Workshop

Agil produktionsutveckling


Prof. Björn Fagerström 2020-02-18


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ASSAR I Skövde

OUTLINE (as sent and generic)

09:15-09:30 KAFFE

09:30-10:15 INTRODUKION AGILT (inklusive relationen till den man kallar vattenfall / V-Modell)

10:15-10:45 START AV PROJEKT OCH ÖVNING ”SJÄLVSKATTNING NULÄGE”

10:45-11:00 KAFFE

11:00-12:00 AGIL PLANERING OCH ORGANISATION

12:00-12:45 LUNCH

12:45-13:30 ÖVNING AGIL PLANERING

13:30-13:45 GENOMGÅNG OCH DISKUSSION AV ÖVNING

13:45-14:30 METODER, VERKTYG SOM STÖDJER AGILT GENOMFÖARNDE

14:30-15:00 KAFFE, DISKUSSION OCH FRÅGOR

OUTLINE (contect)

- INTRODUCTION
- DEFINITION PROJECT MANAGEMENT
- DEMANDING ENVIRONMENT
- CONTEXT PROJECT MANAGEMENT
- INTRODUCTION AGILE
- SELF ASSESSMENT
- AGILE PLANNING
- VISIBLE PLANNING (Obeya)
- TEAM / ORGANIZATION
- INNOVATION
- WORKSHOP
- SET-BASED
- DECISION MAKING
- DISCUSSIONS AND CLOSING

Many small assignments today and high interaction

Questions are Welcome ! PP Slides will be distributed

Presentation slides in English (most) – But we speak swedish

PREMIUM (JU & MDH)

Aktuella kurser för start **HT 2020:**

Agile Production Development /
Agil produktionsutveckling

(kursansvarig: Björn Fagerström)

Maintenance for Production Performance /
Underhåll för produktionsprestanda

(kursansvarig: Gary Linnéusson)

Automation - Possibilities and Challenges /
Automation - möjligheter och utmaningar

(kursansvarig: Kerstin Johansen)

Kurser som startar **VT 2021** och framåt:

Challenge-driven Operations Development / Utmaningsdriven verksamhetsutveckling

Human Factors Engineering / Människa – Teknik – Organisation

Integrated Product and Production Platform Development / Integrerad utveckling av produkt- och produktionsplattformar

Additive Manufacturing Enabling Production Flexibility / Additiv tillverkning för flexibel produktion

Digitalization and Big Data Management / Digitalisering och big data management

Assignments

NO	ASSIGNMENT	YOUR NOTES
1	Which process is most important in any industrial company ?	
2	Why are projects commonly delayed, targets not reached and budgets not maintained?	
3	Why is Industrialization/engineering goal-driven and only 80-90% predictability, *vs* Production almost 100% predictability and activity-driven	
4	Which European Country is Missing?	
5	What do you do in case you get urgent problems in the production / OTD, like task force, etc., but What/How?	
6	What fits better into Agile – Requirement Specification or Requirement management Process	

INTRODUCTION

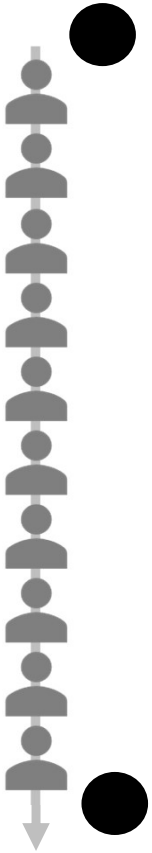
Syftet med dagen

- Introduktion till Agil metodik inom produktionsutveckling.
- Förståelse för skillnaden Vattenfall och Agilt.
- När passar Agilt arbetssätt bäst.
- Lite vägledning för hur ni kan gå vidare på varje företag.

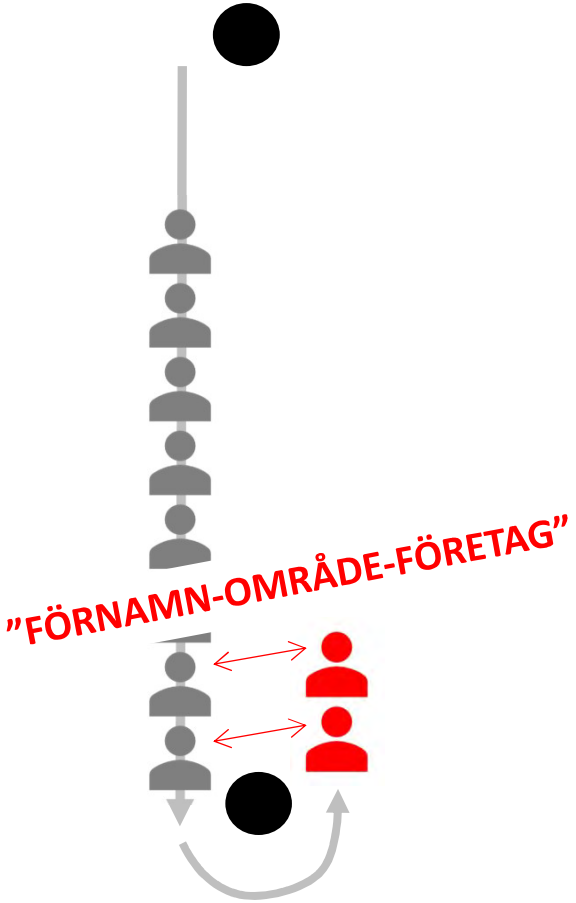
- Ni kan alltid kontakta undertecknad efter dagen om ni har frågor.

”Lära känna” varandra på 5 minuter

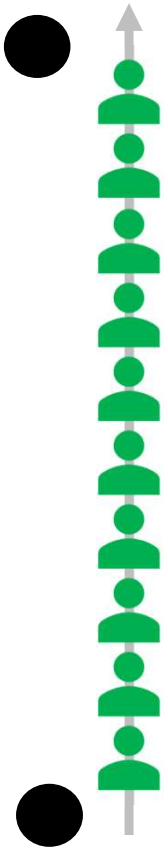
1 På led mellan två stolar



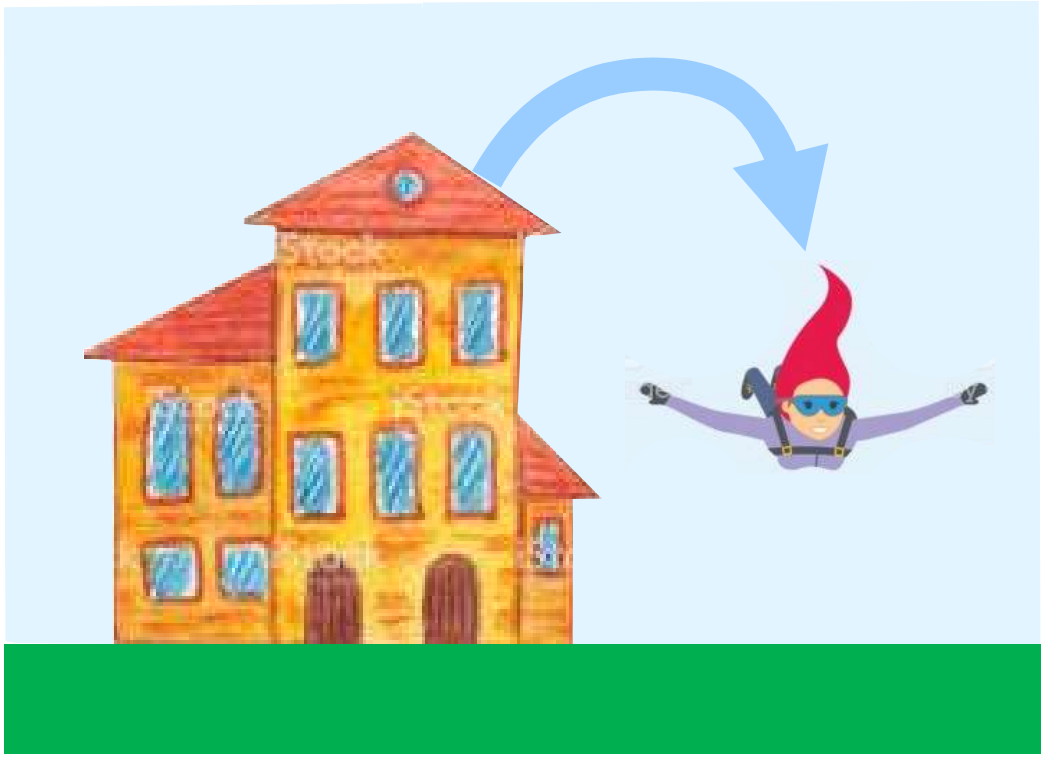
2 Gå moturs, passera varje person



3 Fortsätt tills alla passerat alla



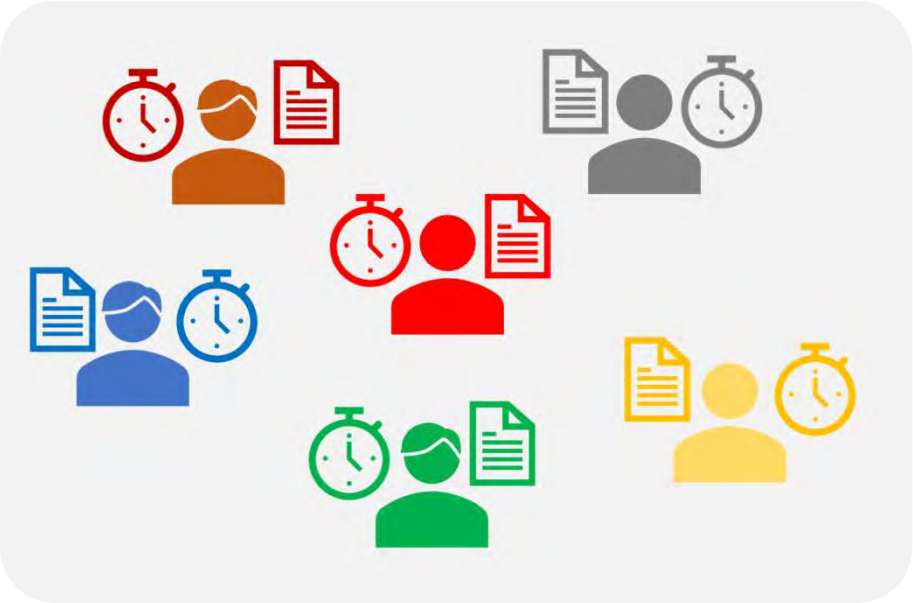
METHOPHORE



Att bara testa Agilt lite grann är som att hoppa fallskärm från ett tak, man kanske lär sig något, men inte så meningsfullt……

AGILE is not solely a method – Rather a philosophy

WATERFALL (COMMON)



- Top down approach
- Distribution of work by PM
- Centralized
- Measure individual

AGILE (intro)

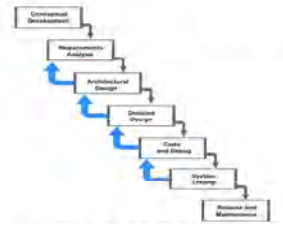
- Bottom Up
- Team effort to define SoW
- Decentralized
- Measure team not individual

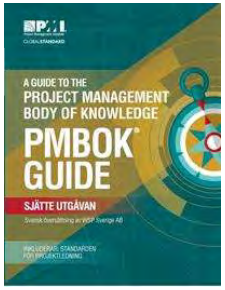
The purpose of this picture was just to introduce Agile and somme differenceies with Waterfall – More will come !

BF1

OUR VIEW

1) Many projects do not meet targets/ expectations and suffer from delays and cost overruns.
2) We need to understand the characteristics of the project, in order to;
3) Decide ”Waterfall” or ”Agile”, and to;
4) Enhance the likelihood to be successful, see 1)





PMBOK (Waterfall)

AGILE (Lean)

Our ambition is to combine these two so

” 1 + 1 > 2 ”

TODAY LESS WATERFALL !

Bild 11

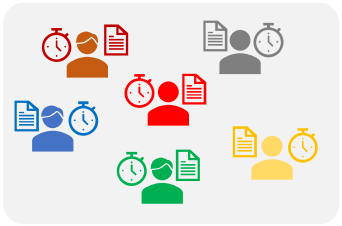
BF1 Björn Fagerström; 2020-02-17

TO SUMMARIZE

1) Quick and simple (Try part of it) = Difficult

2) Great principle differences between “Waterfall” and “agile”

WATERFALL (COMMON)



- Top down approach
- Distribution of work by PM
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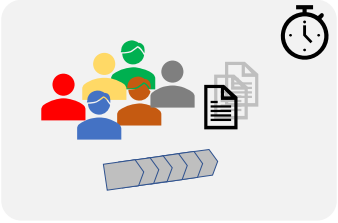
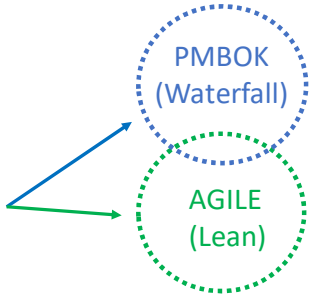
- Measure individual

AGILE (intro)



- Bottom Up
- Team effort to define SoW
- Decentralized
- Measure team not individual

3) Both ”Waterfall” or ”Agile” could be beneficial



Our ambition is to combine these two so

” 1 + 1 > 2 ”

DEFINITION
PROJECT MANAGEMENT

PROJECT DEFINITION

- A project is a temporary endeavor, having a defined beginning and end (usually constrained by date, but can be by funding or deliverables), undertaken to meet unique goals and objectives, usually to bring about beneficial change or added value.
- The temporary nature of projects stands in contrast to business as usual (or operations), which are repetitive, permanent or semi-permanent functional work to produce products or services.

- Many variants of projects, like Internal / External / Product Development / Implementing new Business System / Organizing a sport event / etc.

Read on your own, will be included

DEFINITION - PROGRAM AND PORTFOLIO

Commonly used definition of
Portfolio & Program Management

Portfolio Management:

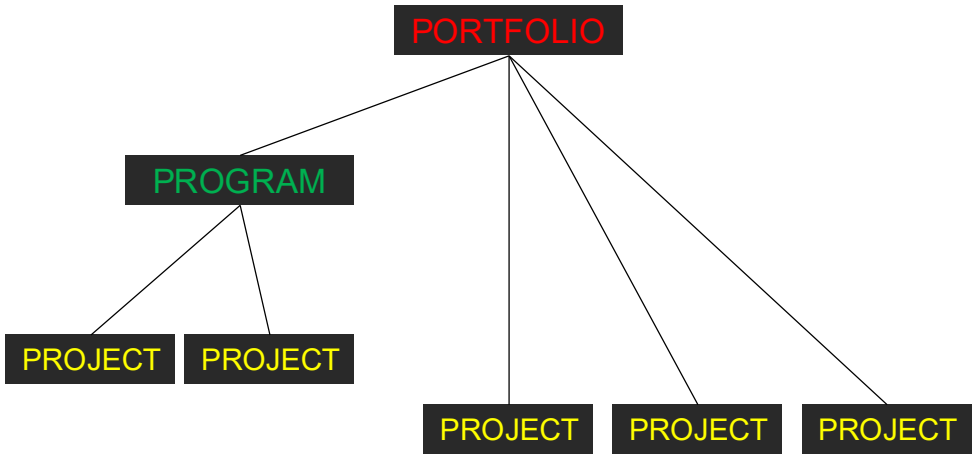
Archibald, 2003
Blomquist and Müller, 2005
PMSPM, 2006

- Managing several (also unrelated) projects
- Involving projects and programs

Program Management:

Archibald, 2003
PMSPM, 2006
PMSPM, 2006
Lycett et al., 2004

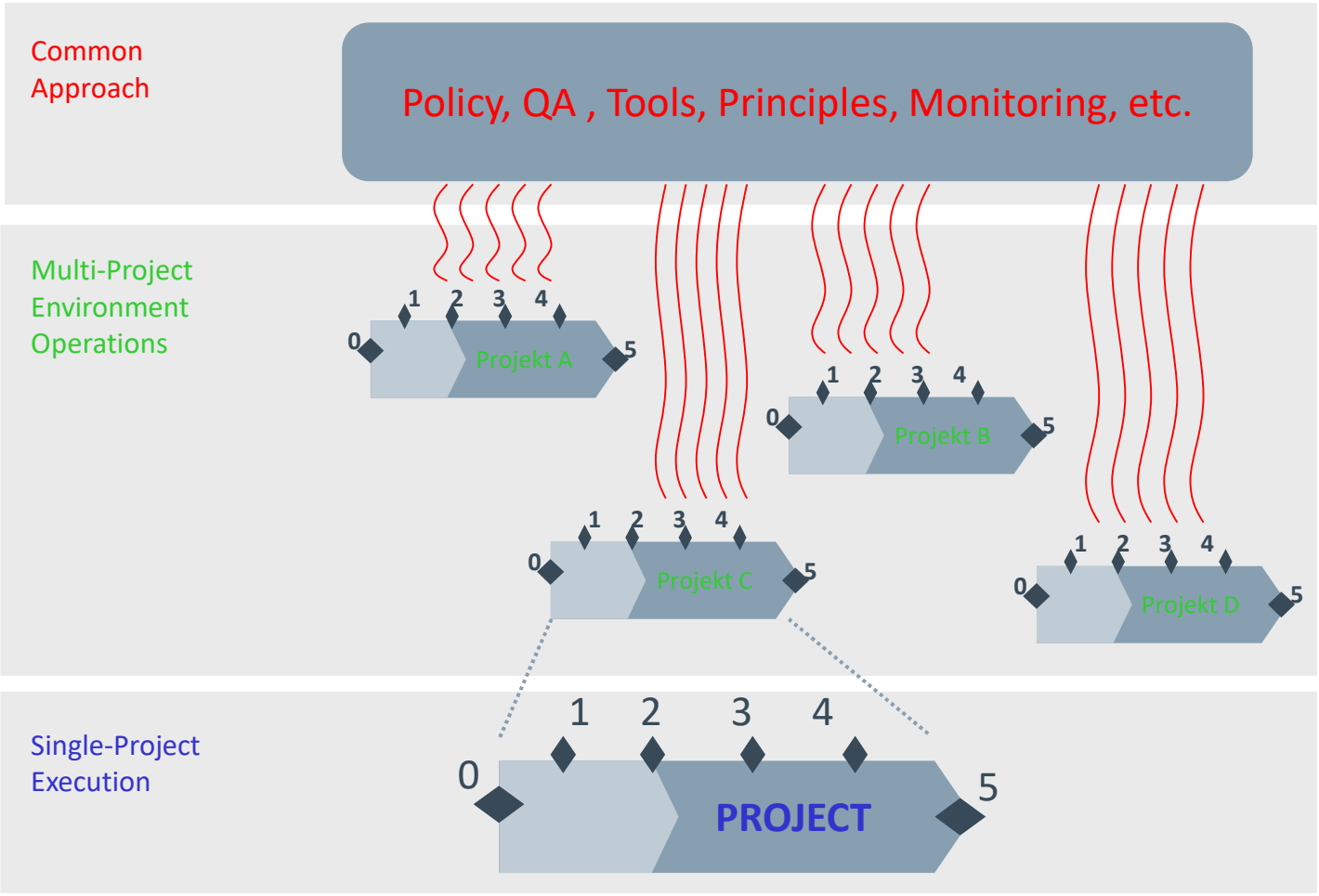
- 2 or more Projects - Co-ordination
- Benefits managing them together



For this Presentation
mainly **Single Project** Focus

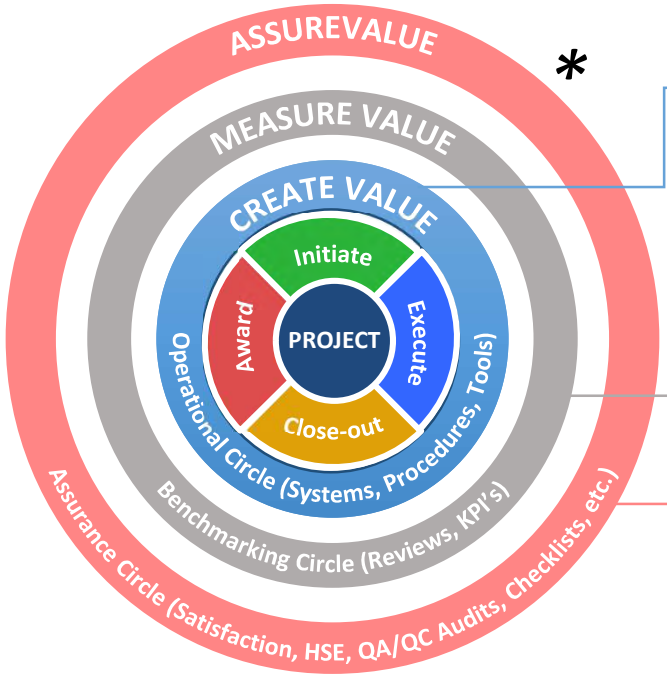
But a key issue is often
To manage several projects.

THE PROJECT ENVIRONMENT



- Frequently managed by a **PMO** office or equal
- **My view** – Some centralized support and common ways of working essential.
- Critical for long term success, but also for learning, measurement, etc.
- **Agile** = Scaled Agile
- **Waterfall** = PMO or equal
- **Today 1 project** focus

EXAMPLE OF PMO GOVERNANCE MODEL



*

- Create value
- Operation and execution
- Etc.

- Measure value
- KPI:s / Gate-reviews
- Etc.

- Assure value
- HSE/QA audits
- Etc.

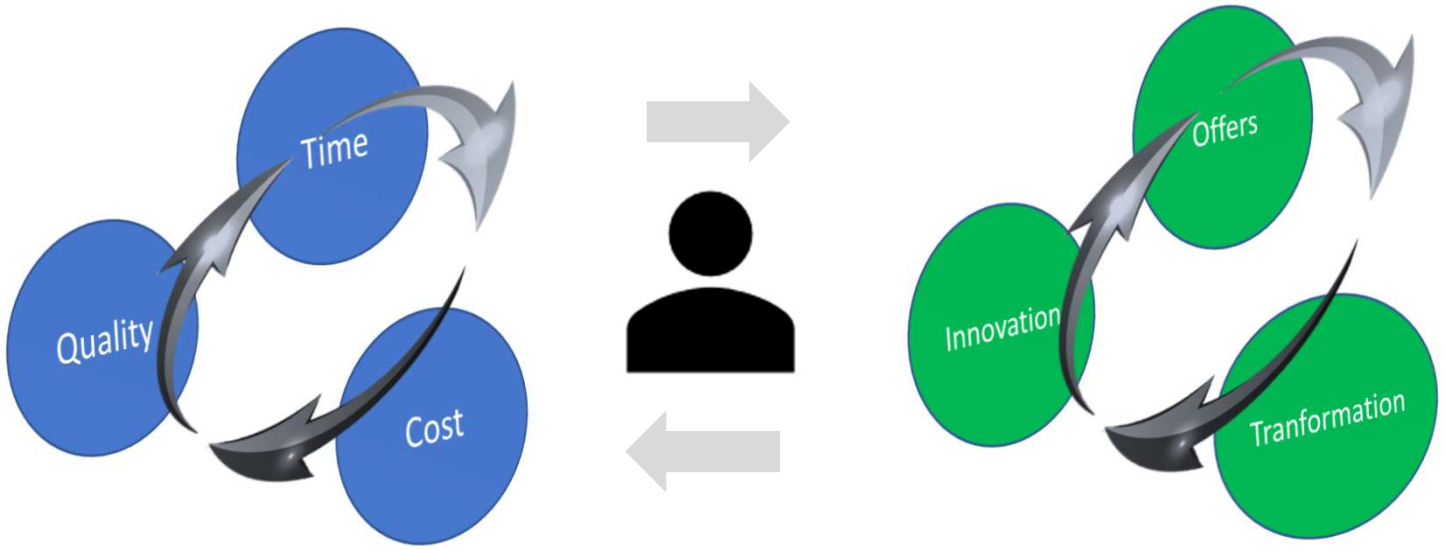
- **Agile** = Scaled Agile
- **Waterfall** = PMO or equal

- **Today 1 project** focus

** Based on Technip-model*

DEMANDING ENVIRONMENT

1 Manage “old” and “new” simultaneously
2 Stuck in inflexible structure and culture



Operational Excellence Dimension

Still to be managed

Innovative Dimension

Crucial for survival

Increased change pace
Current structures obsolete

- Transformation competence needed now
- Increased number of people in the organization focus on transformation/innovation
- Number of project in a company increase
- Thus, the project management capability will be a successfactor!

NEW DEMANDS

EVOLUTION...

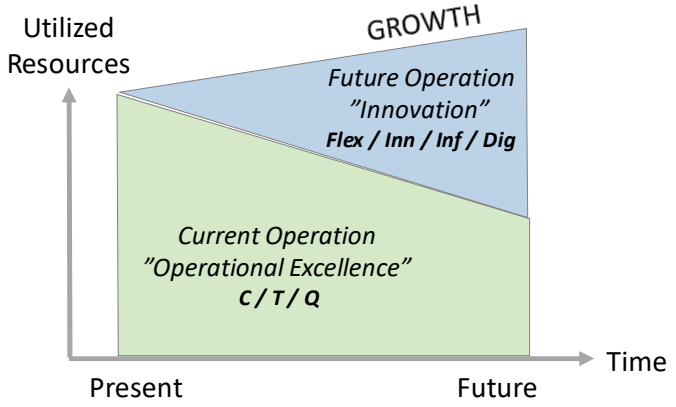
< 2005s Information & Digitalization

< 2000s Continuous adaption to new conditions (Agility – Flexibility)

< 90s Time

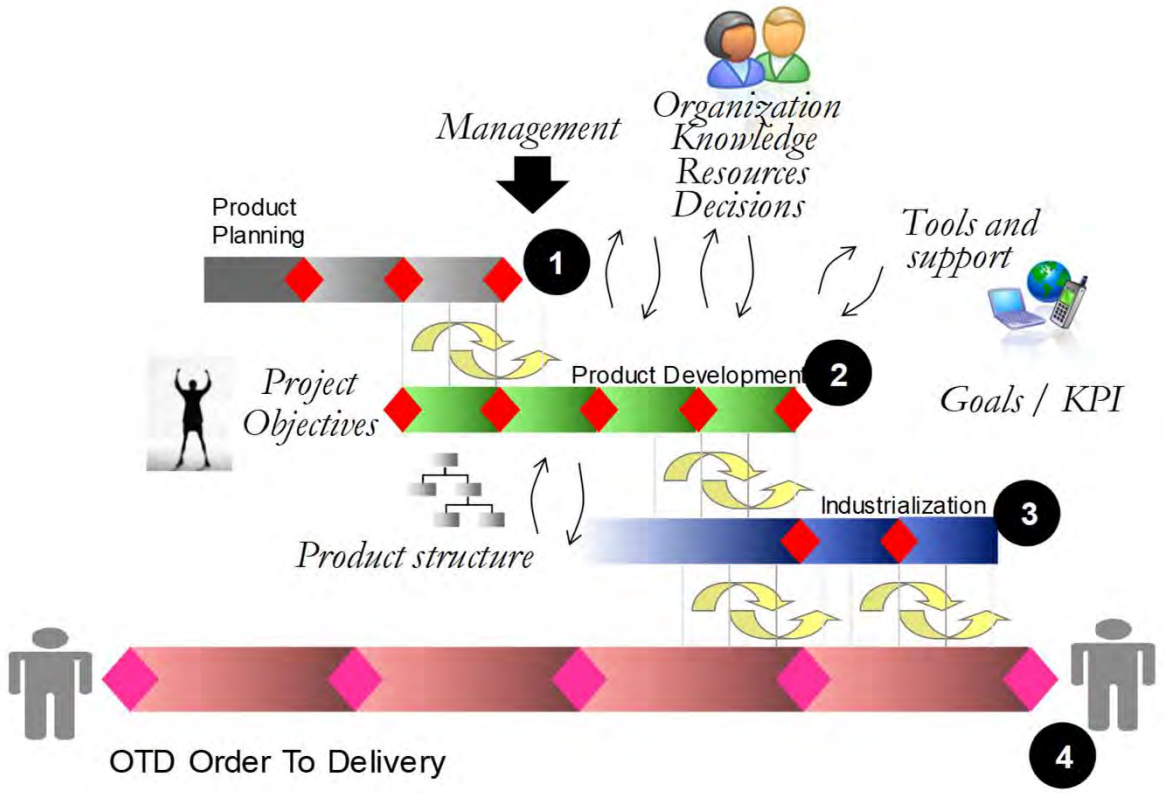
< 70-80s Quality

< 60s Cost



PRODUCTDEVELOPMENT OCH PRODUCTION

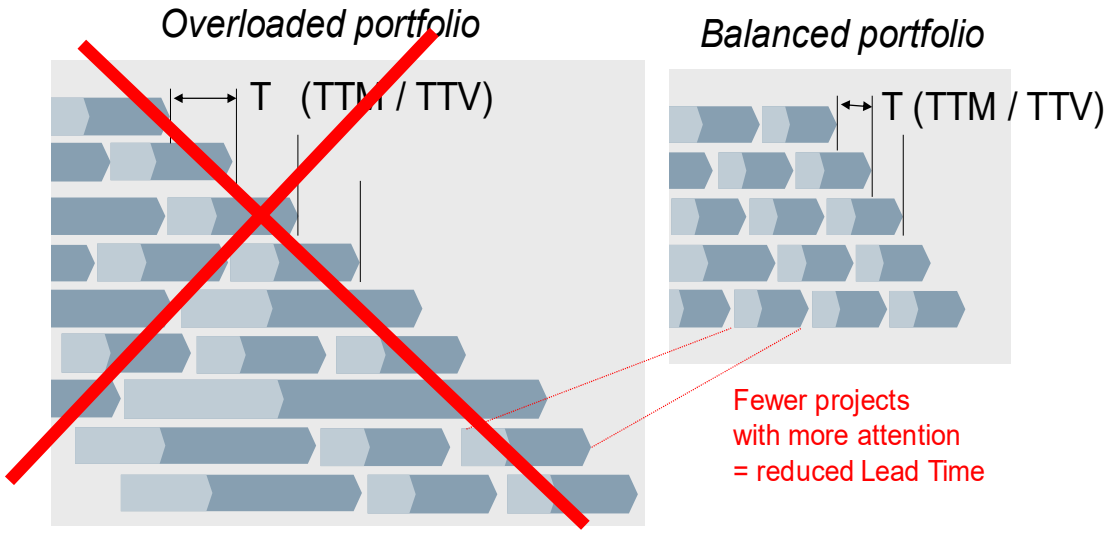
PRODUCT PLANNING AND INDUSTRIALIZATION



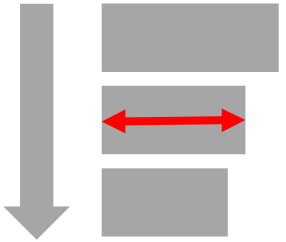
MARKET INTRODUCTION APPROACH

~~TTM~~

TTV



SHORTER TIME IN THE MARKET



INCREASED COST OF DELAY!

- Balanced Portfolio
- Shorter Lead Time
- Fewer projects with Higher pace

- Sounds like a contradiction, as we earlier discussed more projects,
- But please note high pace and short lead time.

CONTEXT
PROJECT MANAGEMENT

OVERVIEW & CONTEXT - PROJECT

PHILOSOPHIES STANDARDS Etc.

- Lean
- Agile
- Waterfall
- PMP/PMI
- ISO 21500 PM
- ISO 56002 Innov
- Prince2
- Corp. standards
- Innovative PM
- Etc.

CONTEXT

- **BUSINESS**
  - OEM
  - Product owner
  - Engineering Consul.
  - Certifier/3rd party
  - Etc.
- **TYPE OF PROJECT**
  - R&D
  - Client project
  - Internal dev.
  - Etc.

COMPETITIVE ENVIRONMENT

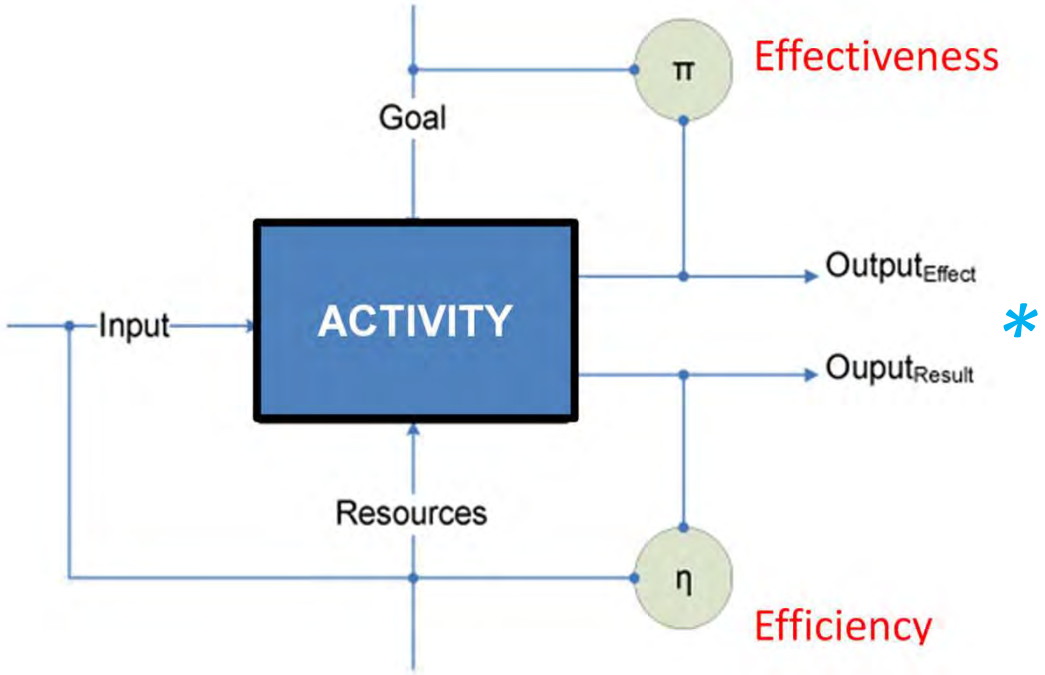
- Many standards !
- Important to decide what to use and why
- If you run both ”Waterfall” and ”Agil” important that you are aware that this har implications for management, process, oroganization, product and support.
- Type of Business / project will influence as well.

Assignment #1 - STARTING WITH PROCESSES

Which process is most important in any industrial company ?

2 and 2 in 1 minute from now

Effectiveness vs Efficiency – Important for projects



Effectiveness

PMO / Contract / Market / Sales

"Doing the right project"

Efficiency

More Project Execution

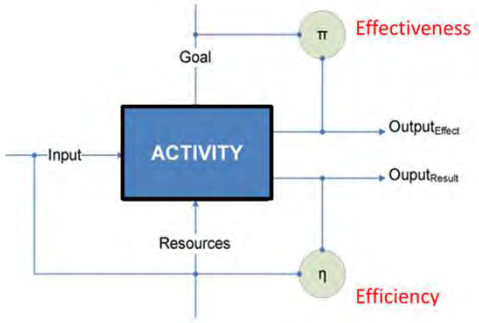
"Doing the project right"

** Risk area – Understand customer journey, end client, etc.*

EEFFECTIVENESS
EFFICIENCY

EFFECTIVENESS
- Product Planning objectives vs Market penetration / effects
- Important input to NPD

EFFICIENCY
- Product development
- Industrialization
- Deliver the agreed result (Q/T/C) within budget



Effectiveness

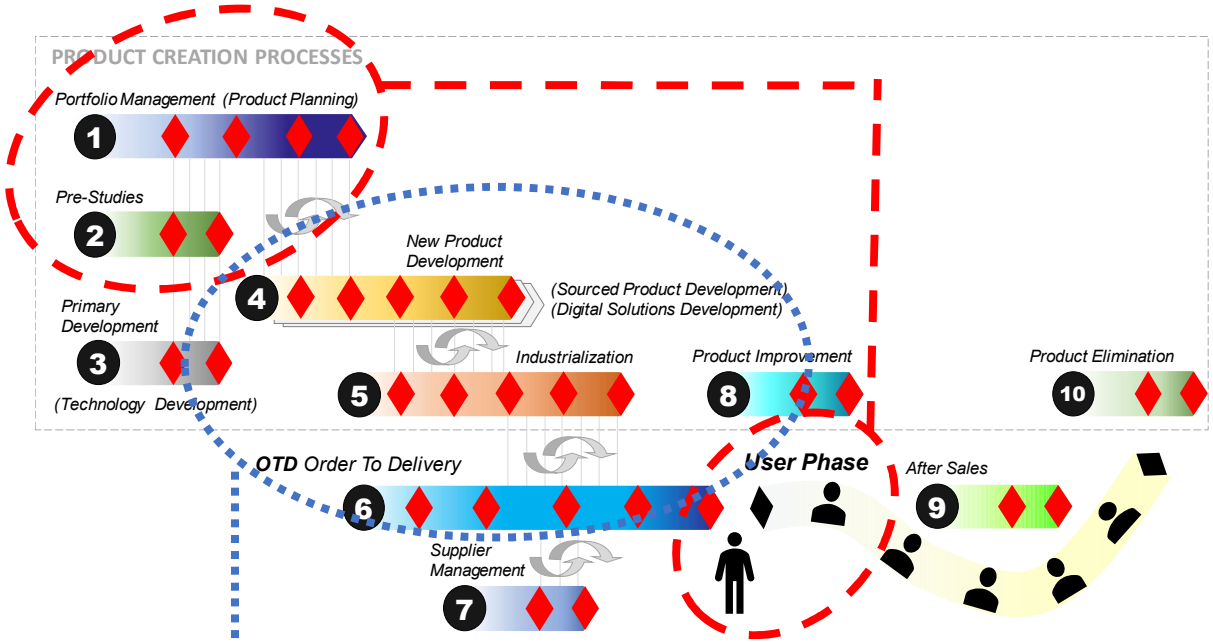
More product planning

"Doing the right things"

Efficiency

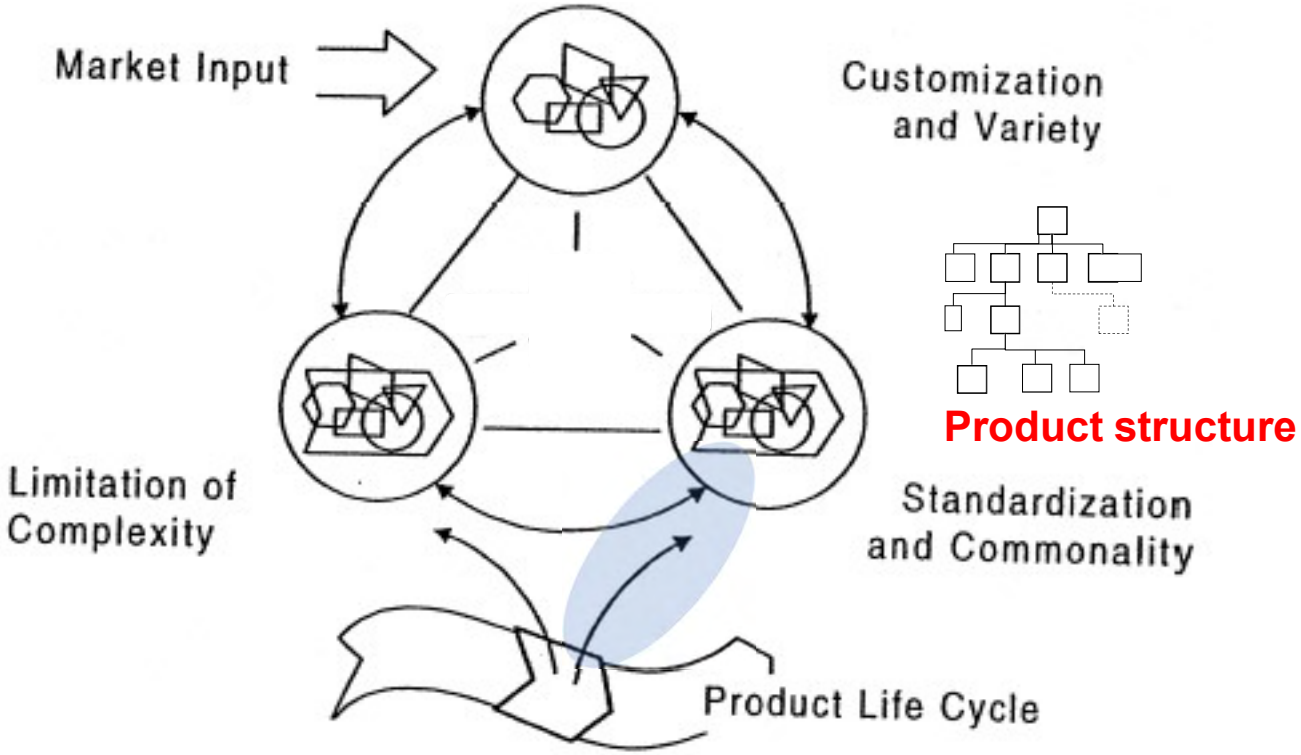
More product development "

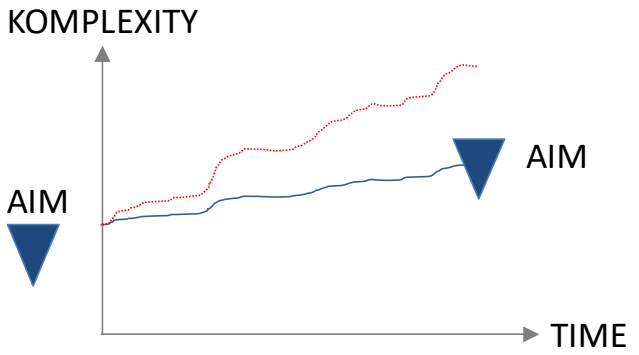
Doing the things right"



All these 5 parts to be managed in the project

PRODUCT STRUCTURE and COMPLEXITY





- Complexity increase (time)
- When to change architecture?

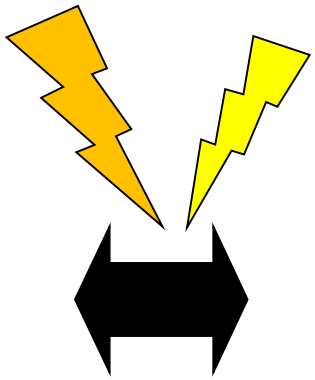
Miller T.D., "Modular Engineering", Technical University of Denmark, PhD Thesis #9, Copenhagen , 2000.

Compromise - Balancing

Operations

"one variant for all and for ever"

Ec of scale
(redu. setups & mechanization)
Learning Curve
Controllability



"Compromizes"
Product Arch,
Platforms,
Modularization,
Segmentation,
Etc

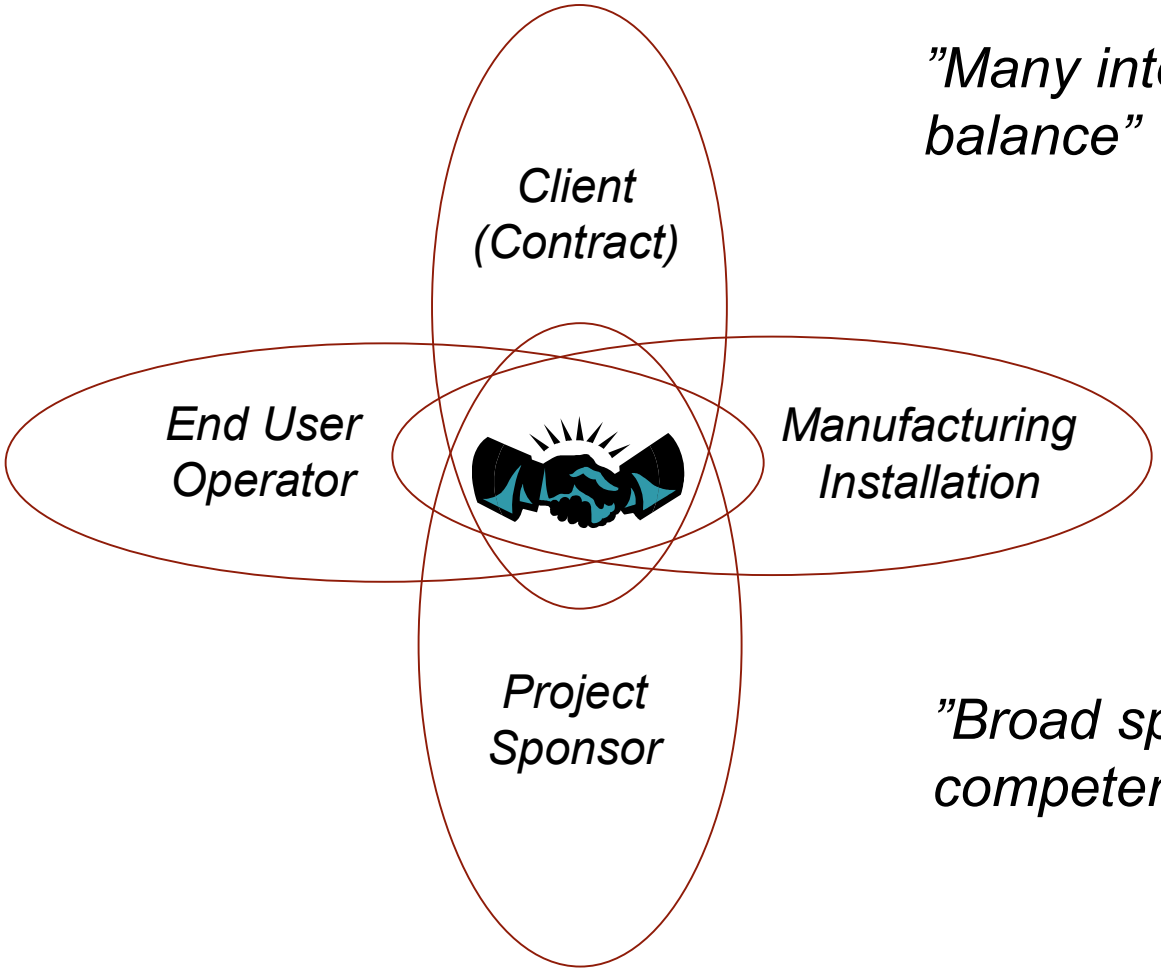
Market

"one variant for each customer"

Individualisation→
Temporary monopoly→
Price premium

Modules = Predetermined set of components with common interfaces.
Those modules that work together technically
and commercially establish platforms.

OFTEN MANY STAKEHOLDERS TO SATISFY



”Many interests to balance”

”Broad spectrum of competencies required”

INTRODUCTION AGILE

ASSIGNMENT #2

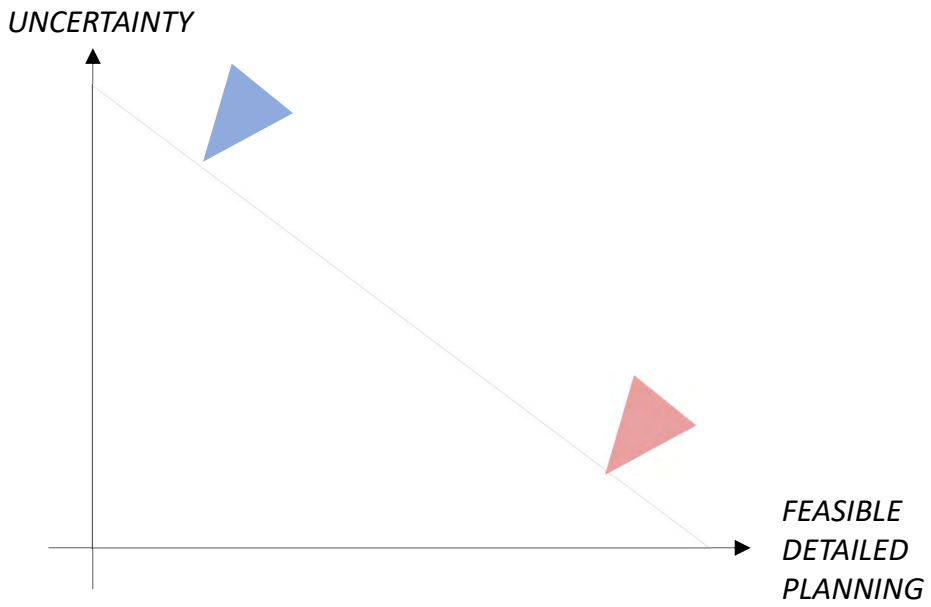
Why are projects commonly delayed, targets not reached, and budgets not maintained?

2 and 2 & 2 minutes from now

Answer - Why are projects commonly delayed and budgets not maintained?

UNCERTAINTY
&
CHANGE

UNCERTAINTY INFLUENCE OUR **PM** APPROACH



AGILE

DRAFT and early concepts / solutions =

- *Draft / indicative Risks*
- *Draft planning*
- *Cost with +/- Targets*

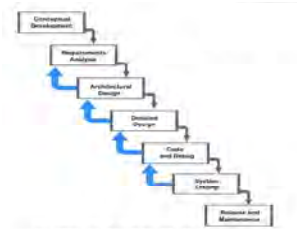
Enhanced detailing and de-risking will allow for more accurate analyzes

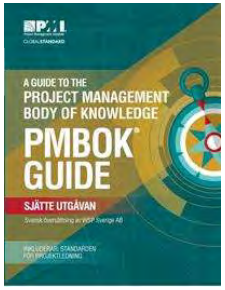
“MORE WATERFALL”

Waterfall assumes known scope

OUR VIEW

1) Many projects do not meet targets/ expectations and suffer from delays and cost overruns.
2) We need to understand the characteristics of the project, in order to;
3) Decide ”Waterfall” or ”Agile”, and to;
4) Enhance the likelyhood to be successful, see 1)





PMBOK (Waterfall)

AGILE (Lean)

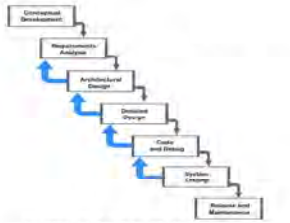
Our ambition is to combine these two so

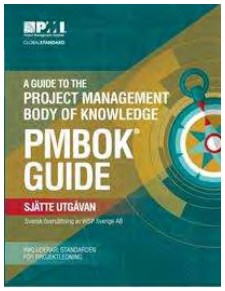
” 1 + 1 > 2 ”

EVOLUTION

PMBOK (Waterfall)

AGILE (Lean)





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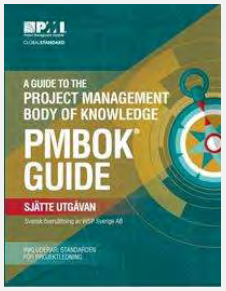
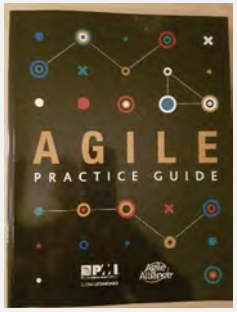
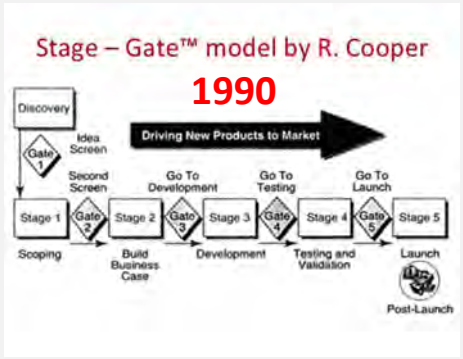
PMI 2017





PMI 2017

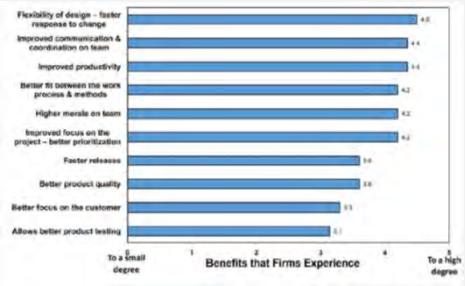
COOPER 2016



2016

From Experience: The Agile–Stage-Gate Hybrid Model: A Promising New Approach and a New Research Opportunity

Robert G. Cooper* and Anita F. Sommer*



SELF ASSESSMENT

Alone & 10 minutes from now

Self assessment

Completed project / or ongoing / or typical

0 = Do not agree
50 = Partly agree
100 = Fully agree

NO		0	25	50	75	100
1	All requirements and targets has been known at project start					
2	The Schedule has been continuously updated by the team and reflect current status					
3	The risks has been identified jointly early and then mitigated downstream					
4	Decisions with good quality has been taken continuously by the distributed team					
5	The project has been completed in time and “end-effects” reached					
6	All in the team has full has access to relevant project related information					
7	The required core team with skilled resources has been allocated and focused on the actual project					
8	All in the team fully understand the client expectations / what to be delivered.					
9	Lessons learned has been part done continously and incorporated into the project / other projects					
10	All upcoming changes has been evaluated continously, including consequences, for consideration and eventual absorption into the project					

Just some measures to serve as an indication and for discussions – Aim not to be complete

Self assessment

Completed project / or ongoing / or typical

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NO		0	25	50	75	100
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7	The required core team with skilled resources has been allocated and focused on the actual project					
8	All in the team fully understand the client expectations / what to be delivered.					
9	Lessons learned has been part done continously and incorporated into the project / other projects					
10	All upcoming changes has been evaluated continously, including consequences, for consideration and eventual absorption into the project					

Just some measures to serve as an indication and for discussions – Aim not to be complete

Starting a new project

(1) Critical aspects and questions to ask while starting up a new project.

(2) Both Agile and Waterfall

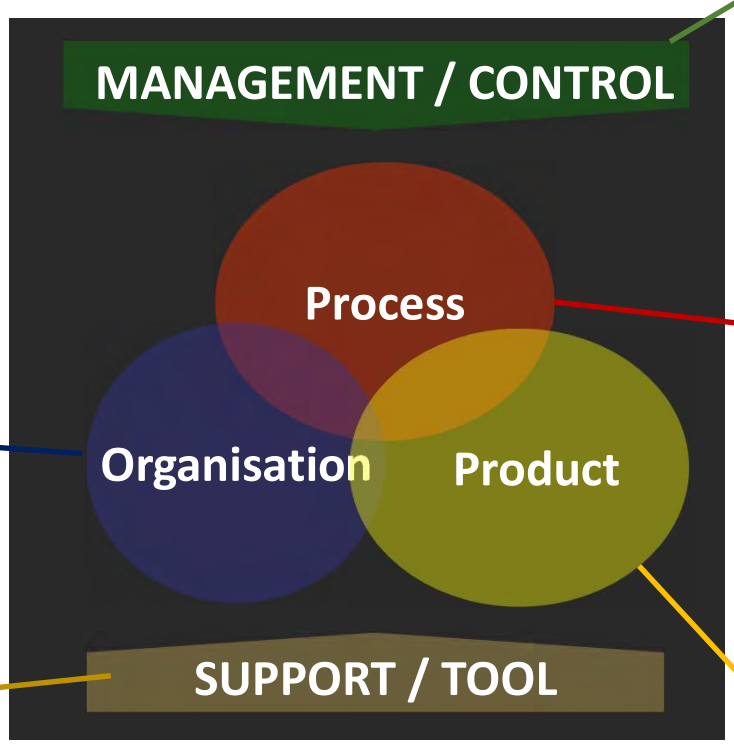
Questions / Check-list

- **Contract / Design Brief / Project Order / etc. ?**
- **Understand the contract?**
- **End effects / goals / targets?**
- **Type of project?**
- **Scope of Work (SoW) defined**
- **Team (Core) defined?**
- **Deliverables known?**
- **Budget defined?**
- **Need of pre-studies?**
- **Uncertainty (known) and risk?**
- **Agile or Waterfall?**
- Milestones? Planning principles, Basel line, etc.
- Reporting
- Communication
- Progress reporting
- Document management (tools, templates, etc.)
- Change management
- Negotiate project sponsor
- QA / HSE
- Norms and Regulation
- Key challenges
- Information management
- DBs / Tools / etc.
- Coordination / Interfaces
- Requirement Management
- Receiver of project results
- Key Stakeholders
- Expectations and priorities
- Etc.

All these examples are dependent on project type, so the importance will vary.

Agile principles – Selected

(some LEAN)



- High pace and throughput
- Transparency
- Eliminate waste
- Daily meeting / Sprint Review
- Product Owner

- Scrum master (PM)
- Flexible org and resp.
- F-2-F communication
- Broad and deep skills combined
- Organize for learning
- Commitment / sprint
- Teach and Learn

- Only plan near future / Sprint
- Few planned activities and high pace
- Focus on end results/effects/client /product owner
- Flexible planning / Use Pull is possible
- Change management
- Burn down shart
- Planning = Team effort = Bottom-up

- Decision Making
- Set-based
- Problem solving – Go to Gemba
- OBEYA Room
- Front-Loading
- Etc.

- Product Owner
- Customer Journey
- Early prototype / digital with main functionality
- Involve client
- Focus on end results/product early

+ Culture

LEAN

SUMMARY

- Process focus and value creation
- Pull principle applied
- Holistic and shared view.
- Bottom-up planning
- Organize for learning.
- Front-loading.
- Transparency and VP
- Eliminating waste
- Cross-functional collaboration
- Shared view of customer expectations
- ESI – Supplier integration
- SET-Based implemented
- Strong management support
- Culture that support cont. impr.
- High pace in project
- Standard processes

SELECTED LEAN THAT MAKES SENSE

1) From long activities and monthly/bi-weekly meetings, to **daily meetings** and small bathsizes/slots, ”**less work in progress**” with higher pace.

2) **GO TO THE GEMBA:** Where the truth can be found. We must go and see where the problem occurs to thoroughly understand the situation supervisors and team members must be intimately involved in quality issues. Will speed up the resolution of problems.

3) **Value stream**. Once the value (end goal) has been determined, the next step is mapping the “value stream”, eliminating waste.

4) Apply **pull principles**, for instance goal oriented process which we will discuss later.

6) **OBEYA** Room or VP (Visible Planning)

7) **Never exceed 80 %** planned utiliztion of the team in order to avoid the system to be overloaded and plugged.

8) Deep & **broad skills** and knowledge / **organize for learning**

9) Balancing **cross functional** teams (collaboration)

10) **Communication**, **SET Based** and **Front-Loading** is other lean principles

AGILE

AGILE PRINCIPLES

1. Satisfy customers through early and continuous value delivery.
2. Harness change for competitive advantage.
3. Deliver products and services to your customers as frequently as possible.
4. Connect business with delivery teams throughout the project.
5. Give motivated individuals the support and environment they need to thrive. Then, trust them to get the job done.
6. Remember that the best way to convey information is face-to-face.
7. Measure progress by what you actually deliver to your customer.
8. Maintain a constant but sustainable pace.
9. Pay attention to excellence and quality.
10. Value simplicity. Maximize the amount of work not done.
11. Know that the best work emerges from self-organizing teams.
12. Give teams regular time to reflect, inspect, and adapt their behavior.

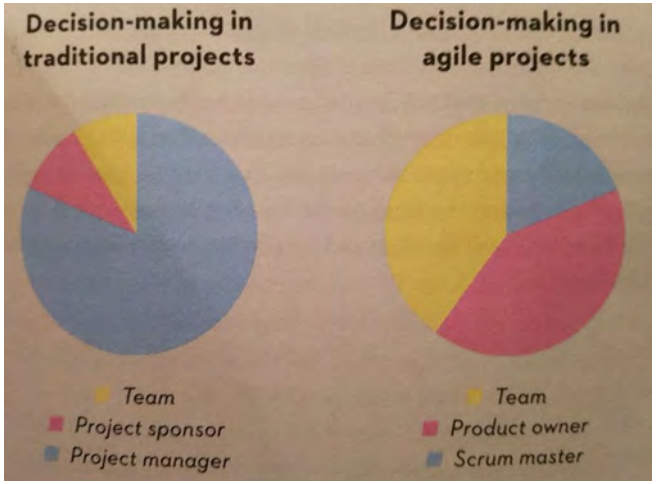
AGILE MANIFESTO

* TBD

- Individuals and interactions over processes and tools *
- Working product over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan *

MISSING

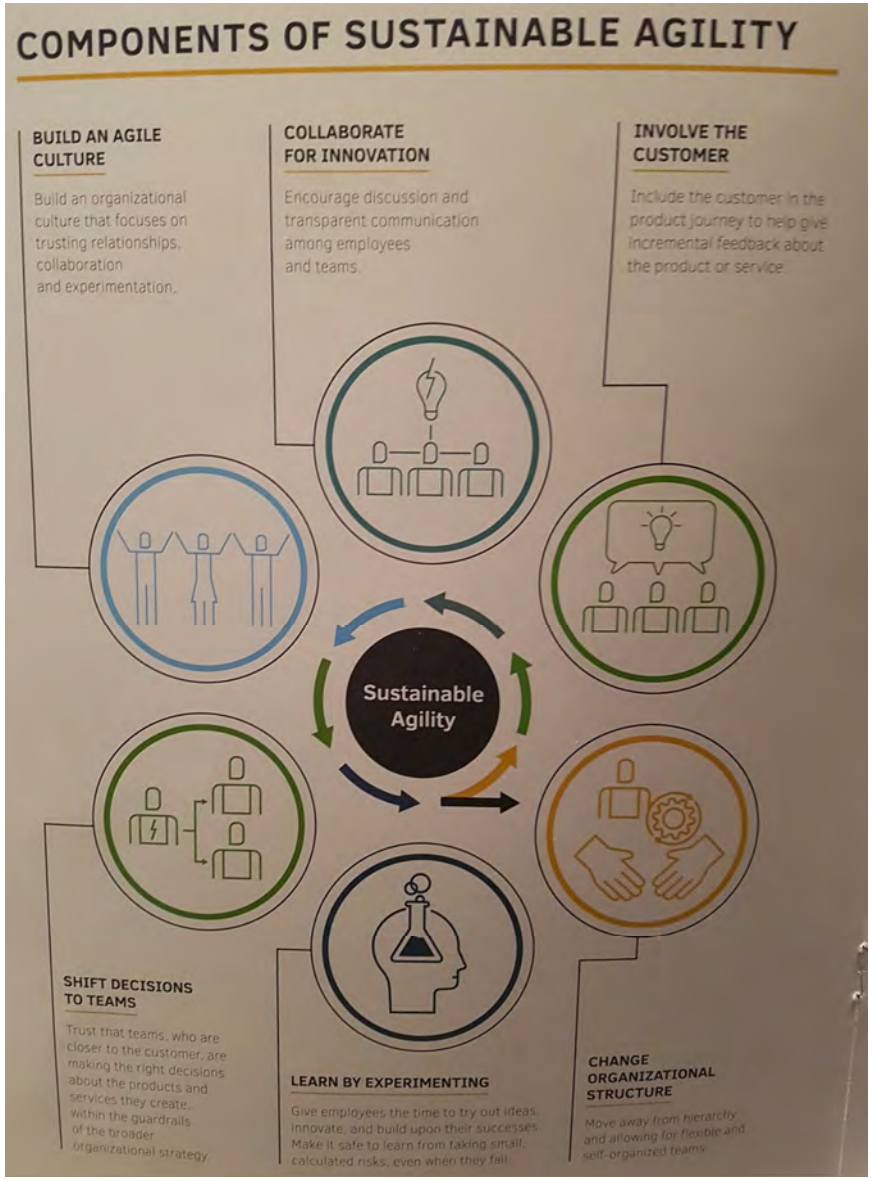
- Decentralized decision making
- Few activities and high pace
- Replanning
- Learning
- Transparency



Building an AGILE Organization

6 Parts

- Culture
- Collaboration / Innovate
- Involve Customer
- Decision Making
- Learn / Experiment
- Change structure



AGILE PLANNING

PLANNING - WHY ?

- Ensure that there are a feasible way for delivering the project on time. (Critical path) (Agile sprint)
- Overall coordination of activities, targets and deliverables visible for all
- Ensure that people are focused on critical activities (avoid working on not planned/agreed work)
- PM:s tool for maintaining control / Agile = Team + Scrum Master
- **DETECT DEVIATIONS** so you can act proactively (when to reschedule)

- Today focus on Agile planning!

Focus on what you can influence!

Waterfall

FIXED (more or less)

- Objectives / Targets
- Contract, SoW, Deliverables
- Cost / Budget
- Schedule (target/milestones)
- QA / Gate-model / Steering group
- Company standards / procedures
- Etc.

VARIABLE (to a high degree)

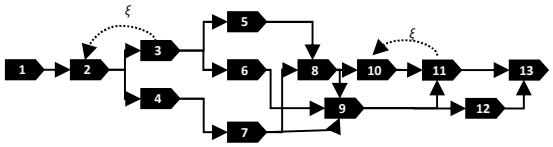
- Managing and leading the project
- The process and task structure
- Resources and manning
- Uncertainty….. Unforeseen……
- 8h -> 24h a day…..
- Change Management VOR
- Etc.

Agile

WHAT – WHEN

Needs to be fully understood !

WHO - HOW



Your arena for securing a successful project!

Agile planning – According to book

Some comments based on my experience

- Vision
- Road Map
- Delivery plan
- Sprint Plan
- Daily Plan

Vision can be OK. But expected endeffects can give a better picture

Road Map. If possible visualize the likely order in which the project results (deliverables) will be completed and consider alternative structures. Sometimes Solution dependent – So you need several alternatives

Key Stakeholders

Requirements (Functional)

Develop a milestone plan and set target dates.

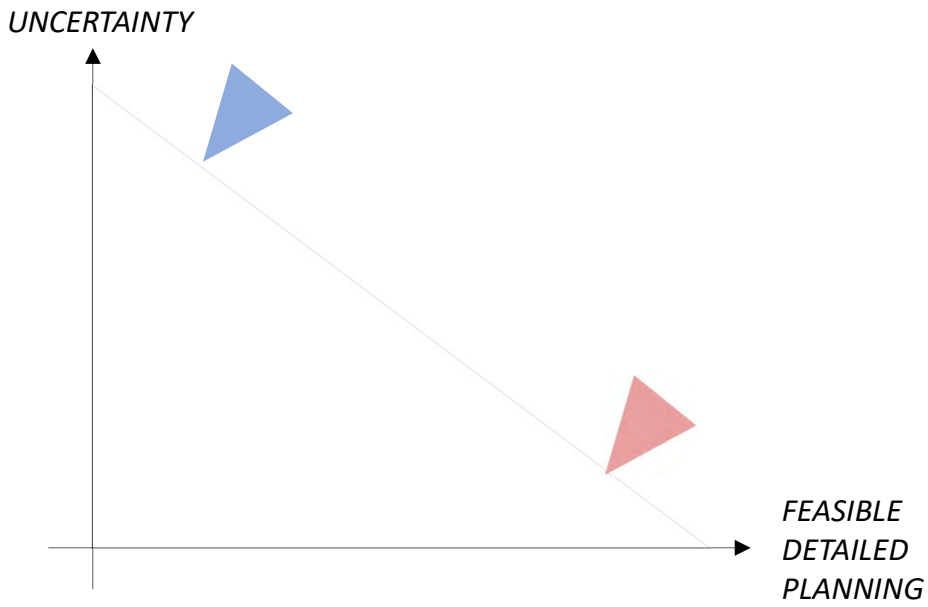
Delivery plan. Planning over a few sprints, like 6-8 weeks.
To be updated as work progresses. Plan to next milestone is a good approach. It might be needed to keep several tracks alive.

Back-Log

Sprint plan. Planning over 2 weeks (1-4). Adjust length based on charcteristics of project and possibility to have results to verify. Time-boxing and burn down shart. Focus on value for end-user.

Daily plan. Can be part of sprint planning, but updated on a daily bases if needed.

UNCERTAINTY INFLUENCE OUR **PM** APPROACH



AGILE

DRAFT and early concepts / solutions =

- *Draft / indicative Risks*
- *Draft planning*
- *Cost with +/- Targets*

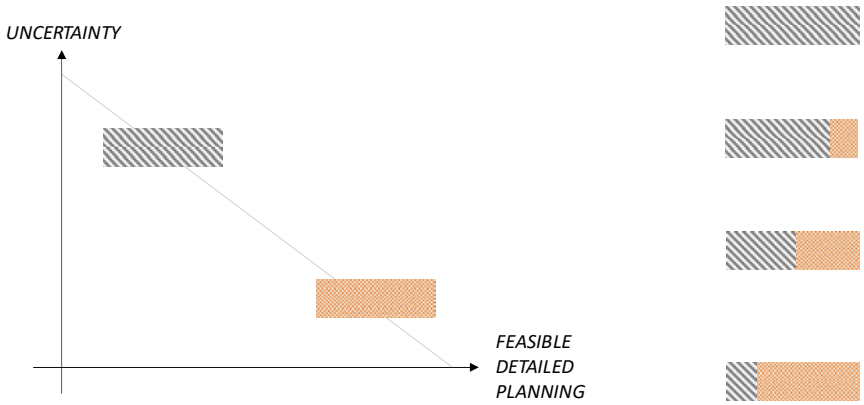
Enhanced detailing and de-risking will allow for more accurate analyzes

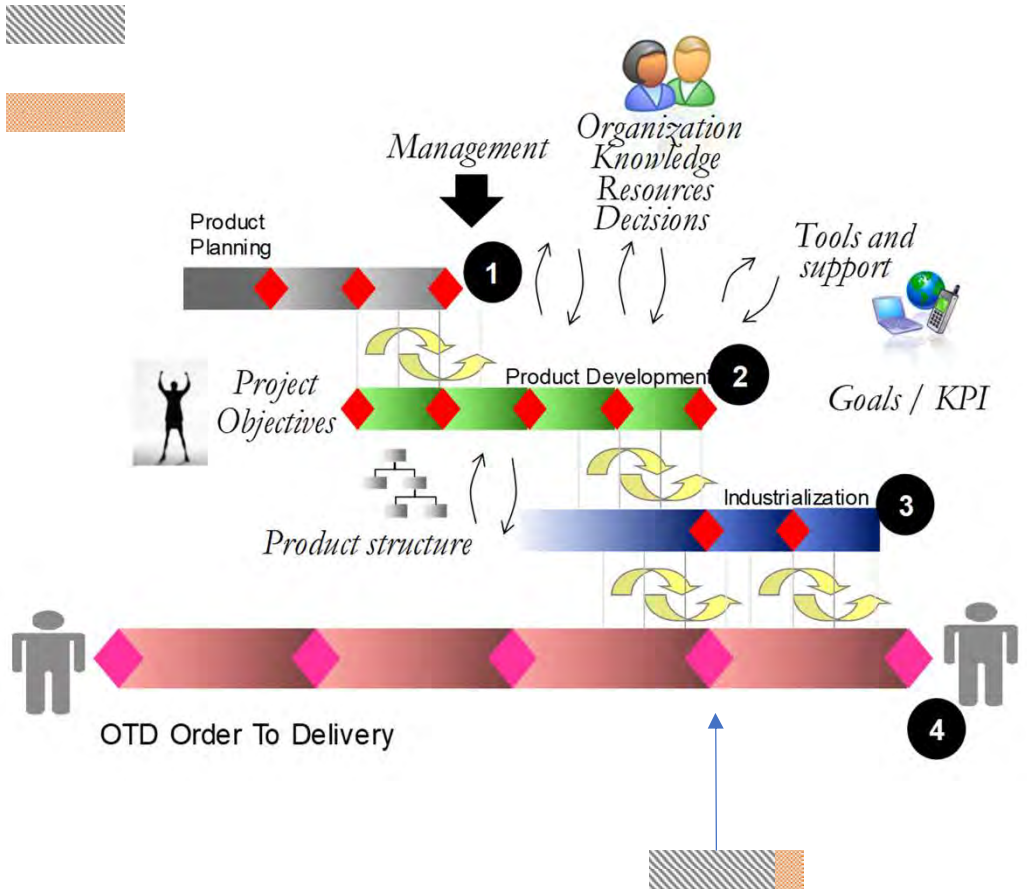
“MORE WATERFALL”

Waterfall assumes known scope

PRODUCT PLANNING -> PRODUCTION

- More agile way of working
- More traditional way of working

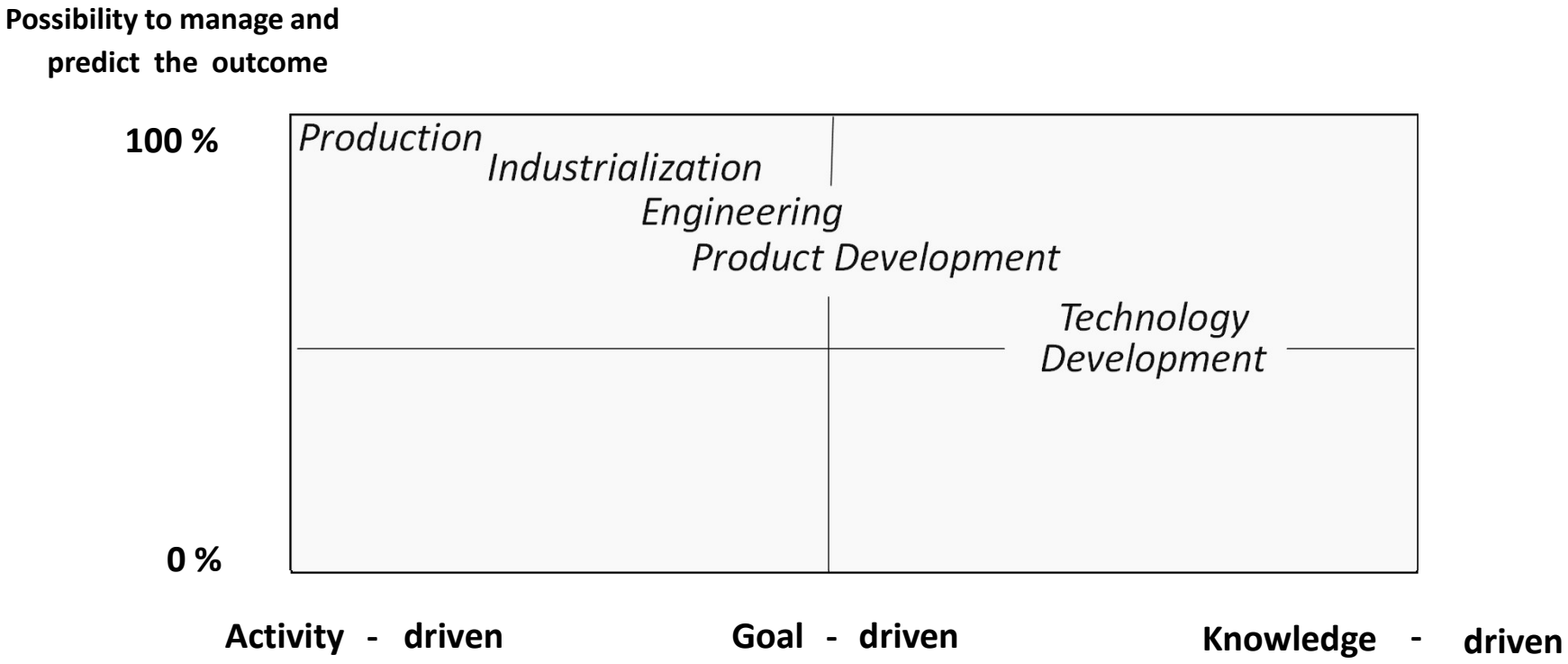




Establish new production system

CONTROL AND PREDICTABILITY

IMPORTANT PICTURE



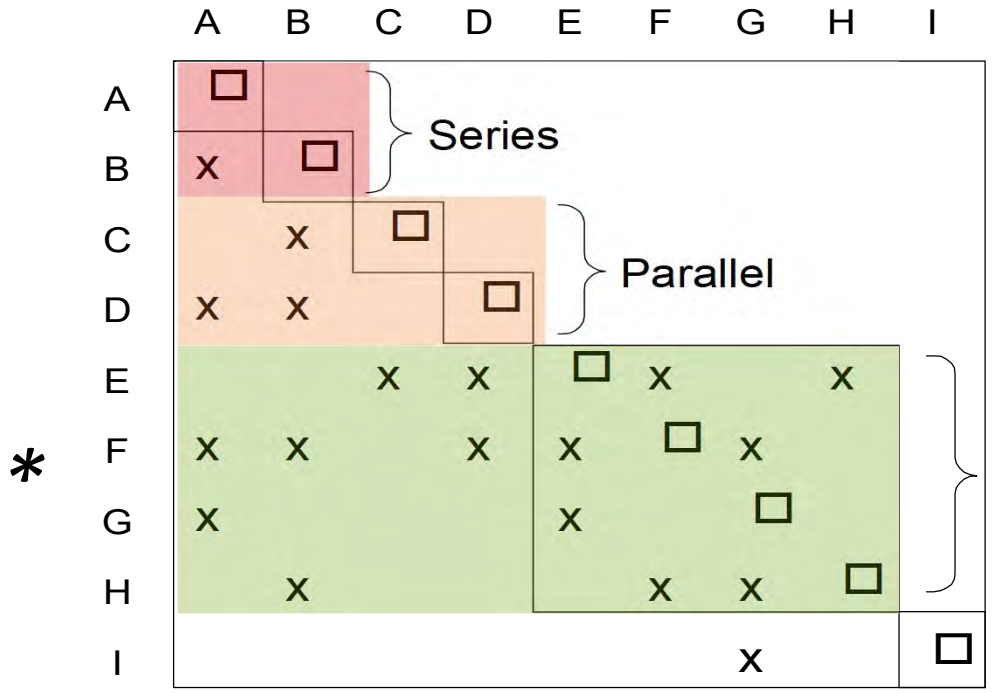
Partly Debenham , 2001

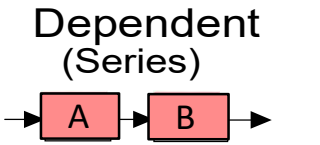
ASSIGNMENT #3

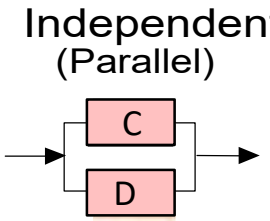
Why is Industrialization/engineering goal-driven and only 80-90% predictability, *vs* Production almost 100% predictability and activity-driven

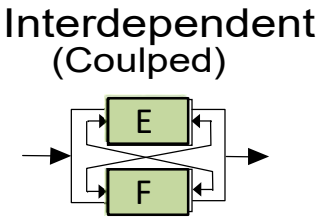
2 and 2 & 2 minutes from now

EARLY PHASES – MORE ITERATIVE





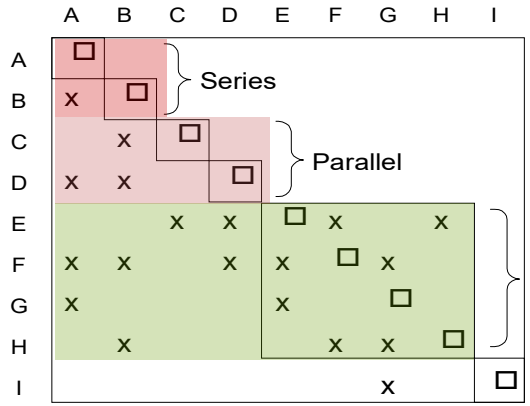


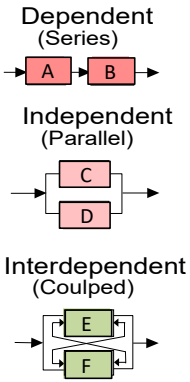


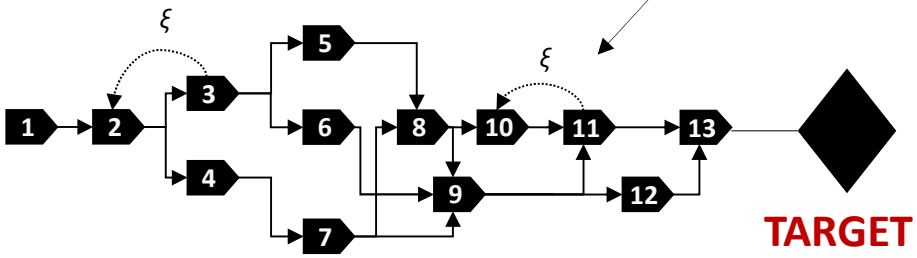
**DSM* = Design Structure Matrix*

There are some methods and tools that can be applied to minimize consequences of iterations, if time allows…..

GOAL *vs* ACTIVITY DRIVEN

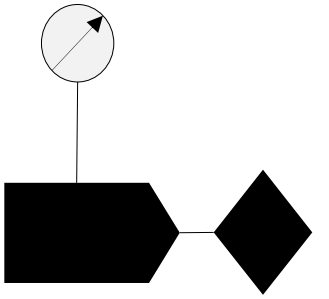






TARGET DELIVERABLE

GOAL



ACTIVITY

Several task structures possible to reach target. Replanning critical

INTEGRATED
COORDINATED

From Engineering to Production

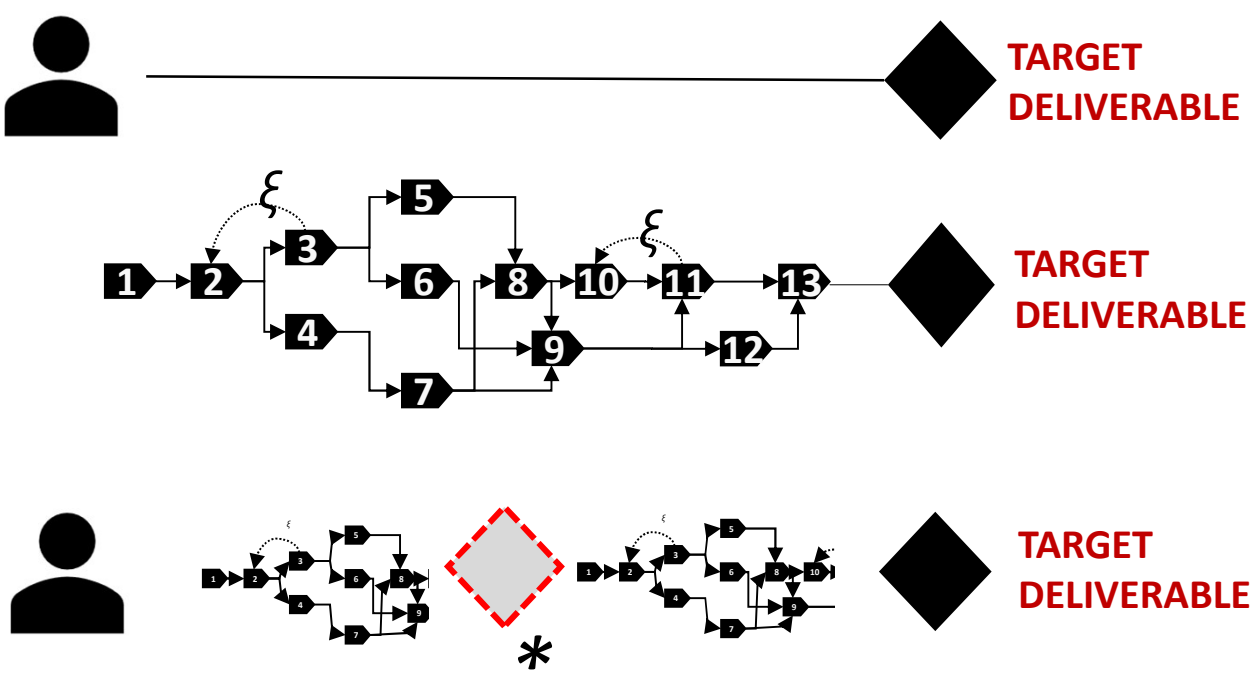
ENGINEERING		Operations
PRE-STUDY CONCEPT	***DETAIL DESIGN INDUSTRIALIZATION***	***PRODUCTION OTD***
Difficult to predict before Start of Project (+/-80%)	Predictable with a low level of uncertainty (+/-5%)	Predictable (+/- 0%)
Complex relations and iterations is provided in order to develop a competitive concept	Manageable iterations and defined dependencies.	Sequential or parallel tasks No iterations
Project Based (more started pre-studies the executed in detail)	Project based	Continuously (commonly)
Innovation and searching for several concepts before freeze	Defined, standardised process for execution of 1 concept	Defined, optimised and implemented
Uncertainty and risks	Manageable Uncertainty and risks	Determinable
Highly Interdisciplinary	Interdisciplinary (defined)	Disciplinary
Intensive formal and informal communication	More structured & defined communication channels	Defined communication channels

More Agile ⟷ More waterfall

Fagerström , 2004

Also more Pull ☺

PRINCIPLE – MANAGE ITERATIVE SCOPE



1) Involve the team to visualize the targets and expected deliverable. Pictures welcome.

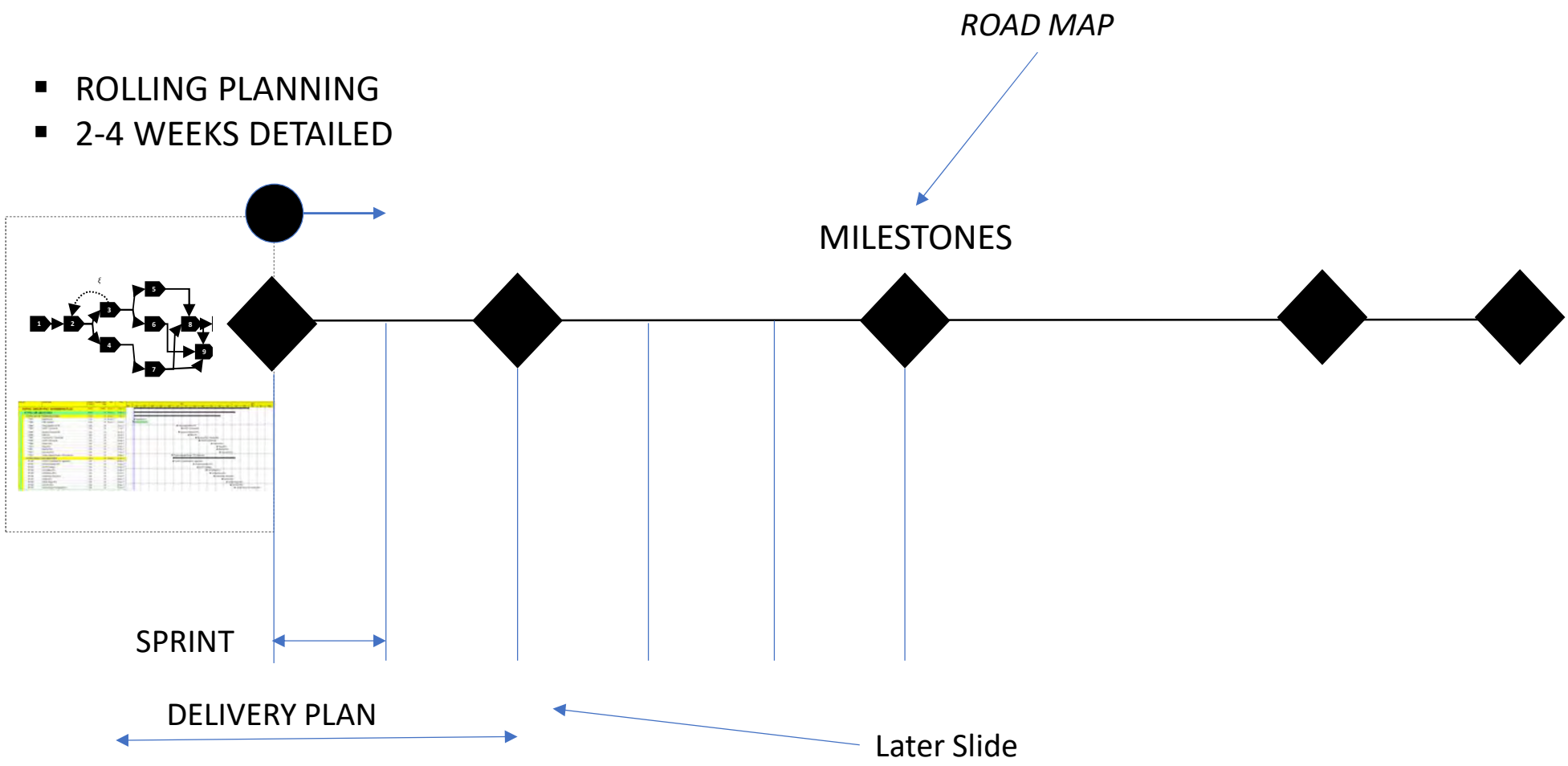
2) Consider alternative paths and develop several alternative DRAFT solutions to meet target.

3) Consider early DRAFT concepts that will be fine tuned in next step

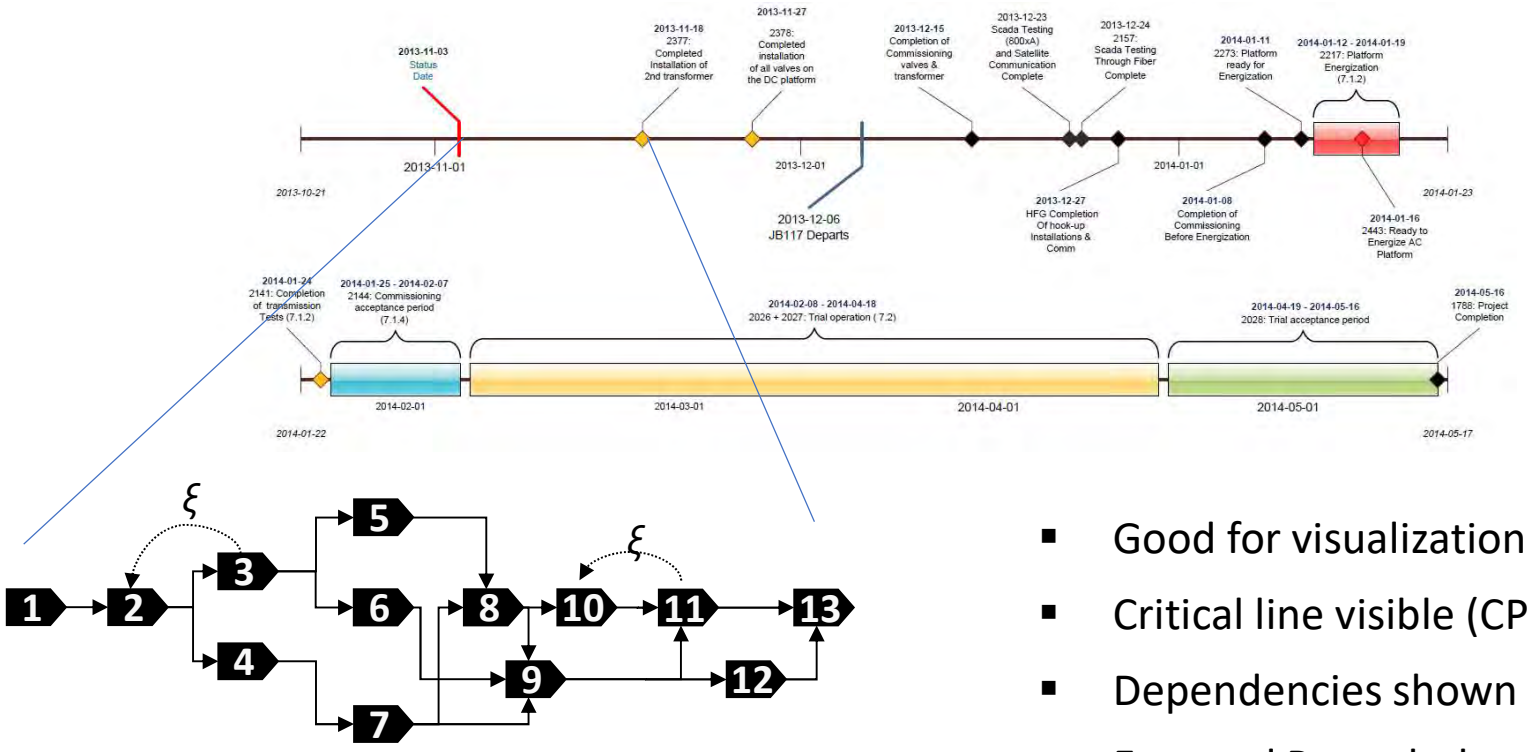
- *Focus on key functionality and key parameters*
- *Iteration driver can also be used*

PRODUCT DEVELOPMENT / INDUSTRIALIZATION

- ROLLING PLANNING
- 2-4 WEEKS DETAILED



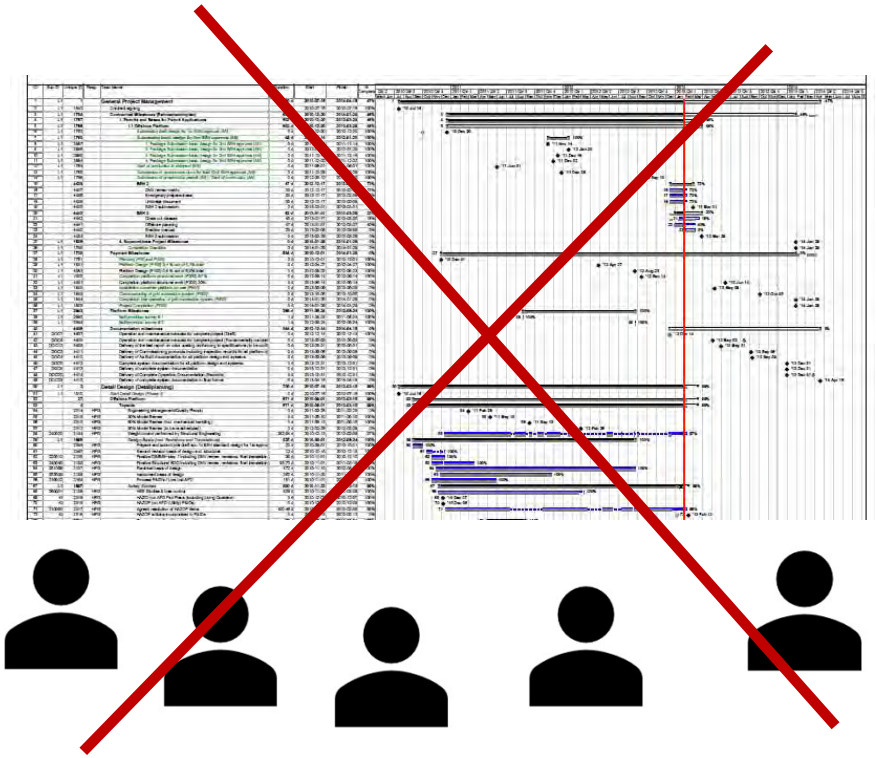
NETPLAN FOR PLANNING TO MILESTONE



As earlier – Divide Delivery plan into sprint (if possible).

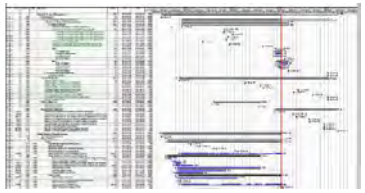
- Good for visualization
- Critical line visible (CPM)
- Dependencies shown
- Eventual Rework shown
- Open up for opportunities and innovation

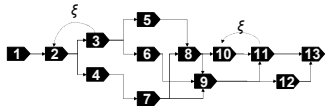
DO NOT START A WORKSHOP WITH A DETAILED PLAN



1

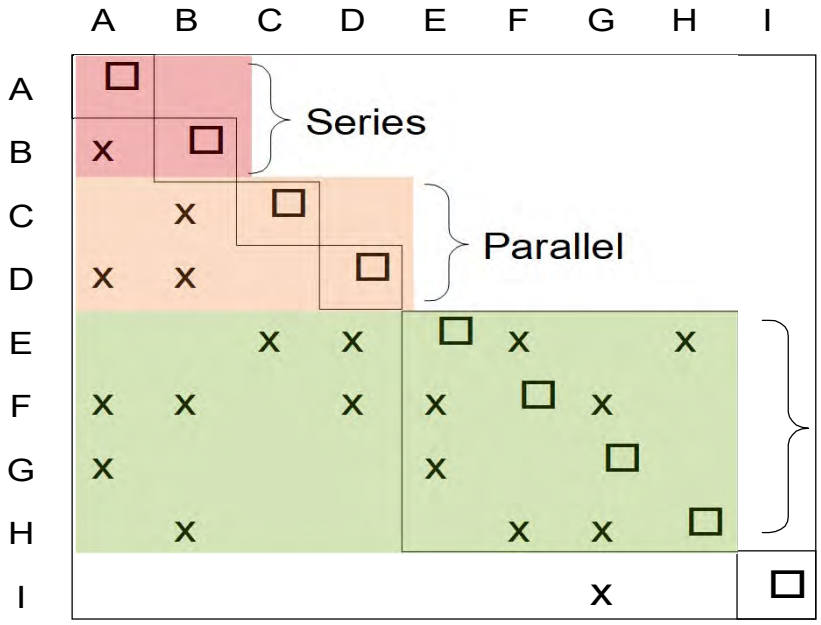
2



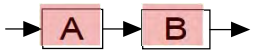


OR VISIBLE PLANNING

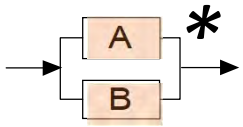
ITERATIVE SCOPE DEMANING TO PLAN



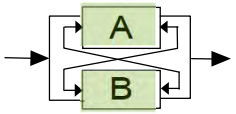
Dependent
(Series)



Independent
(Parallel)



Interdependent
(Coulped)



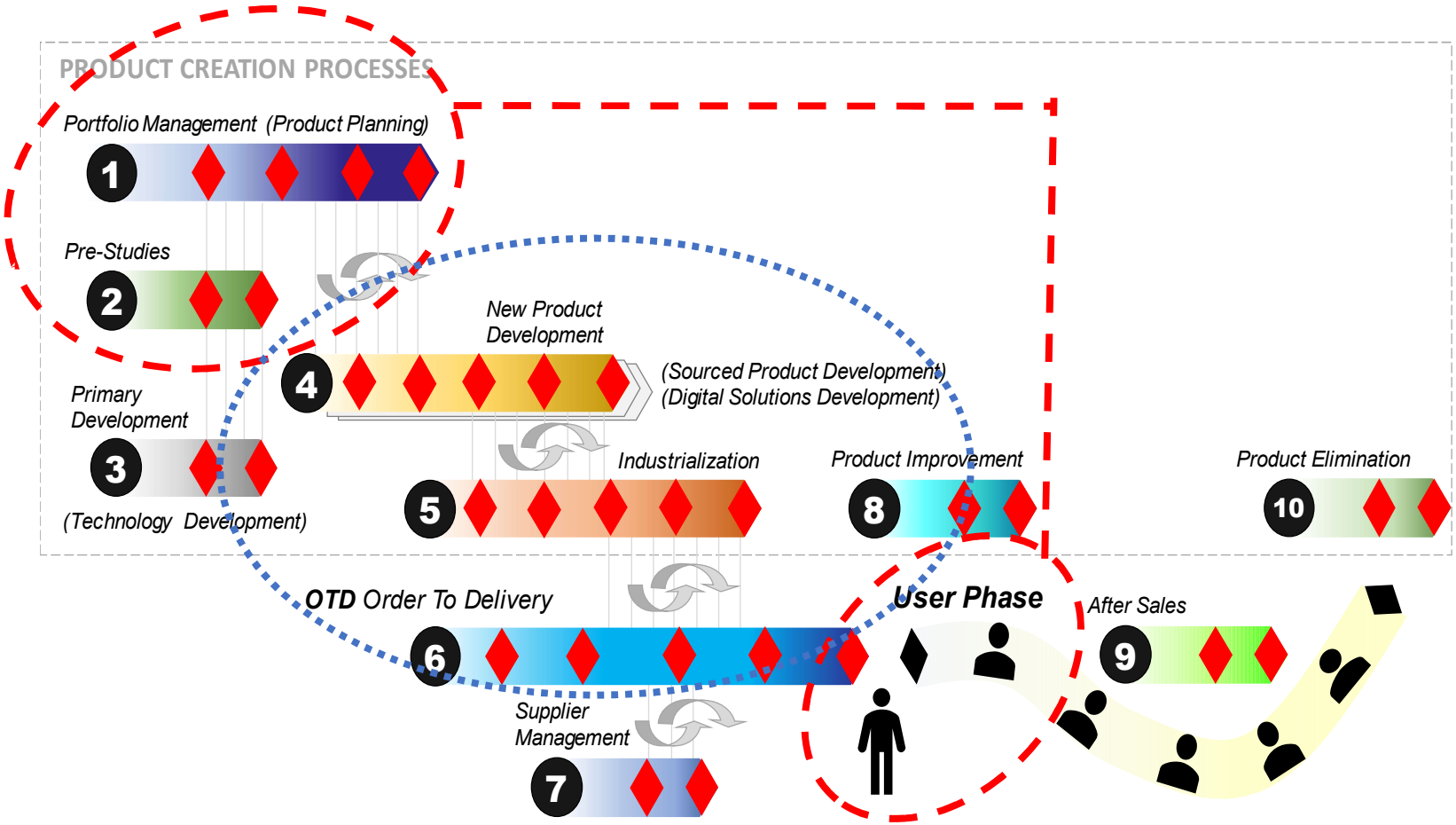
How easy to plan?

EASY

DEMANDING

** The uncertainty on each task add on a lot of uncertainty for entire schedule (@risk)*

DE-RISKING



NPD De-Risking

From iterations to sequencial / paralell

VISIBLE PLANNING (VP)

ASSIGNMENT 4

INTRODUCTION VP (OBEYA Room)

Which European Country is Missing?

Sweden
Czech Republic
Belarus
Greece
United Kingdom
Romania
Liechtenstein
Monaco
Slovenia
Luxembourg
Croatia
Norway
Poland
Montenegro
Estonia
France
Germany

Bosnia and Herzegovina
Serbia
Portugal
Slovakia
Belgium
Russia
Netherlands
Lithuania
Ukraine
San Marino
Switzerland
Iceland
Moldova
Italy
Austria
Ireland

Andorra
Kosovo
Bulgaria
Latvia
Macedonia
Denmark
Finland
Vatican City
Malta
Albania

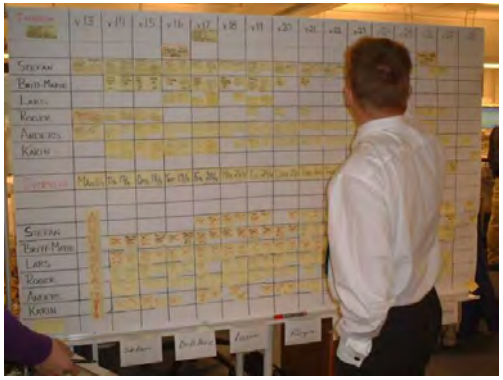
ASSIGNMENT 4#

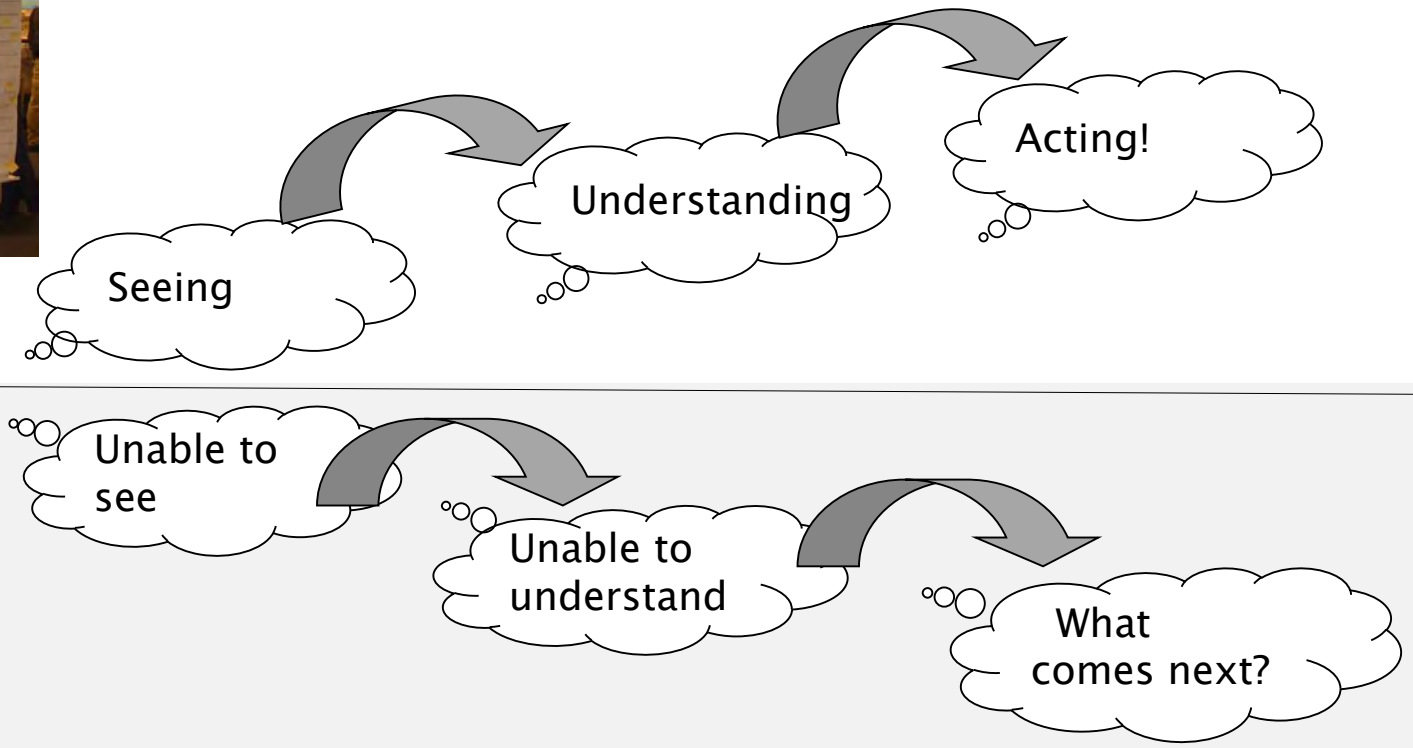
INTRODUCTION VP

Which European Country is Missing?

- The purpose was just to illustrate how much easier it is to interpret pictures in many occasions.
- This is also starting point for VP (Visible Planning)

VP – VISIBLE PLANNING



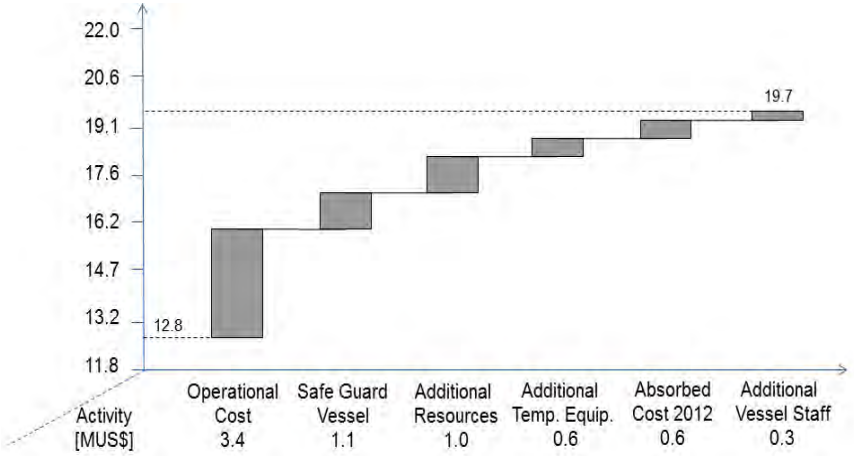


VP – KEEP IT SIMPLE

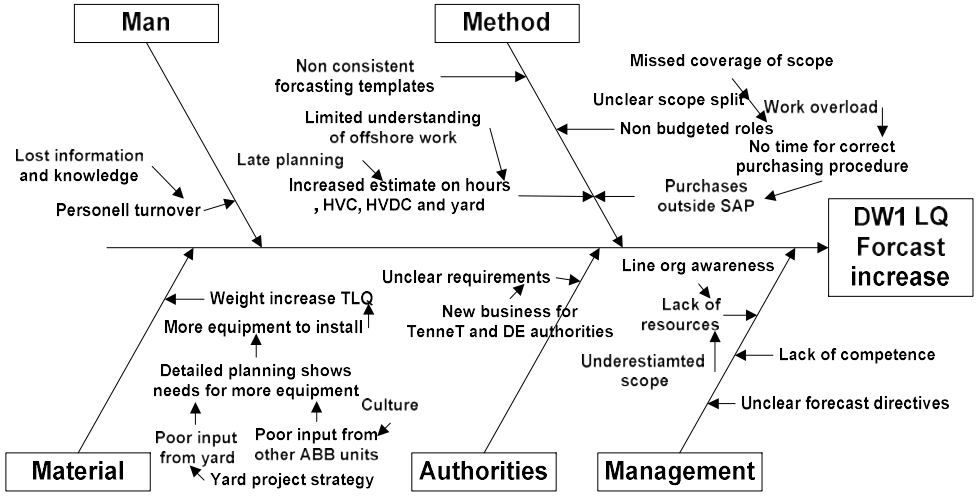
- Define what to bring up based on project.
- Ensure that it is updated
- Short meeting in front of wall
- All can put up red notes, to be discussed in next meeting

EXAMPLE – NOT SOLELY PLANS !

BRIDGE



ROOT CAUSE



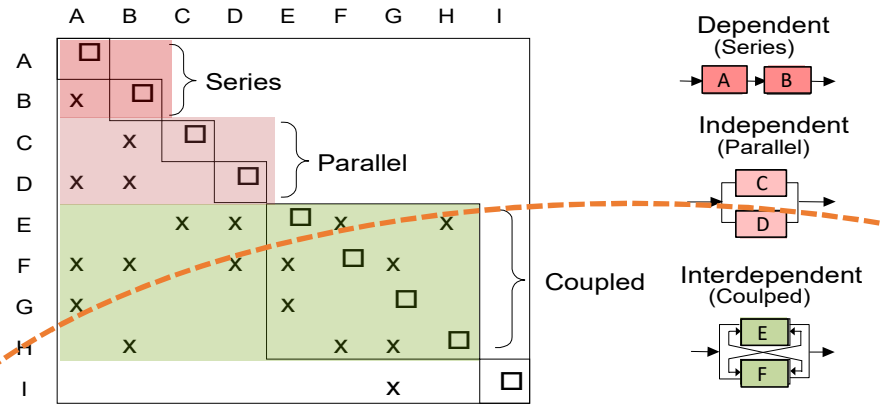
TEAM ORGANIZATION

ASSIGNMENT #5

What do you do in case you get urgent problems in the production / OTD, like task force, etc., but What/How?

2 and 2 & 2 minutes from now

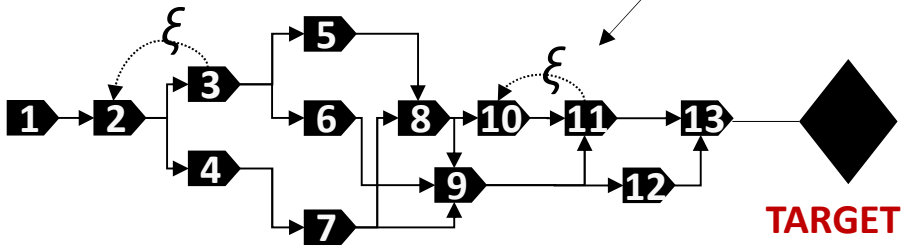
ORGANIZATION FOR ITERATIVE SCOPE



Dependent
(Series)

Independent
(Parallel)

Interdependent
(Coulped)



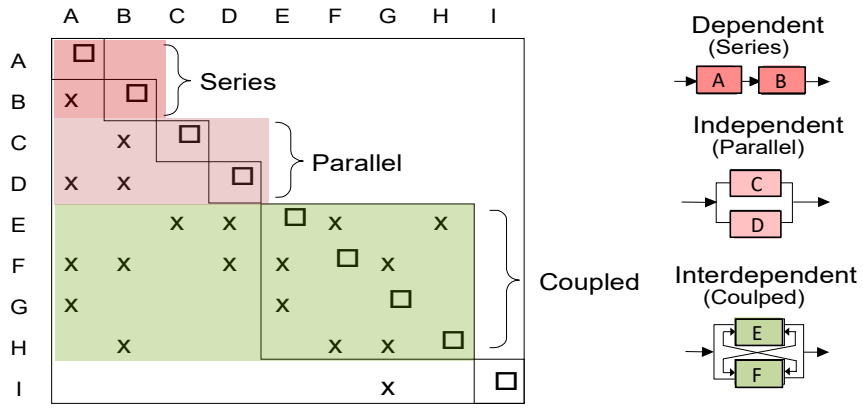
Several task structures possible to reach target. Replanning critical

TARGET DELIVERABLE

GOAL

ORGANIZATION FOR ITERATIVE SCOPE

COORDINATION <-> INTEGRATION



COORDINATION

- Well defined work package
- Just to send a specification and you know exactly what you get.
- Limited uncertainty

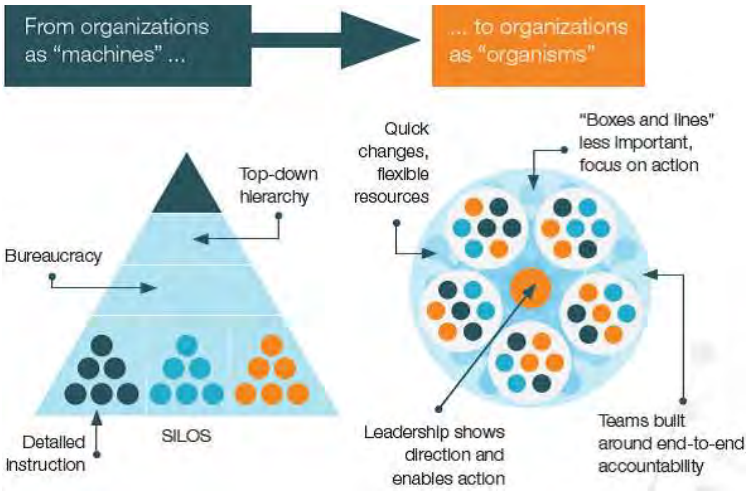
INTEGRATION

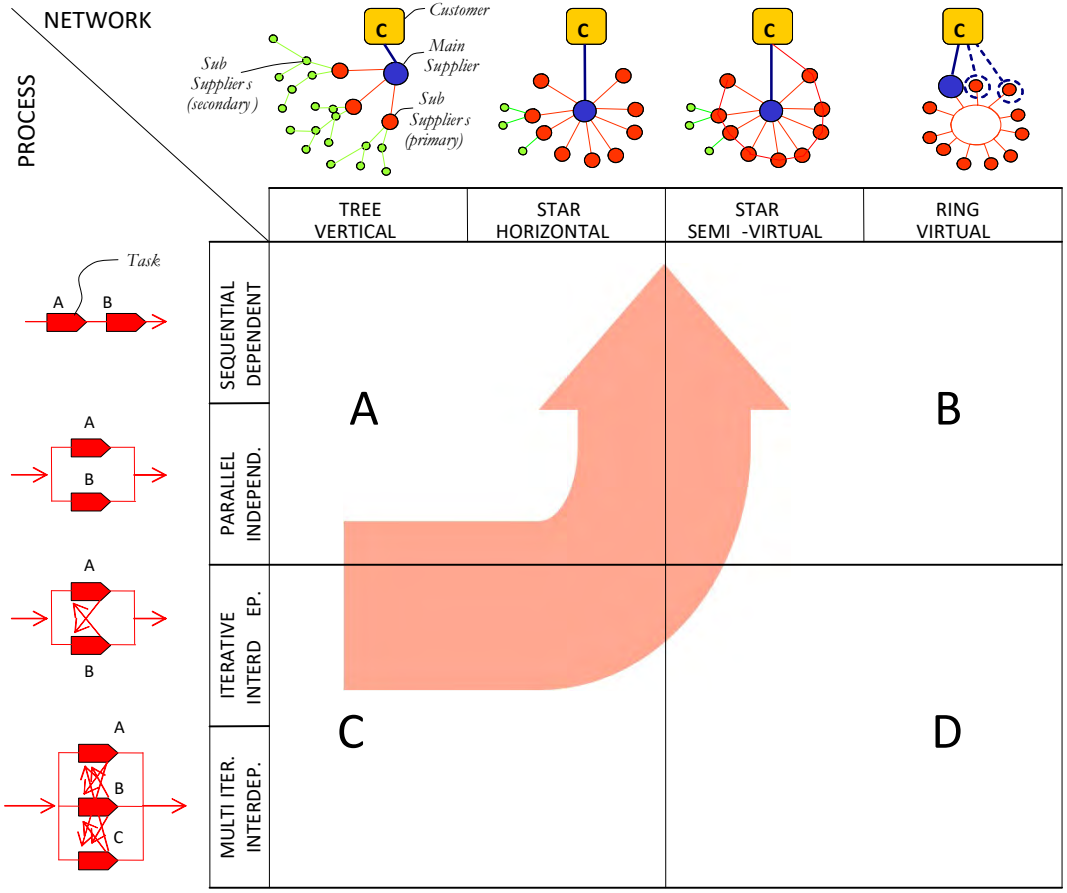
- Uncertainty
- Iterative scope
- Joint effort required

PLANNINING/ACTIVITIES *vs* ORGANIZATION

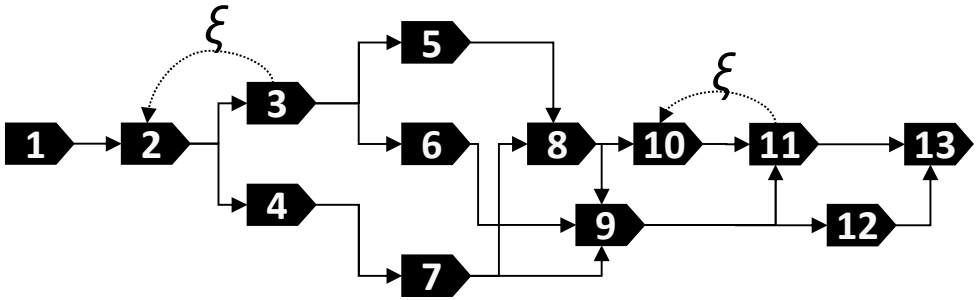
L=Low
H=High

Trend ?

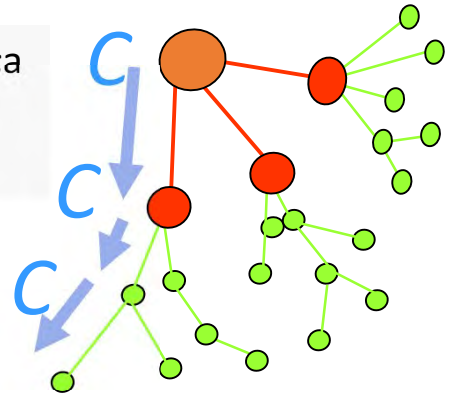




SIMULATIONS



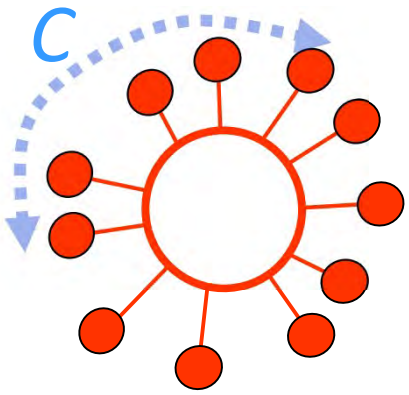
Hierarchical control



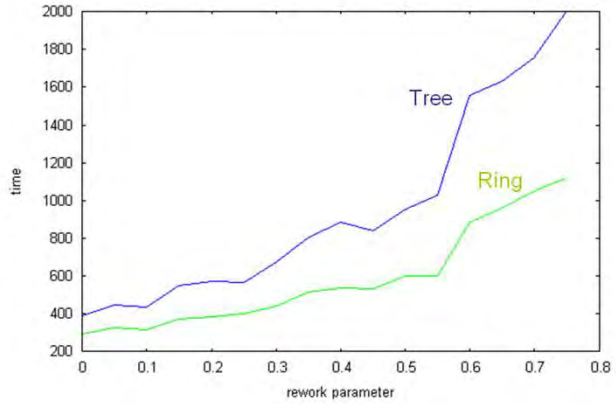
Tree/Vertical

	Execution time [-]			
Network	Phase 1	Phase 2	Phase 3	Total Σ
Tree (95 % CI)	39.4 ([38.9, 40.0])	153.8 ([146.0, 161.5])	44.1 ([42.9, 45.3])	237.3 ([229.4, 245.2])
Ring (95% CI)	43.7 ([42.4, 44.9])	123.5 ([117.2, 129.6])	43.2 ([41.9, 44.6])	210.4 ([203.6, 217.2])
Dynamic	39.4	123.4	43.2	206.0

Ring/virtual

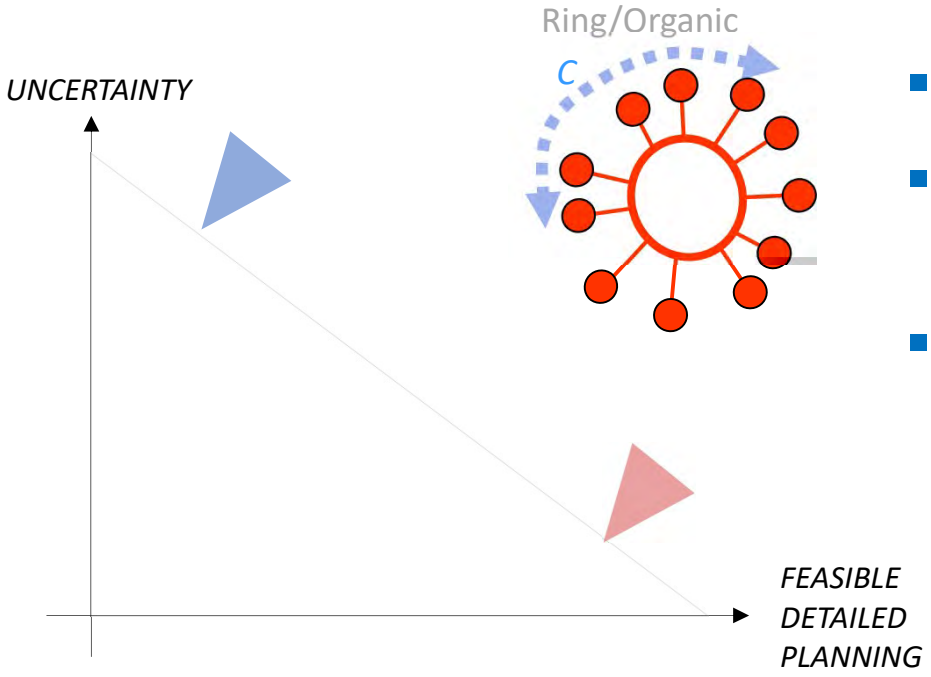


The control functions shift dependent on task



See also: *Bar-Yam, Y. (2004). About Engineering Complex Systems: Multiscale Analysis and Evalutionary Engineering*

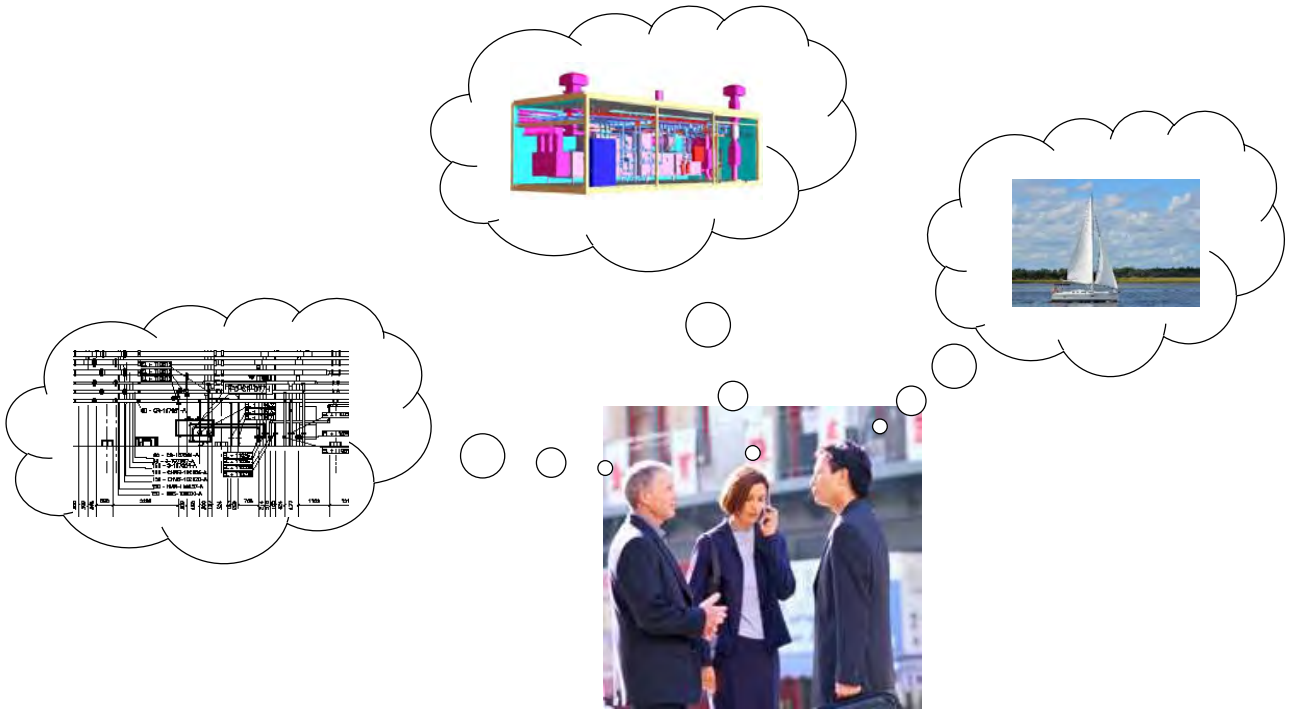
UNCERTAINTY AND TEAM



- *Ring network / organic*
- *Do not control – Motivate and guide with objectives/targets and frames.*
- *Aim for learning and common understanding*

Enhanced detailing and de-risking will allow for a more predictable plan and a "tree structure" will make more sense.

COMMUNICATION……..

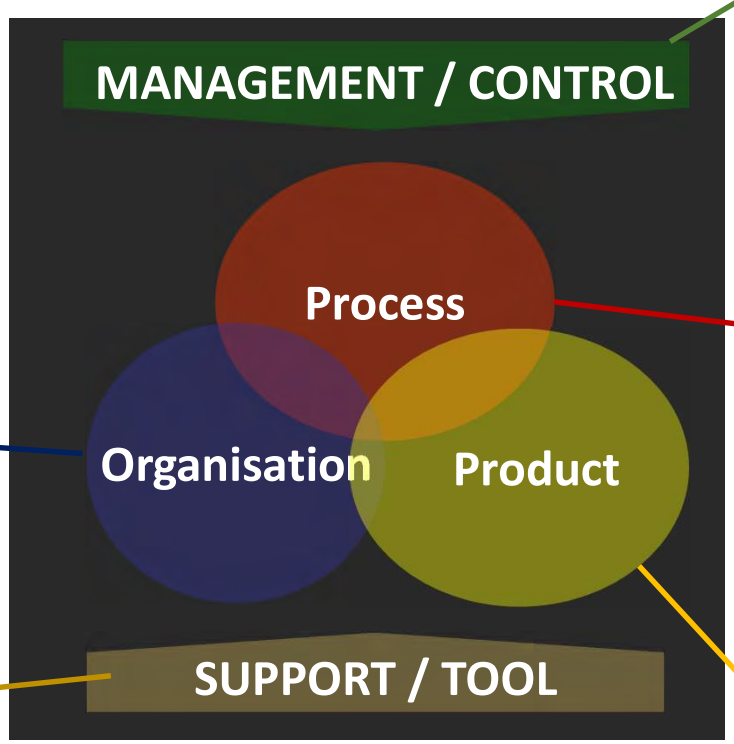


- Communication is one of the most important tools in the Agile team
- F-2-F
- Use pictures when possible and not solely text and words.
- Communication is essential for transferring information into knowledge and organize for learning

Agile principles – Organization

(some LEAN)

- High pace and throughput
- Transparency
- Eliminate waste
- Daily meeting
- Product Owner



- Scrum master (PM)
- Flexible org and resp.
- F-2-F communication
- Broad and deep skills combined
- Organize for learning
- Commitment / sprint
- Teach and Learn

- Only plan near future / Sprint
- Few planned activities and high pace
- Focus on end results/effects/client /product owner
- Flexible planning
- Change management
- Burn down shart
- Planning = Team effort = Bottom-up

- Decision Making
- Set-based
- Problem solving – Go to Gemba
- OBEYA Room
- Front-Loading
- Etc.

- Product Owner
- Customer Journey
- Early prototype / digital with main functionality
- Involve client
- Focus on end results/product early

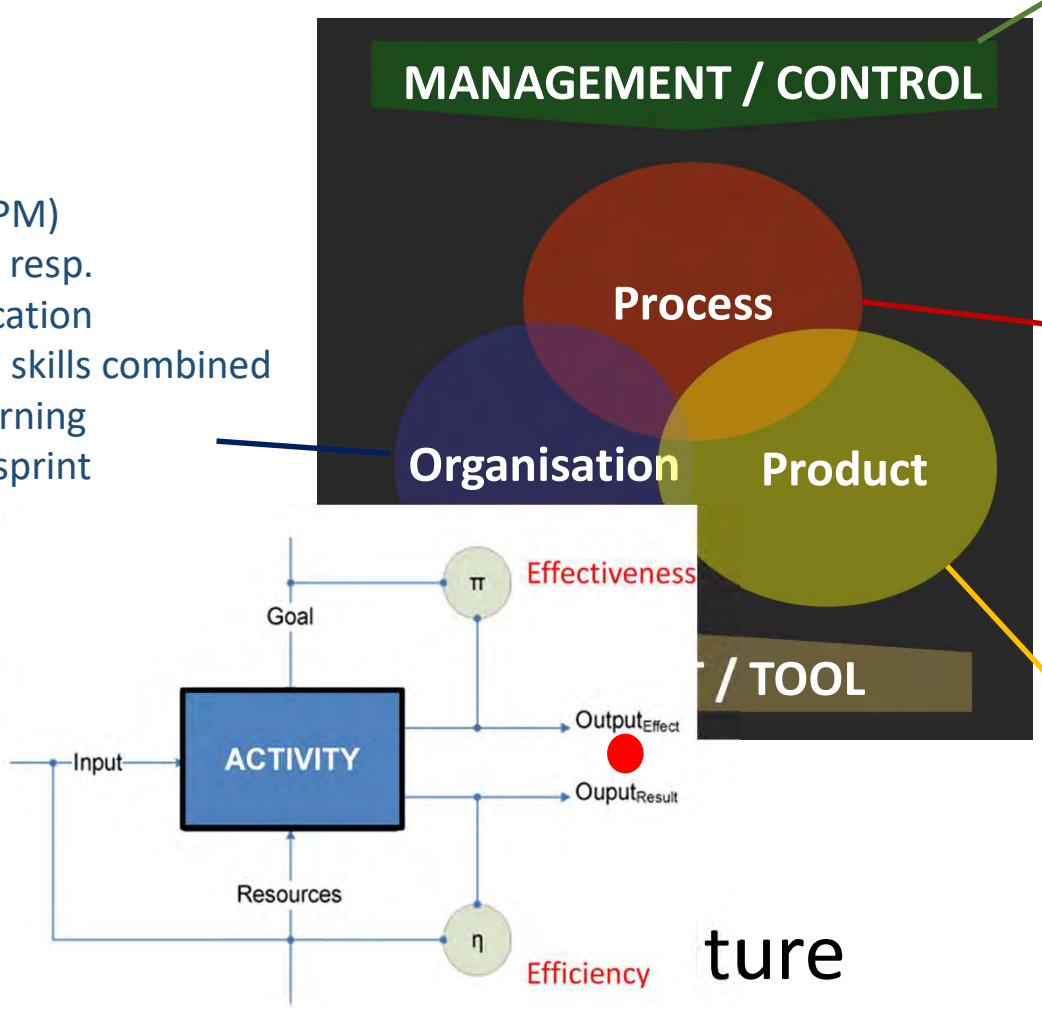
+ Culture

Product Owner

Internal Product Owner

- Scrum master (PM)
- Flexible org and resp.
- F-2-F communication
- Broad and deep skills combined
- Organize for learning
- Commitment / sprint
- Teach and Lear

- **Decision Makir**
- Set-based
- Problem solvin
- OBEYA Room
- Front-Loading
- Etc.



ture

- High pace and throughput
- Transparency
- Eliminate waste
- Daily meeting
- **Product Owner**

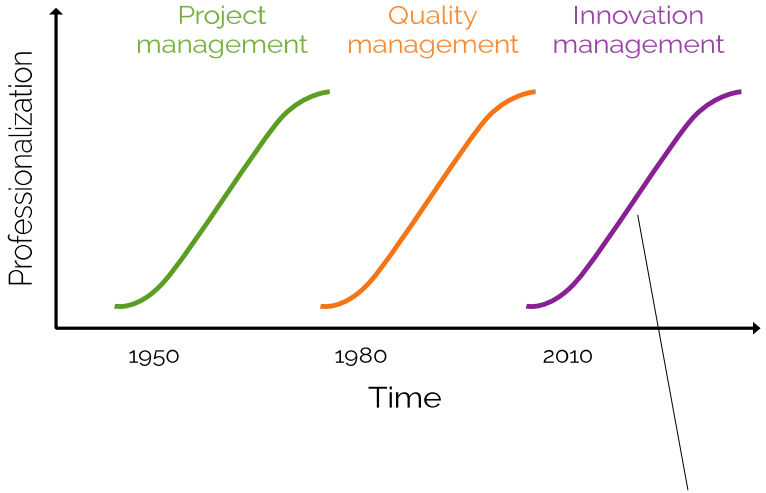
- Only plan near future / Sprint
- Few planned activities and high pace
- **Focus on end results/effects/client /product owner**
- Flexible planning
- Change management
- Burn down chart
- Planning = Team effort = Bottom-up

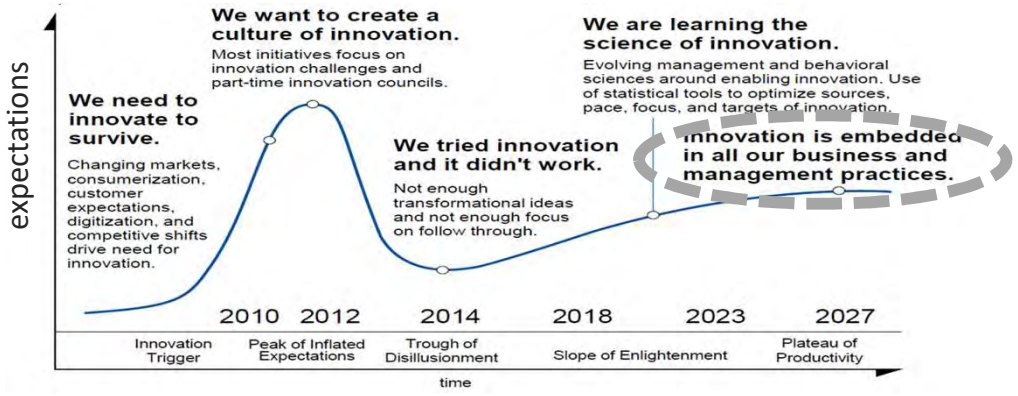
- **Product Owner**
- **Customer Journey**
- Early prototype / digital with main functionality
- Involve client
- Focus on end results/product early

INNOVATION

INNOVATION - FUTURE

- Innovation an integrated part of the corporate ”ECO-System”



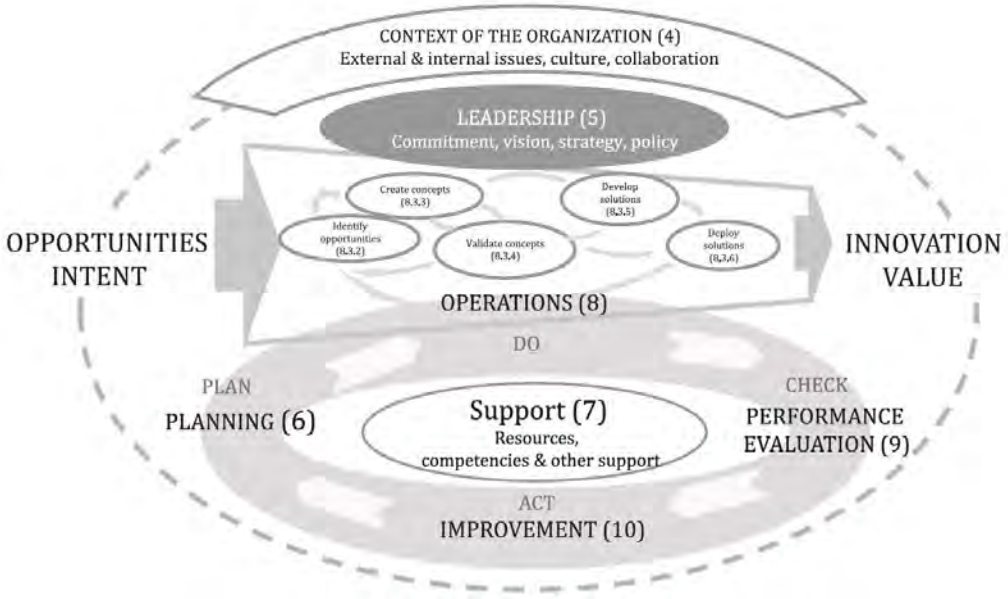


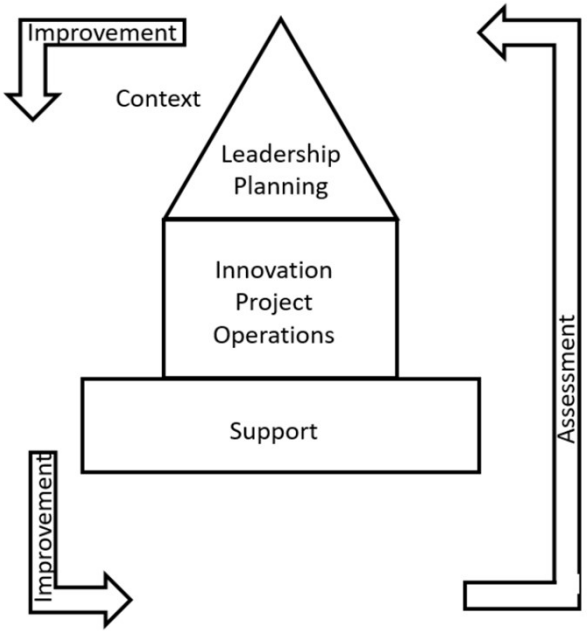
ISO 56002:2019
Innovation management

ISO STANDARD 56002:2019

Innovation Management

- Holistic view
- Inclusive leadership





INNOVATION *vs* INNOVATIVE

DEF Innovation

New or changed;
Product, service, process, model, method etc.
Realizing or redistributing value

Innovative Project Management

Our capability to find new and/or revised ways of executing projects, in order to manage change and deliver on T/C/Q (or exceed).

(Some argue that AGILE = Innovative Project Management)

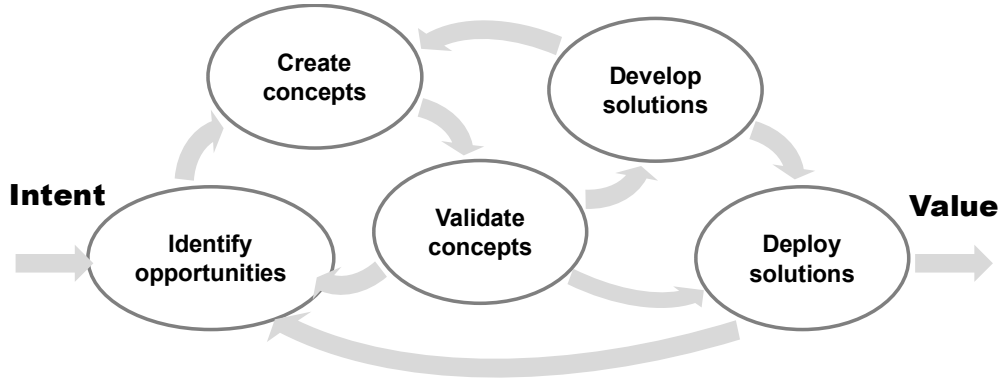
[Various definitions in literature]

STRUCTURE ?

Some structure and guidance could help the team to find innovative solutions/alternatives/opportunities/ etc.

However, difficult to control and predict innovation (uncertainty)

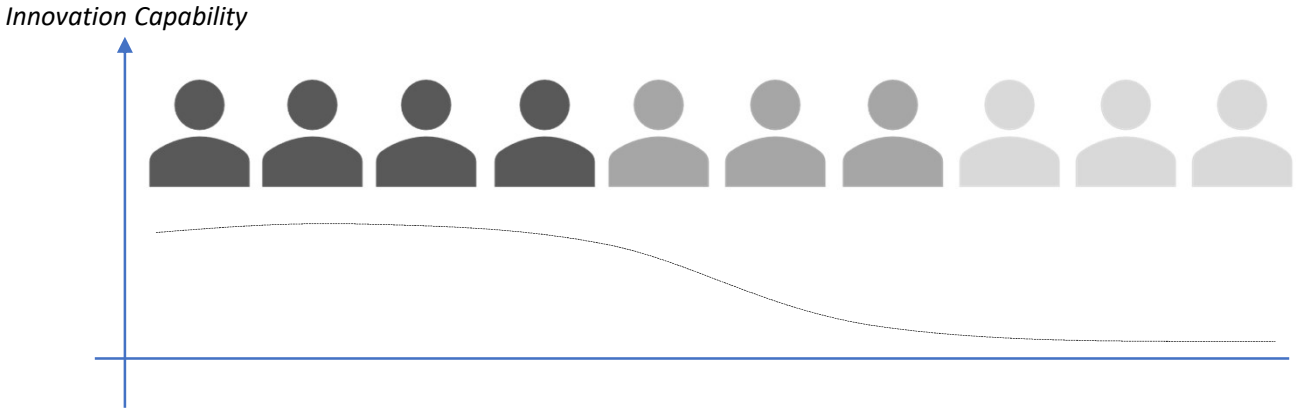
(literature not consistent)



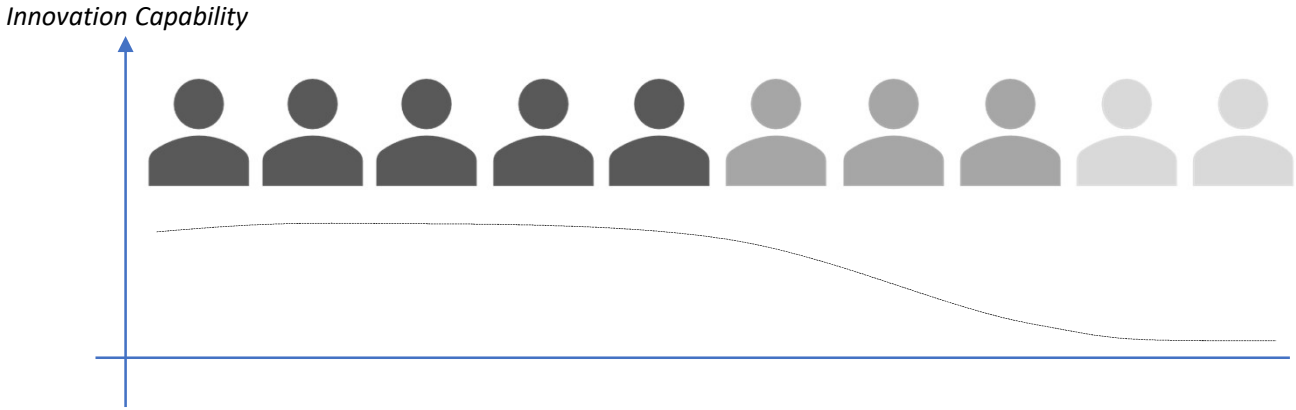
More support will be presented later under both Planning and then Tools

ENHANCING INNOVATION CAPABILITIES

- Commonly there are same people that interact and participate in case you run a workshop that are based on the ability to innovate.



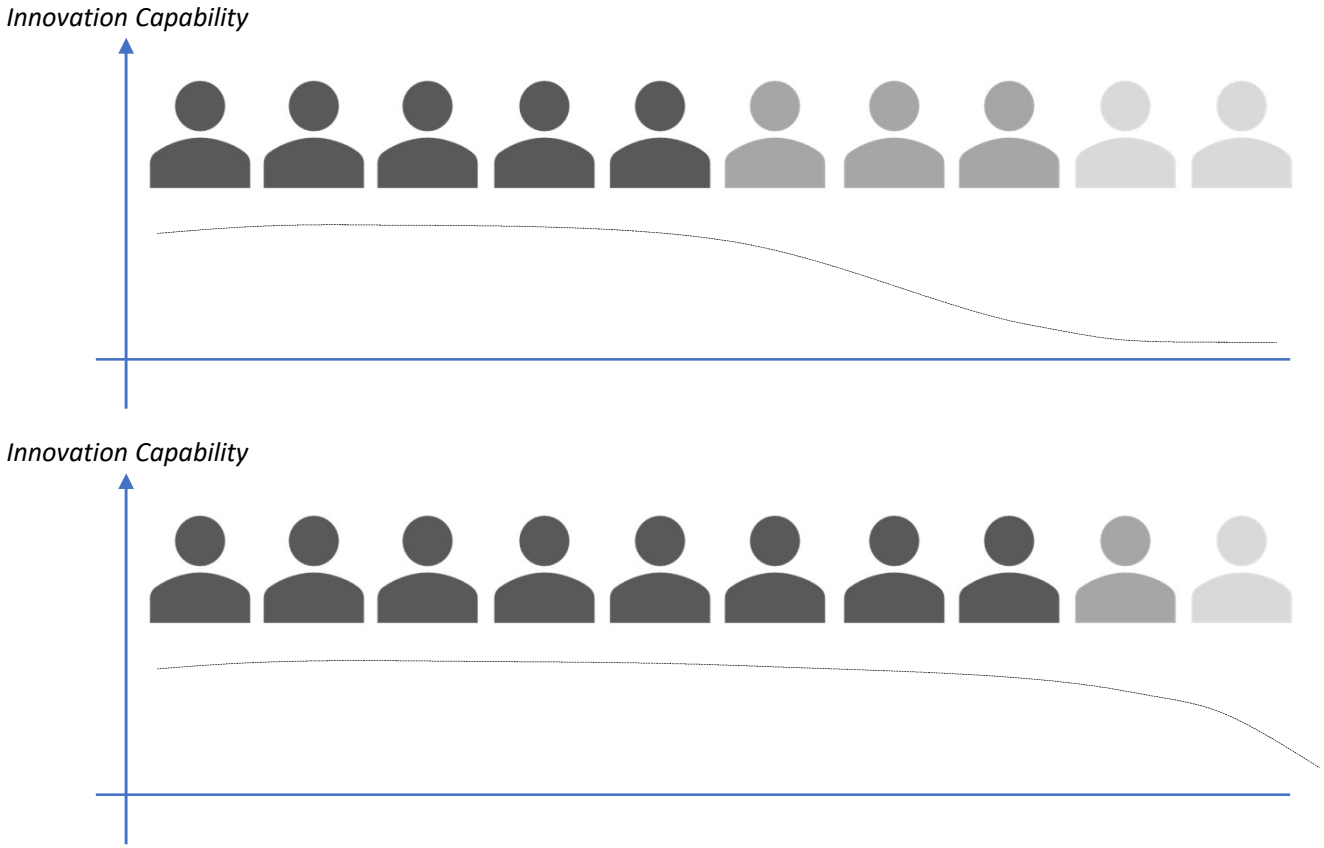
- Many companies concludes;



- By selecting smart methods, be very enthusiastic, etc., you might influence some.
- Still a lot of waste…….

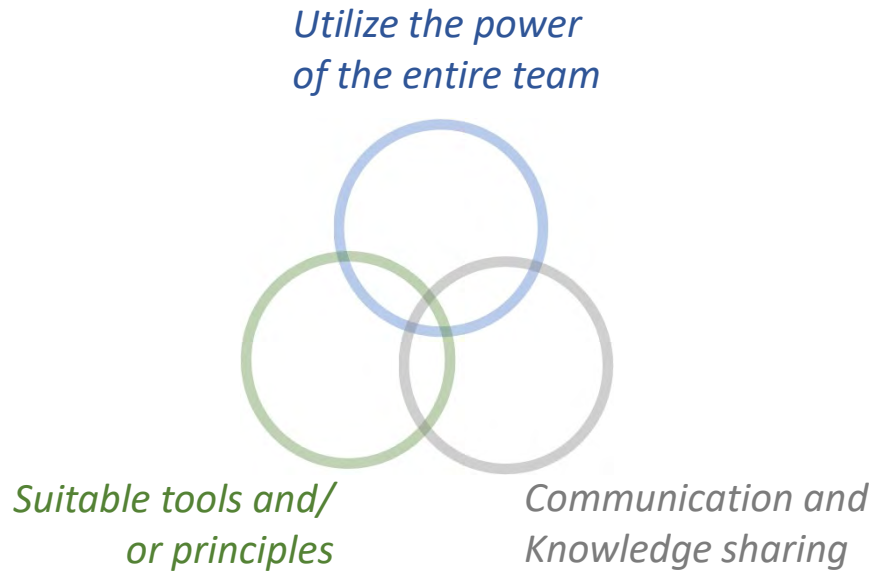
HOW TO GET MORE PEOPLE ENGAGED?

- Likely the one that do not feel they can contribute has “chosen beliefs” or “selected truths” that they cannot innovate.
- Everyone can decide to change and get rid of their “chosen beliefs”, it takes 4-6 weeks, at least, but they need to take a conscious decision.
- Step 1 is to enhance the number in the team that would like to contribute!



STEP 2 AND STEP 3 WILL BE

- Select suitable methods and/or principles for the specific task.
- Plus communication and knowledge sharing



The ability to teach and learn is a factor in a Agile Team!

Not solely learn!

ANYONE CAN BE INNOVATIVE

1) *Five* **specific behaviors** to innovation:

1) Associating
2) Questioning
3) Observing
4) Networking
5) Experimenting

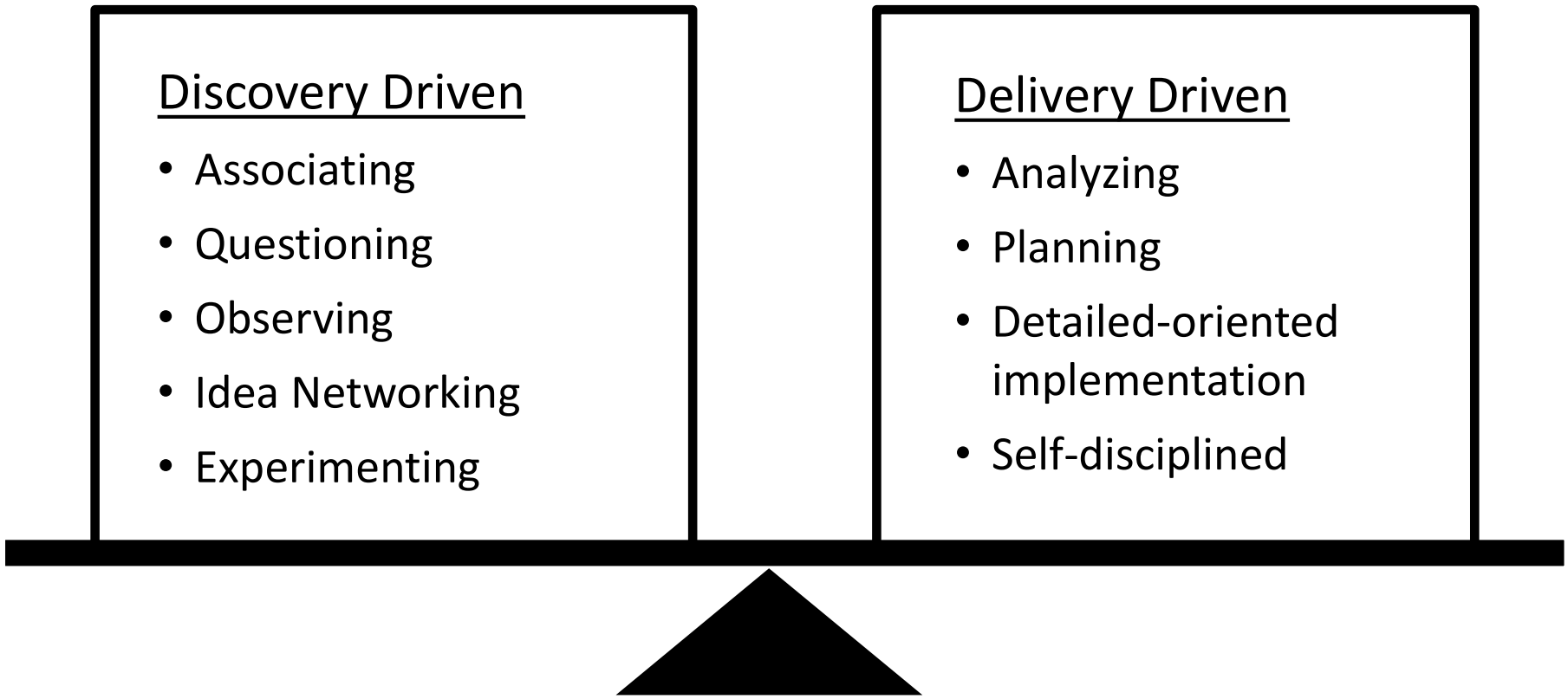
Cognitive skills to synthesize

Behavioral skills

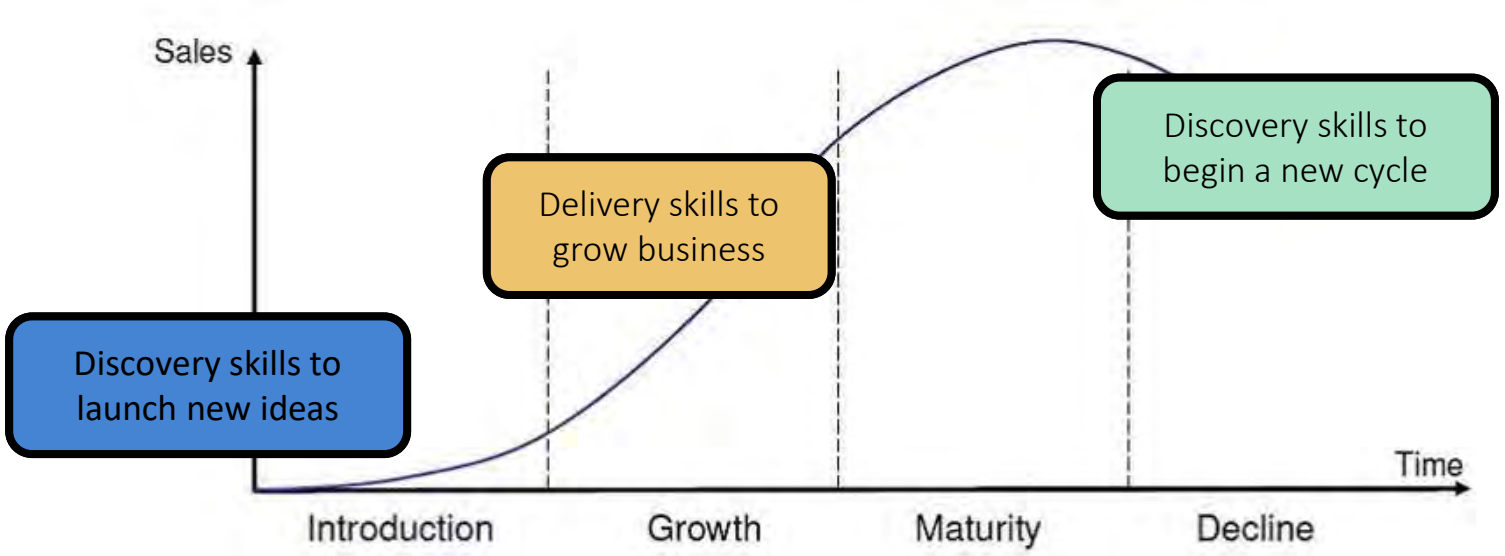
2) **Anyone** can be as innovative and impactful as the **most creative people** in business, if they **practice the above behaviors.**

[Dyer et al.]

Discovery *vs* Delivery Skills -



VARIOUS PHASES



OUTLINE (as sent and generic)

09:15-09:30 KAFFE

09:30-10:15 INTRODUKION AGILT (inklusive relationen till den man kallar vattenfall / V-Modell)

10:15-10:45 START AV PROJEKT OCH ÖVNING ”SJÄLVSKATTNING NULÄGE”

10:45-11:00 KAFFE

11:00-12:00 AGIL PLANERING OCH ORGANISATION

12:00-12:45 LUNCH

12:45-13:30 ÖVNING AGIL PLANERING

13:30-13:45 GENOMGÅNG OCH DISKUSSION AV ÖVNING

13:45-14:30 METODER, VERKTYG SOM STÖDJER AGILT GENOMFÖARNDE

14:30-15:00 KAFFE, DISKUSSION OCH FRÅGOR

OUTLINE (contect)

- INTRODUCTION
- DEFINITION PROJECT MANAGEMENT
- DEMANDING ENVIRONMENT
- CONTEXT PROJECT MANAGEMENT
- INTRODUCTION AGILE
- SELF ASSESSMENT
- AGILE PLANNING
- VISIBLE PLANNING (Obeya)
- TEAM / ORGANIZATION
- INNOVATION
- **WORKSHOP**
- **SET-BASED**
- **DECISION MAKING**
- **DISCUSSIONS AND CLOSING**

INTRODUCTION WORKSHOP

3 teams – Set up an Agile Bid-team and Plan for project H12;

- Danish client Örstedt has asked ABB for quotation for a customized 3-phase transformer at 900 MW and 250 T.
- Manufacturing and engineering planned for ABB in Ludvika.
- Transformed should be delivered on quay side at yard in Esbjerg.
- FAT to be done in Ludvika.
- ABB to provide services for commissioning at site in Denmark
- Spare parts to be decided later.
- Lead time for firm bid to the client is 9 weeks.
- Transformer should be delivered 2021-08.
- 5 years warranty.

- FAT testing likely 6-8 weeks
- Örsted will come back concerning standard.
- Manufacturing 6 month
- Long lead items 5 month lead time from order.
- Earliest slot in production 2020-08 (SOP)
- Engineering divided into three phases, concept, basic and detail, in total 6 month.
- Örsted has indicated that they are willing to place a firm order 4 weeks after they have recieved the ABB offer.
- Manufacturing not willing to start without all material in house.
- It might be difficult to go on barge at Vänern in wintertime.

Picture Transformer

Agile planning – You will do Vision to sprint

- Vision Statement
- Road Map
- Delivery plan
- Sprint Plan
- Daily Plan

Vision Statement Expected endeffects

Key Stakeholders

Road Map. Visualize the intended concept for the delivery of this project. Just 2-3 steps required.

Key Requirements (Functional)

Develop into a milestone plan a set target dates for road map

Delivery plan. Planning over a few sprints, like 6-8 weeks.
Plan to next milestone is a good approach, if possible

Sprint plan. Planning over 2-3 weeks (TBD). Make 1 sprint

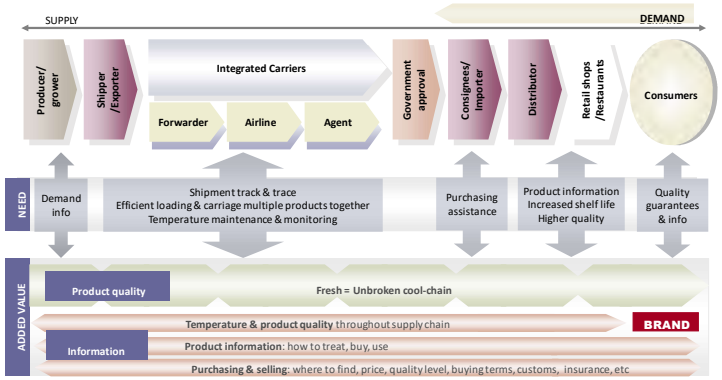
Back-Log Product Project

Daily plan. Can be part of sprint planning, but updated on a daily bases if needed. Not included

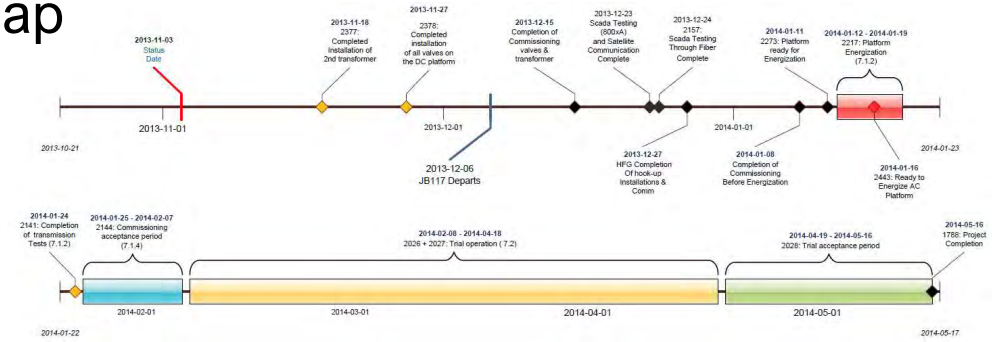
Agile planning – You will do Vision to sprint

- Vision
- Road Map
- Delivery plan

Vision = End effects



After Road Map
= Milestone



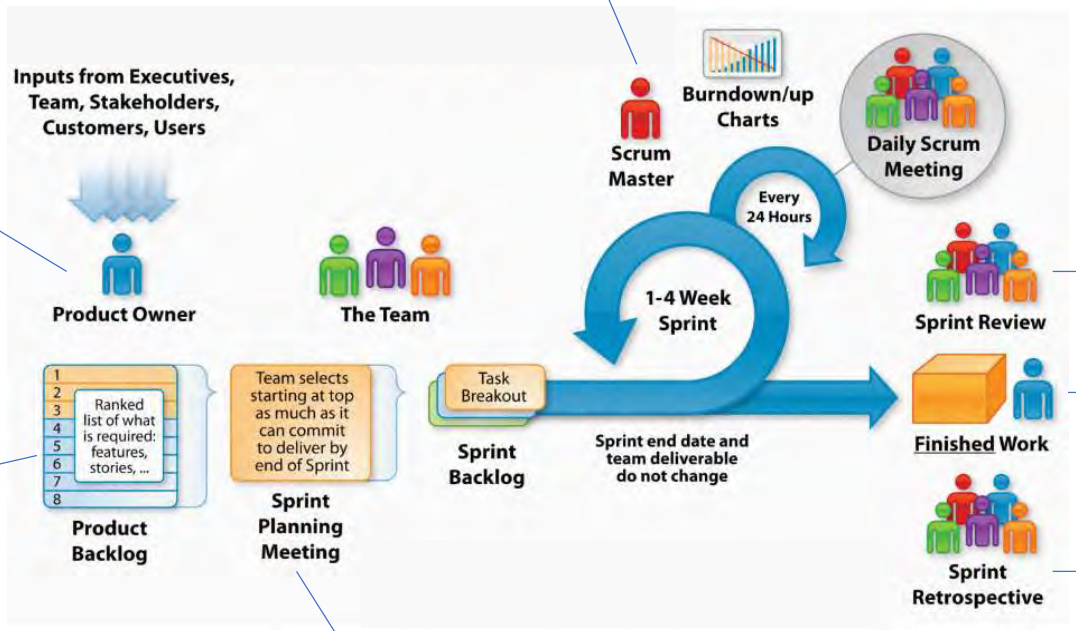
Overview – Sprint Planning

Scrum Master not equal to PM, more facilitator

Product Owner central for decisions/support related to user.

Always aim for direct client contact

Product Backlog is another word for requirements, fucus on key functions

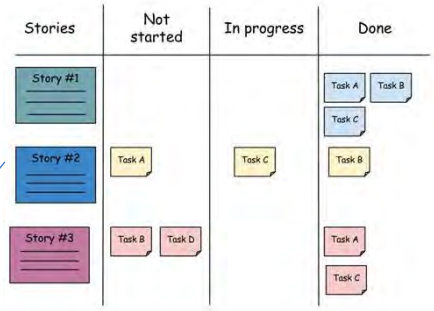


Crossfunctional meeting Product Owner, Scrum Master, Team and other Stakeholders

Viualize completed work

Learning

Time boxing
What can the team commit to do in the sprint 2-3 weeks.
Burndown chart



User stories (clients)

Ref = Scrum Alliance

3 teams – Set up an Agile Bid-team and Plan for project H12;

- Appr 10 persons in each team

Scrum Master, Team and Product Owner (TBD).

Björn can be one stakeholder (Role flexible)

- Whiteboard / Post It
- Joint effort required in the team
- Responsibility can shift
- Framing!

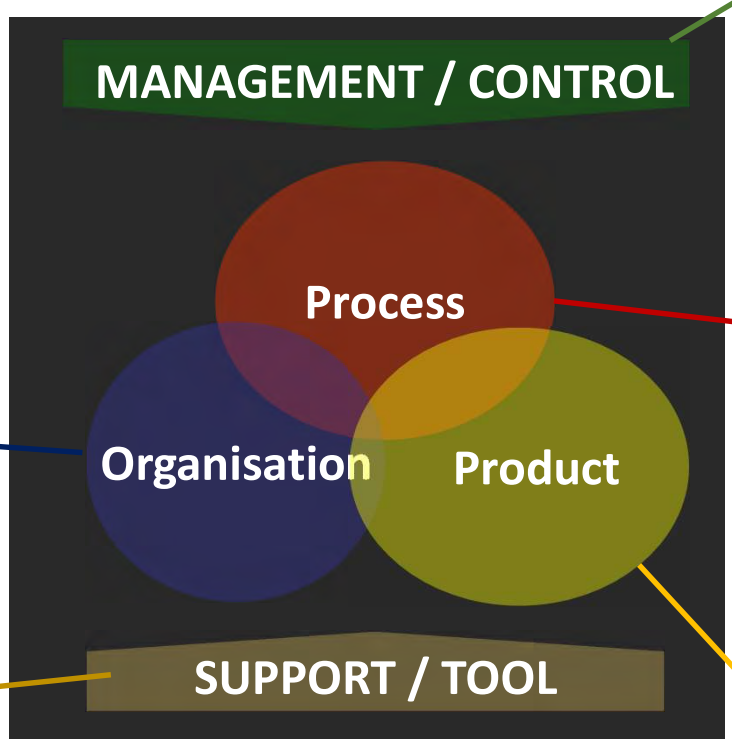
- Vision Statement
- Road Map (part)
- Delivery plan (part)
- Sprint Plan (1 sprint)

SET-BASED

Support – Set-Based

(some LEAN)

- High pace and throughput
- Transparency
- Eliminate waste
- Daily meeting / Sprint Review
- Product Owner



- Scrum master (PM)
- Flexible org and resp.
- F-2-F communication
- Broad and deep skills combined
- Organize for learning
- Commitment / sprint
- Teach and Learn

- Only plan near future / Sprint
- Few planned activities and high pace
- Focus on end results/effects/client /product owner
- Flexible planning / Use Pull is possible
- Change management
- Burn down shart
- Planning = Team effort = Bottom-up

- Decision Making
- **Set-based**
- Problem solving – Go to Gemba
- OBEYA Room
- Front-Loading
- Etc.

- Product Owner
- Customer Journey
- Early prototype / digital with main functionality
- Involve client
- Focus on end results/product early

+ Culture

ASSIGNMENT #6

What fits better into Agile – Requirement Specification or Requirement management Process

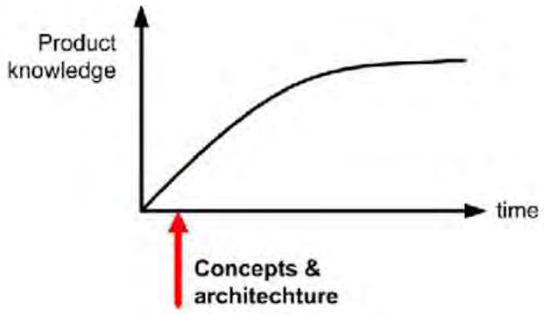
2 and 2 & 2 minutes from now

´COMMON´ APPROACH – PRODUCT DEVELOPMENT

A

A very detailed overdefined specification starts up the work, with inconsistencies and a lot of not needed information, often based on earlier products/projects

B



Early concept decision when availible product knowldge is low

C

Hard work to develope each sub-system to ensure that all requirements are fullfilled

D

Finally when all details are defined, time to involve suppliers and get in quotations.

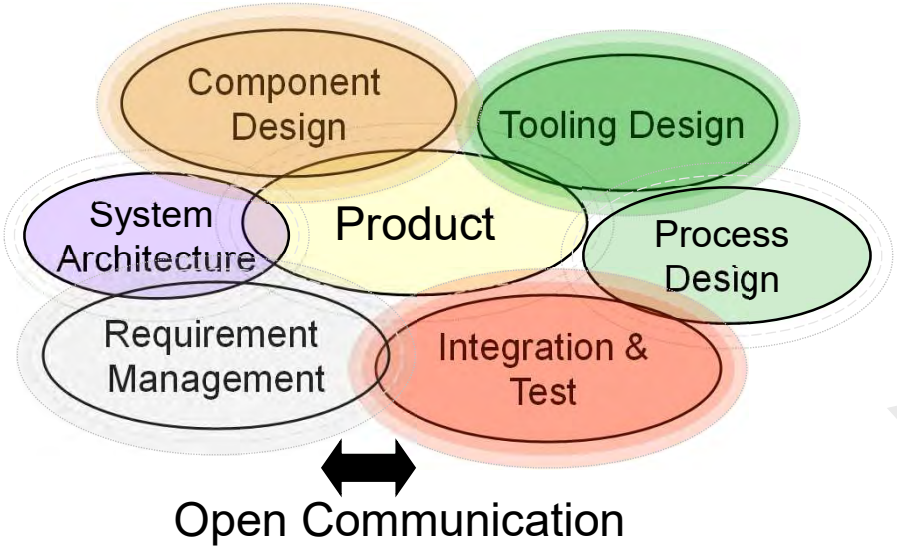
E

Demanding Re-design due to cost overruns

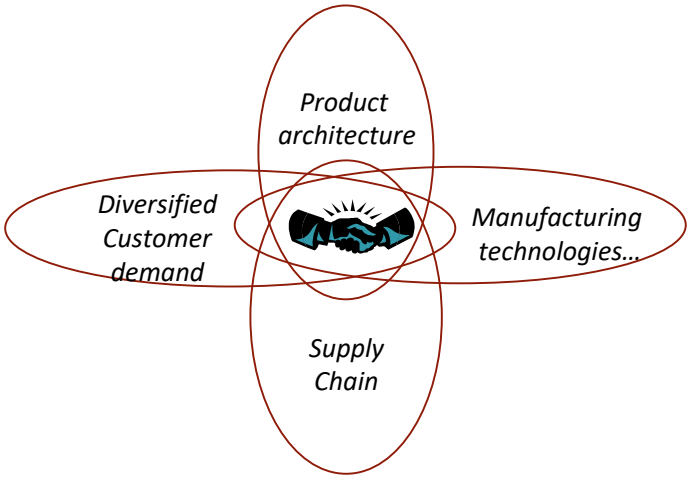
Characteristics of Set-based engineering

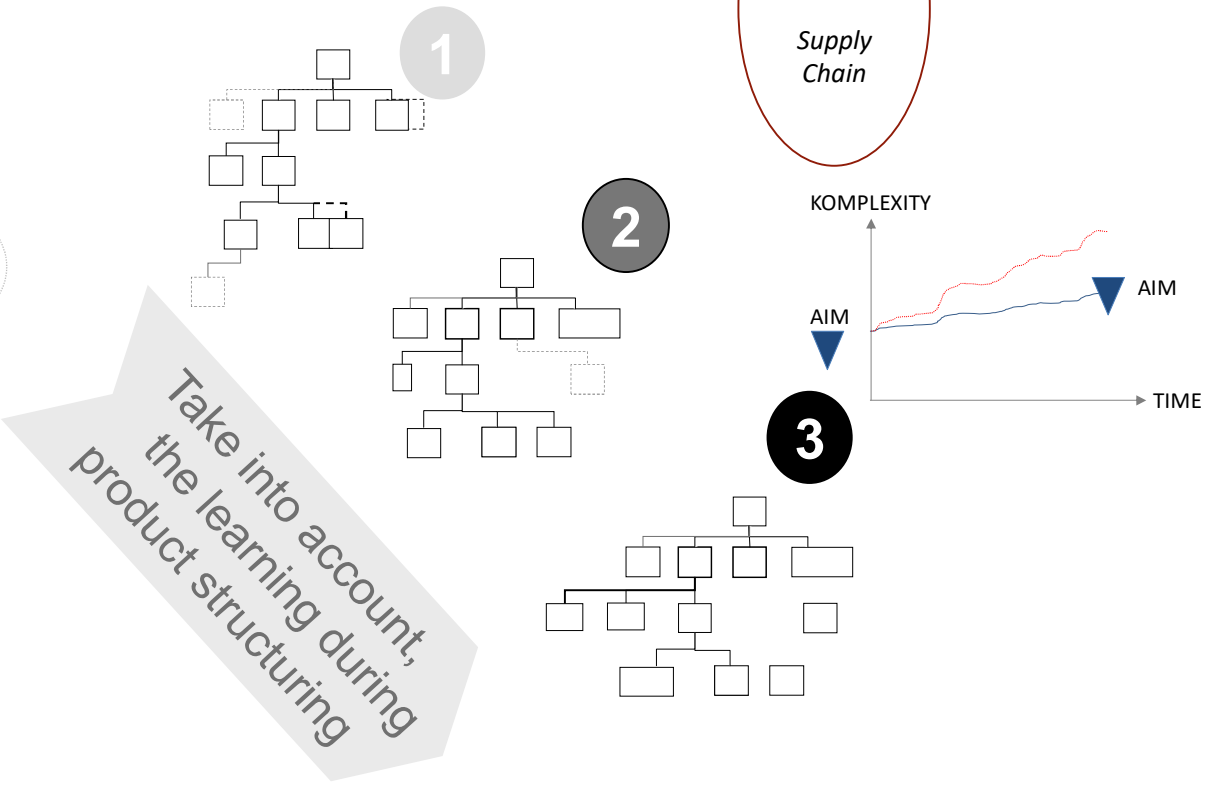
- Specifications are initially specified as ranges (not points) These are gradually narrowed down in the PD-process in a converging process
- Elimination of inferior alternatives instead of selection of a best alternative
- Set-based design requires more resources than point based – Initially !
- The decisions are taken at the latest possible time
- Multiple small decisions instead of fewer large decisions

SET-BASED ENGINEERING



CLOSE COLLABORATION

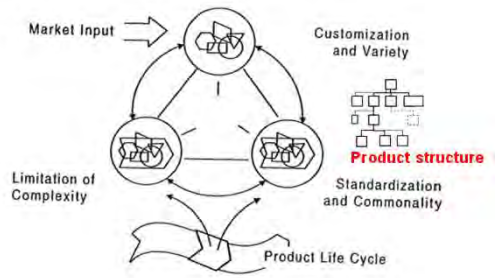


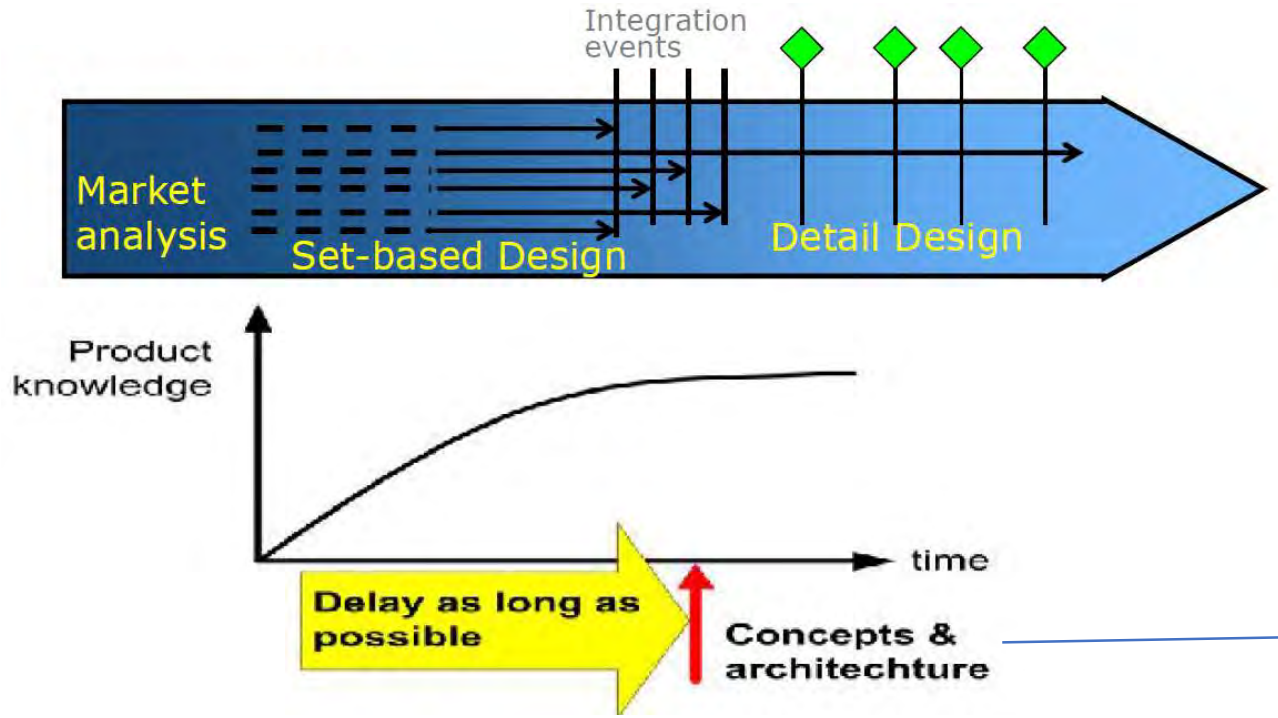


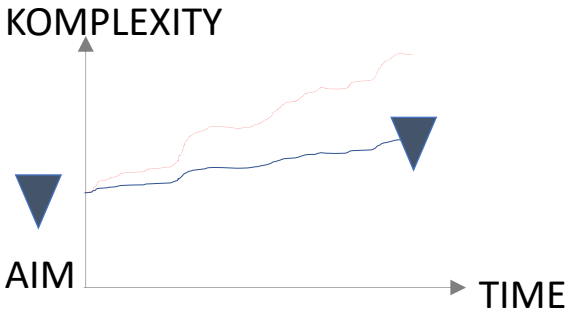
OVERVIEW SET-BASED

- Focus on Functional requirements
- Few but important explicit requirements
- Consider bandwidth for RQs (+ picture/diagram)
- Parallel sets of concepts

- Test various combinations of your sets of concepts
- In order to find the overall best architecture







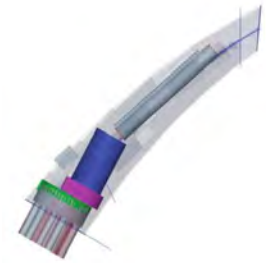
Examples of Sets

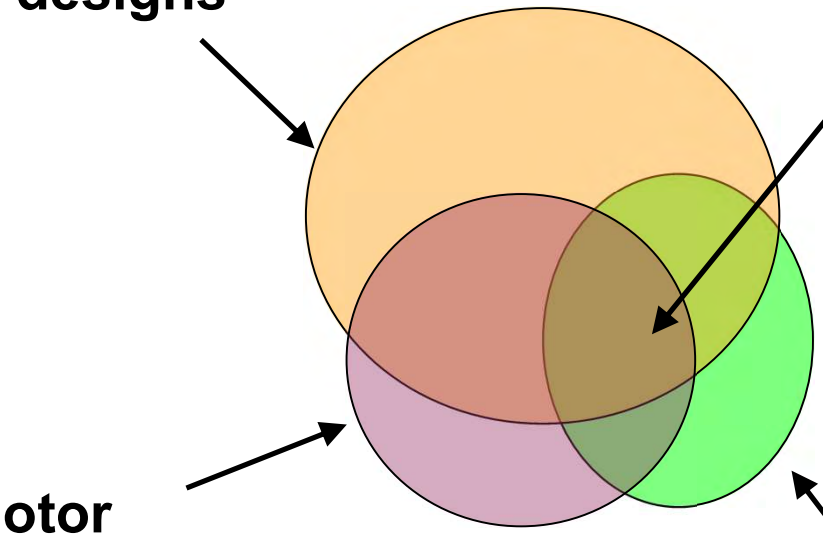
Sets of industrial designs

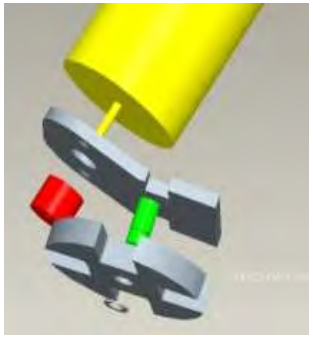
Sets of configurations

Sets of detailed designs

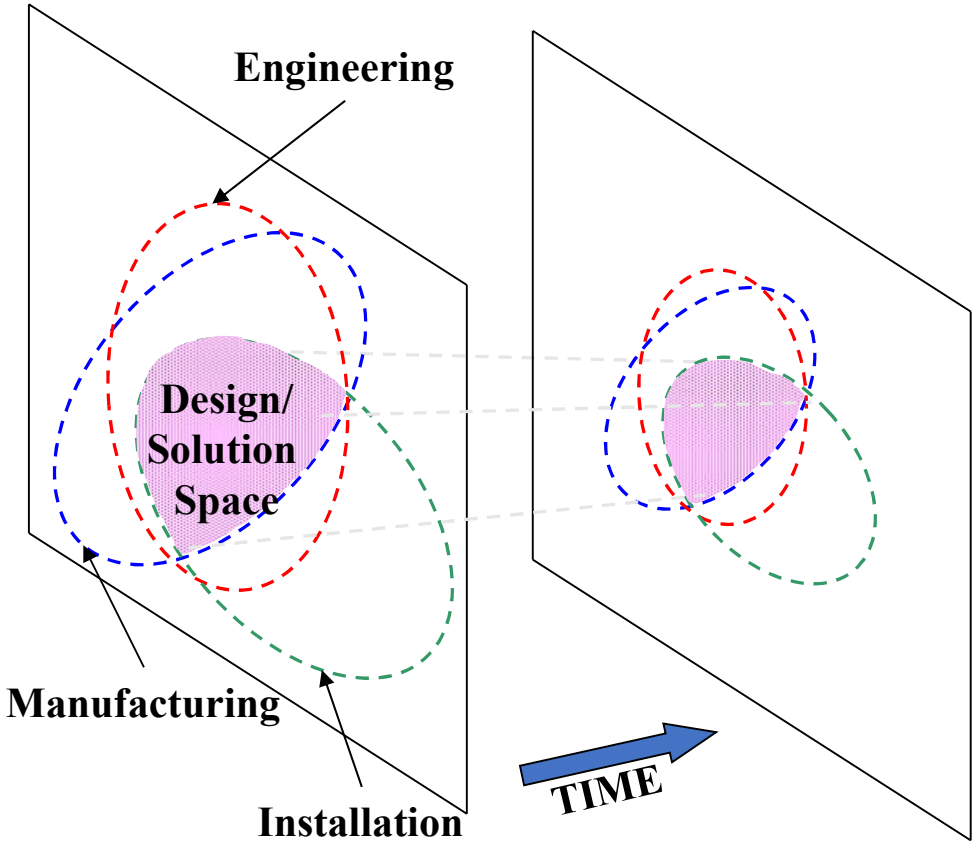
The sets are combined into systems





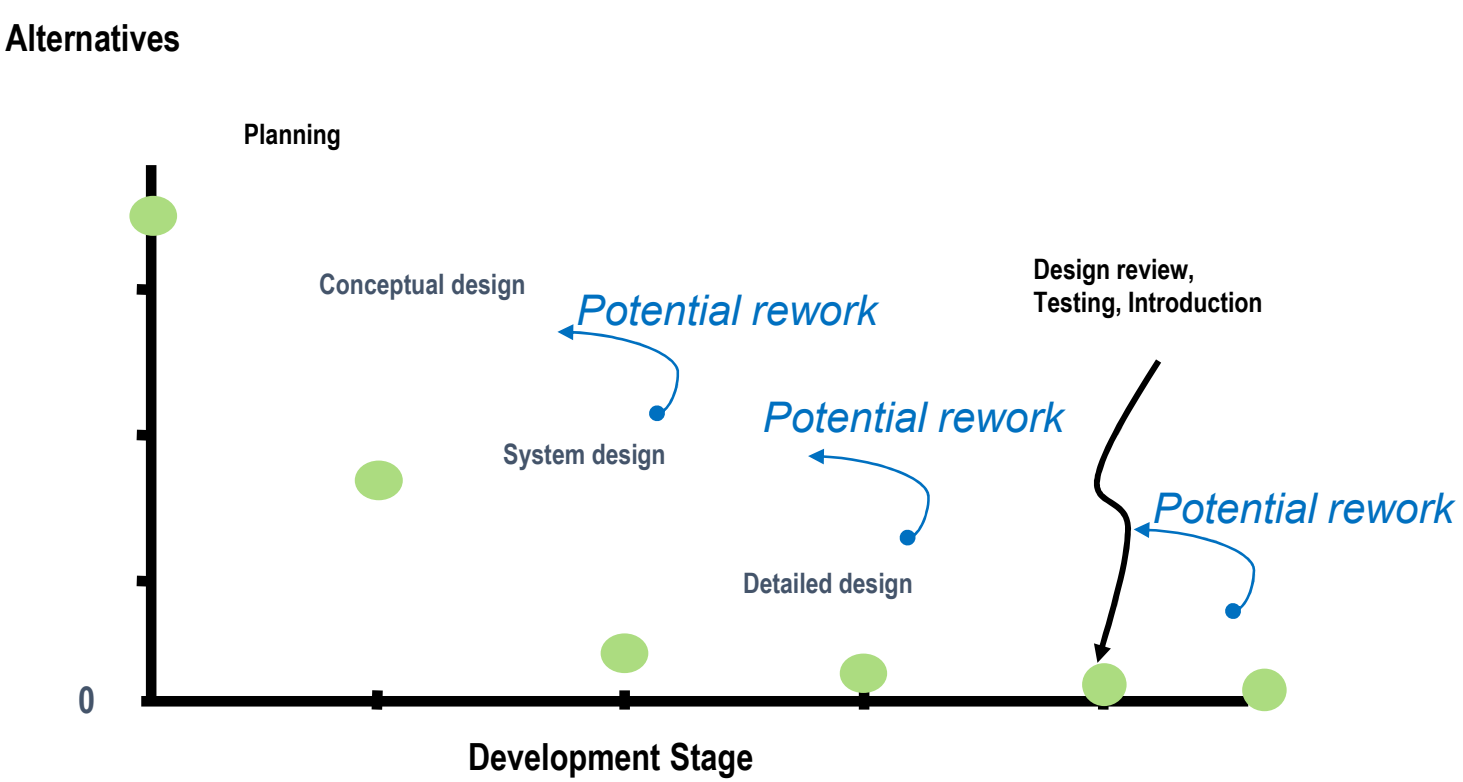


SET BASED ALTERNATIVE EXPLANATION



Many authors argue that Set-based concurrent engineering (SBCE) is one of the main principles behind the highly effective product development at Toyota. SBCE broadly considers sets of possible solutions (in parallel and relatively independently) and gradually narrowing the set of possibilities to converge on a final solution, see figure. The opposite to set-based are *point-to-point* approaches which typically represent, analyze, and modify one idea at a time.

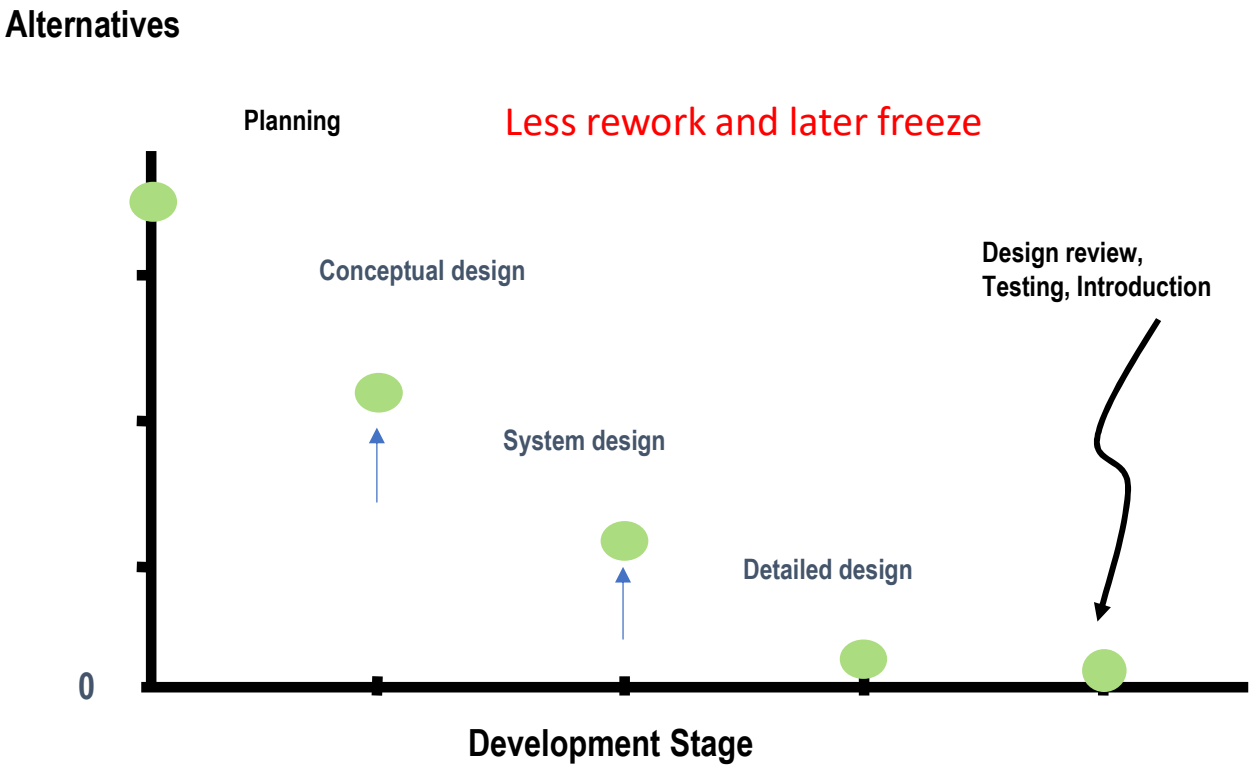
Insufficient process and methods –
Scope growth, high risk for rework, delays and cost!



You learn a lot in the process and obviously that learning can result in rework or you park improvements to next revision of the product.

Skilled resources mitigate problems late in the process, Unstable ramp-up

Set-Based



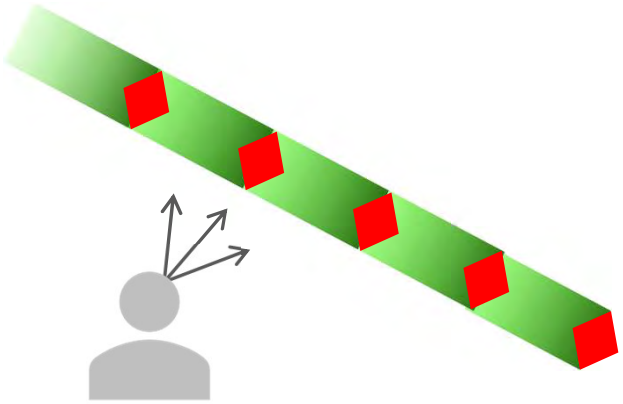
More stable ramp-up and less late surprises

SOME GUIDANCE

1) Expand your solution-space beyond your planned system boundary, do not constrain your solution space early.
2) Integration meetings allow to learn from each other and narrow down the solution space.
3) Aim for robust system boundaries that are not sensitive for variation in other parts.
4) Ensure that the functionality of the integrated overall system is maintained
5) Develop requirements continuously as sub-systems are defined and solutions selected.

DECISION MAKING

INTRODUCTION **DM**



- My interest started
  - Product development – Progress / Decision
  - Few companies focus on development of DM capabilities.
  - Chevron (O&G Company US)
- Aim
  - Present decision-making process, supporting PM:s/Teams to enhance the decision quality.
  - Increase flexibility, as decisions are planned upfront and options evaluated in a structured manner.
  - Focus on complex decisions which don't have easily calculated and simple solutions.
- Based On
  - Research
  - Experiences from large scale engineering/ construction projects.

CRITERIA FOR DECISION?



+ 2 FEASIBLE ALTERNATIVES TO BE EVALUATED

"…. Decision making can be regarded as a process, resulting in selection of a course of action among multiple alternatives. One choice is selected for action and implementation."

"We prefer the term "Decision Quality" rather then aiming for the perfect or optimal decision, even if that is worthwhile to striving for."

WHY?

"..... above all else, leaders are made or broken by the quality of their decisions "

[Garvin and Roberto, HBR, September, 2001, p 108]

"..... improving your companies decision-making competency can have a direct impact on performance "

[Luecke, 2001]

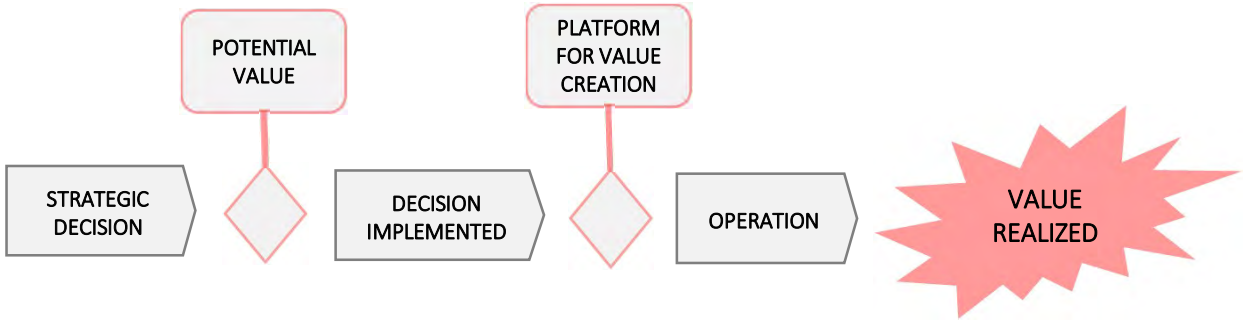
" Life is a sum of all your choices..... "

[Decision Quality, 2016]

"... or just because it works ....."

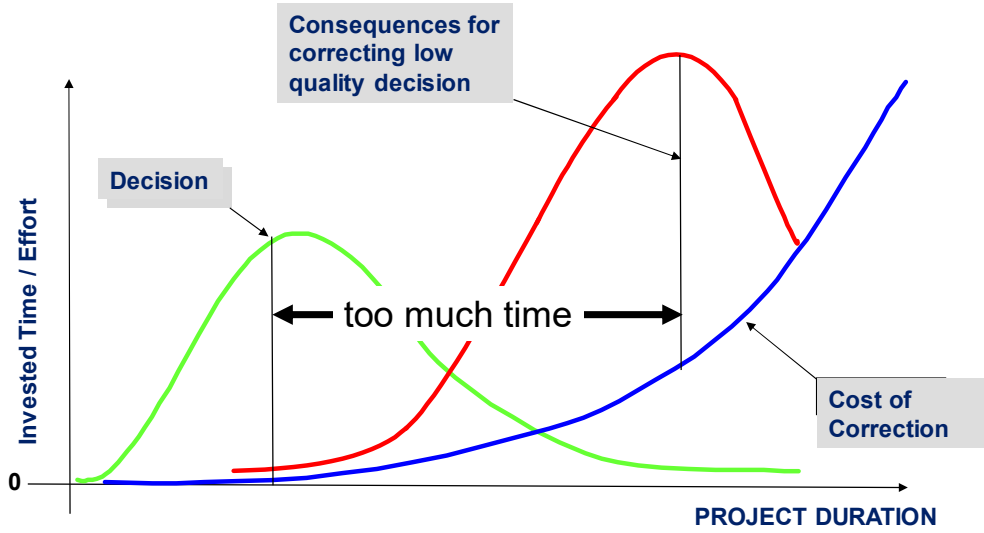
[DM high impact ROI]

EVALUATE IMPACT OF DECISION



A key problem with decision-making is that there are often long time between the decision is taken and the consequences of the decision visible/realized……

Important to always consider ways to shorten the feedback loop, through simulations, scenario development, agile methods, etc.



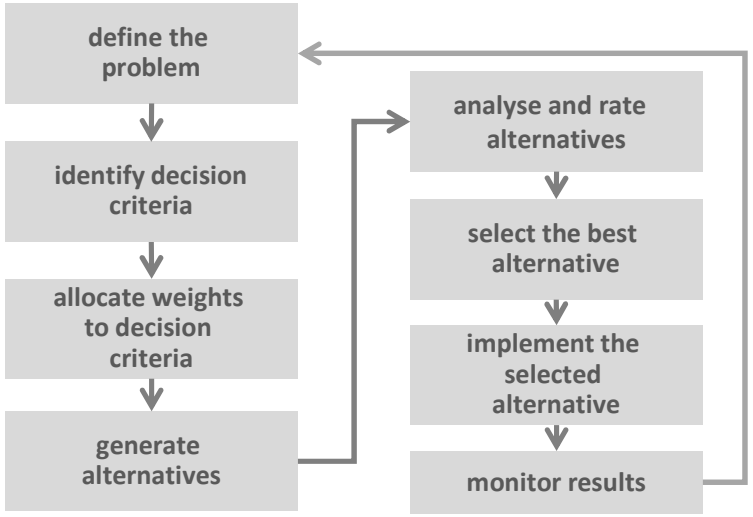
APPROACH

" Selection of approach/method for decision making is dependent on your view and what type of decision you aim to take and implement. "

RATIONAL *vs* BOUNDED RATIONAL

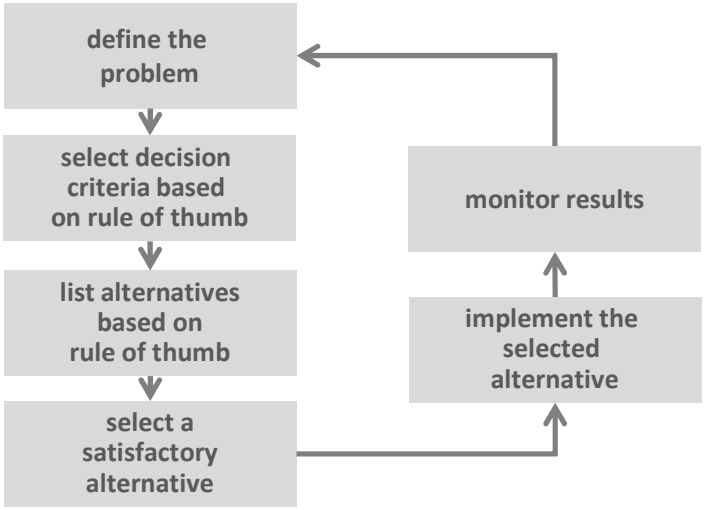
Rational model

- clear and stable objectives
- objective is to maximize outcome
- closed decision-making process
- all required information is available
- founded on quantitative disciplines;
- process supported by computers



Bounded Rational model

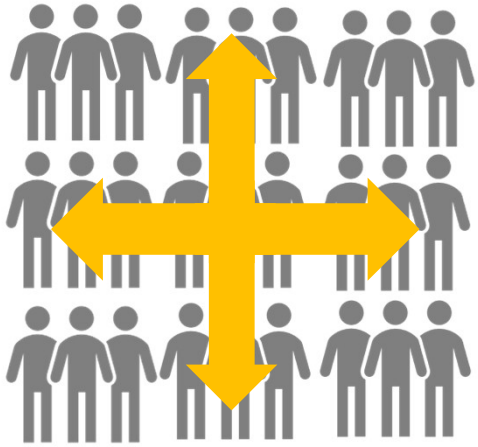
- objectives are achievable (might change)
- to identify solutions that are good enough
- open decision-making process
- decision-making strategy is based on making judgements under bounded rationality
- not all information is available or obtainable
- qualitative orientation



[1945, Simon H.A. (Administrative behavior). Nobel-prize 1978. D.2001]

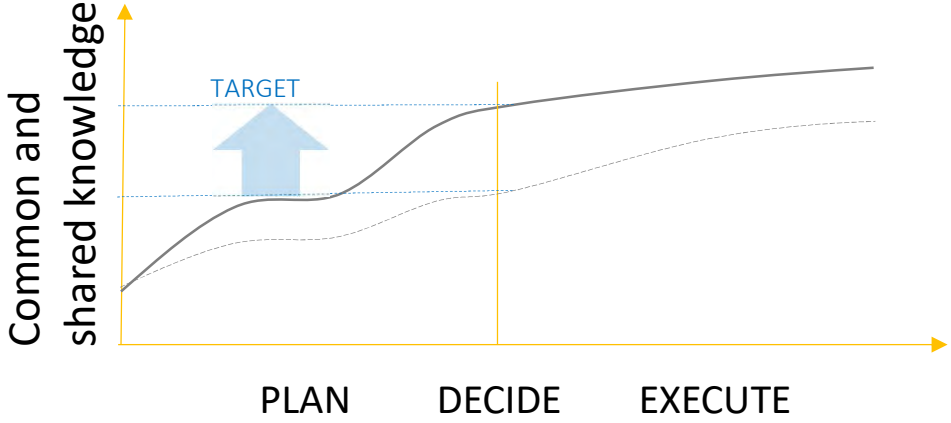
2 CRITICAL ASPECTS

Cross Functional Collaboration



Process Focus *(more details will follow)*

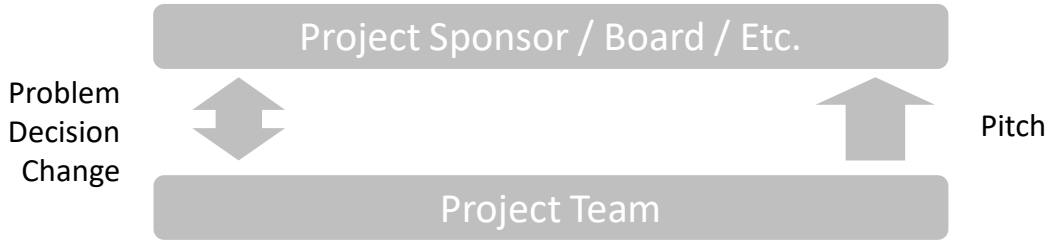
Aiming at



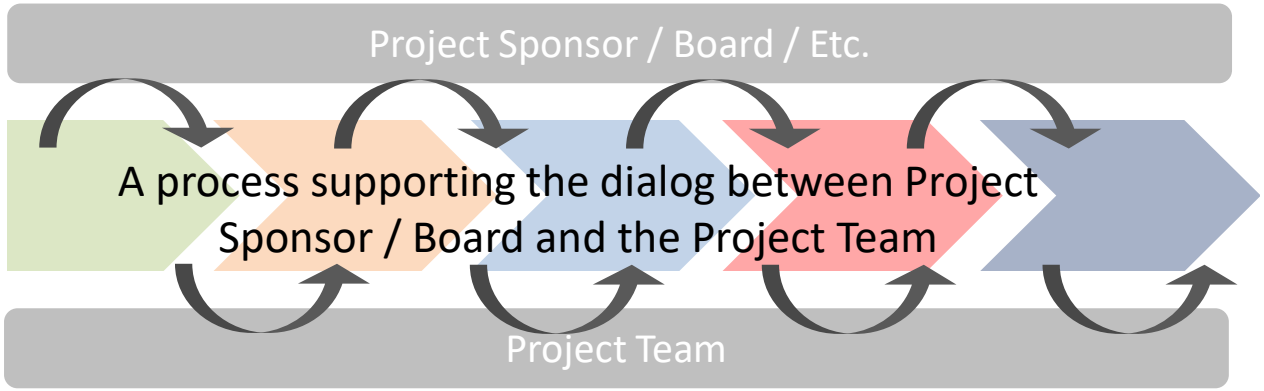
AD-HOC vs PROCESS (including collaboartion)

Somewhat simplified for Illustration purposes

COMMONLY >



PROPOSED >

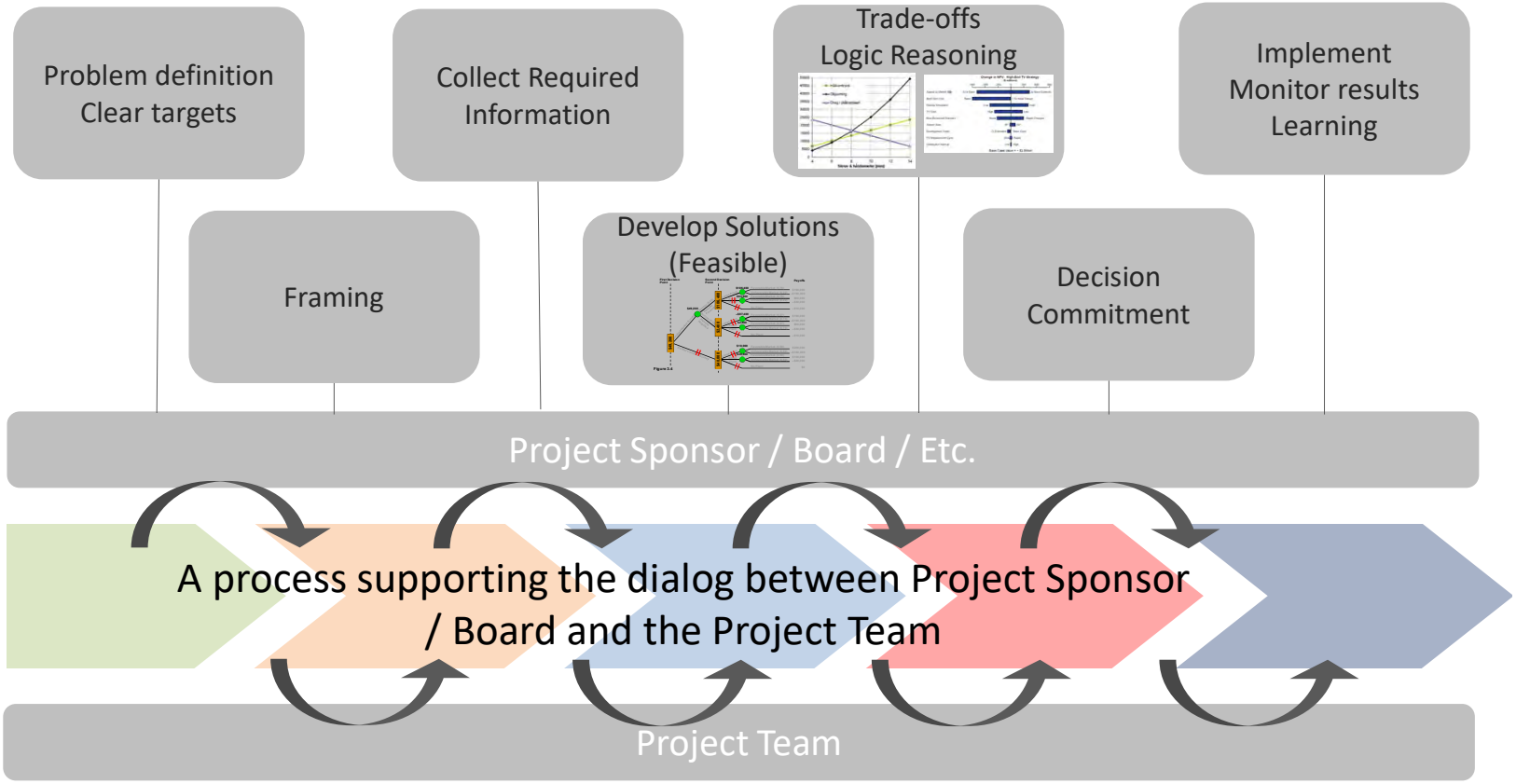


[See for instance Decision Quality, 2016]

DECISION MAKING PROCESS

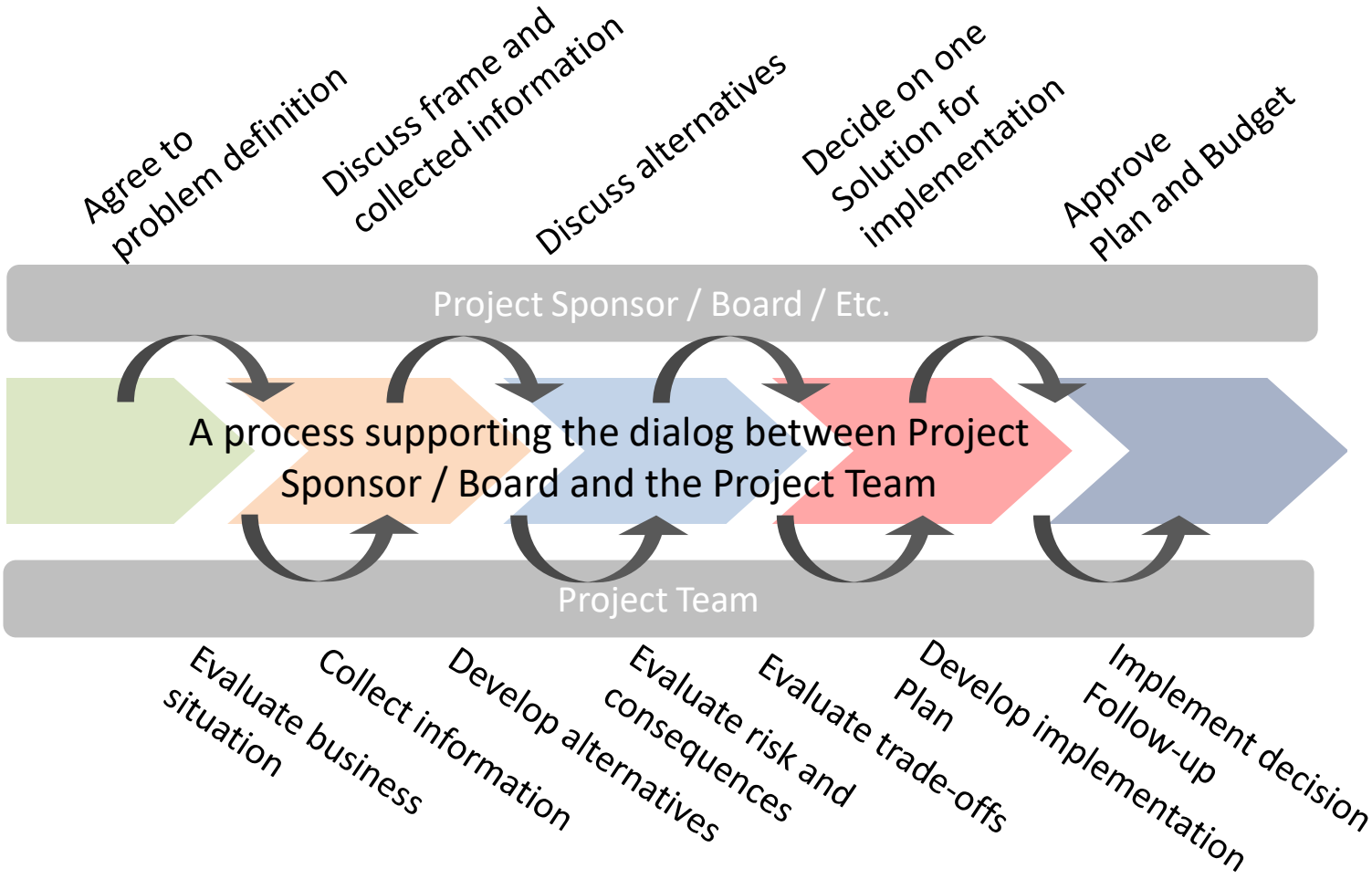
Process Focus *(more details will follow)*

PLAN (PRE) D EXECUTE (POST)



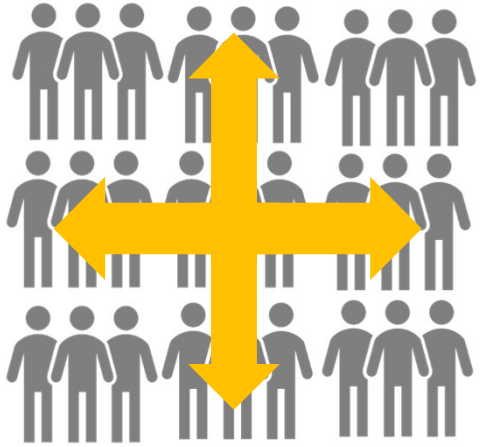
[See also Strategic Decision Group, SDG]

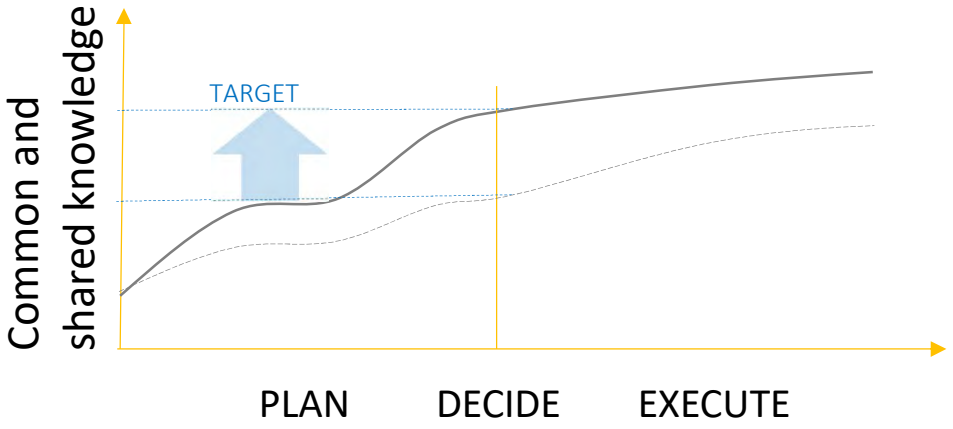
DECISION MAKING PROCESS – EXAMPLE OF ACTIVITIES



COMMON PROBLEM – COMMUNICATION / COLLAB.

Cross Functional Collaboration

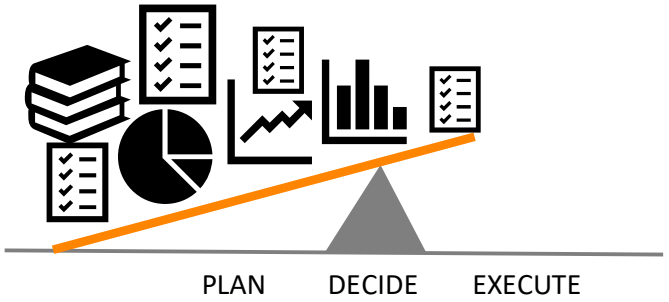


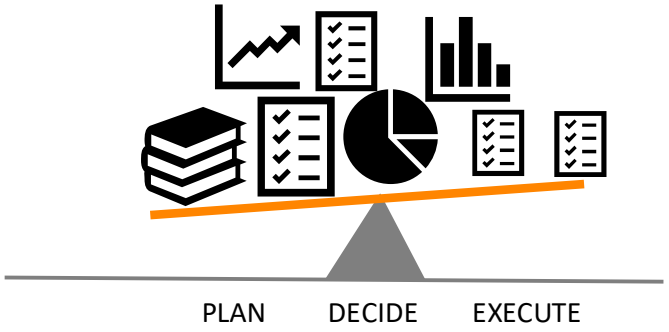


LACK OF PROCESS FOCUS and UNBALANCED PROCESS

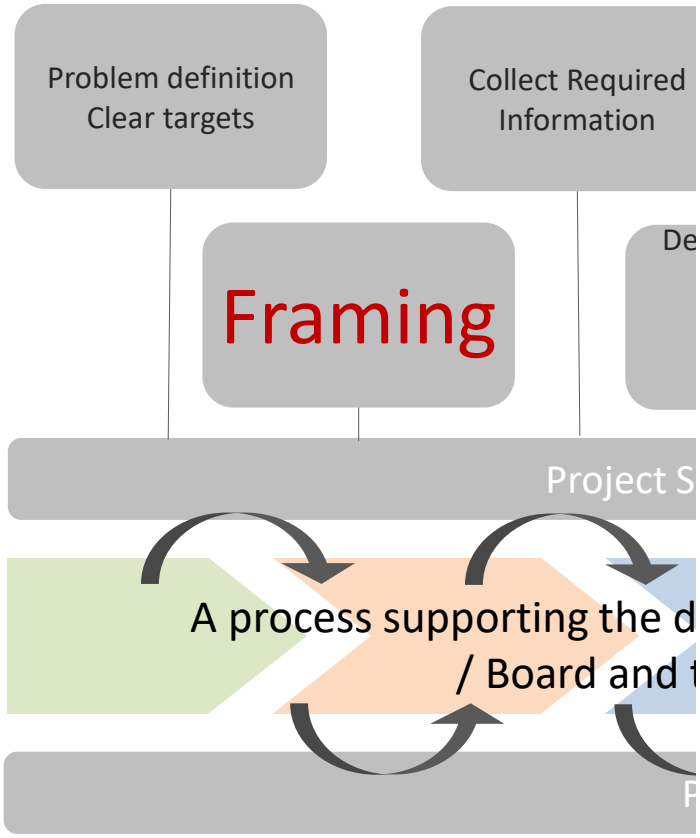
Process Focus *(more details will follow)*

" Lack of process focus and ad-hoc behavior reduces the possibility take a well informed decision (reduces decision quality) "

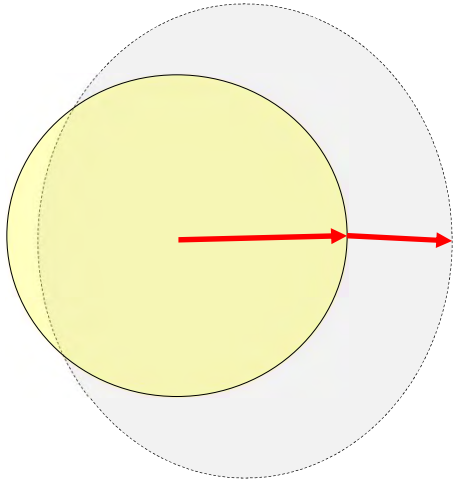




COMMON PROBLEM – LACK OF FRAMING



Poor defined frame and by just collecting some additional not required information increases the complexity and reduce the likelihood to take a decision with high quality!



COMMON PROBLEM – ADDITIONAL

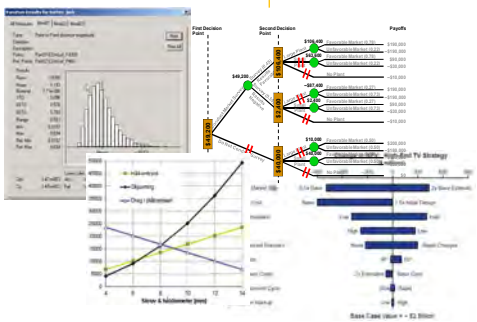
Potential problem list can be used as a check sheet and reminder

GENERAL

- Decision making not considered as critical capability
- Roles/Responsibilities not defined.
- Sufficient resources not allocated

PLAN (PRE)

- Unclear problem definition.
- Information quality low (Wrong and too much info)
- Few feasible alternatives
- Few classical decision analysis tools used



D

- Few persons with knowledge of planned decision present => No decision / delays.
- Decisions influenced by one/several traps.

EXECUTE (POST)

- Execution plan for the taken decision pending (Vacuum).
- Follow-up pending.
- Feedback and lessons learned to line organization.

POTENTIAL TRAPS (1 AND 2 ADDED BY BJÖRN)

1. **The Expert Advice Trap**
   the simple way out – rely on an external expert

2. **The Expectations Trap**
   uncertain information provided due to expectations from team to provide certain input.

3. **The Anchoring Trap**
   disproportional weight to first information

4. **The Status Quo Trap**
   bias toward maintaining current situation

5. **The Sunk Cost Trap**
   justify previous decisions that are not working

6. **The Confirming Evidence Trap**
   seek supporting information only

7. **The Framing Trap**
   misstating the decision situation – undermining entire D-M process

8. **The Memory Trap**
   over-influenced by both recent and dramatic events

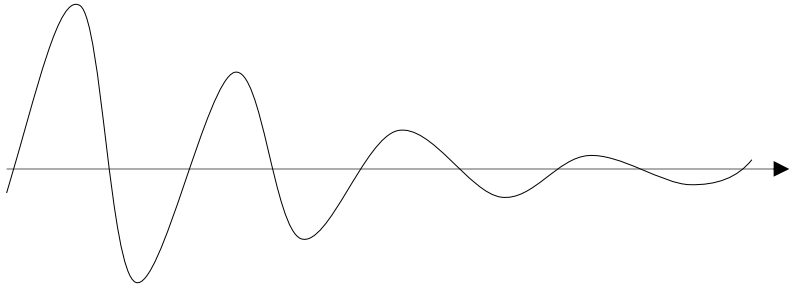
9. **The Prudence Trap**
   overcautious of estimates around uncertain events

10. **The Recognition Trap**
    tendency to place a higher value on what is familiar

[See for instance; Beshears and Gino, HBR, 2015 & Hammond, Keeney & Raiffa, HBR, 1998]

BENEFITS – PROCESS FOCUS

- Allows PM enhance the decision quality, resulting in a higher likelihood to deliver the project in line with plans and reaching goals/objectives.
- The process is the motor for collaboration and common creation of knowledge
- People have two modes (somewhat simplified): Emotional and logical/analytical – The process will help to balance these.
- It is normally bad to discuss facts, alternatives, objectives, implementation, etc. in the decision in the same meeting. The process will allow for dedicated meetings for certain tasks.
- Manage biases, by using several meeting to structure the problem, facts, solutions, uncertainty, frame, etc.



[See for instance; Mankins & Davis-Peccoud, Bain, 2011 & Beshears and Gino, HBR, 2015]

CONCLUSIONS – FINAL WORD

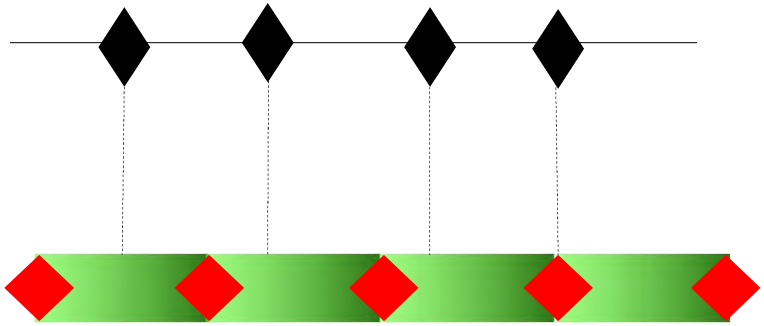
- Few companies has realized the full potential of efficient Decision Making and implemented sufficient processes, tools, trained the staff, etc.
- Decision making is a critical task for all PM:s. The proposed DM process can support you as PM to enhance the decision quality.
- Progress in a project is directly influenced by decisions, no decisions means no progress and low quality in the decision-making might give rework.
- Taking control over the DM Process enhance your flexibility, as more problems solved upfront and more focus on several feasible alternatives.
- When we see a great disaster – That is normally caused by a series of small bad decisions, none of which would have caused a fatality on its own! [McGinn, 2013]

  *"**Deepwater Horizon Oil Spill**: ….. blamed BP and its partners for a series of cost-cutting decisions…. (Wiki)"*

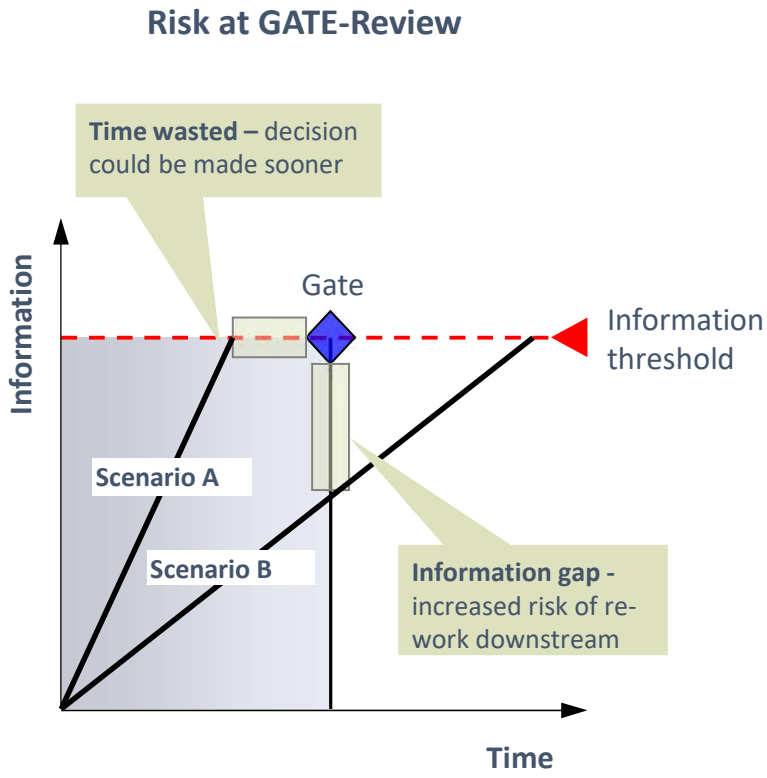
- Do not wait, define your required DM process and work accordingly!

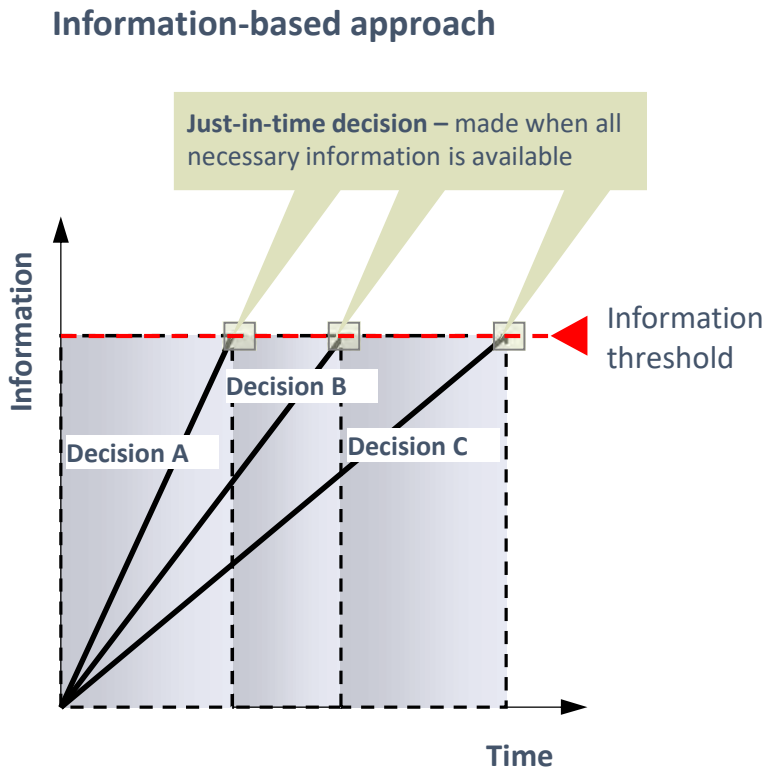
KEY DECISIONS *vs* GATE MODELS

- As PM, define your critical decisions that you can foresee, apply the DM Process.
- For R&D projects – Gate-models is commonly applied. Synchronize.
- Normally a quite demanding situation, some support on next slide.



INFORMATION BASED APPROACH





[The Future of Product Development", The McKinsey Quarterly, Vol. 2003]

OUTLINE (as sent and generic)

09:15-09:30 KAFFE

09:30-10:15 INTRODUKION AGILT (inklusive relationen till den man kallar vattenfall / V-Modell)

10:15-10:45 START AV PROJEKT OCH ÖVNING ”SJÄLVSKATTNING NULÄGE”

10:45-11:00 KAFFE

11:00-12:00 AGIL PLANERING OCH ORGANISATION

12:00-12:45 LUNCH

12:45-13:30 ÖVNING AGIL PLANERING

13:30-13:45 GENOMGÅNG OCH DISKUSSION AV ÖVNING

13:45-14:30 METODER, VERKTYG SOM STÖDJER AGILT GENOMFÖARNDE

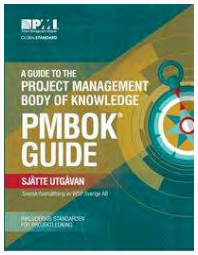
14:30-15:00 KAFFE, DISKUSSION OCH FRÅGOR

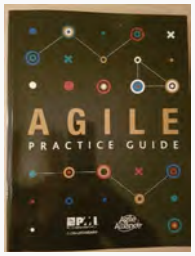
OUTLINE (contect)

- INTRODUCTION
- DEFINITION PROJECT MANAGEMENT
- DEMANDING ENVIRONMENT
- CONTEXT PROJECT MANAGEMENT
- INTRODUCTION AGILE
- SELF ASSESSMENT
- AGILE PLANNING
- VISIBLE PLANNING (Obeya)
- TEAM / ORGANIZATION
- INNOVATION
- WORKSHOP
- SET-BASED
- DECISION MAKING
- **DISCUSSIONS AND CLOSING**

Workshop

Agil produktionsutveckling





Literature
Ex. Agile project Management
Tomas Gustavsson

www - Scrum alliance, Etc.

Few best practice mechanical industry SE
SAAB Aerostructure, Volvo, etc.

Prof. Björn Fagerström 2020-02-18

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ASSAR I Skövde