

Implementing an organizational capability for systems management - a model based approach

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Outline

- WHAT is happening and WHY is this important?
- WHAT can I do about it?
- HOW do I do it (and don't do it)?
- WHAT will be the results?



PHILIPS



MYCRONIC



BAE SYSTEMS



VOLVO



excellence in systems
lifecycle management

KOCKUMS



DeLaval

BOMBARDIER



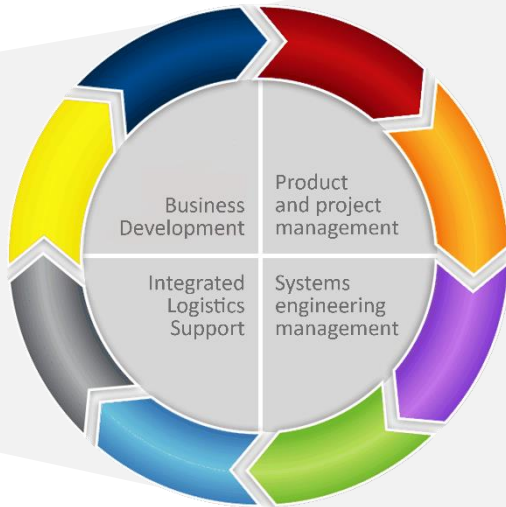
NOKIA



KMW



Our business - INDUSTRY



	Defence	Transport	Heavy Vehicles	MedTech	Other Industry
Strategy	Active	Active	Active	Active	Active
Business Development	Active	Active	Active	Active	Active
Capability Development	Active	Active	Active	Active	Active
Project Support	Active	Active	Active	Active	Active
Acquisition Support	Active	Active	Active	Active	Active
Bid Support	Active	Active	Active	Active	Active
Training Services	Active	Active	Active	Active	Active

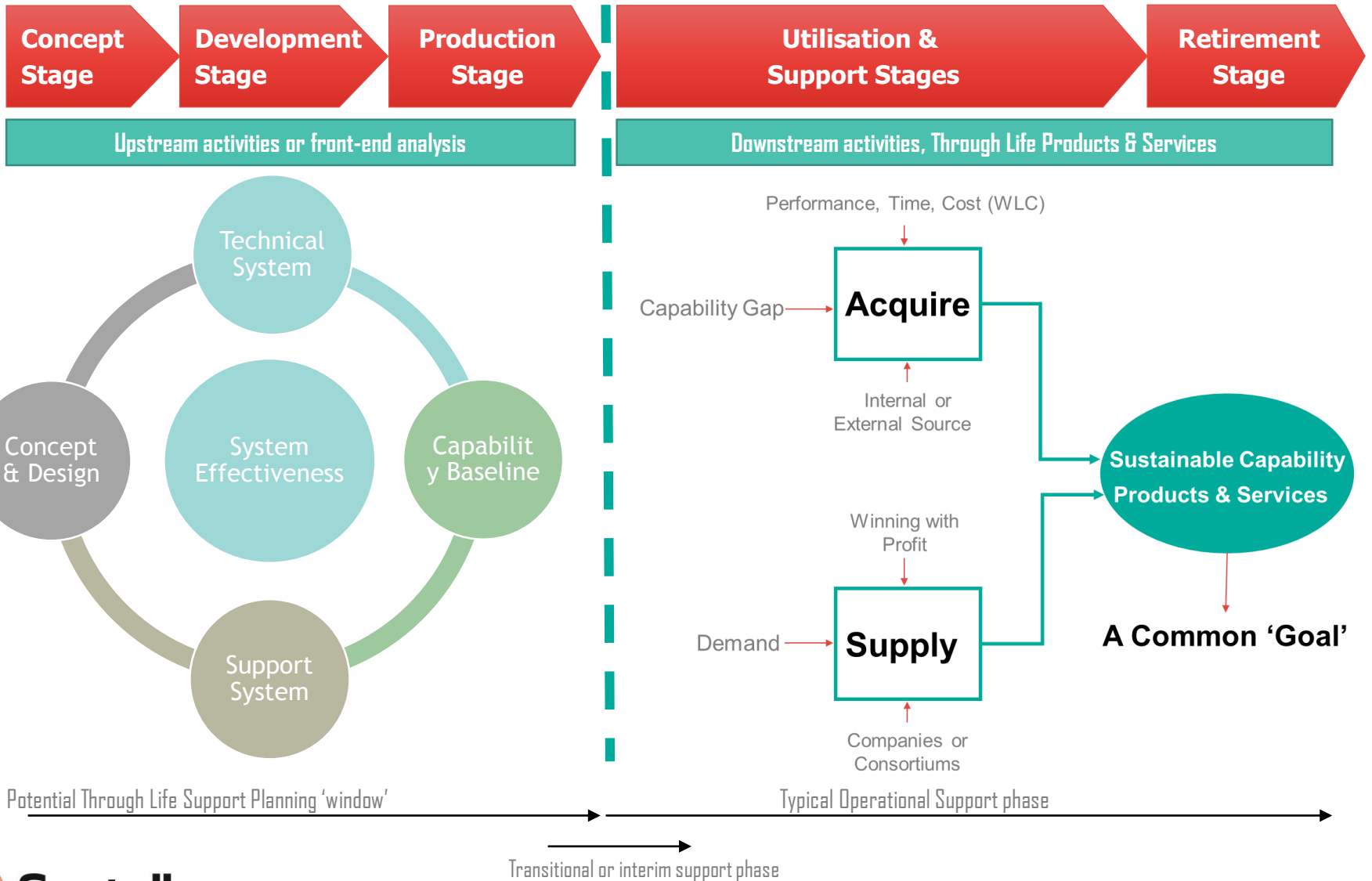
OUR CLIENTS



Stockholms läns landsting



SYSTEMS & LIFECYCLE PERSPECTIVE



Competencies, www.Syntell.se

The screenshot shows the Syntell website's 'Kompetenser' (Competencies) page. The page features a teal header with the Syntell logo and a main heading 'Kompetenser'. Below the header is a grid of nine competency areas, each with a title and a brief description. The grid is organized as follows:

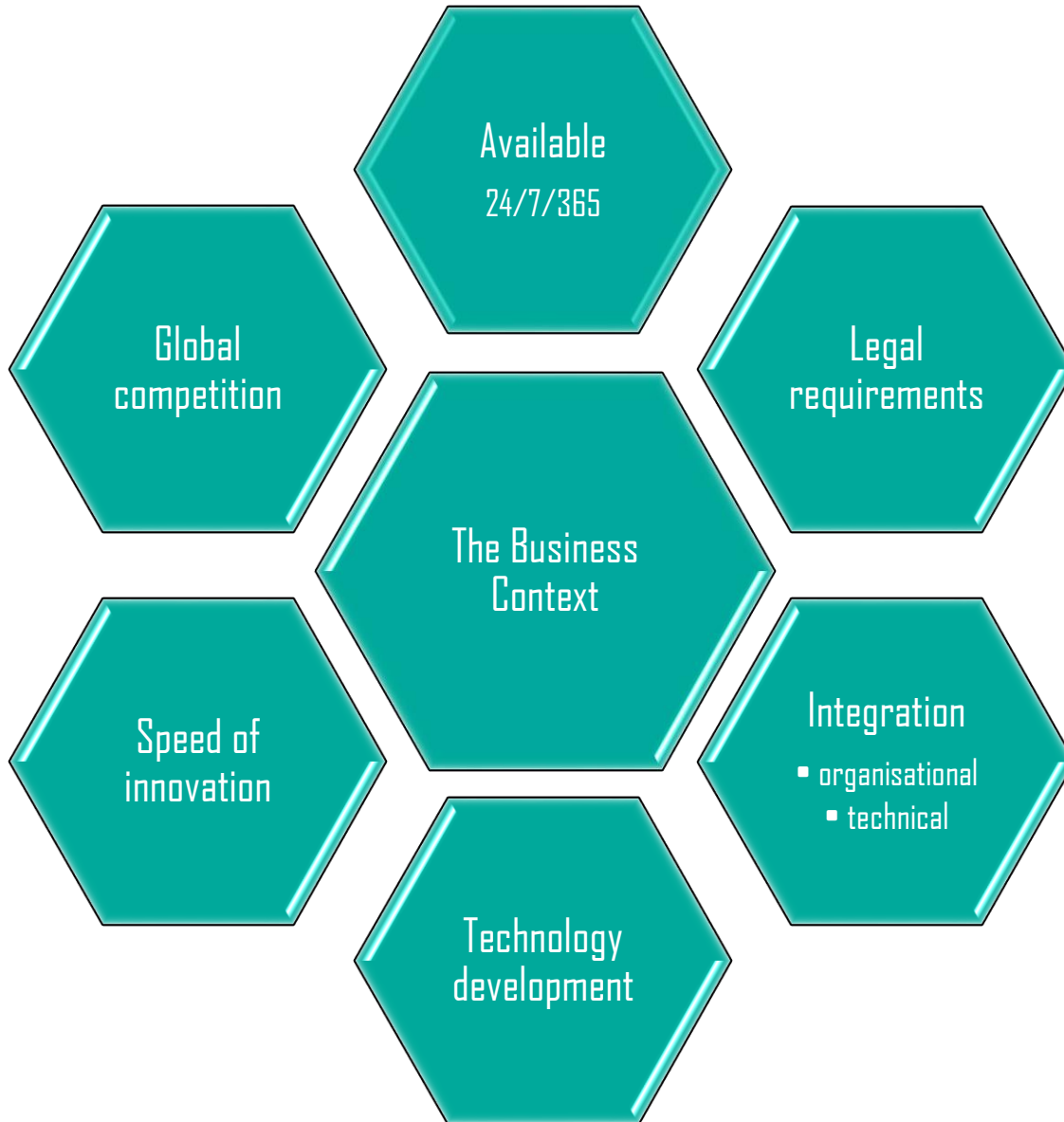
LÖNSAMHET OCH NYTTA KOMBINERAT Cirkulär Ekonomi	PLANERA FÖR HELA LIVSCYKELN! Systems Engineering	SKAPA EN EFFEKT ÖVER TIDEN Integrated Logistics Support
LÖS RÄTT PROBLEM! Kravhantering	FÖRENKLA KOMPLEXITET Enterprise Architecture	INFORMATION SOM TILLGÅNG Informationsarkitektur
KONTROLL GENOM LIVSCYKELN Configuration Management	SÄKERHET I KOMPLEXA SYSTEM Systemsäkerhet	FRAMGÅNG TILL PROJEKT Projektledning

At the bottom of the grid, there is a red banner with the text: 'AKTUELLA KURSER: in Systems Architecting Fundamentals | Summer School 2016 on Systems Engineering Fundamentals'. The left sidebar contains a navigation menu with items like 'START', 'SEMINARIER & EVENTS', 'KURSER & UTBILDNINGAR', 'VÅRA TJÄNSTER', 'PRODUKTER OCH LÖSNINGAR', 'REFERENSER', 'KOMPETENSER', 'KARRIÄR', 'OM OSS', 'KNOWLEDGE BASE', 'SYNTELL & PARTNERS', and 'KONTAKT'. A search bar is also present at the bottom of the sidebar.

Summer School
A unique learning experience

WHAT is happening and WHY is this important?

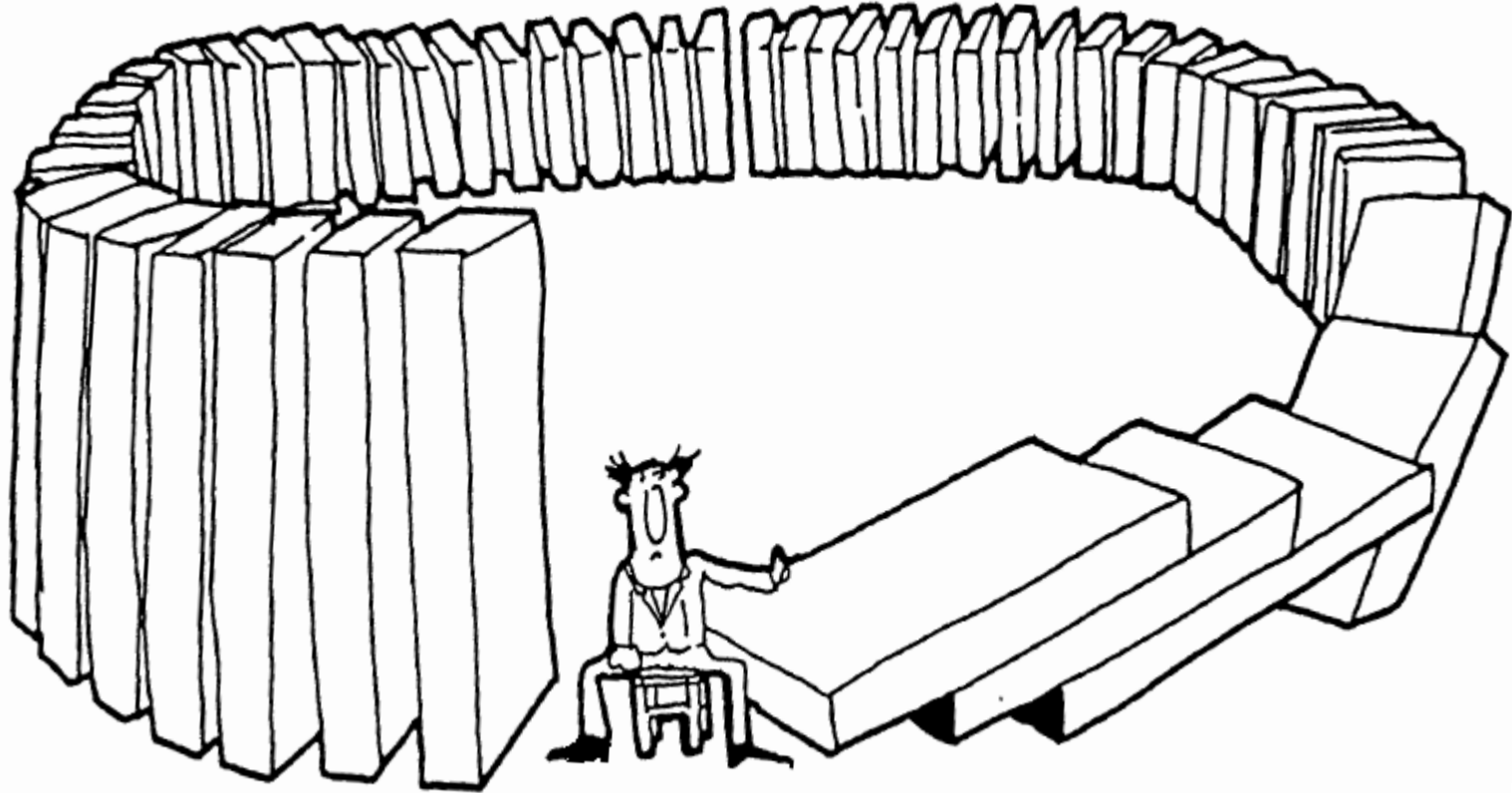
Market trends



Increasing pressure to ...

Act!





Decisions - in an increasingly complex environment, the effect is difficult to predict

What can You do about it?

Managing complex systems ...

- Systems thinking
 - Understand the real problem
 - Understand the cause and effect
- Systems Engineering
 - Define a balanced solution to meet stakeholder´s needs and requirements
 - Establish traceability between need and solution
- Asset Management
 - Managing your physical assets over time to maximize benefits

Systems Thinking

Definition of a 'System':*

- A system is a group of interacting, interrelated, and interdependent components that form a complex and unified whole

Systems have several defining characteristics* :

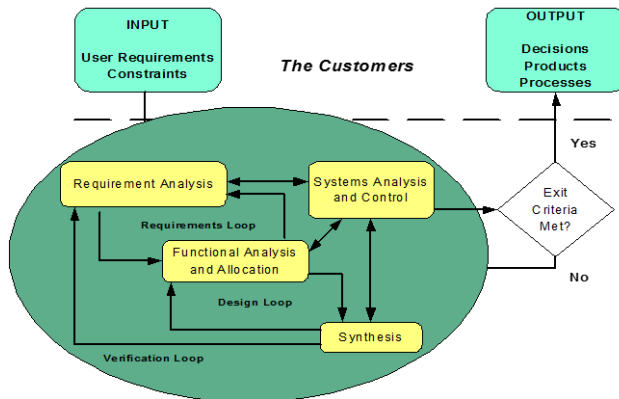
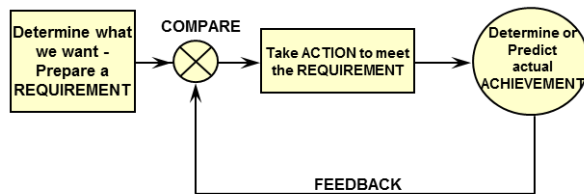
- Every system has a purpose within a larger system
- All of a system's parts must be present for the system to carry out its purpose optimally.
- A system's parts must be arranged in a specific way for the system to carry out its purpose.
- Systems change in response to feedback.
- Systems maintain their stability by making adjustments based on feedback.

* Extracted from: <https://thesystemsthinker.com/>

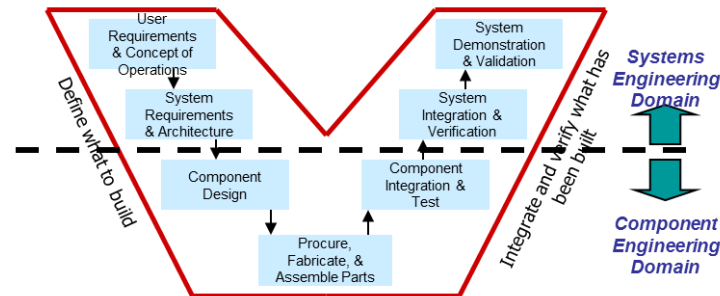
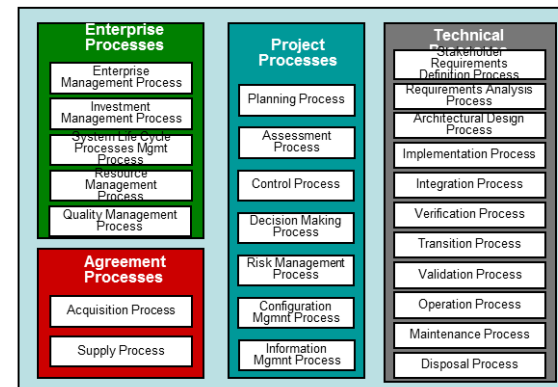
Systems Engineering

Interdisciplinary approach governing the total technical and managerial effort required to transform a set of customer needs, expectations, and constraints into a solution and to support that solution throughout its life.

(ISO/IEC/IEEE 2010)



ISO/IEC 15288 Processes



SE and ISO 15288 Key Concepts

Definitions

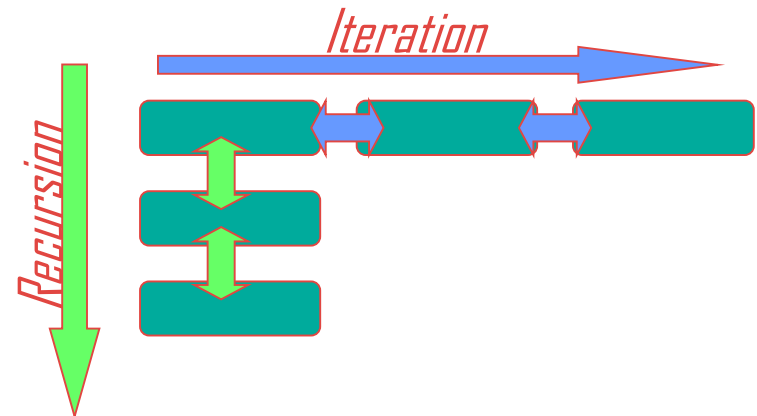
- Systems of Interest and Enabling Systems
- System and System element
- Systems comprise Hardware, Software and "Humanware", aka Cyber-Physical Systems (CPS) - 15288 puts SW in a system context

Building Blocks

- Processes (30 to be tailored)
- Life Cycle Model (sample stages illustrated in 2002 version)

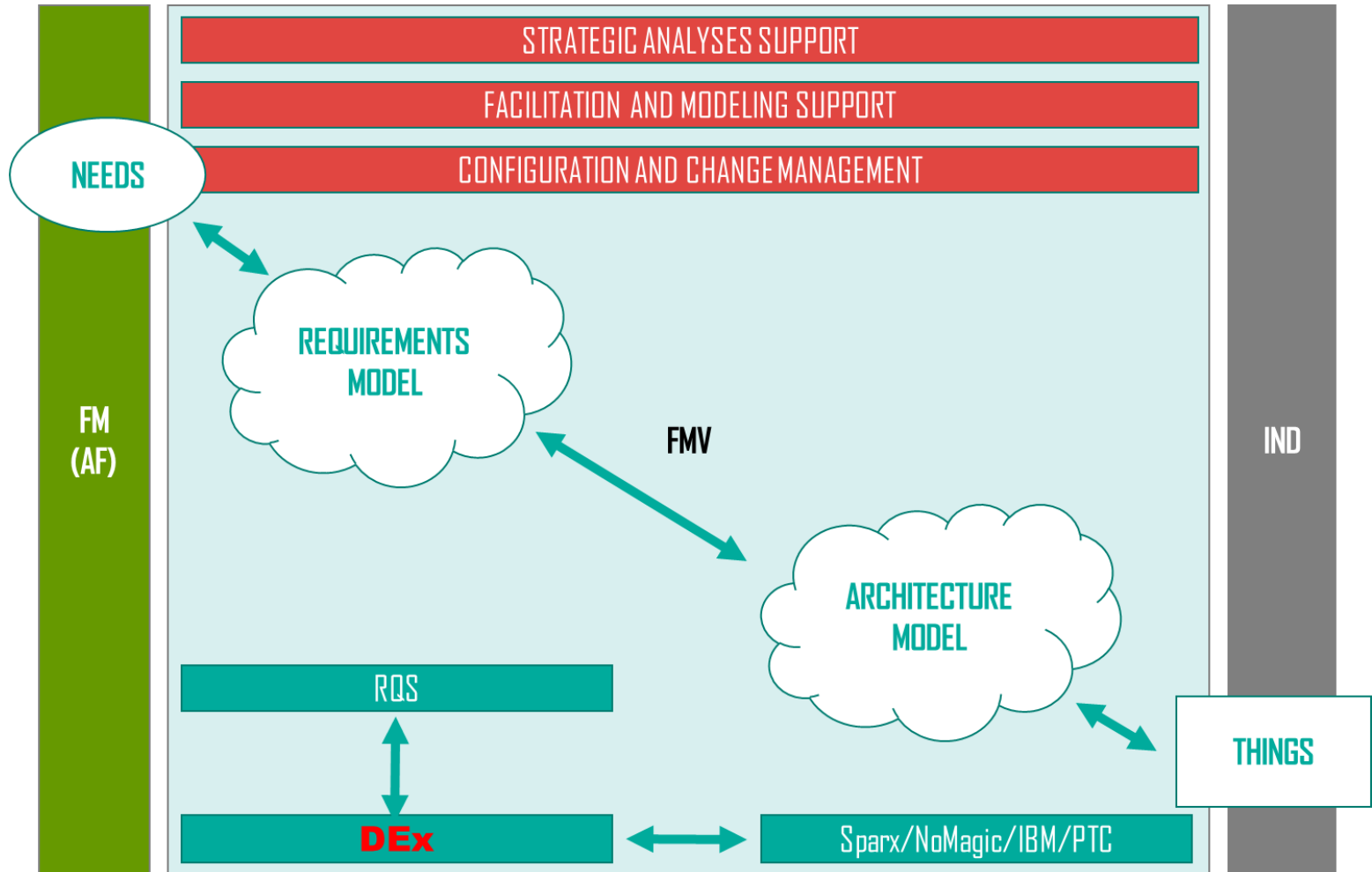
Use

- Project Centric View
- Recursive Utilization
- Iterative Utilization



SE - establish traceability

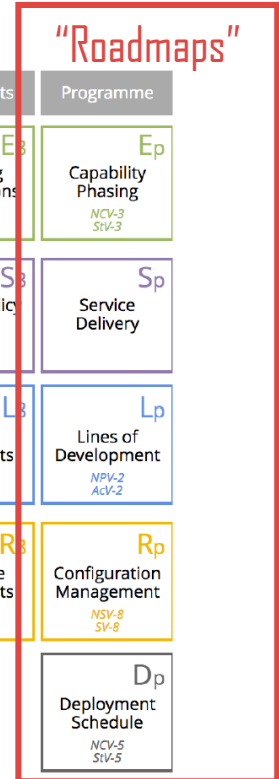
From Need to Solution



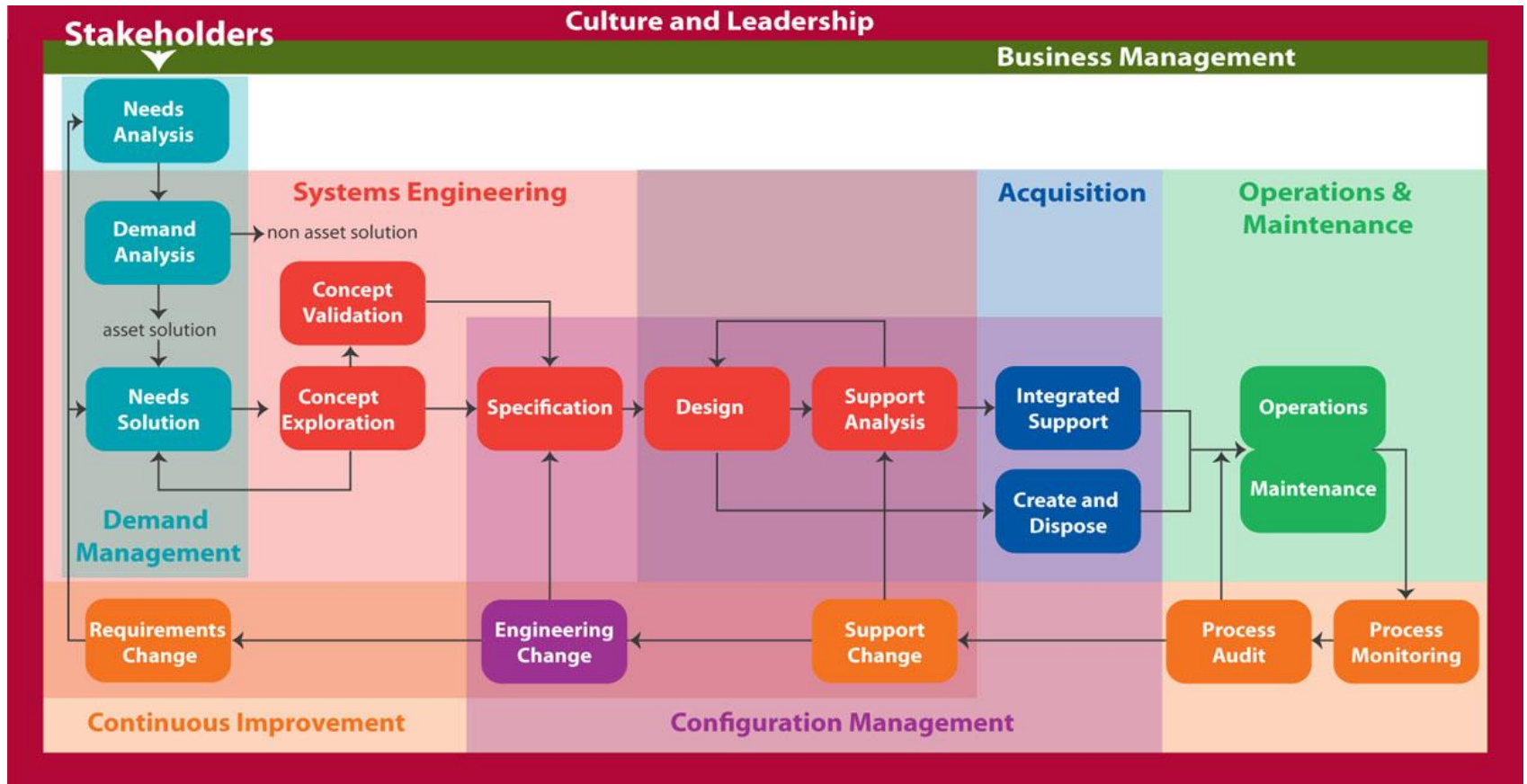
Architecture Framework NAF 4.0

- Grid approach (compare Zachmann / TOGAF)
- Provides "Roadmap" views

	Behaviour								
	Classification	Structure	Connectivity	Processes	States	Sequences	Information	Constraints	Programme
Enterprise	E1 Capability Taxonomy <small>NAV-2, NCV-2 AV-2, SV-2</small>	E2 Enterprise Vision <small>NCV-1 SV-1</small>	E3 Capability Dependencies <small>NCV-4 SV-4</small>	E4 Standard Processes <small>NCV-6 SV-6</small>	E5 Effects		E7 Performance Parameters <small>NCV-1 SV-1</small>	E8 Planning Assumptions	E _p Capability Phasing <small>NCV-3 SV-3</small>
Service	E1-S1 (NSOV-3) S1 Service Taxonomy <small>NAV-2, NSOV-1 AV-2, SOV-1</small>		S3 Service Interfaces <small>NSOV-2</small>	S4 Service Functions <small>NSOV-3 SOV-5</small>	S5 Service States <small>NSOV-4b SOV-4b</small>	S6 Service Interactions <small>NSOV-4c SOV-4c</small>	S7 Service I/F Parameters <small>NSOV-2 SOV-2</small>	S8 Service Policies <small>NSOV-4a SOV-4a</small>	S _p Service Delivery
Logical	L1 Node Types <small>NAV-2 AV-2</small>	L2 Logical Scenario <small>NOV-2 OV-2</small>	L3 Node Interactions <small>NOV-2, NOV-3 OV-2, OV-3</small>	L4 Logical Activities <small>NOV-5 OV-5</small>	L5 Logical States <small>NOV-6b OV-6b</small>	L6 Logical Sequence <small>NOV-6c OV-6c</small>	L7 Logical Data Model <small>NSV-11a OV-7</small>	L8 Logical Constraints <small>NOV-6a OV-6a</small>	L _p Lines of Development <small>NPV-2 ACV-2</small>
Resources	R1 Resource Types <small>NAV-2, NSV-9 AV-2, SV-9</small>	R2 Resource Structure <small>NOV-4, NSV-1 OV-4, SV-1</small>	R3 Resource Connectivity <small>NSV-2, NSV-6 SV-2, SV-6</small>	L4-R4 (NSV-5) R4 Resource Functions <small>NSV-4 SV-4</small>	R5 Resource States <small>NSV-10b SV-10b</small>	R6 Resource Sequence <small>NSV-10c SV-10c</small>	R7 Physical Data Model <small>NSV-11b SV-11</small>	R8 Resource Constraints <small>NSV-10a SV-10a</small>	R _p Configuration Management <small>NSV-8 SV-8</small>
Deployed	D1 Master Data <small>NAV-2 AV-2</small>	D2 Deployed Resources <small>NCV-5, NOV-4 SV-5, OV-4</small>							D _p Deployment Schedule <small>NCV-5 SV-5</small>
Architecture	A1 Meta-Data Definitions <small>NAV-3 AV-1/2</small>	A2 Architecture Products	A3 Architecture Correspondence <small>ISO42010</small>	A4 Methodology Used <small>NAF Ch3</small>	A5 Architecture Status <small>NAV-1 AV-1</small>	A6 Architecture Versions <small>NAV-1 AV-1</small>	A7 Architecture Meta-Data <small>NAV-1/3 AV-1</small>	A8 Standards <small>NTV-1/2 TV-1/2</small>	A _p Architecture Plan



(Physical) Asset Management



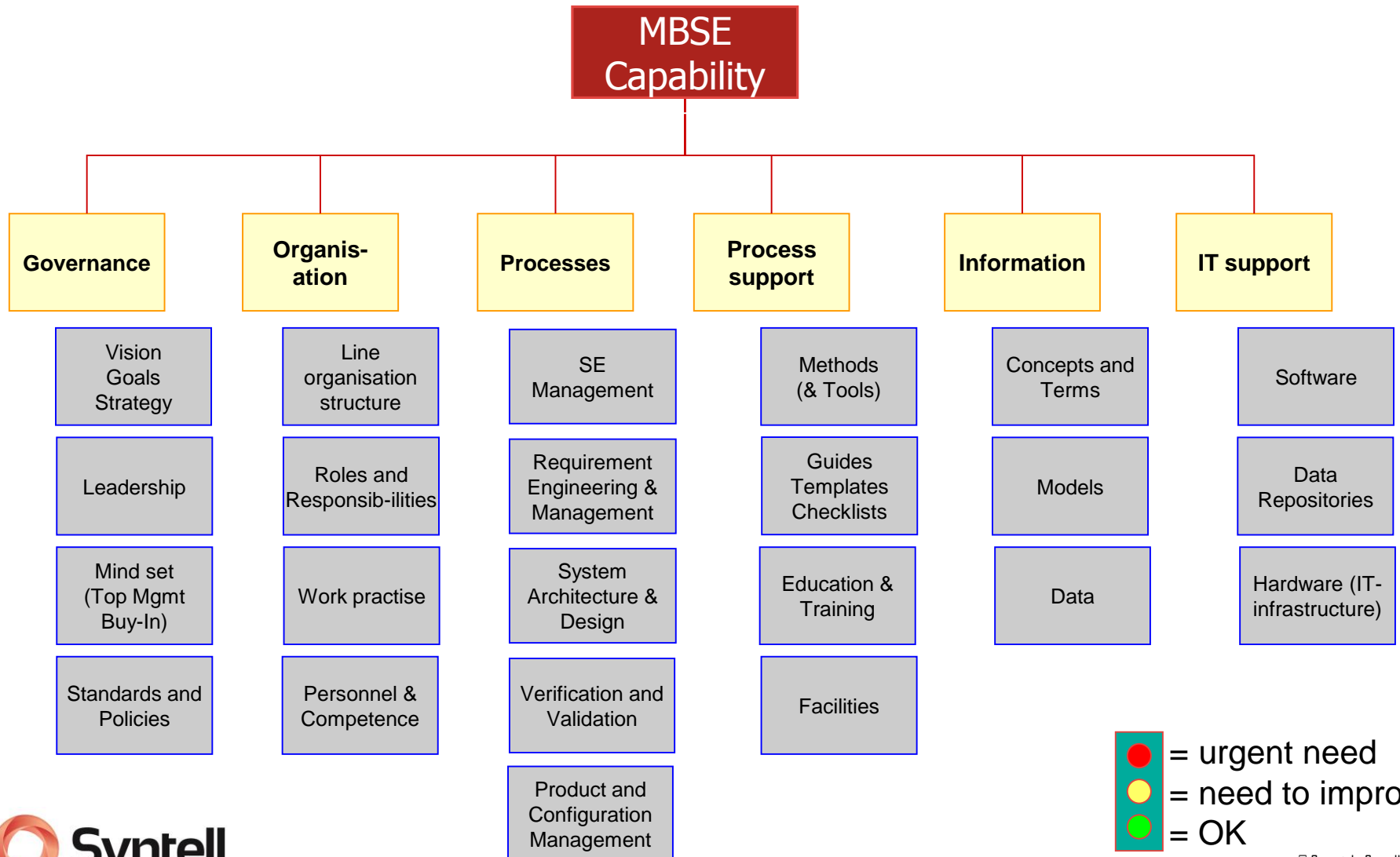
**Asset Management Council AM Framework
Reference to ISO 55000 and 15288**

How do you do it?

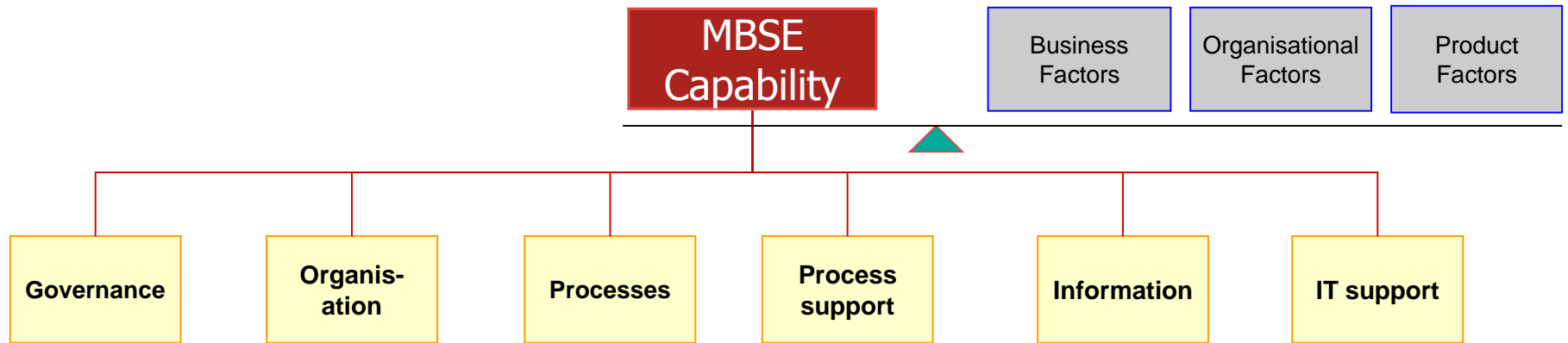
Model-based SE

- Managing complex relationships requires simplification, i.e. modeling
- Coming of age
- Methods and tools exist
- Acceptance suffered from bad implementations
 - ... (numerous examples)
 - and to do MBSE, you need first to do SE!
- Building a capability
 - Is more than a tool ...

MBSE Capability Model



Balancing the Capability with Business Needs and Situation



Need



Run the business



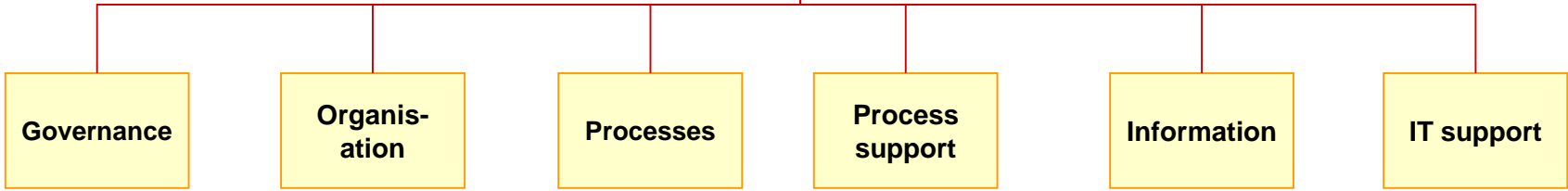
Effect

MBSE Capability

Business Factors

Organisational Factors

Product Factors



Mind-set: Stöd i att definiera en tydlig målbild i form av vilka modeller som tas fram för att möta behov

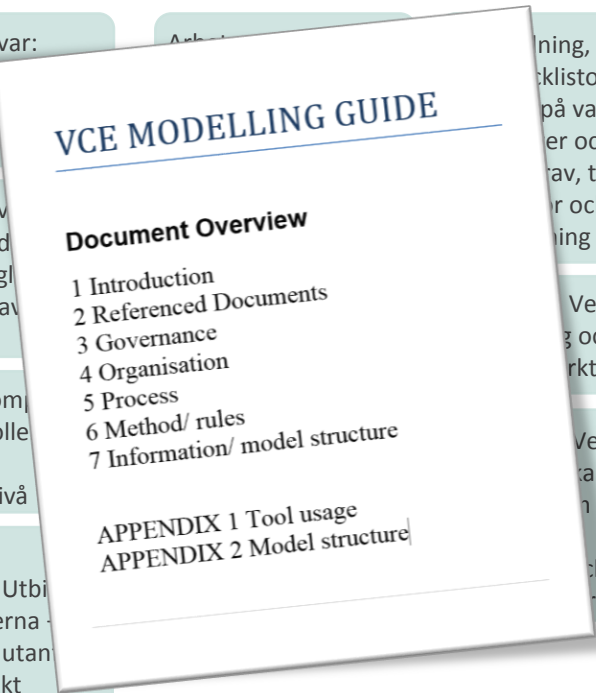
Visioner och Mål: Stötta argumentation och samarbete med Projekt X och Model-Based Dev.

Roller & Ansvar: Löpande med för kvalitetsmodellen

Roller & Ansvar: Definiera nödroller och regler ägandeskap av modellen.

Personal & Kompetens: Definiera roller och lämplig kompetensnivå

Personal & Kompetens: Utbilda olika rollerna extra kurser utan detta kontrakt



Arbetsmetoder: Skapning, mallar och checklistor: på valda områden och utvärdering, ta fram krav, ta fram krav och mallar för modellering

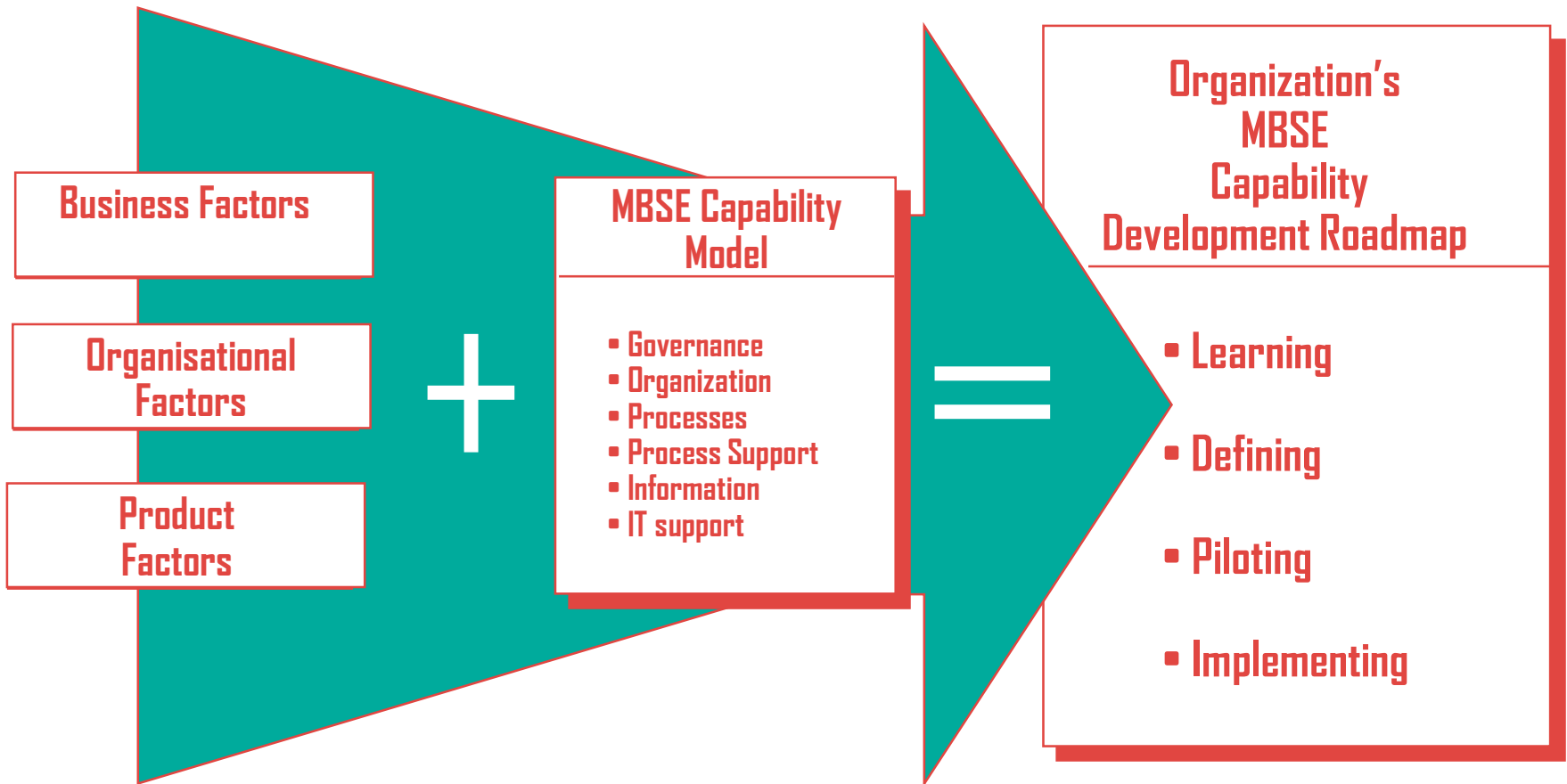
Verktyg: Utvärdering och val av verktyg

Verktyg: Skapande och användning av verktyg och möten

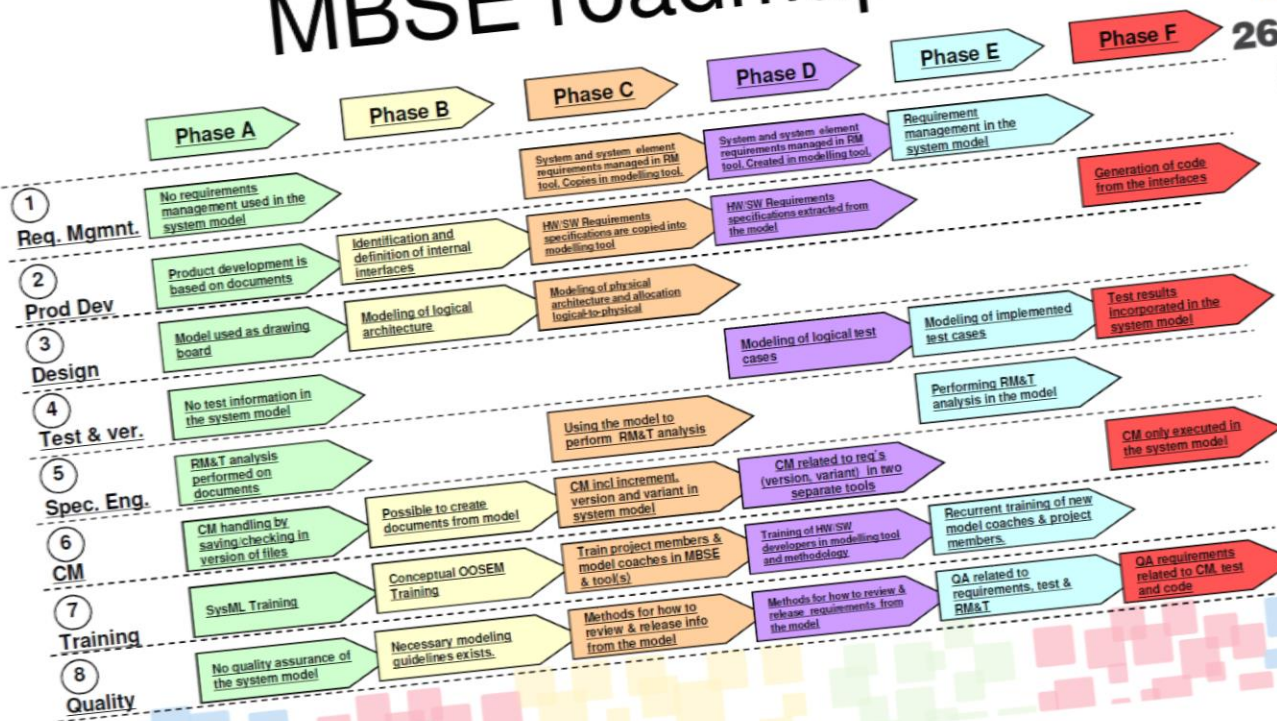
Begrepp & termer: Sammanställ existerande terminologi, synka med gängse etablerad terminologi

IT-stöd: Leda upplägg för konfigurationsledning av modellen

Capability Tailoring Concepts



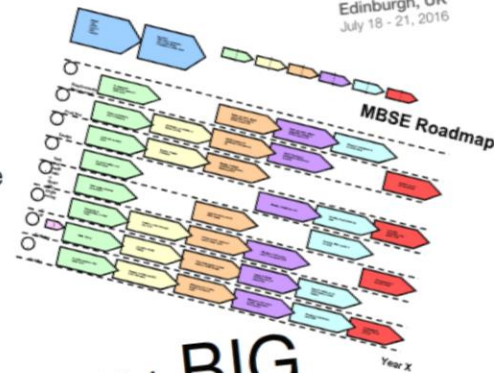
MBSE roadmap



www.incose.org/symp2016

Key issues

- No one succeed with a large and fast introduction of MBSE for complex product development
- All organizations report the need for a careful and well planned change
 - ✓ Identify the need and what problem that is expected to be solved by working with models
 - ✓ Plan the transition into MBSE careful
 - ✓ Perform small steps and evaluate
 - ✓ And always remember the original need and problem
- Provide time to develop methods in sync with introduced change
- Provide time to increase competence base in sync with introduced change



Think **BIG**
Start Small
and **EVOLVE**

www.incose.org/symp2016

What You will win

Improved business and systems mgmt

An improved map to navigate your business from:

- identify impact of change in your market on your system
- define the market mix of services and products
- understand impact of introducing new technology
- Streamline your assets portfolio



Prepared for change

Complexity turned into
competitive advantage!

Questions?

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Syntell

excellence in systems lifecycle management