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Lean Six Sigma

Principles : A comprehensive introduction

10.00am – 12.00 noon

HELLO!

Kara Ovington ☺

Full time trainer since 2015

Project Management, risk management, health and safety, GDPR

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Course content

By the end of this session you will understand the following:

- Introduction to project management methodologies
- Lean six sigma, DMAIC
- Waste – TIMWOODS, DOWNTIME
- Project Charter, schedule
- Stakeholder management
- SIPOC, VOC
- Process mapping

Introduction to project management and Lean six sigma

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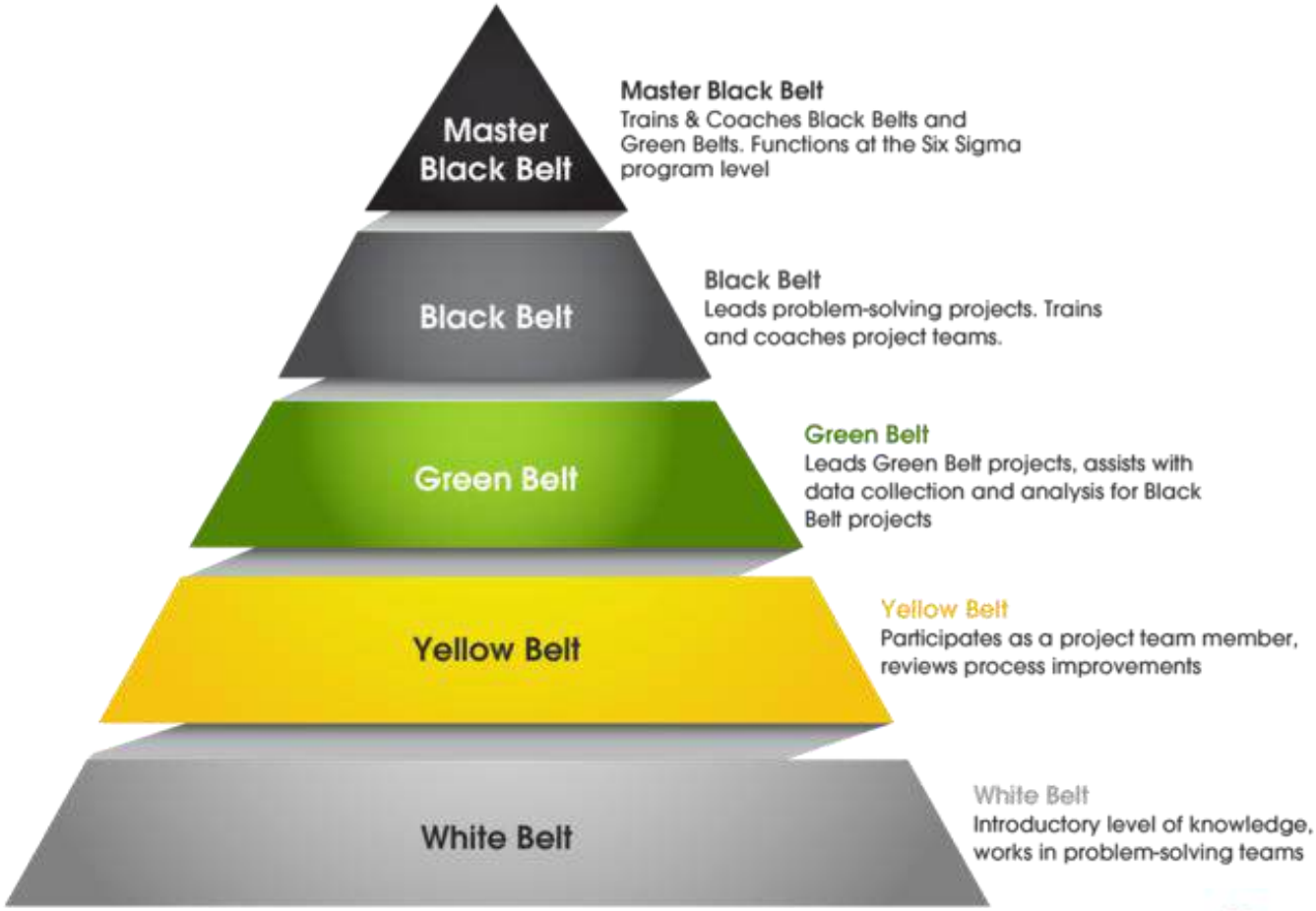
Lean Six Sigma Belt Structure



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Project Management Methodologies

- 5 Project Phases
- Methodology
- Continuous Improvement
- Apply to existing processes

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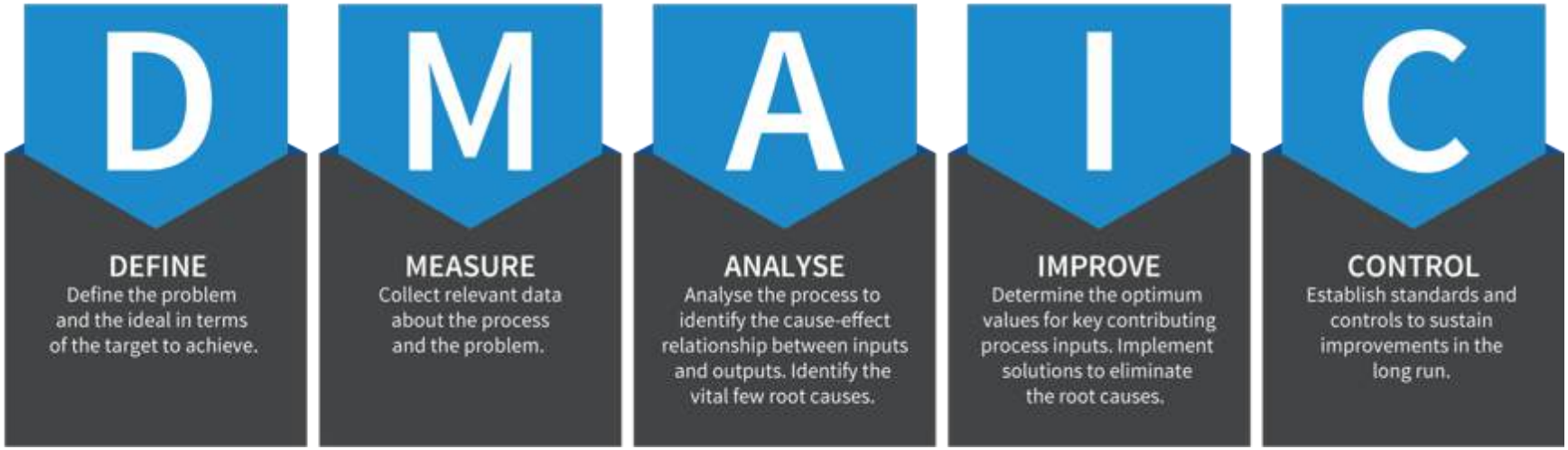
Project Management Methodologies



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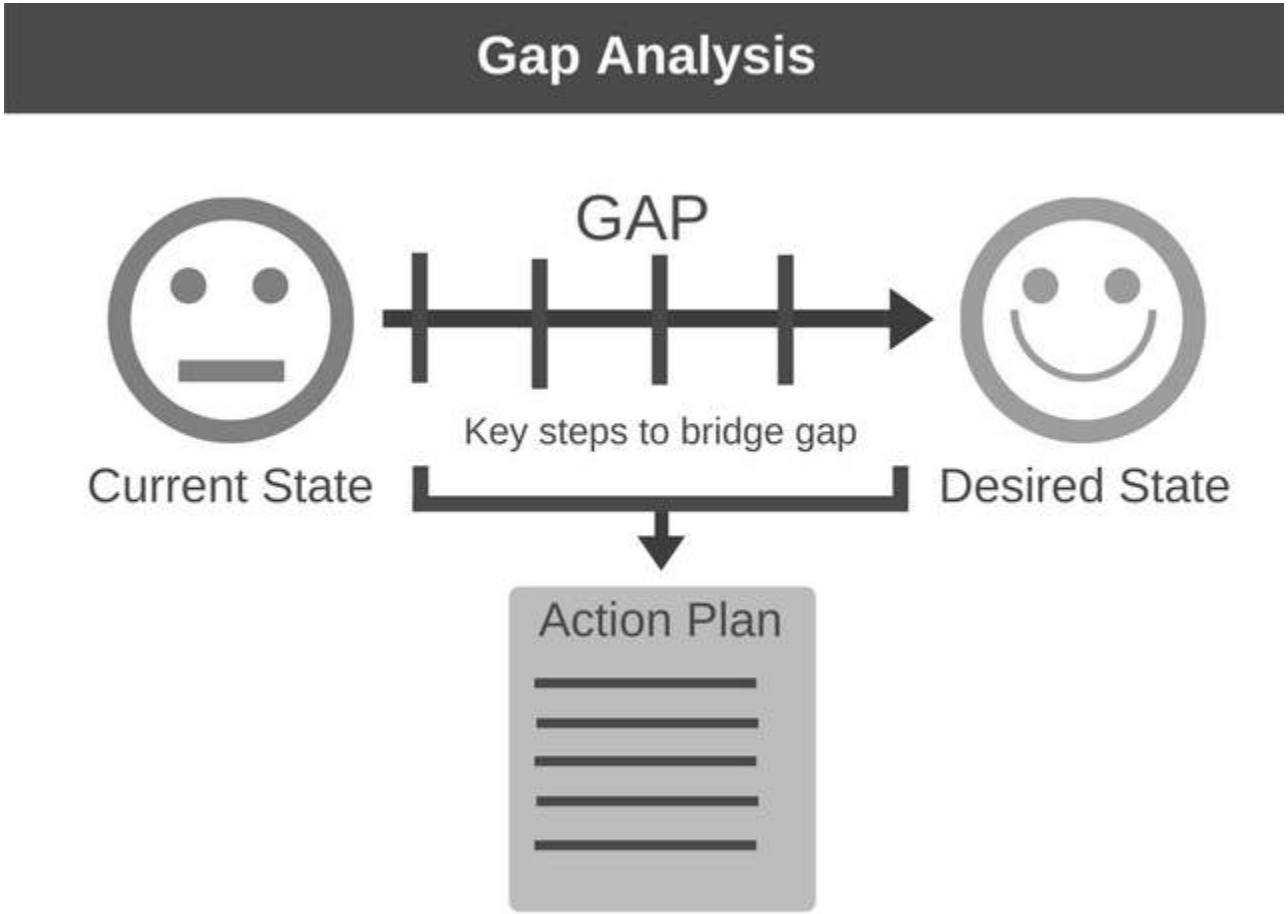
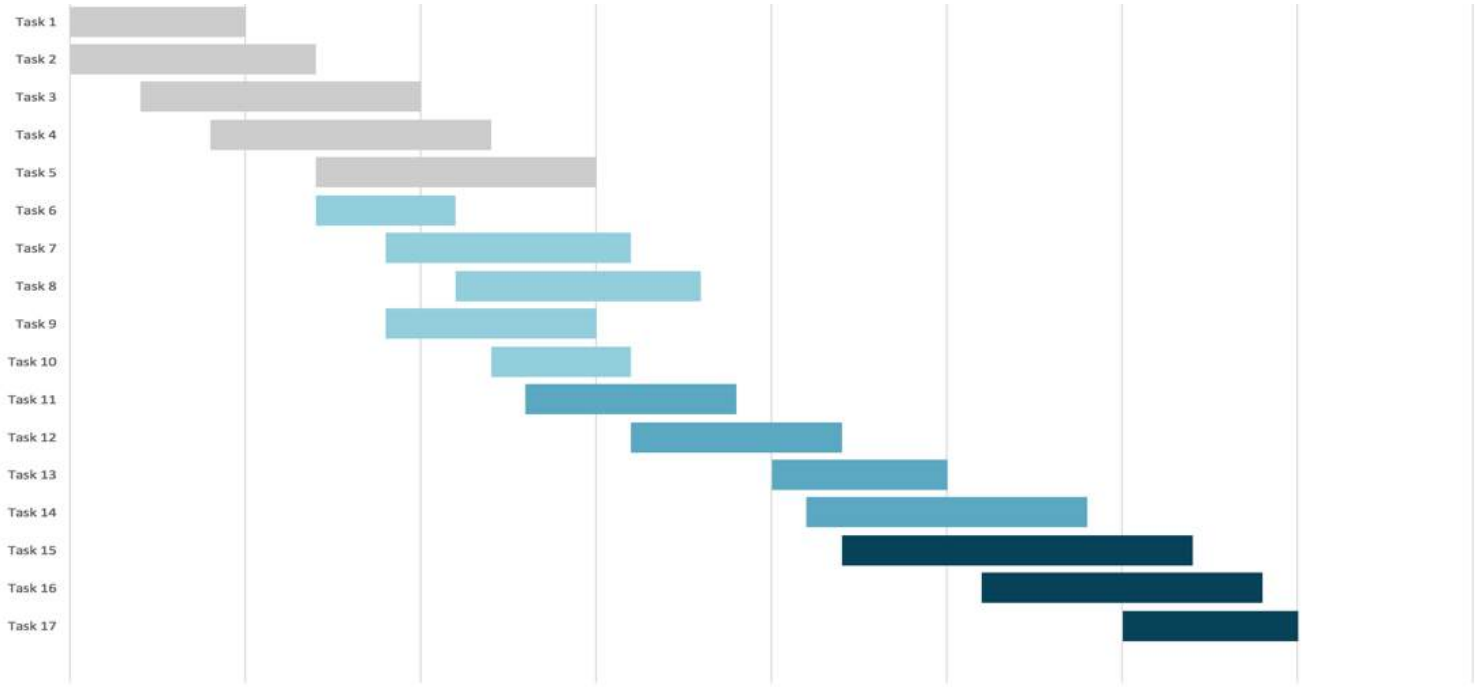
Project Management Methodologies



Project Triple Constraints

Project Management Methodologies

Project Management - WATERFALL



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Project Management Methodologies

Project Management - AGILE

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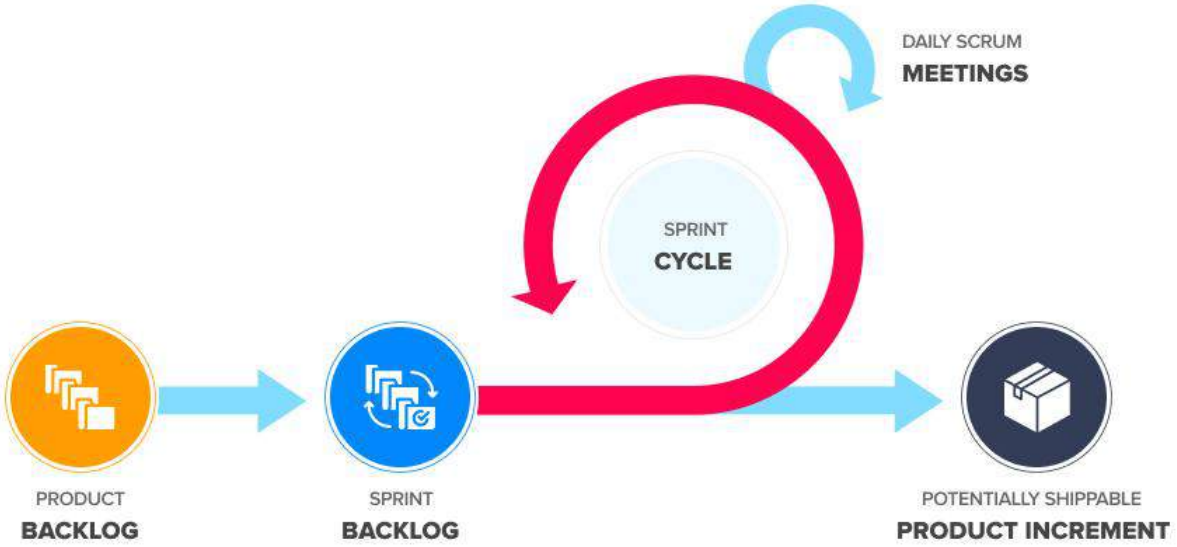
Project Management Methodologies

Project Management - AGILE Cycle



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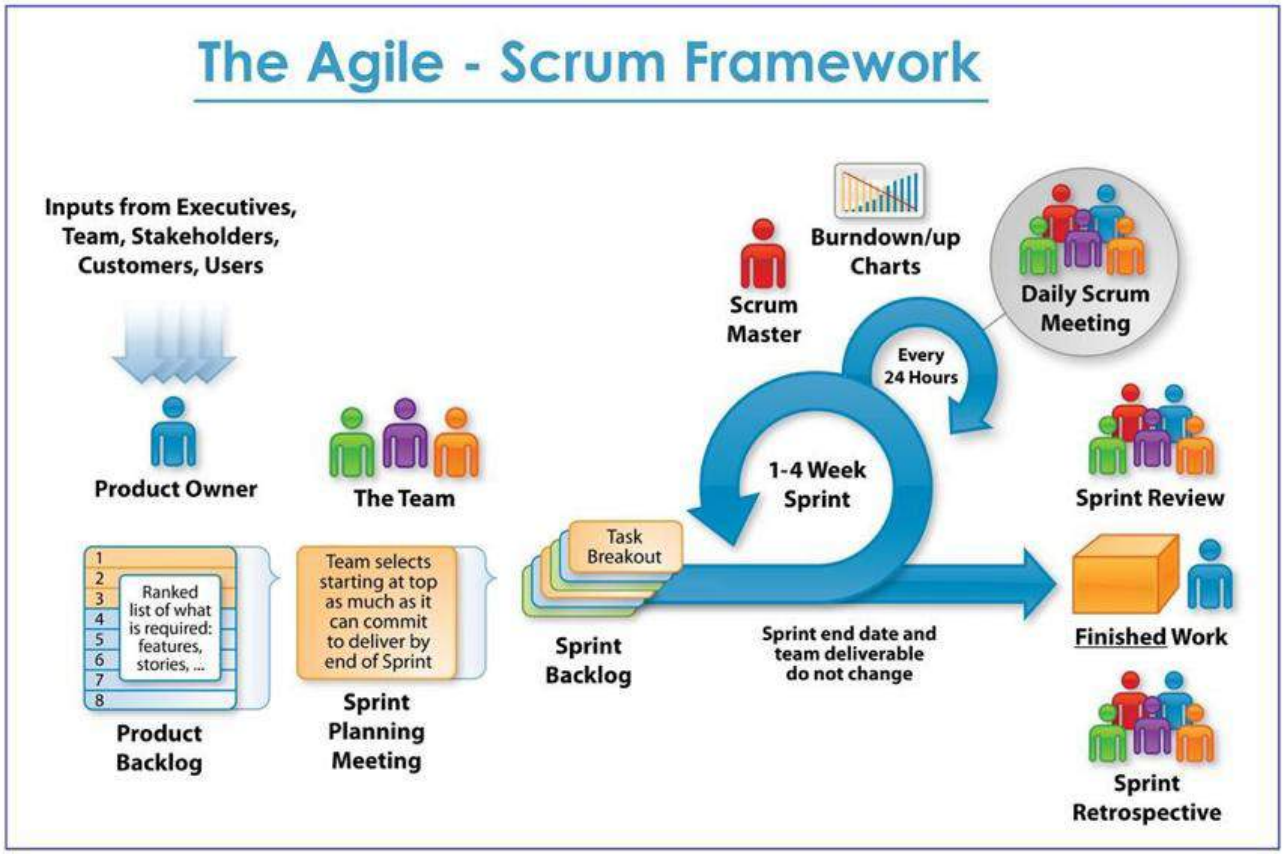
Project Management Methodologies



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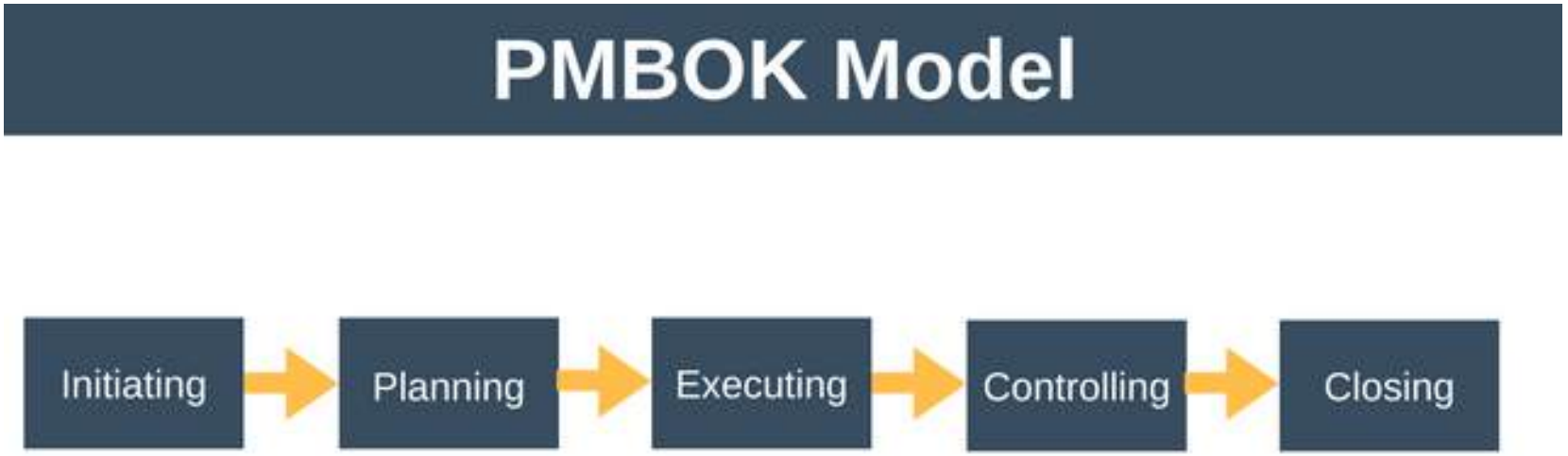
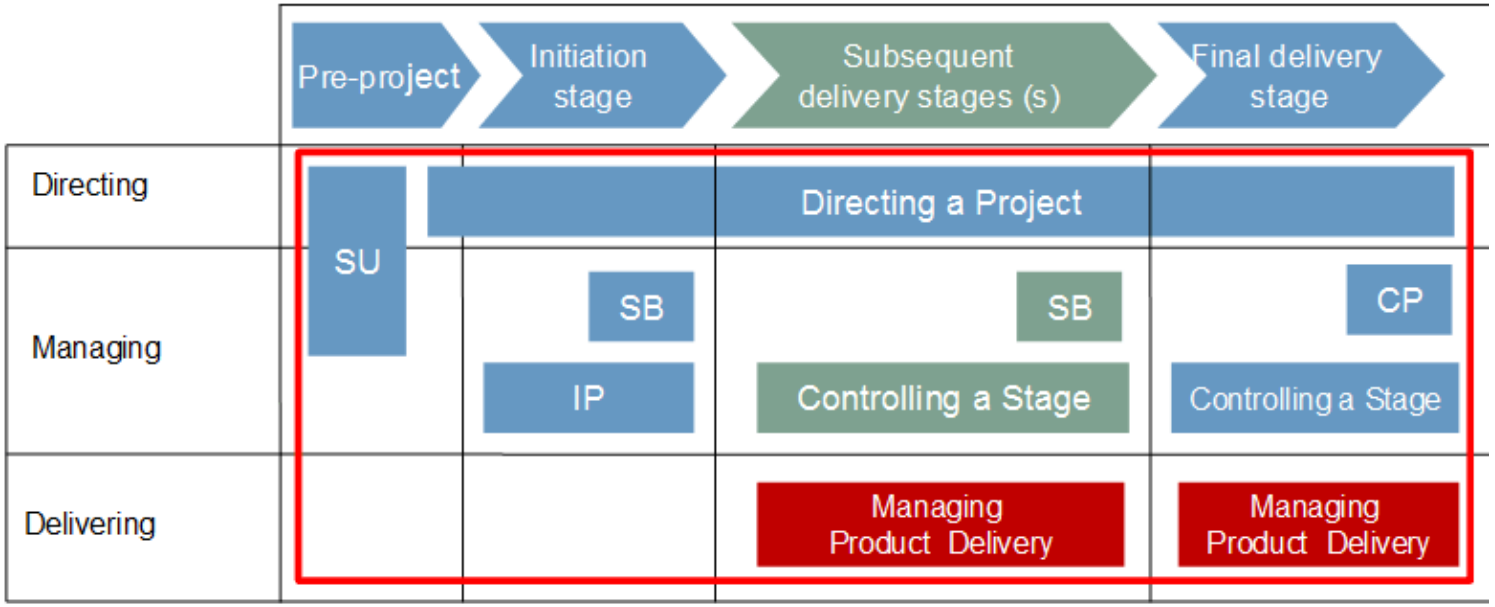
Project Management Methodologies



Project Management Methodology - PRINCE2



5 Integrated Elements

- 7 Principles
- 7 Practices
- 7 Processes
- People
- Project Context

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Project Management Methodologies

Lean Six Sigma Diagram

Six Sigma Quality supports Lean Speed
(less rework means faster cycle times)

Lean Focus on Waste Elimination supports Six Sigma Quality
(waste elimination eliminates an opportunity to make a defect)

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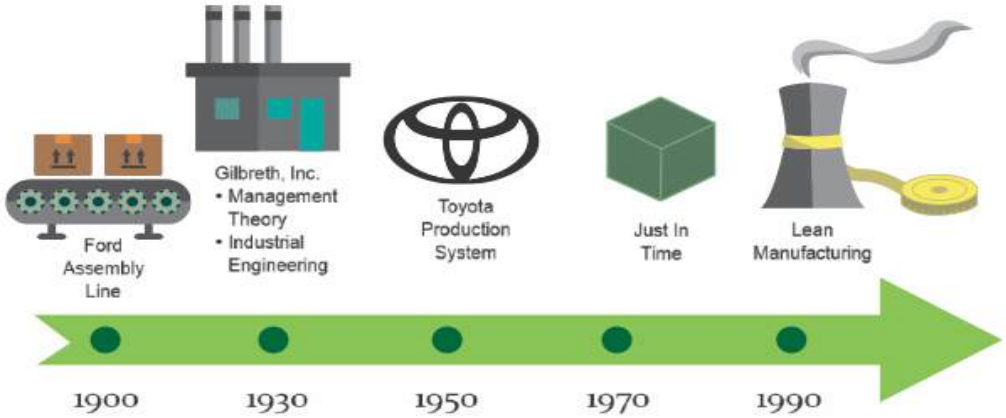
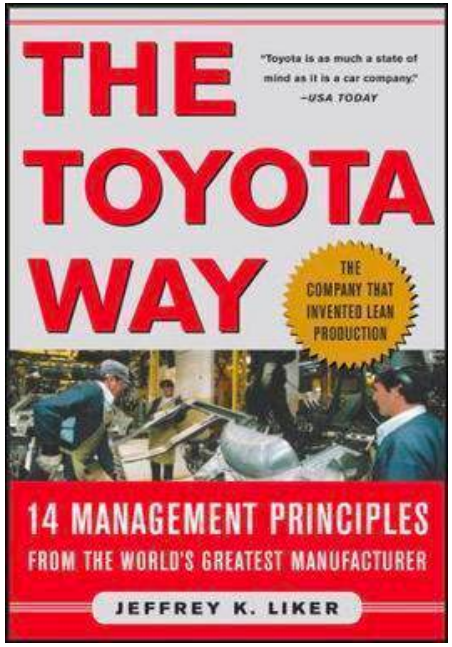
History of Lean six sigma

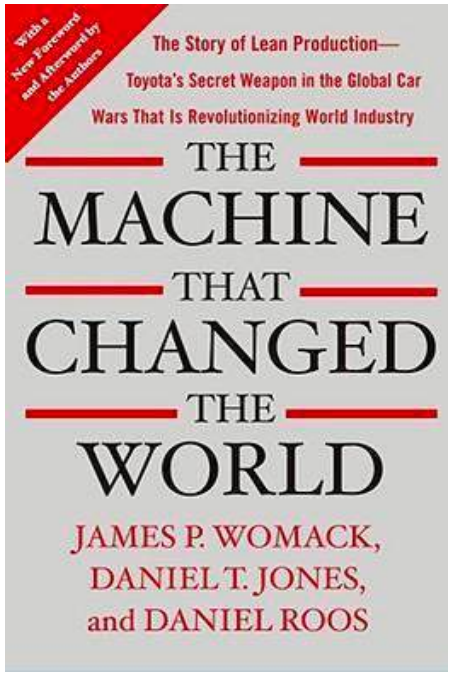
Sigma Six Sigma is a methodology used to improve business processes by utilizing statistical analysis rather than guesswork. Processes are improved by controlling variation and understanding the intricacies within them. The use of statistics can be traced back to 1908, here in Ireland. 1.

1908 Henry Sealy Gosset – t-test – Guinness t-statistic was introduced in 1908 a chemist working for the Guinness brewery in Dublin, Ireland. ...

Gosset devised the t-test as an economical way to monitor the quality of stout. 2. The t-test work was submitted to and accepted in the journal Biometrika and published in 1908. 3. Walter Skewhart – SPC – Bell Labs 4. Deming – PDCA Cycle / Edwards Deming - 7 Deadly diseases – Toyota – Japan 5. Followed by Motorola 1983 - Bill Smith & Mikel Harry – Motorola







Lean manufacturing, or **lean production**, is a production method derived from Toyota's 1930 operating model "The Toyota Way" (Toyota Production System, TPS).

The term "Lean" was coined in 1988 by John Krafcik and defined in 1996 by James Womack and David Jones to consist of five key principles; 'Precisely specify value by specific product, identify the value stream for each product, make value flow without interruptions, let customer pull value from the producer, and pursue perfection.'

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Deming

“If you can’t describe what your process is doing then you don’t know what you're doing”

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Customers

“Its about what you do for your customers and not what you do to your customers”

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Principles of Lean six sigma

1. Specify Value (from the eyes of customer)
2. Integrate the Value Stream
3. Make the offering Flow
4. At the pull of the Customer
5. In pursuit of perfection

1. Specify Value

being busy V being productive V value-adding

Understand, identify & specify "what adds value" from your customers perspective (VOC)

How ? – Ask your customer(s), voice of customer

No 2. Integrate the Value Stream

Identify all activities & resources in the entire process stream.

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Principles of Lean six sigma

No 3. Make the Offering Flow

Create a continuous flow of activities along the value stream

Value should be added in a smooth, uninterrupted flow, from the start to the end of the process. The ultimate effect of this principle is that all process steps are focussed and aligned to adding value, one piece at a time, removing all wasteful and unnecessary activities from the process.

No 3. Make the Offering Flow – The FLOWS

- The flow of raw material / incoming data - specs
- The flow of work-in-process / open reports
- The flow of finished goods / deployed services
- The flow of operators / staff interactions
- The flow of machines / usage of software lic
- The flow of information
- The flow of engineering / software development

No 3. Make the Offering Flow – The BARRIERS

- Distance / Timezones / Cultures
- Long set up times
- Batch Orientation
- Poor maintenance / absenteeism
- Unreliable quality / delivery / bugs
- Approval processes / Sign offs / Over testing
- Lack of faith / Resistance to change

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Principles of Lean six sigma

No 4. At the Pull of The Customer

- Align supply with real demand
- Optimise inventory
- Work flow is visible
- Problems become visible
- Facilitates continuous improvement and faster implementation

No 5. In pursuit of Perfection

- Standardise the new state
- Evaluate, innovate, plan new future state
- Implement improvement / innovation
- Standardise the “new” new state
- And repeat
- Continuous Improvement journey

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Lean for Production *and* Services

A popular misconception is that lean is suited only for manufacturing. Not true. Lean applies in every business and every process. It is not a tactic or a cost reduction program, but a way of thinking and acting for an entire organization.

Businesses in all industries and services, including healthcare and governments, are using lean principles as the way they think and do. Many organizations choose not to use the word lean, but to label what they do as their own system, such as the Toyota Production System or the Danaher Business System. Why? To drive home the point that lean is not a program or short term cost reduction program, but the way the company operates. The word **transformation or lean transformation** is often used to characterize a company moving from an old way of thinking to lean thinking. It requires a complete transformation on how a company conducts business. This takes a long-term perspective and perseverance.

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Lean & Six Sigma

Reduce Waste	Reduce Variation
Agility	Accuracy
Concise	Consistent
Efficient	Effective
PDCA	DMAIC

+

=

Lean 6 Sigma is a methodology for systematic improvement

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Project Charter, Schedule

Project Initiation

Business Case

Project Charter

Stakeholder Management

The Business Case

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The Business Case

- "Sales pitch" to senior management
- Contains all the information to determine if the expected project outcomes justify the required investment
- Plain English document

The Business Case

- Business needs
- Analysis of the situation
- Options for action and one recommendation
- Implementation
- How benefits will be measured

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Project Charter?

- Formally authorises the existence of a project
- Provides project manager with authority to apply organisational resources to project activities
- Links project to strategic objectives of the organisation
- Creates a formal record of the project

The Project Charter

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Project Charter Tools

"Data gathering"

- Brainstorming – idea generation / idea analysis
- Focus groups – subject matter experts and stakeholders
- Interviews – high level requirements, approval criteria, constraints

- Stakeholders tend to describe what they'd like to be able to do (activities) rather than the things they need to do it (deliverables)

Outputs

- Project purpose
- Measurable objectives and success criteria
- High-level requirements
- High-level project description – boundaries and key deliverables
- Key milestones
- Summary of risk (to the project)
- Key stakeholders

Outputs

- Project success criteria – what constitutes success, who decides
- Assigned project manager – responsibilities and authority level
- Sponsor name and authority levels
- Exit criteria – conditions under which the project can be closed or cancelled

Project Charter

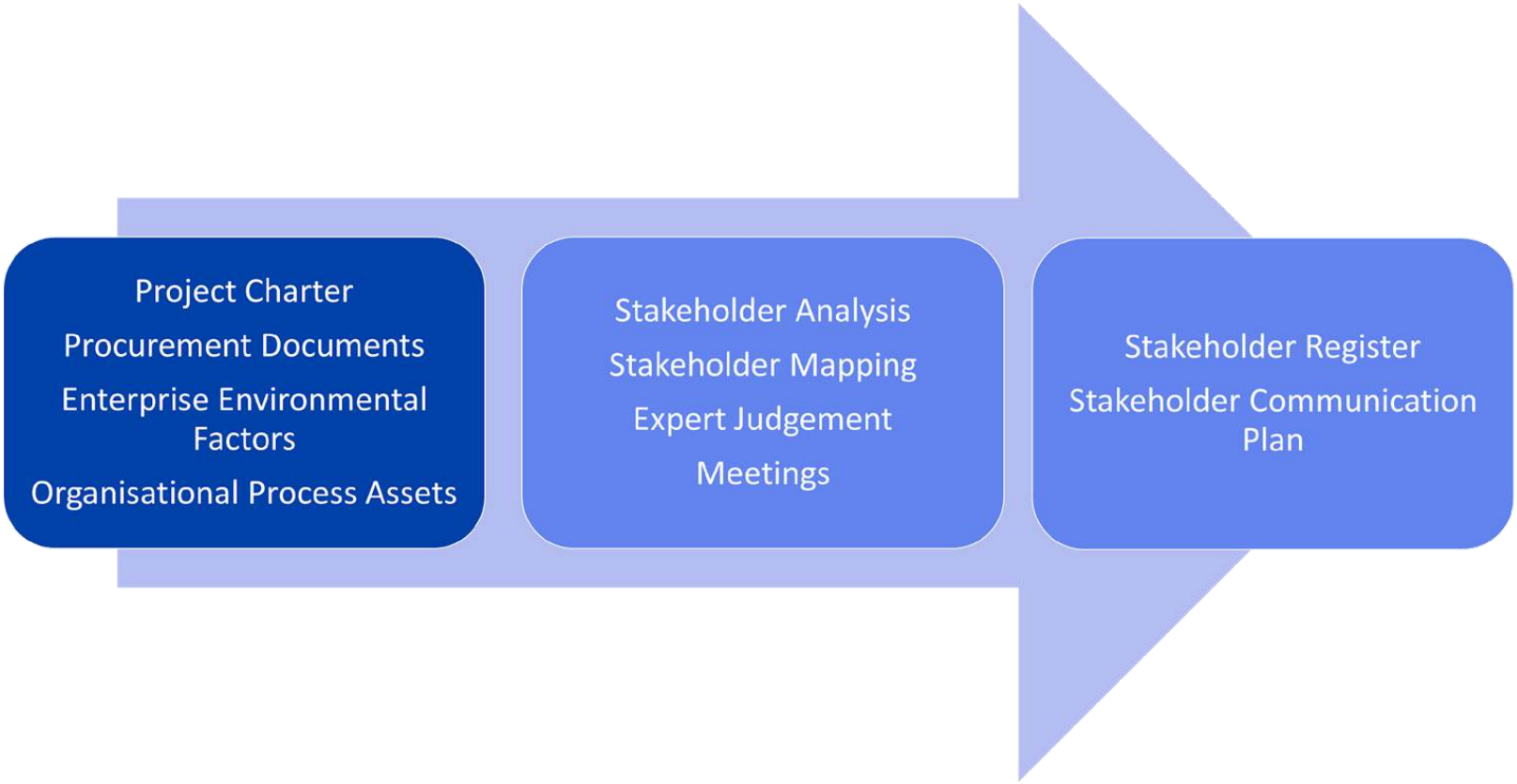
Project Name:					
Business Case:					
Problem/Opportunity:			**Scope, Constraints, Assumptions:**		
Goal:			**Team Members:**		
Preliminary Project Plan:	**Target Date:**		**Actual Date:**		
Define					
Measure					
Analyze					
Improve					
Control					
Prepared by:			**Approved by:**		

Assumption Log

- Assumptions should ALWAYS be identified and agreed with stakeholders and sponsor
- High-level, appended to project charter
- Low-level built up as project progresses – living document
- Stakeholders made aware of assumptions right from the start of the project

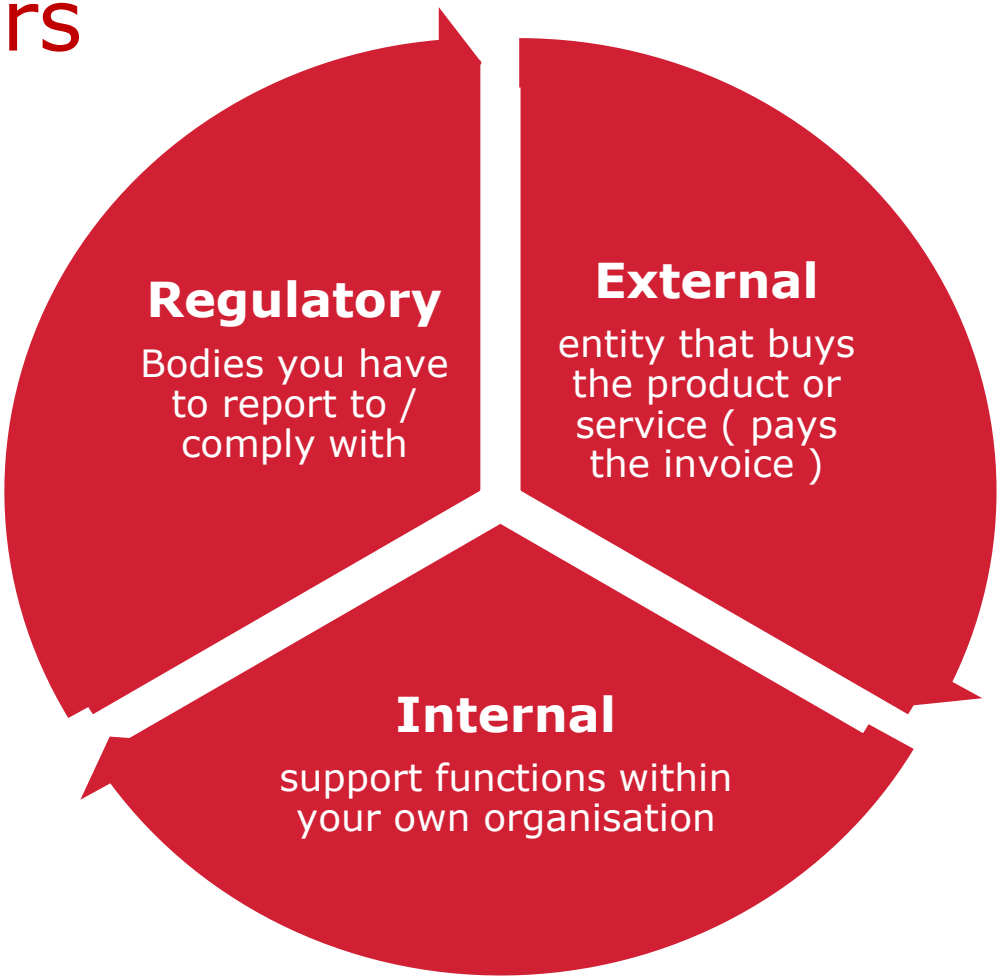
Stakeholders?

- Anyone impacted positively or negatively by the project
- Anyone with a degree of influence over the project
- May change over the life of the project
- Identification can impact success or failure of a project



Stakeholder management

Stakeholders



Definition of a stakeholder:

"Stakeholders are all those who have an interest or role in the project or are impacted by the project, or even think your project will impact them"

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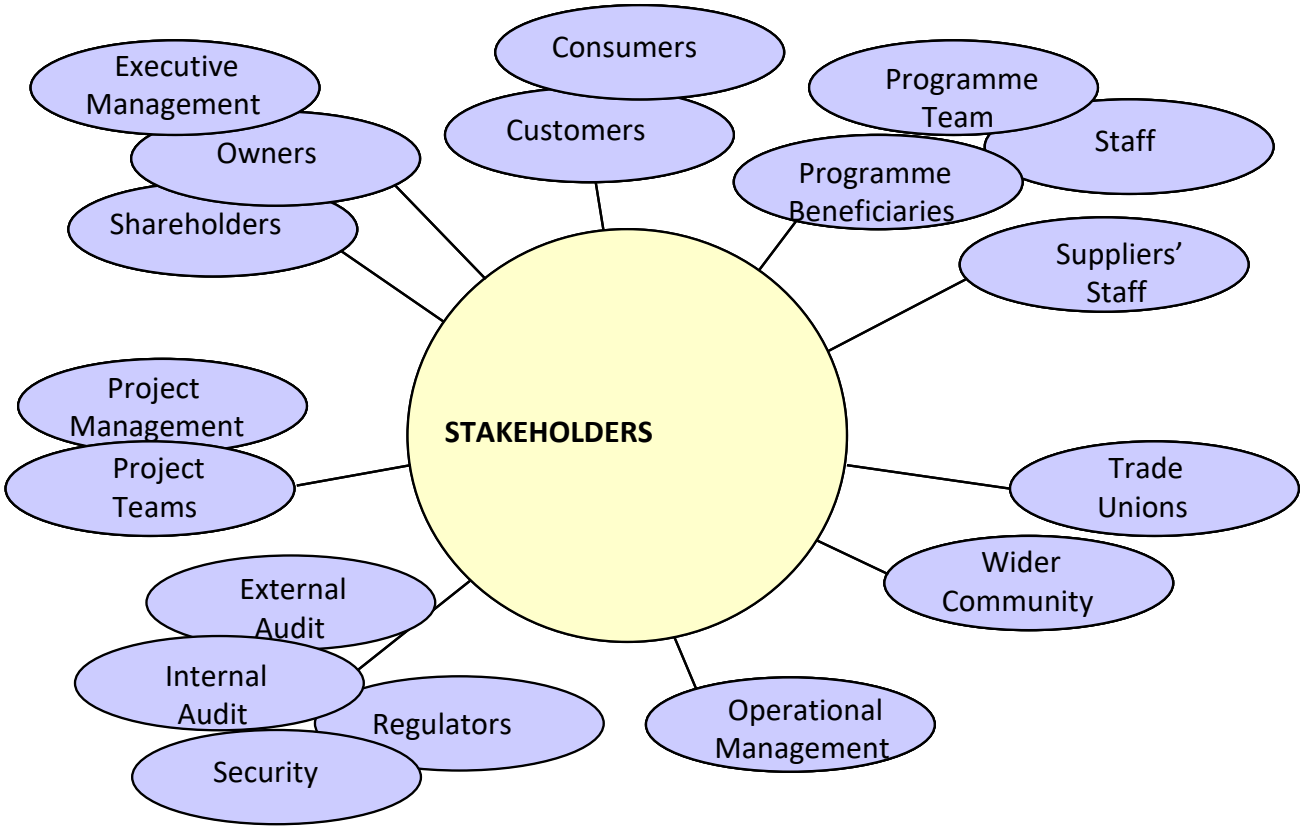
Stakeholder mapping



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Stakeholder Management

"… the systematic identification, analysis, and planning of actions to communicate with, negotiate with, and influence stakeholders."

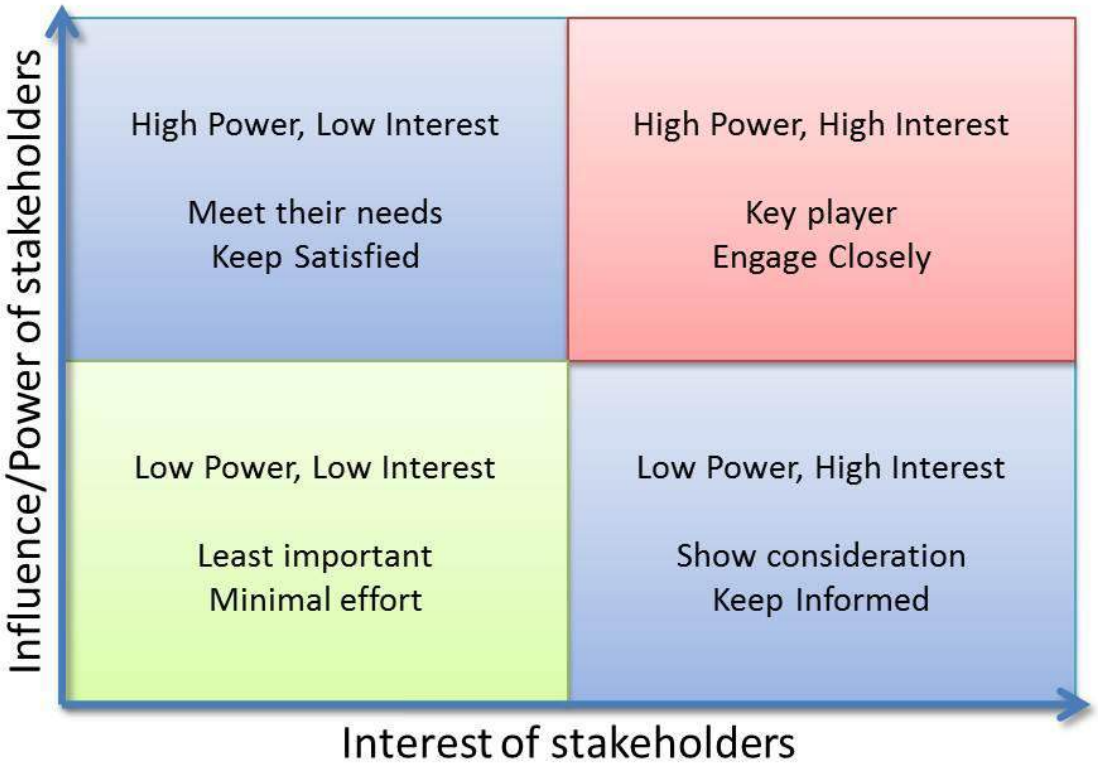
Starts in Start-up and carries on throughout the project

Important as can determine:

- Needs/expectations
- Goals, past reactions, expected behaviour, impact of project (positive/negative), likely reactions, impact on project success, extent of buy-in
- Stakeholders can have positive and negative views on your project

Stakeholder influence/interest matrix

The purpose of an influence/interest matrix is to provide a simple visual representation of the importance of particular stakeholders to a specific organisational activity, so that management effort is prioritised and focussed on those organisations, groups or individuals who can directly influence the activity outcomes



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RACI MATRIX for stakeholder analysis

What Is a RACI Chart?

A RACI chart, also called a RACI matrix, is a type of responsibility assignment matrix (RAM) in project management. In practice, it's a simple spreadsheet or table that lists all stakeholders on a project and their level involvement in each task, denoted with the letters R, A, C or I. Once these roles are defined, assignments can be attributed to the roles and work can begin.

R, A, C, I stands for:

- Responsible
- Accountable
- Consulted
- Informed

Here's what each designation means:

Responsible

Responsible designates the task as assigned directly to this person (or group of people). The responsible person is the one who does the work to complete the task or create the deliverable. Every task should have at least one responsible person and could have several.

Accountable

The accountable person in the RACI equation delegates and reviews the work involved in a project. Their job is to make sure the responsible person or team knows the expectations of the project and completes work on time. Every task should have only one accountable person and no more.

Consulted

Consulted people provide input and feedback on the work being done in a project. They have a stake in the outcomes of a project because it could affect their current or future work.

Project managers and teams should consult these stakeholders ahead of starting a task to get input on their needs, and again throughout the work and at the completion of a task to get feedback on the outcome.

Informed

Informed folks need to be looped into the progress of a project but not consulted or overwhelmed with the details of every task. They need to know what's going on because it could affect their work, but they're not decision makers in the process.

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Example RACI for stakeholder analysis

R	Responsible
A	Accountable
C	Consulted
I	Informed

RACI matrix.

Project tasks	Product Owner	Business Analyst	Financial Lead	Design Director	Design Lead	CRM Lead	Head of CRM	Senior Stakeholders*	Senior Stakeholders**	AGENCY
1. Research										
Econometric model	C	C	A	I	I	C	I	C	I	R
Strategic framework	A	C	C	I	I	C	I	C	I	R
2. Define										
Product concept	A	C	I	C	I	C	C	C	I	R
User testing	A	C	I	I	I	C	I	I	I	R
User journey	A	C	I	I	I	C	I	C	I	R
Design framework	C	C	I	R	A	I	I	C	I	R
Technology recommendations	C	A	I	I	I	I	I	C	I	R
Measurement framework	R	C	A	I	I	C	I	C	I	R
Product backlog	A	R	I	C	I	C	I	C	I	C
Delivery roadmap	A	R	I	R	C	C	I	C	C	R

*Senior Stakeholder 1, Senior Stakeholder 2, Senior Stakeholder 3, Senior Stakeholder 4
** Senior Stakeholder 5, Senior Stakeholder 6, Senior Stakeholder 7, Senior Stakeholder 8

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Communications Plan

- Glossary of commonly used terms
- Communication flow-charts
- Escalation paths
- Constraints – legal, technological, organisational
- Method for updating communication plan throughout project

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Communications Plan

Stakeholder Communication Plan

Stakeholder	Level of Detail	Project Phase	How often?	Who receives updates?	Who updates the stakeholder?	Update Method

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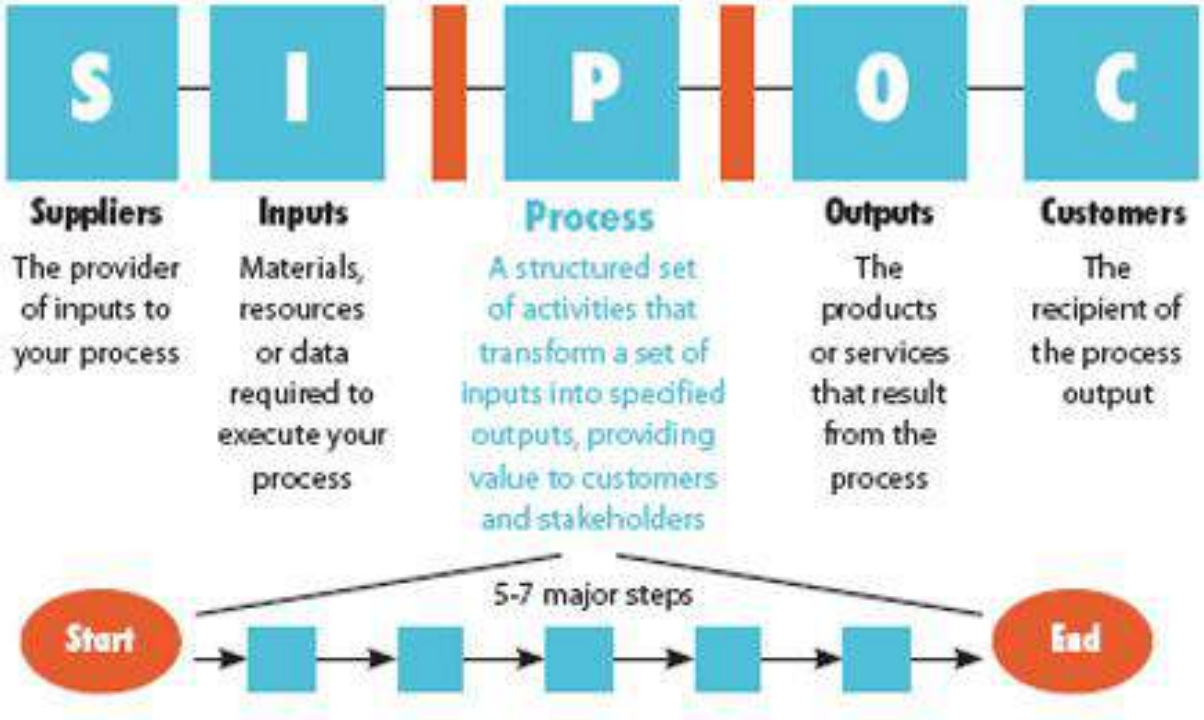
SIPOC and VOC

SIPOC

What Is SIPOC?

SIPOC is an acronym that stands for Suppliers, Inputs, Process, Outputs and Customers. In practical terms, SIPOC is a process mapping and improvement method that summarizes the inputs and outputs of one or more processes using a SIPOC diagram.



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SIPOC

A SIPOC diagram is a tool used by a team to identify all relevant elements of a process improvement project before work begins.

It helps define a complex project that may not be well-scoped and is typically employed at the Measure phase of the Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) methodology.

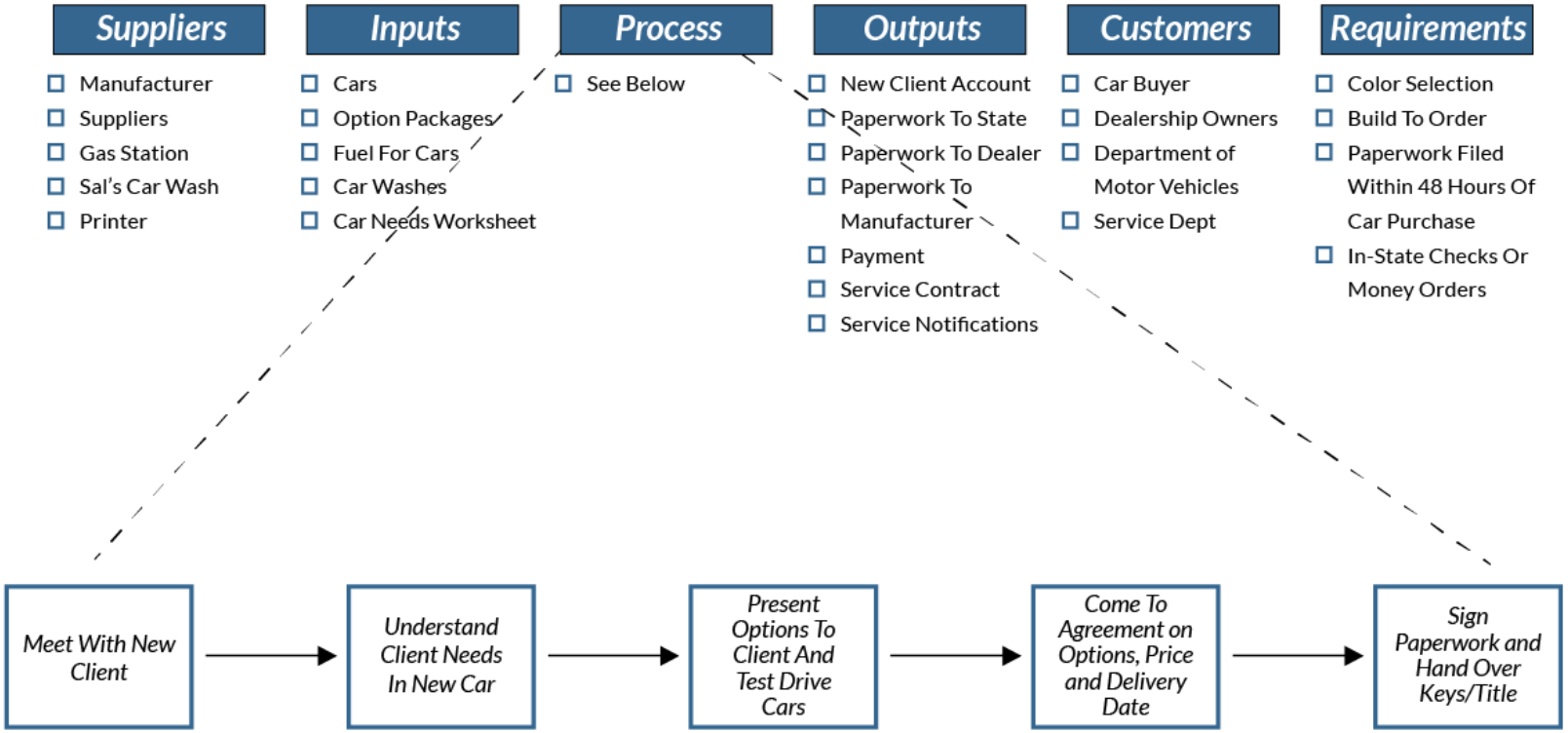
It is similar and related to process mapping and 'in/out of scope' tools, but provides additional detail.

This tool prompts the team to consider the suppliers (the 's' in SIPOC) of your process, the inputs (the 'i') to the process, the process (the 'p') your team is improving, the outputs (the 'o') of the process, and the customers (the 'c') that receive the process outputs. In some cases, your customer's needs can be appended to the end of the SIPOC Diagram for further detail.

SIPOC

SIPOC Diagram

Fictitious Car Dealer Example



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VOC

What is Voice of the Customer (VOC)

Understanding the voice of the customer is more than just collecting feedback from customers. It is a strategy that helps businesses assign their products, services, and experiences to what the customers actually want and need.

The Voice of the Customer is a term used in Lean Six Sigma projects to describe the process of capturing the customer's expectations, preferences, and dislikes. This is a key element in creating a product or service that deeply connects with the business's target audience.

Enhancing Customer Experience

By understanding what the customer truly wants, both stated and unstated, businesses can personalize their offers to meet these needs more accurately. This can usually lead to higher customer satisfaction and loyalty as customers feel valued and heard.
VOC also helps in mapping out the customer journey and identifying customer touchpoints where the customer experience can be enhanced. This might range from improving the user experience on digital platforms to optimizing in-store layouts and interactions.

Driving Product Innovation

VOC can be used to identify unmet needs and frustrations customers have with the current market offerings. This insight helps to drive innovation as it directs product development to areas where there is a real demand for improvement or new innovative solutions. Additionally, continuous VOC collection allows for iterative product development in the direction of the customers changing preferences and trends.

VOC

Improving Service Quality

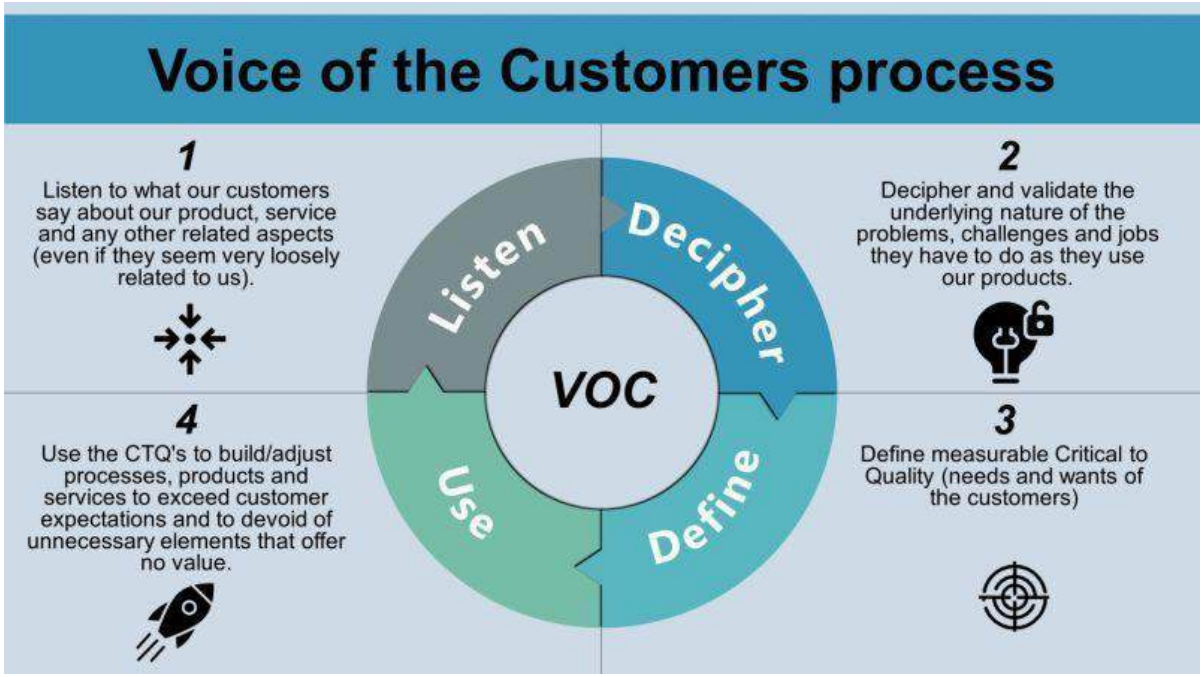
Regular customer feedback about services can pinpoint areas needing improvement, be it in customer support, service delivery speed, or quality. Addressing these areas can reduce complaints and enhance overall service efficiency.

How to collect the VOC

Surveys and Questionnaires

Interviews and Focus Groups

Social Media and Online Reviews



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VOB, VOP

The Voice Of the Business (VOB)

are the needs, wants, expectations, and preferences, both spoken and unspoken, of the people who constitute (run) the business itself (e.g., shareholders, officers, or others involved in corporate governance). Voice of Business (VOB) The company is doing business to sustain, to make a profit, to accomplish a greater goal, … , but this cannot be done at the cost of the customers. The same counts for the customers, they want the best products for the cheapest prices: how can the company deliver without going bankrupt?

Voice of Process (VOP)

The Voice of the Process (VOP) is how the process communicates with the organisation on performance against customer needs and expectations. This communication takes place through process measures which are descriptors of how the process is performing in its current state. Voice of Process is the performance of a process over a period of time. What we know about the parts/service actually provided—maximum and minimum, average, standard deviation, outliers, etc.—is known as the "voice of the process" (VoP). The VoP tells us the limits of our process.

8 Wastes of Lean

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The 8 WASTES TIMWOODS

T

TRANSPORTATION

Moving items or information

I

INVENTORY

Items or information that customer has not received

M

MOTION

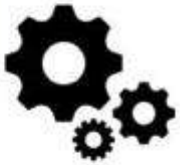
Excessive movement within workspace

W

WAITING

Waiting for information or items to arrive

O



OVERPROCESSING

Doing more work than necessary

O

OVERPRODUCTION

Doing work before it is needed

D

DEFECTS

Mistakes and errors that need to be reworked

S

SKILLS

Not using workers to fullest of abilities

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TIMWOODS

Overview: What are the 8 wastes of lean?

One corporate executive is fond of saying, "Waste is all around us, yet we walk by it every day." There are two popular acronyms that are used to describe the 8 most commonly identified wastes. The first is TIMWOODS and the other is DOWNTIME. Let's first understand what TIMWOODS is all about. In Japanese, Muda is the word for Waste. Originally, there were 7 wastes that were described by Taiichi Ohno, the Chief Engineer at Toyota, as part of the Toyota Production System (TPS). Those 7 wastes were:

1.Transportation: The unnecessary moving around of material, people and equipment often resulting in wasted time and possible damage.

2.Inventory: Excessive inventory that takes up valuable space, requires resources to manage it and ties up capital dollars.

3.Motion: Unnecessary and dangerous movement that can cause harm to people, damages to equipment, or defects in the product. This is different from Transportation since, in the case of people, we are talking about the ergonomic issues rather than the mere relocation of them.

4.Waiting: The waste of time waiting for people, equipment, materials, and information to arrive so that you can do your work.

5.Overproduction: Producing more than the customer or your process needs results in excess inventory and all the expenses described above under Inventory.

6.Overprocessing: Doing more than the customer wants, needs, or is willing to pay for.

7.Defects: The production of a defective product or delivery of service will require either a rework or a scraping of the product. The customer will not pay for either.

8.Skills: This waste was not originally included in Ohno's original 7 Wastes but is certainly a valid waste. Skills are the waste of not using people's talent, knowledge and experience to improve the organization.

The 8 WASTES DOWNTIME

Defects

Efforts caused by rework, scrap and incorrect information

Overproduction

Production that is more than needed or before it is needed

Waiting

Wasted time waiting for the next step in a process

Non-Utilized Talent

Underutilzing people's talents, skills & knowledge.

Transportation

Unnecessary movements of products & materials.

Inventory

Excess products and materials not being processed.

Motion

Unnecessary movements by people (ex.walking).

Extra-Processing

More work or higher quality than is required, by the customer.

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DOWNTIME

The second common acronym for the 8 Wastes of Lean is DOWNTIME. You will notice that the elements are exactly the same in content but with slightly different terminology and order.

1. Defects
2. Overproduction
3. Waiting
4. Non-Utilization of Talent
5. Transportation
6. Inventory
7. Motion
8. Extra processing

The benefits of identifying the 8 wastes of LEAN

1. It improves process performance
By identifying the 8 wastes and eliminating them, you improve your productivity and process performance because you are not wasting time and resources that result from these wastes.

2. Creates a common definition and description of waste
By using the terms of either acronym, everyone in the organization can view and define the various wastes in common terms. This reduces any miscommunication as to what you are talking about when pointing out that something is indeed a waste.

3. The wastes focus on the functioning of the process and *not* on the people
There will be less resistance and defensiveness if waste is perceived as a process issue rather than a people issue.

8 WASTES
Acronyms (8 MUDA)

- TIMWOOD
- TIMWOODS
- TIMWOOD DOES IT
- DOWNTIME
- HOSPITAL

TIMWOODDOESIT = Transport / Inventory / Motion / Waiting / Over processing / Over production / Defects / Design / Overhead / Energy / Safety / Ideas / Technology

HOSPITAL

H - Halting - (See W/Waiting)
O - Over producing - (See O/Overproduction)
S - Slips (See D/Defects)
P - Processes - Non Value Added (See E/Excess Processing)
I - Inventory (See I/Inventory)
T - Transportation (See T/Transportation)
A - Action (See M/Motion)
L - Lack of Employee Engagement (See E/Non efficient use of people).

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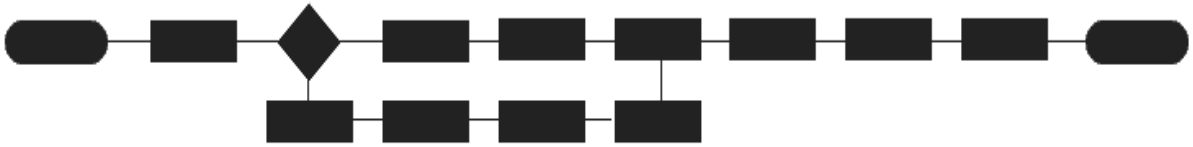
Process Mapping

What is Process Mapping?

A Visual Guide to Your Operations

At its core, Process Mapping is like a visual guide for your business processes. It visually represents each step, action, or operation involved in a process from start to finish. Utilizing various symbols, shapes, and arrows, it paints a clear picture of how tasks flow through the system. This visualization makes it easier to understand complex workflows, especially for those who are not directly involved in the process.



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What is Process Mapping?

Key Elements of Process Mapping

•**Activities**: These are the tasks or operations that are part of the process. An activity could be as simple as 'Approve Request' or as complex as 'Conduct Quality Assurance Testing'

•**Inputs/Outputs**: Every activity in a process typically has something that triggers it (input) and produces a result (output). For instance, an input could be a customer order, and the output could be the shipped product.

•**Decision Points**: These are the junctures where a decision needs to be made, often represented by diamond shapes in the map. For example, a decision point might be "Is the inventory sufficient?"

•**Roles**: This specifies who is responsible for each activity. Assigning roles removes ambiguity and ensures accountability.

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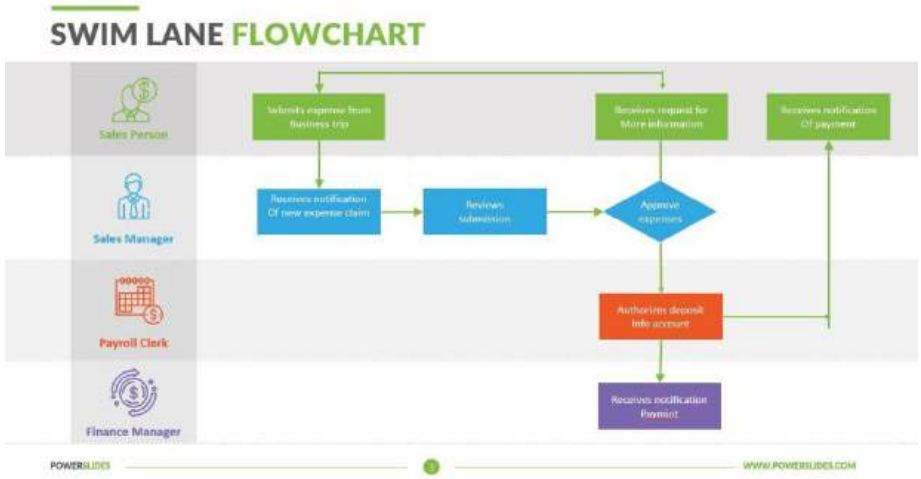
Swim Lane Process Map

What is a Swim Lane Process Map?
A Swim Lane Process Map is a specialized form of flowchart designed to make complex processes easier to understand by visually organizing tasks, activities, and decisions. The "swim lanes" are essentially parallel horizontal or vertical lanes that represent different departments, roles, or individuals involved in a process. Each lane contains a series of steps or tasks that are the responsibility of that specific department or role.

Visual Analogy
Imagine a swimming pool with multiple lanes. Each lane is like a specific department or role in your organization. Just as a swimmer stays within their lane to reach the finish line, each department or role stays within its lane to complete its designated tasks. This segregation by lanes allows for a clear, visual representation of who does what and when, thereby reducing confusion and ensuring that everyone knows their responsibilities.



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Swim Lane Process Map

How to Create a Swim Lane Process Map
Creating a Swim Lane Process Map is a structured yet flexible approach that involves multiple stages. Here's a detailed explanation of how to go about each step:

Step 1: Identify the Process
•**What to Do**: Start by choosing the process you wish to map. This could range from something specific like "Order Processing" to something more general like "Employee Onboarding."
•**Why It's Important**: Knowing the process you want to map sets the stage for what you aim to achieve. It helps in focusing your mapping efforts and ensures that all participants have a clear understanding of the objective.

Step 2: Determine the Participants
•**What to Do**: Identify all the departments, roles, or individuals involved in the process.
•**Why It's Important**: These entities will form the 'lanes' in your Swim Lane Process Map. Knowing who is involved is essential for assigning responsibilities and ensuring a seamless flow of activities

Step 3: Start Mapping
•**What to Do**:

- Place your lanes either horizontally or vertically on your map.
- Start with the first step in the first lane.
- Add subsequent steps and decision points in each lane as they occur in the process.

•**Why It's Important**: The lanes help in segregating tasks based on roles or departments. Adding steps and decision points in a logical sequence ensures that you capture the process accurately.
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Swim Lane Process Map

Step 4: Add Connectors
•**What to Do**: Use arrows to indicate the flow of the process from one step to the next.
•**Why It's Important**: Connectors are crucial for directing the flow of activities. They help in understanding how each task moves from one entity to another and in what sequence.

Step 5: Review and Validate
•**What to Do**: After the initial draft is complete, review the map to check for accuracy. It's also a good idea to validate the map by consulting with team members who are involved in the process.
•**Why It's Important**: Review and validation ensure that the map is not only accurate but also practical. It identifies any missing steps or bottlenecks that may have been overlooked.

Step 6: Implement and Monitor
•**What to Do**: Once the map is finalized, use it as a guide for executing the process. It should also serve as a tool for ongoing monitoring and potential improvements.
•**Why It's Important**: The ultimate goal of a Swim Lane Process Map is to improve efficiency. Regularly referencing and updating the map ensures that it remains a relevant tool for continuous improvement.
By meticulously following these steps, you will be able to create a detailed and effective Swim Lane Process Map that serves as a valuable asset for process analysis and improvement.

Value Stream Maps

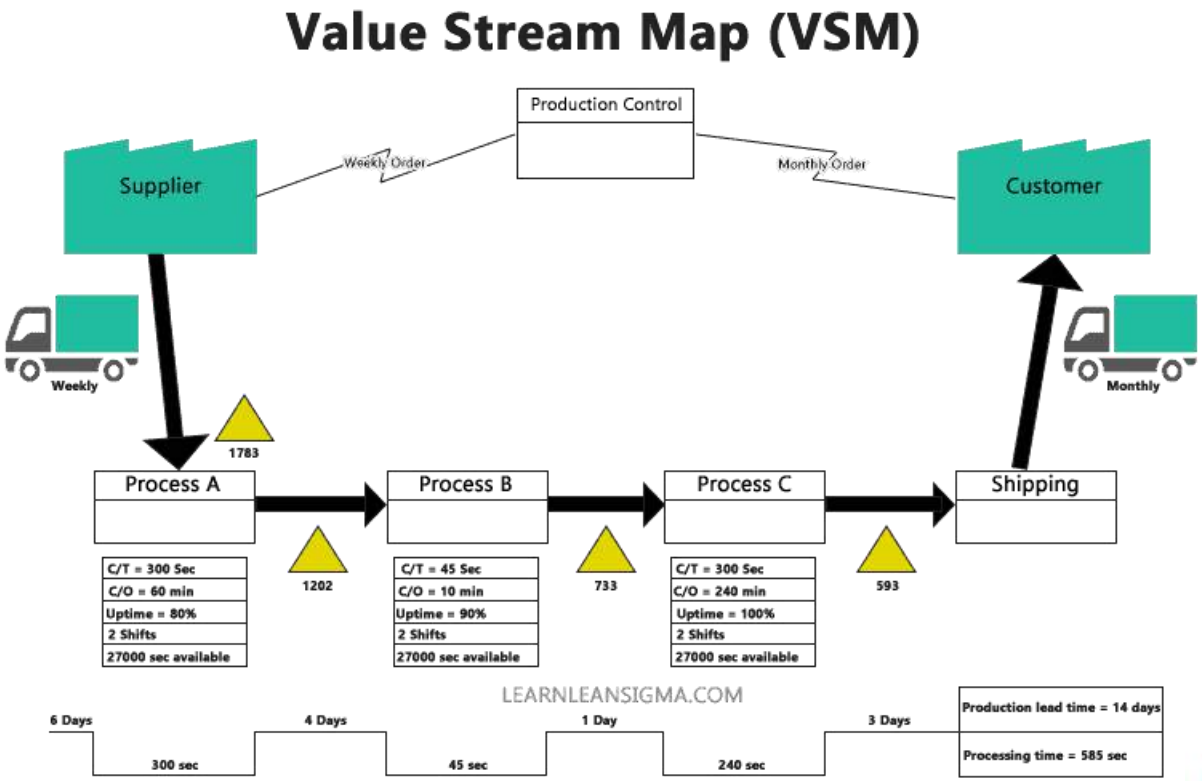
What are they?

Value Stream Maps are commonly used in Lean methodologies. They not only map the process but also add data about time, cost, and resources to help identify value-added and non-value-added activities.

When to Use

•When you're applying Lean methodologies.

•When you want to understand and reduce waste in the process.



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Value-Stream Mapping versus Process Mapping

Taking a value-stream perspective means working on the big picture and not just individual processes. In other words, it is about improving the whole not just optimizing the parts.

	What	Why	When
Value Stream Mapping (VSM) 	• 'Big Picture' tool • Shows all linked processes • Illustrate problems with material AND information flow • Holistic view of system flow from the customer's perspective	• Contextual improvements vs. sub-optimizing • Identifies where to start to create a roadmap for improvement	• Early in problem investigation
Process Mapping 	• Detailed series of tasks to accomplish an operation • Breaks down a process in greater detail • Concentrates on a single process • From the worker's perspective	• Identifies tactical improvements to a process	• To analyze a point-of-concern on the VSM • To create standardized work

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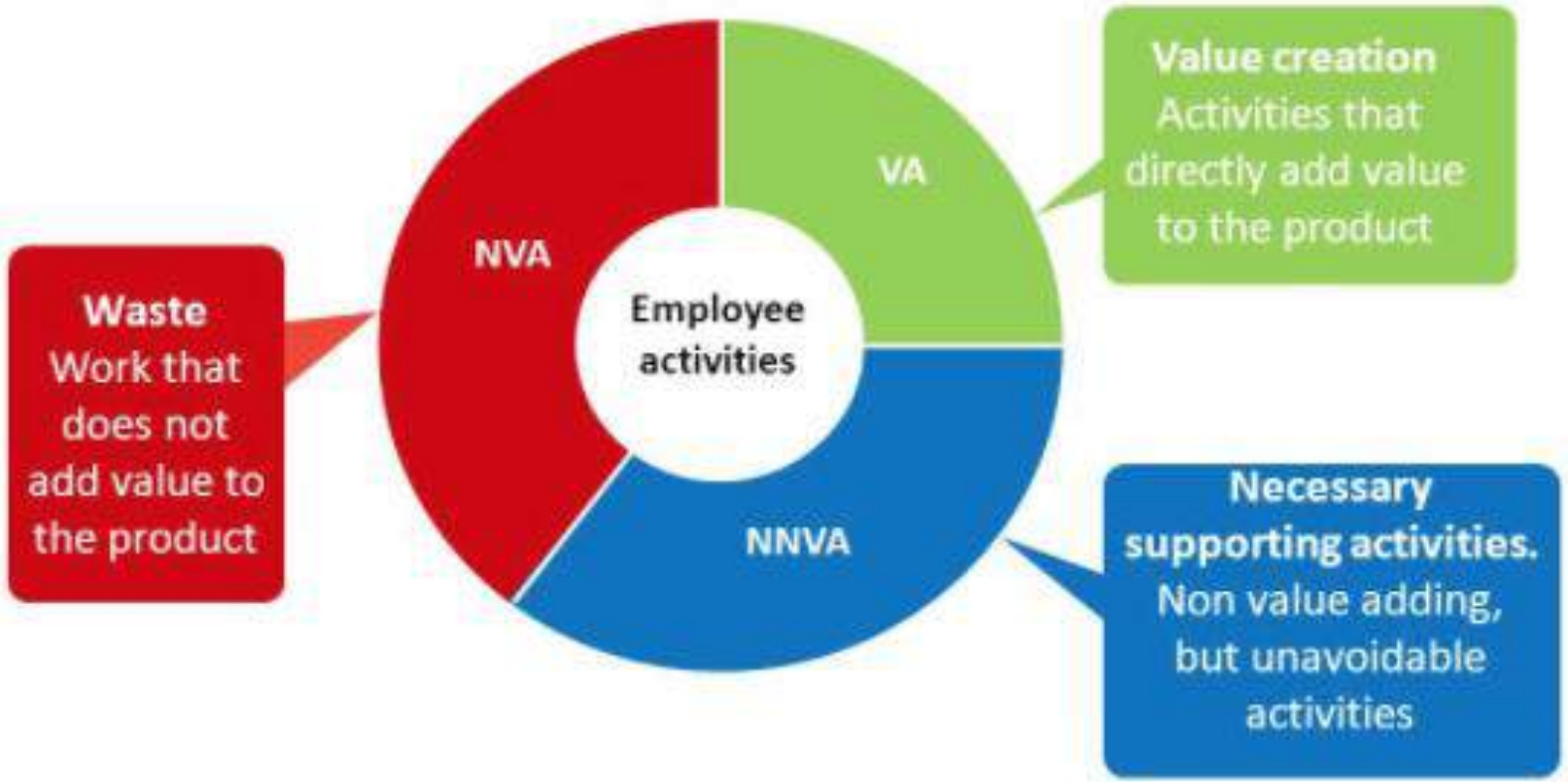
Value vs Activity



The three criteria for a Value Adding Activity are:

The step transforms the item toward completion.

The step is done right the first time (not a rework step)

The customer cares (or would pay) for the step to be done.

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VA, NVA, NNVA

VALUE ADD –

- Something the customer wants or is willing to pay for
- Transformative
- Done right 'first time'

Considers the Leadtime of a process as being a combination of Value Add (VA) + Non-Value-Add (NVA) + Necessary-Non-Value-Add (NNVA).

PCE (Process Cycle Efficiency) examines the relationship between VA and LT.

LT = VA+NVA+NNVA

PCE = VA/LT

Considers total Lead time of a process as a combination of

Process time (useful) & Waiting Time (waste)

LT = PT + WT

A:R = PT / LT

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VA, NVA, NNVA

Activity	Definition	Action
Value Add	Any resources that changes the nature, shape or characteristic of the product or service being provided	Maximise
Non Value Add	All unnecessary resources	Eliminate
Necessary Non Value Add	Resources which are invested by necessity under current conditions (eg. Regulation) but which do not directly improve product or service	Minimise

Any questions?

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Thank you ☺

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