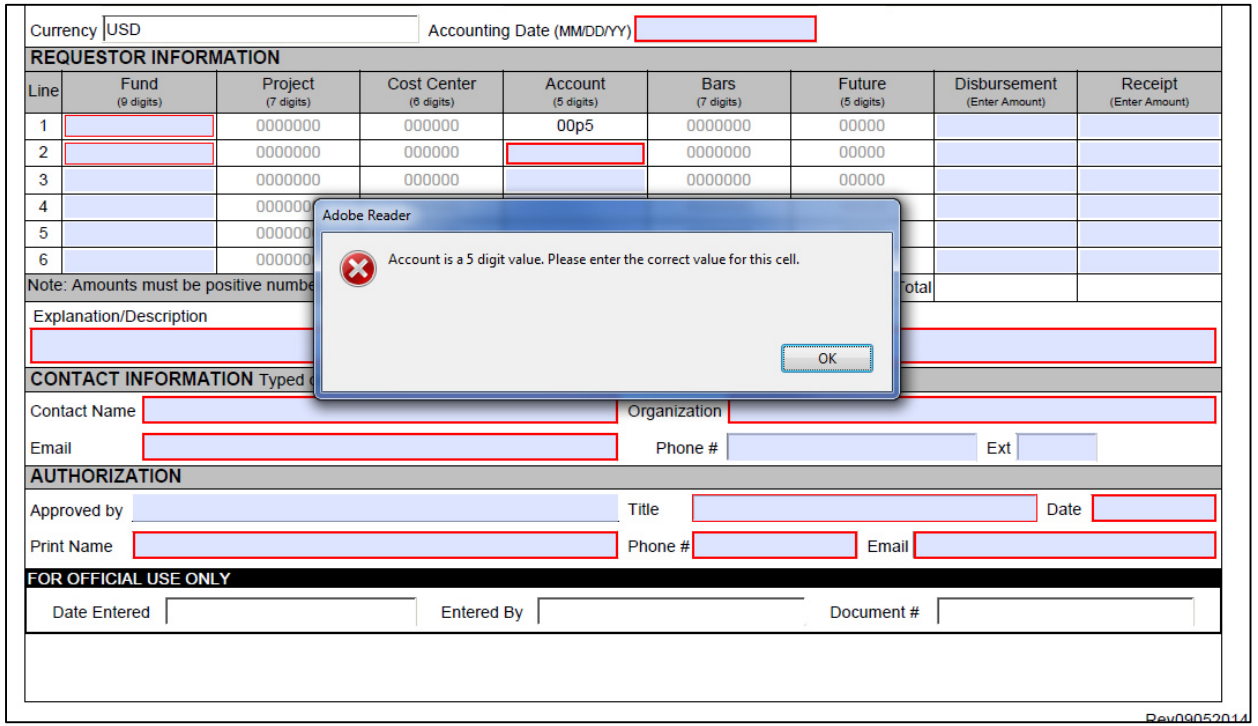
POKA YOKE



POKA YOKE



Source: https://leaninkingcounty.com/2014/10/28/mistake-proofing/

Shingo, S. (1986). *Zero quality control: Source inspection and the poka-yoke system.* Productivity Press

Munro R. A., *Six Sigma for the Office: A Pocket Guide*. Quality Press. Milwaukee, 2003.

Source: https://pl.pinterest.com/bnkbch/poka-yoke/

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TWO KANBAN BOXES

SIGNAL KANBAN

+

SUPERMARKET

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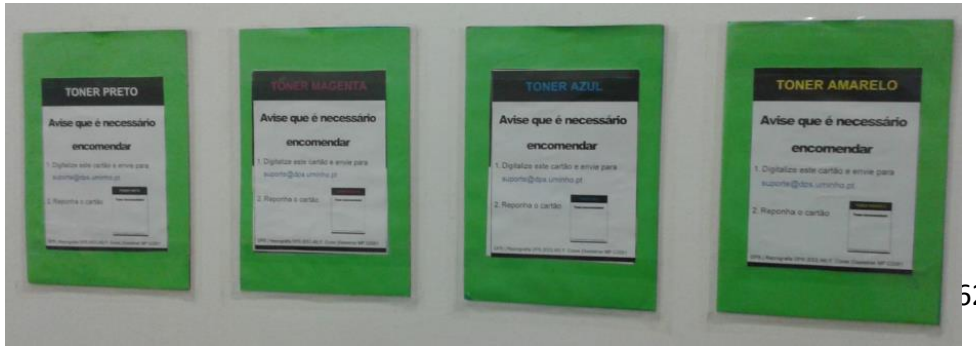
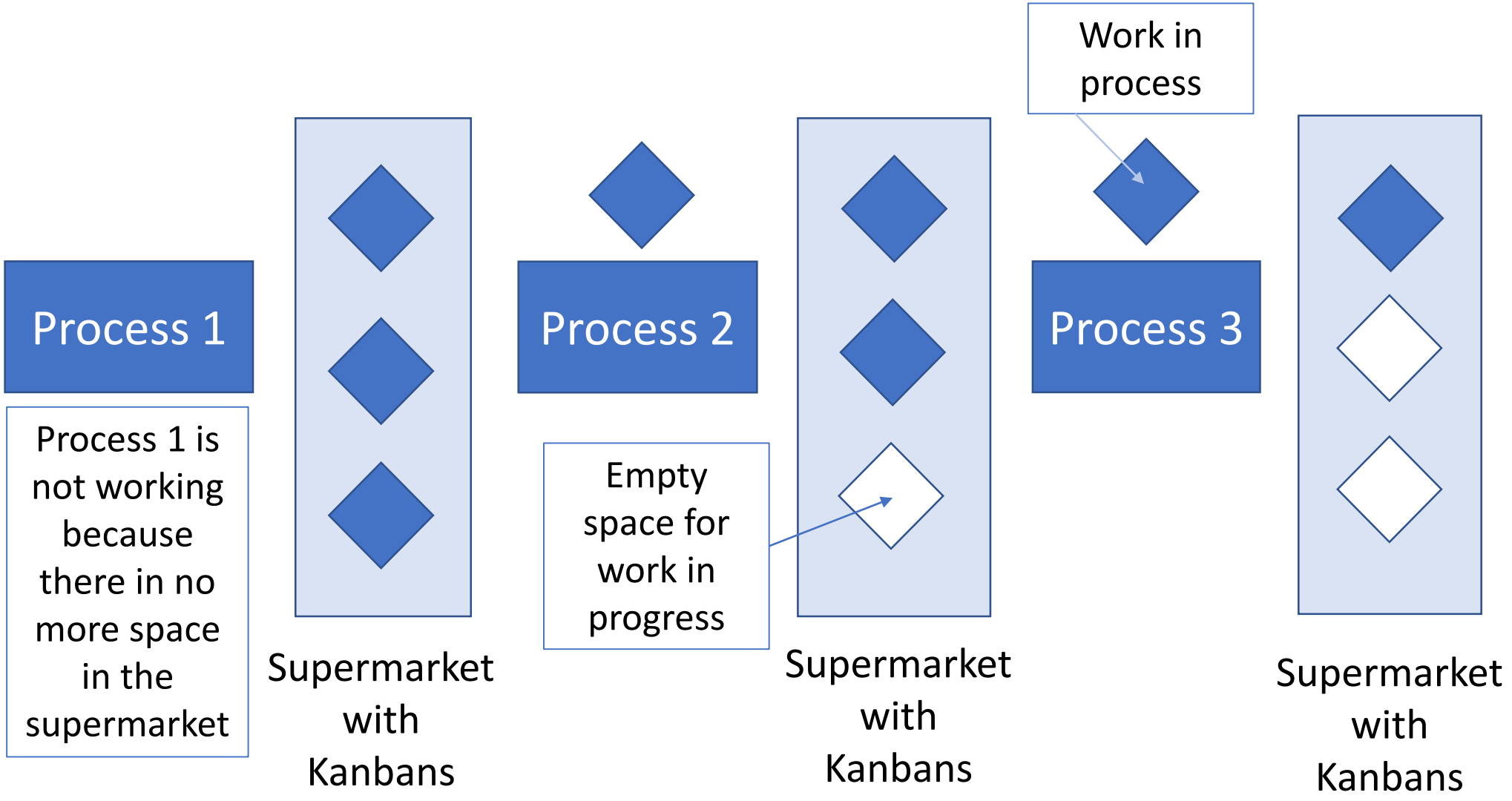
KANBAN CARD

+ STANDARDIZATION



KANBAN SYSTEM



GO TO GAME 5

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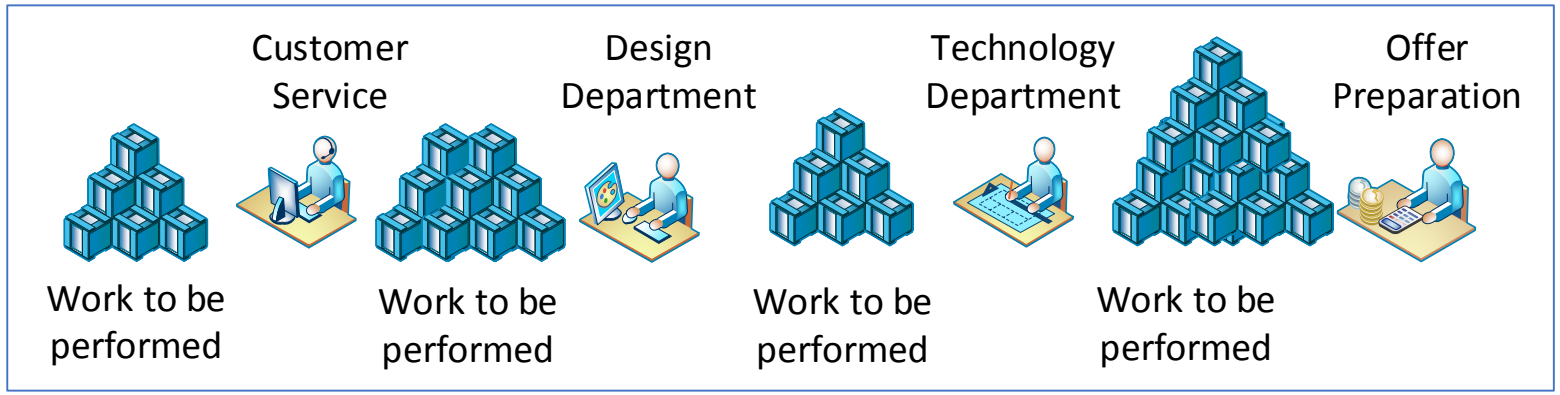
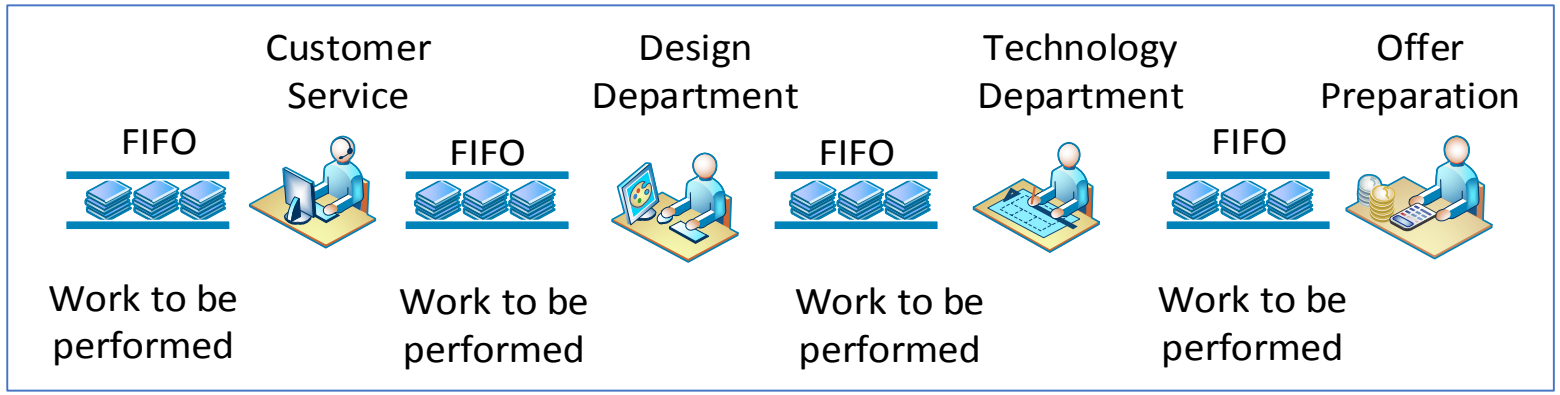
FIFO





Kevin J. Duggan, Tim Healey, *Operational Excellence in Your Office: A Guide to Achieving Autonomous Value Stream Flow with Lean Techniques*. RCR Press. Taylor & Francis Group. A Productivity Press Book. Boca Raton, 2016.

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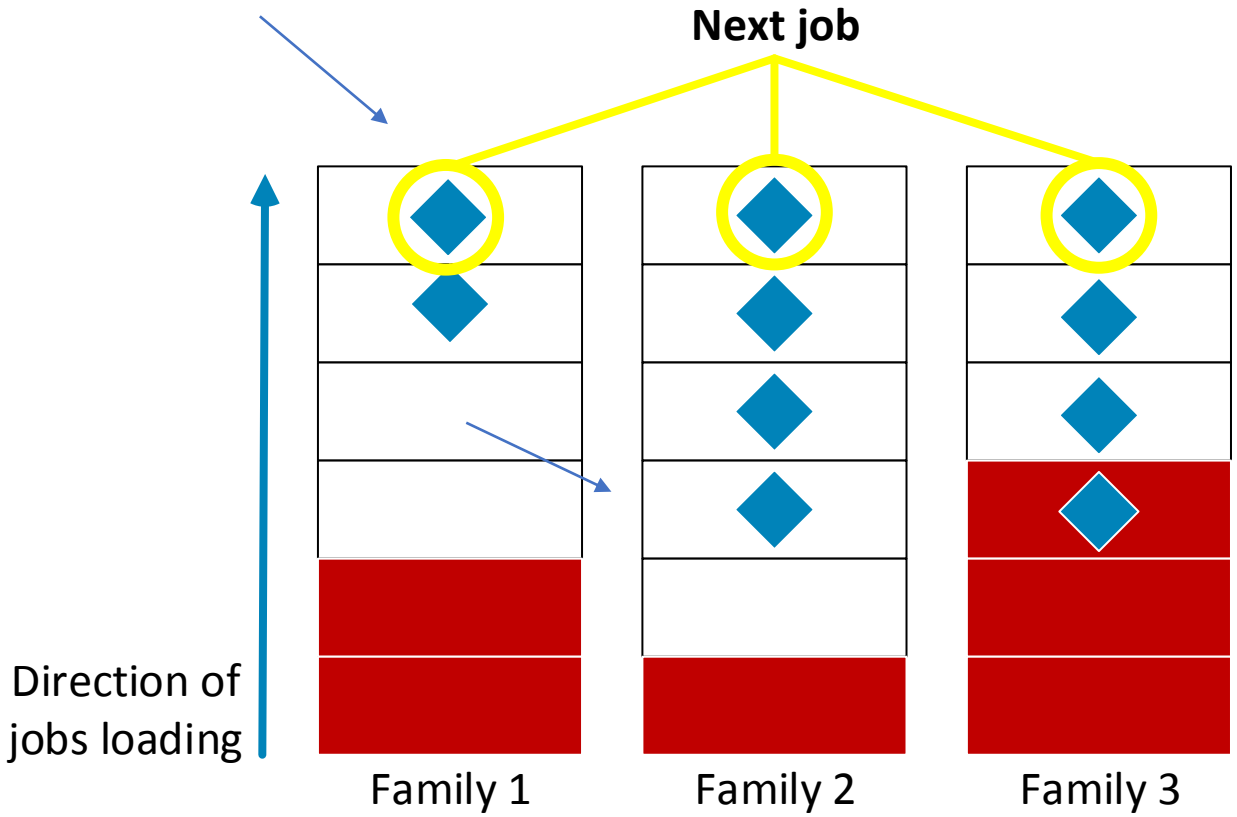
FIFO



Kevin J. Duggan, Tim Healey, *Operational Excellence in Your Office: A Guide to Achieving Autonomous Value Stream Flow with Lean Techniques*. RCR Press. Taylor & Francis Group. A Productivity Press Book. Boca Raton, 2016.

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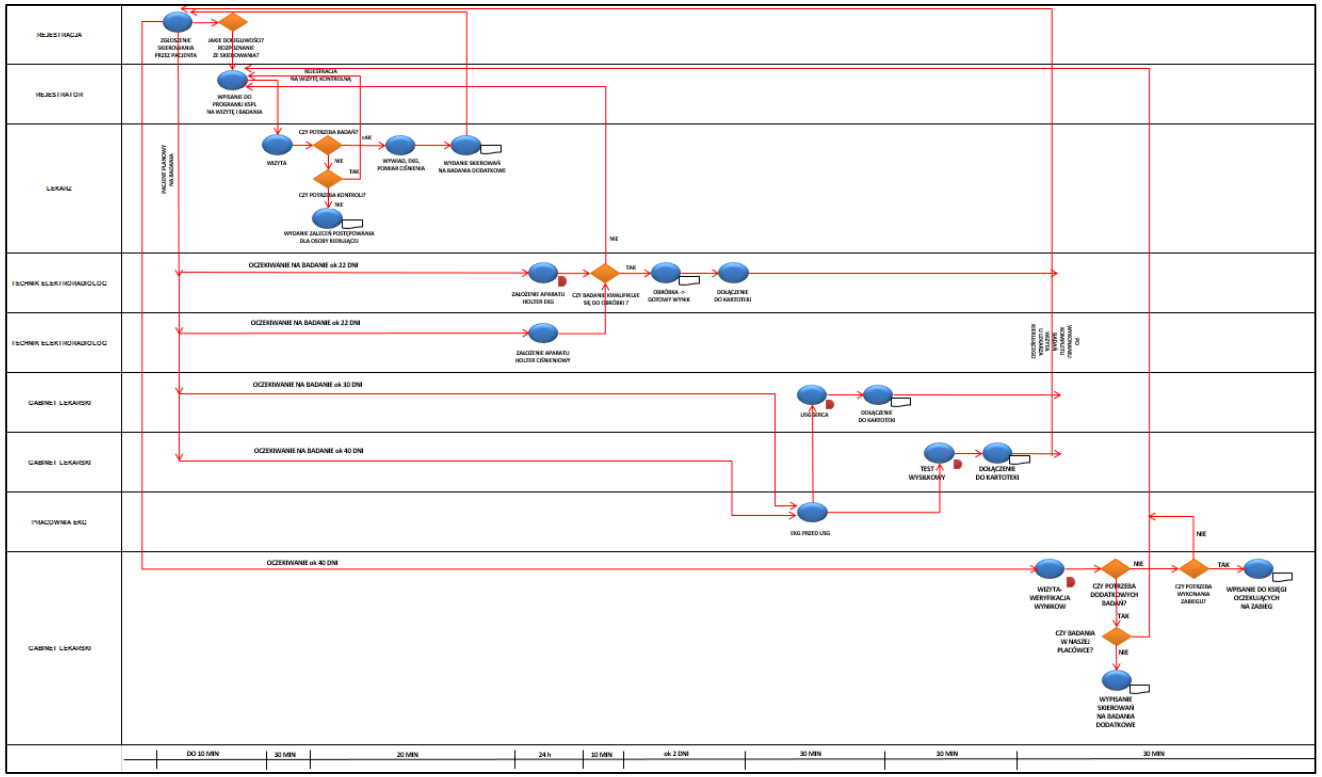
VALUE STEAM MAPPING

Value stream mapping is a tool to visualize the flow of work and information in a process.

Value Stream Mapping helps with wastes identification

Current state of value stream map	=	Information about problems
Future state of value stream map	=	An expected standard



Bartłomiej Korzystka, Zastosowanie wybranych narzędzi Lean Manufacturing dla doskonalenia realizacji usług medycznych - diploma thesis

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PROCESS MAPPING

A simple form of a value stream map - post-its on a big sheet of paper

Karen Martin, Mike Osterling, *Value Stream Mapping: How to Visualize Work and Align Leadership for Organizational Transformation*. McGraw Hill, USA, 2013.

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GO TO CHAPTER 3.3

TAKT TIME

In manufacturing

TAKT TIME – how often you should produce one part or product, based on the rate of sales, too meet customer requirements

Mike Rother, John Shook, Learning to See: Value Stream Mapping to Add Value and Eliminate Muda. The Lean Enterprise Institute, Cambridge, 2003

In office and knowledge work

TAKT TIME – the time that elapses between two units being delivered

$$TT = \frac{\text{Available working time}}{\text{Number of units needed to be delivered}}$$

Chris Hefley, Lean Metrics How to measure and improve the flow of work., CEO of LeanKit. November 5 th, 2014

How many problems can you analyze?

How many projects can you complete?

How many decisions can you undertake?

How many analyses can you perform?

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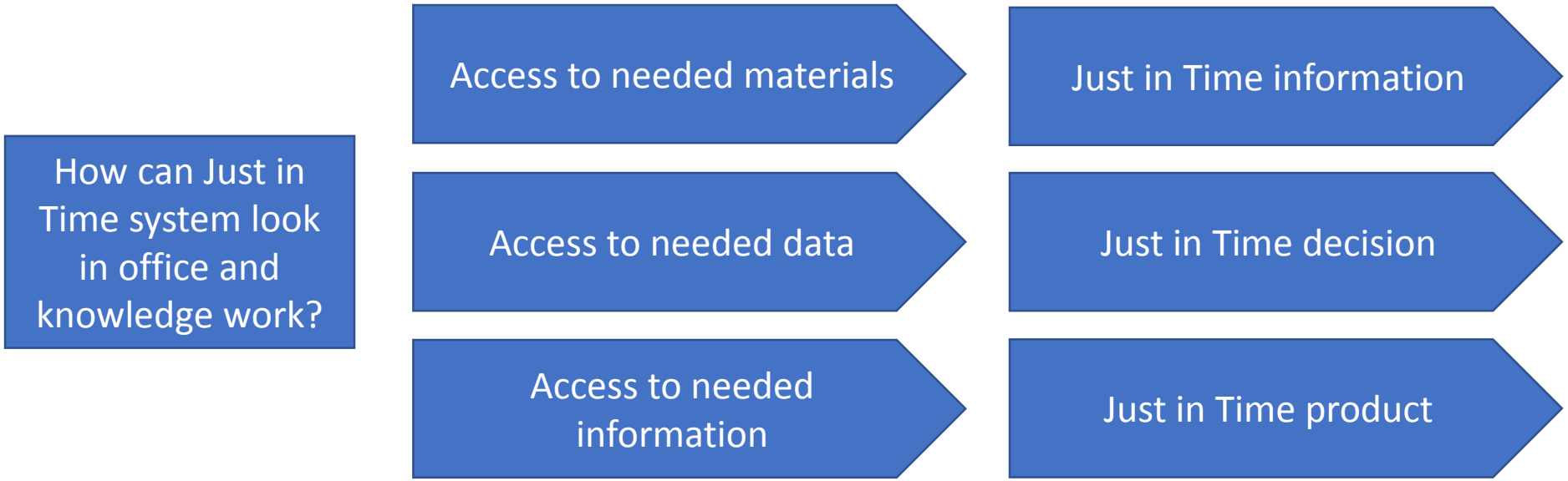
JUST IN TIME

Just in Time is a system which ensures that customers will get just what they need, just when it is needed, and just in the amount needed.



Davenport TH, Glaser J (2002) *Just in time delivery comes to knowledge management.* Harvard Business Review 80:107–111

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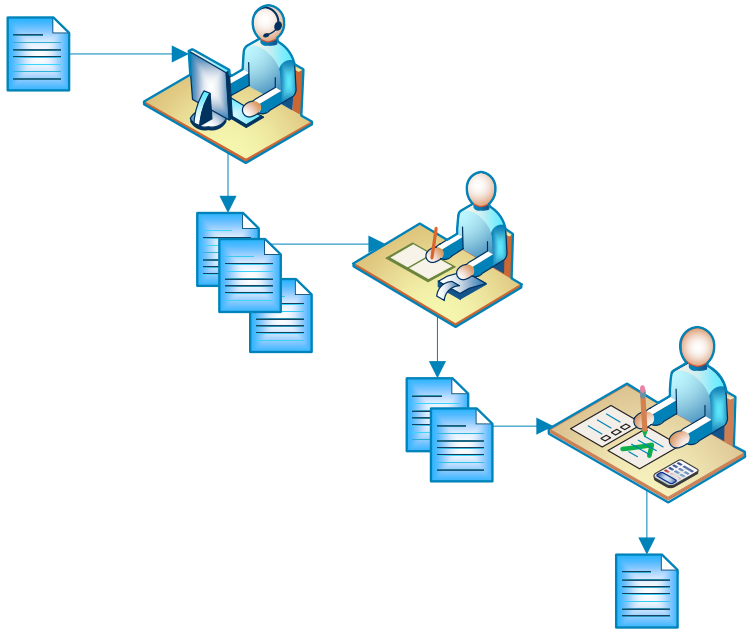
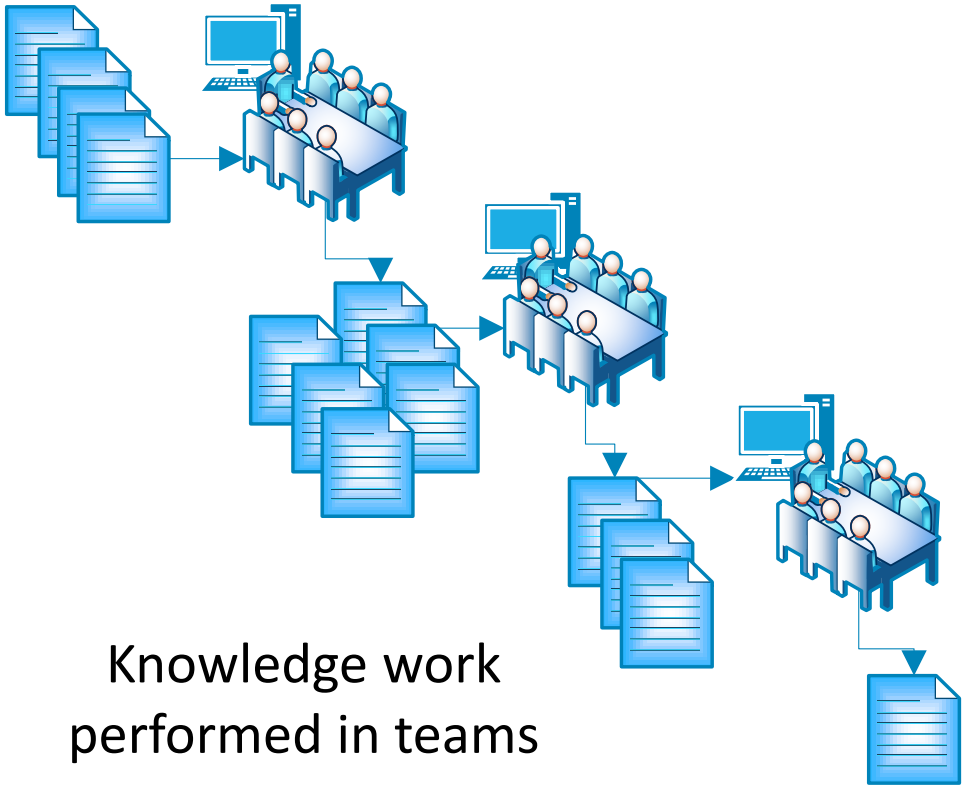
ONE PIECE FLOW

One piece flow is making and moving one piece at a time.



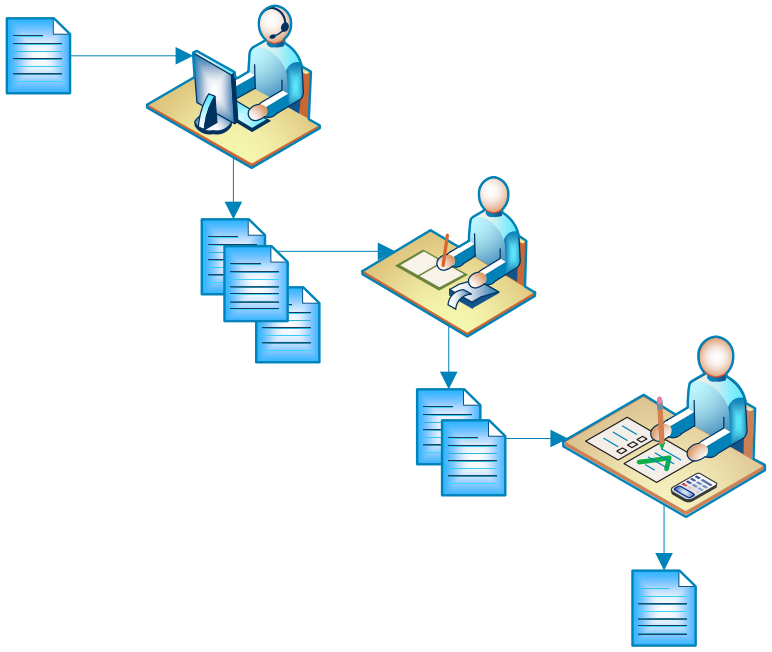
One employee



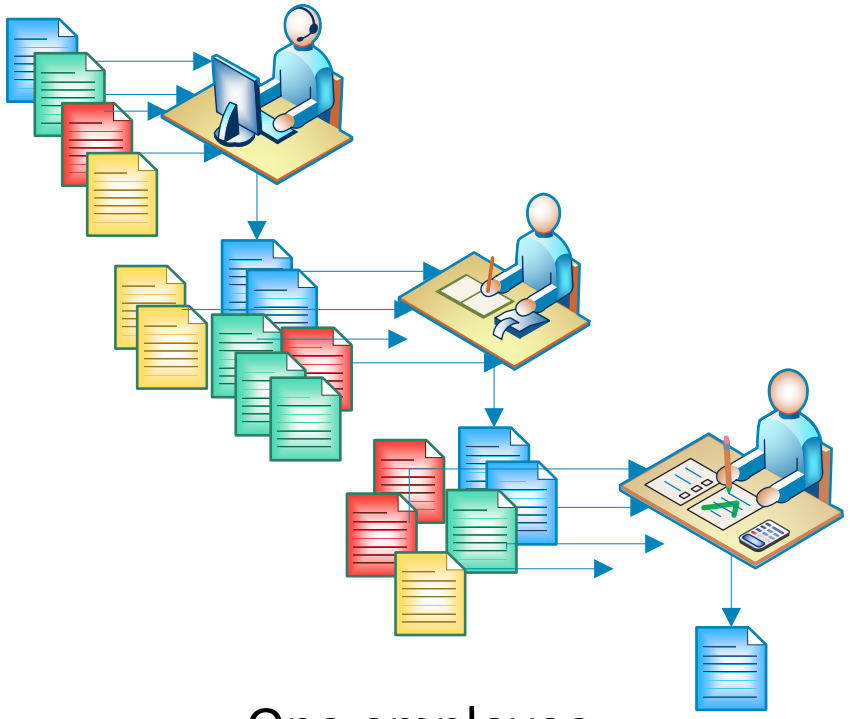
Knowledge work performed in teams

ONE PIECE FLOW

One piece flow makes and moves one piece at a time.



One employee
One piece flow



One employee
May project in progress at the same time

GO TO GAME 2

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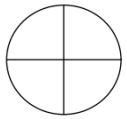
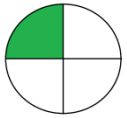
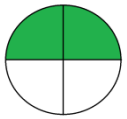
MATRIX OF COMPETENCES



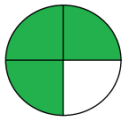
No training



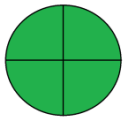
In training



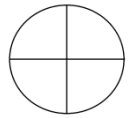
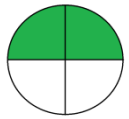
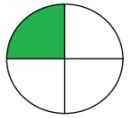
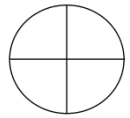
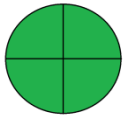
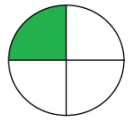
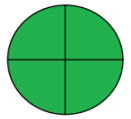
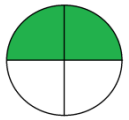
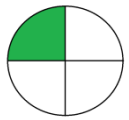
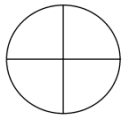
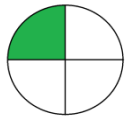
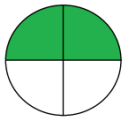
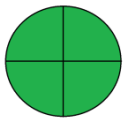
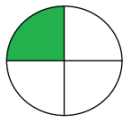
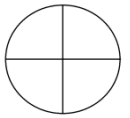
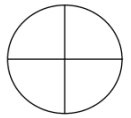
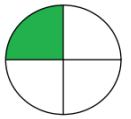
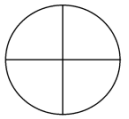
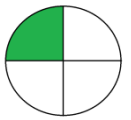
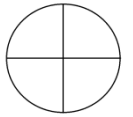
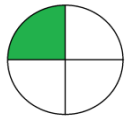
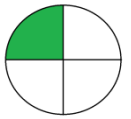
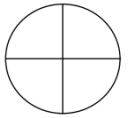
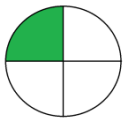
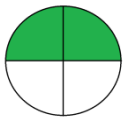
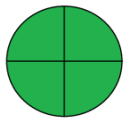
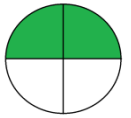
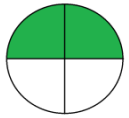
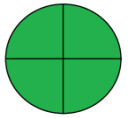
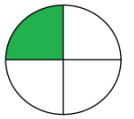
Proficient, but isn't able to work in standard time



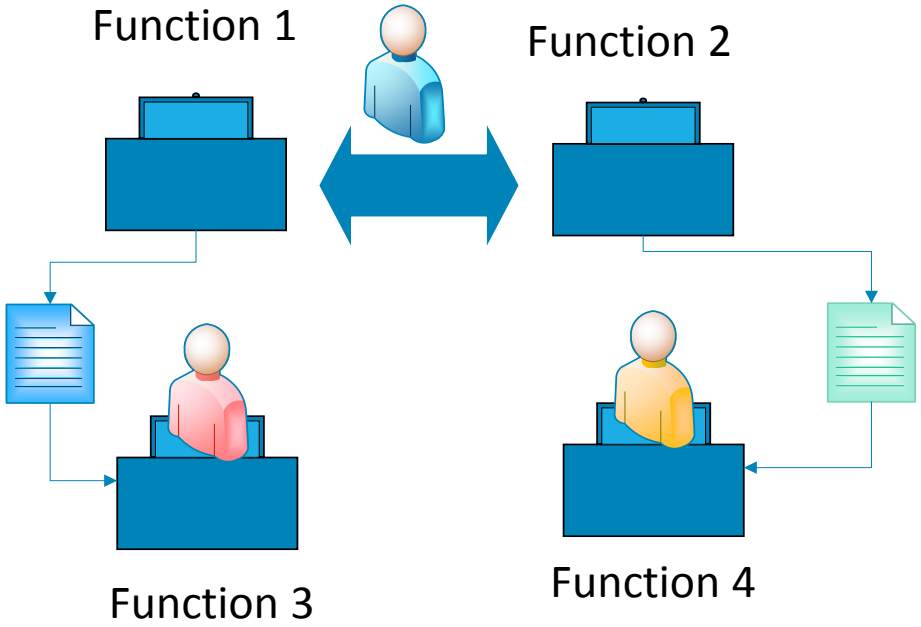
Proficient and able to work in standard time



Master / Trainer

	Function 1	Function 2	Function 3	Function 4	Function 5
Person 1					
Person 2					
Person 3					
Person 4					
Person 5					
Person 6					

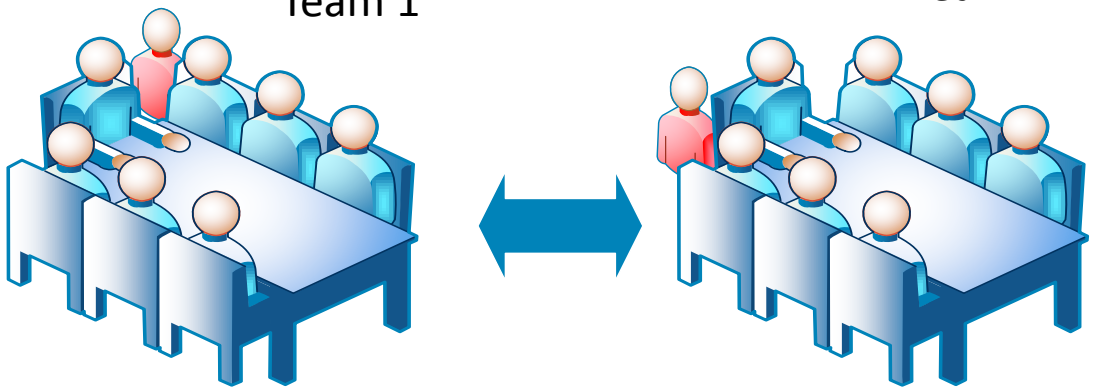
CHAKU CHAKU
MATRIX OF COMPETENCES



Chaku Chaku between functions

Chaku Chaku – a work organization when one person realizes two or more different functions moving from one to another, after completing certain work.

Chaku Chaku between teams



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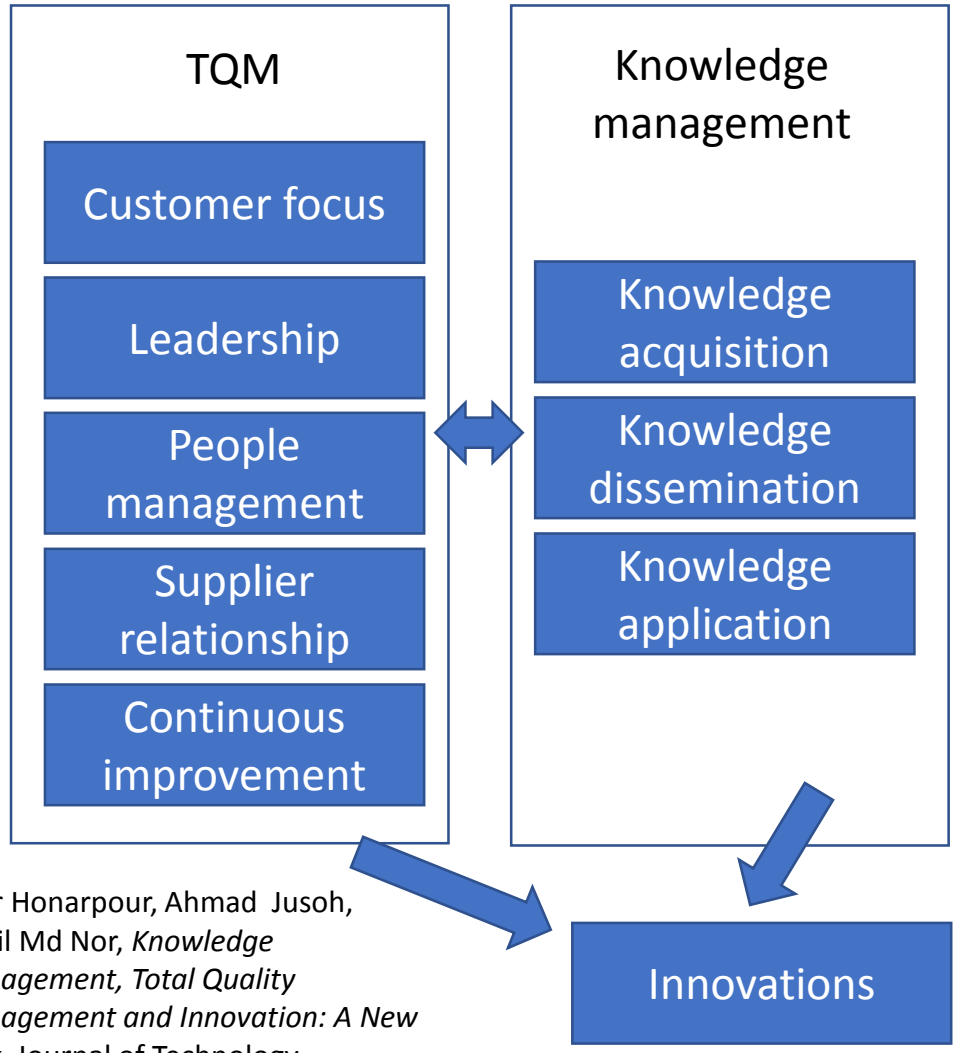
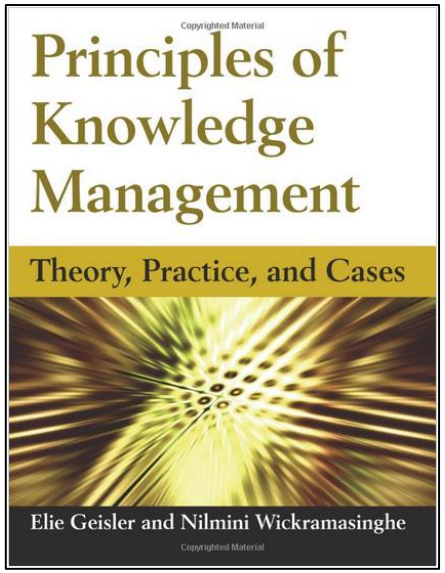
TQM

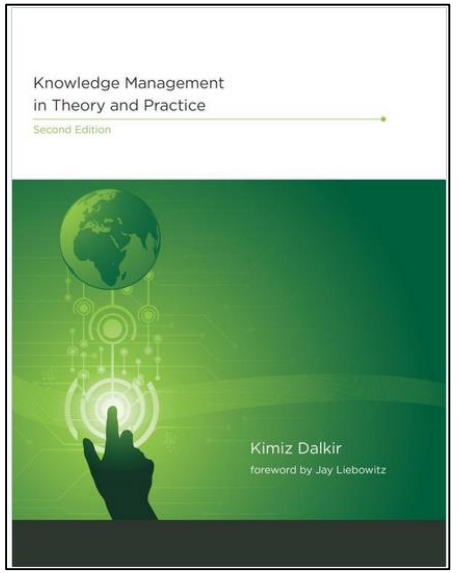
TOTAL QUALITY MANAGEMENT



Amir Honarpour, Ahmad Jusoh, Khalil Md Nor, *Knowledge Management, Total Quality Management and Innovation: A New Look.* Journal of Technology Management & Innovation, 2012, Volume 7, Issue 3, p.22-31.



Elie Geisler and Nilmini Wickramasinghe, *Principles of Knowledge Management. Theory, Practice, and Cases.* Routledge Taylor & Francis, Noe York, 2009.



Kimiz Dalkir, Jay Liebowitz, *Knowledge Management in Theory and Practice*, Second Edition. Massachusets Institute of Technology, 2011

Akdere, M. (2009). *The role of knowledge management in quality management practices: Achieving performance excellence in organizations.* Advances in Developing Human Resources, 11(3), 349–361.

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TEAM WORK

Knowledge work

- Analysis
- Decision making
- Creativity

Office work

Problems solving

Work organization improvements

Brainstorming

Problem solving methods

Amar, A.D. (2002), *Managing Knowledge Workers*. Quorum Books.

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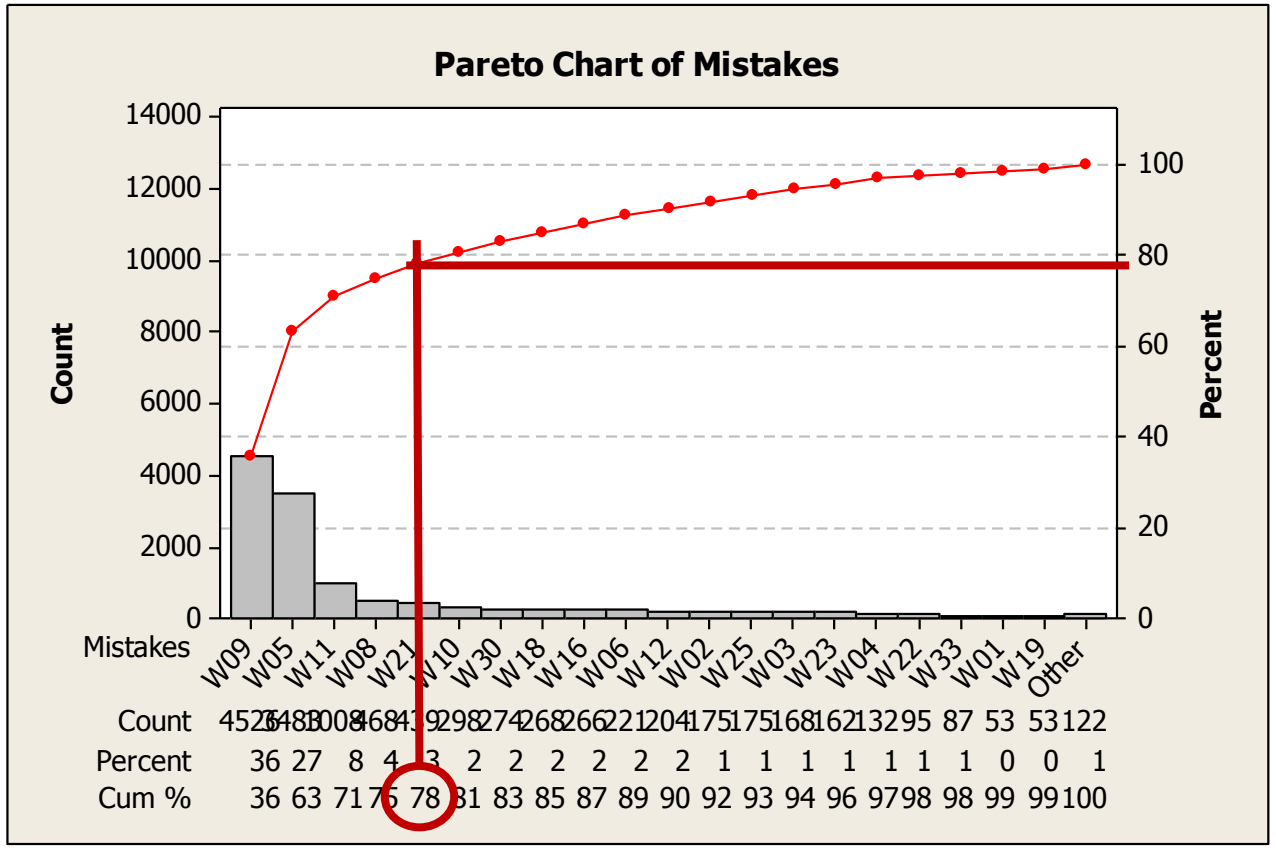
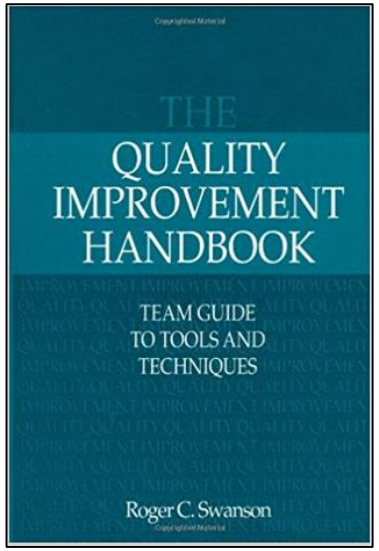
PARETO ANALYSIS



Pareto analysis is one of the quality tools which is used in a problems analysis.

80:20 rule



Roger Swanson, *The Quality Improvement Handbook: Team Guide to Tools and Techniques.* CRC Press LLC, 1995

The Handbook of Quality and Service Improvement Tools. Institute for Innovation and Improvement. Accessible on: http://www.miltonkeynesccg.nhs.uk/resources/uploads/files/NHS%20III%20Handbook%20serviceimprove.pdf

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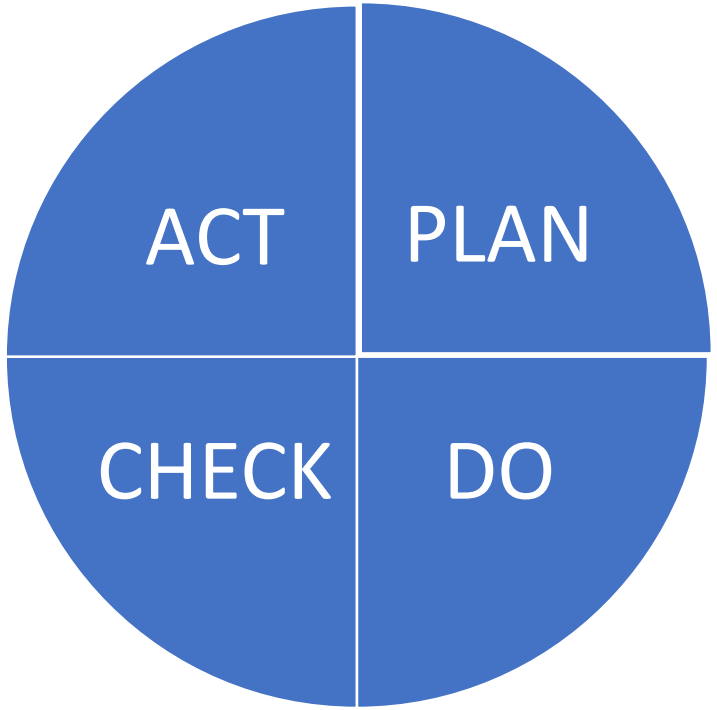
KAIZEN
KAIKAKU

PDCA Cycle - Deming Cycle

„An improvement cycle based on the scientific method of proposing a change in a process, implementing the change, measuring the results, and asking appropriate action”

Lean Lexicon, a graphical grossary for Lean Thinkers. Fourth Edition. Lean Enterprise Institute, Cambridge, MA, USA, March 2008.

The goal is
IMPROVEMENT



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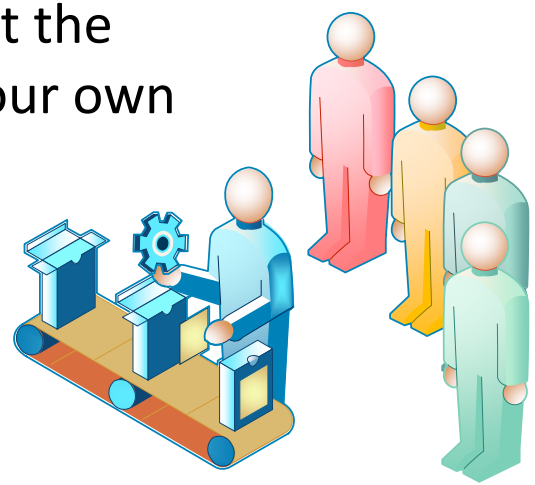
GEMBA WALK

Gemba walk – an “actual place”

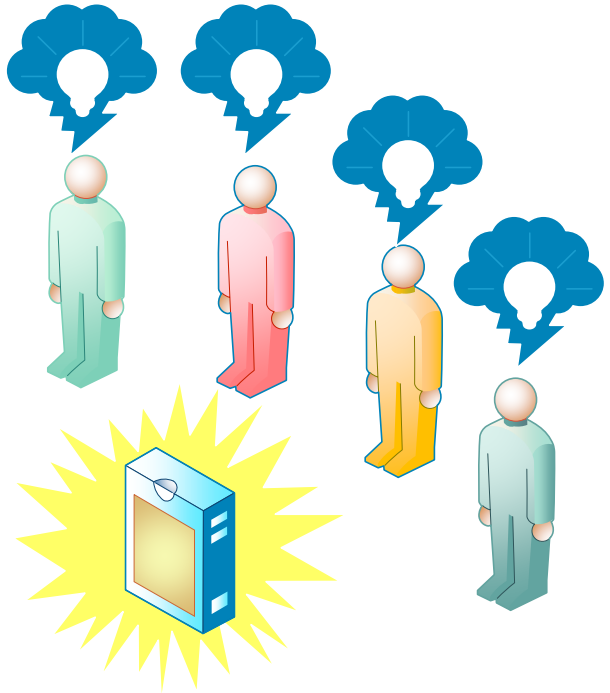
In problem solving

go and see what the problem is with your own eyes



In innovations

go and see what you have created, what can be still improved, what are strong and weak sides of the solution



- See the place
- Talk to people
- Find out the failure mode

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8 STEP PROBLEM SOLVING METHOD

- 1D Team formation
- 2D Problem description
- 3D Interim Containment Actions
- 4D Root Cause Analysis
- 5D Corrective Actions
- 6D Validate Corrective Actions
- 7D Identify and Implement Preventive Actions
- 8D Team and Individual Recognition

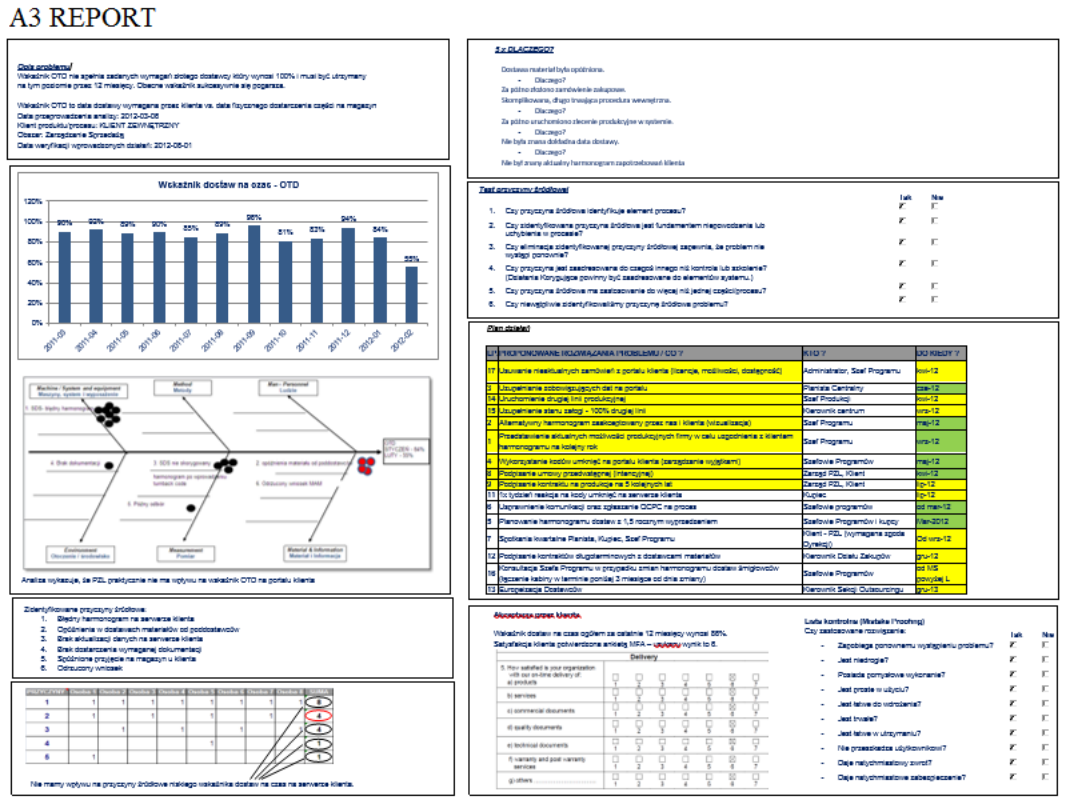
8D REPORT

"No problem should be repeated but fixed permanently"

Source: http://www.whatissixsigma.net/8d-report/

PROBLEM SOLVING
A3 REPORT

- Problem Solving Method - A simple way to present data and information
- An easy way to visually communicate information and ideas – it tells a story
- A standardized approach for **team** based problem solving
- It allows teams to get the most important information on one A3 sheet of paper to be easily read, understood and to make decisions
- If you can't say it with one page, you're not concise enough



John Shook: *Managing to Learn: Using the A3 Management Process Pap*/Chrt Edition. Lean Enterprise Institute, Inc., 2008

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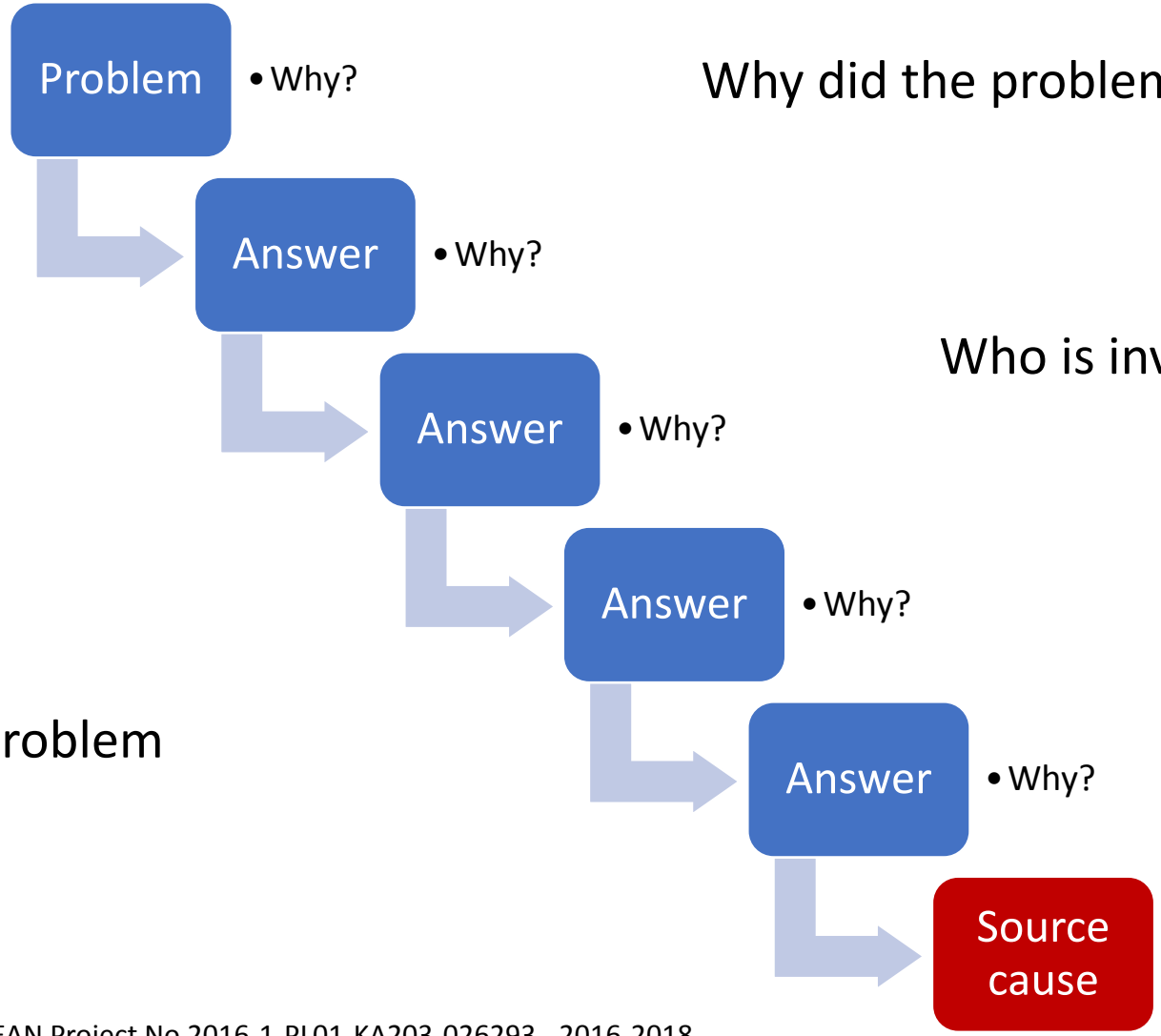
5 x WHY?



Why did the problem appear?

Who is involved?

When did the problem appear?

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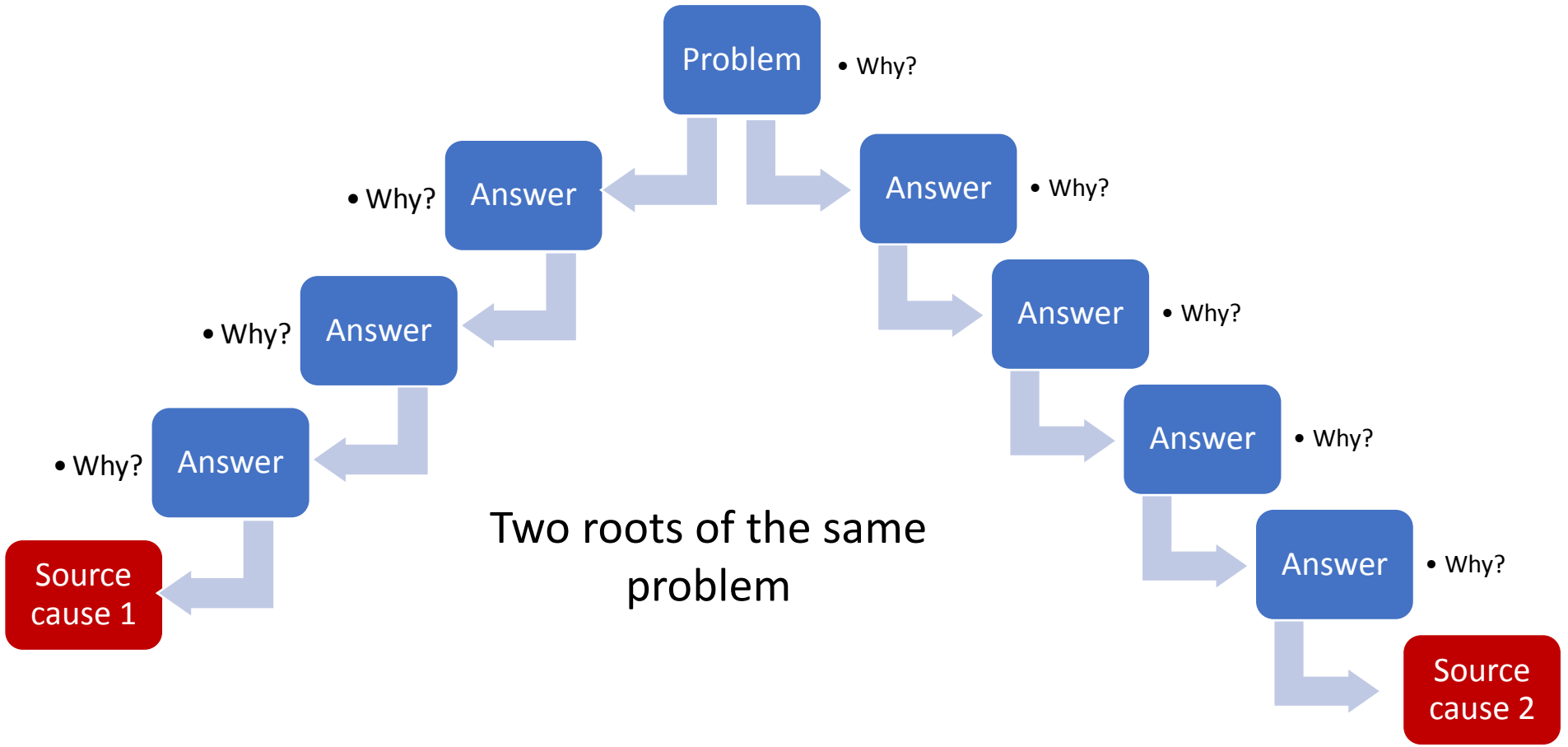
5 x WHY?



Brożyńska M., Lis A., Kowal K., Szymczak M., *5-Whys. Method First Handbook.* 2K Consulting Krzysztof Kowal, Łódź, 2016

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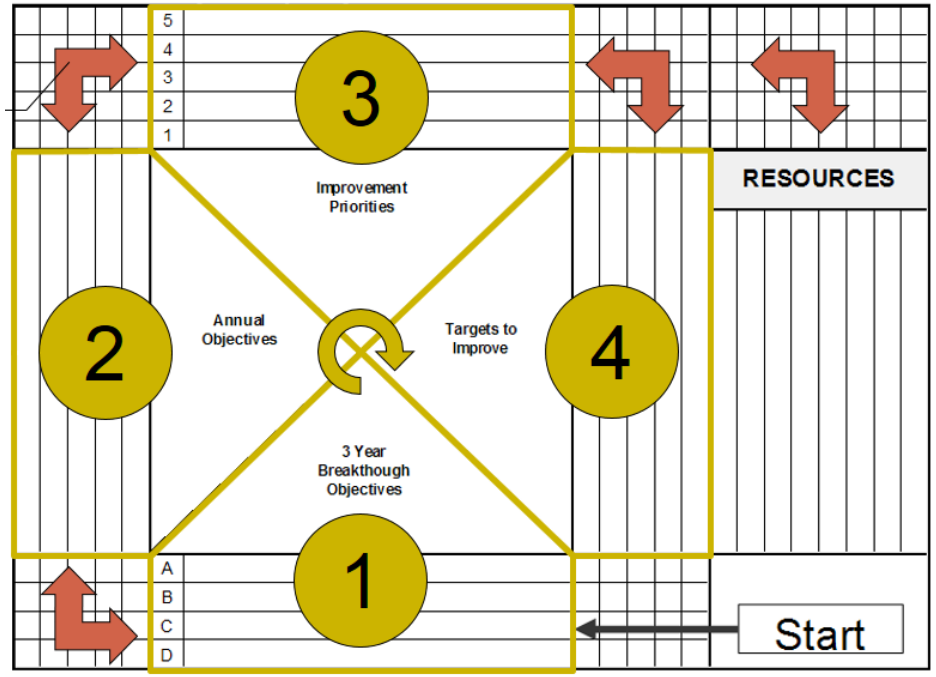
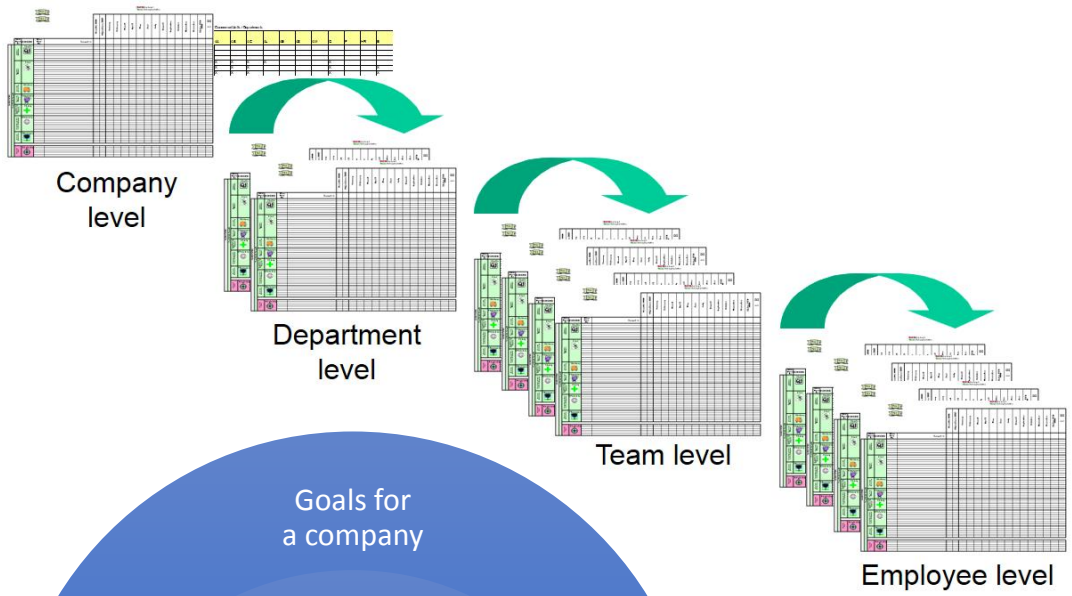
HOSHIN KANRI





- company's priorities
- goals for each department, team and person

Lean Lexicon. A grafical glosary for lean thinkers. Forth Edition. Lean Enterprise Institute, Cambridge, MA, USA, 2008.

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