28th Annual INCOSE international symposium

Washington, DC, USA

July 7 - 12, 2018

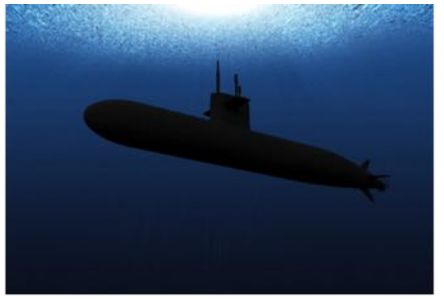
Systems Engineering Quick Check

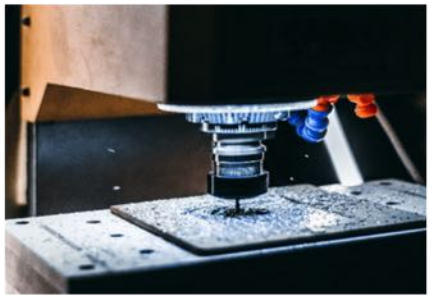
www.incose.org/symp2018

Validation

- The Data are obtained from the UNITY industry knowledge.
- Contains data from SME up to DAX rated companies.





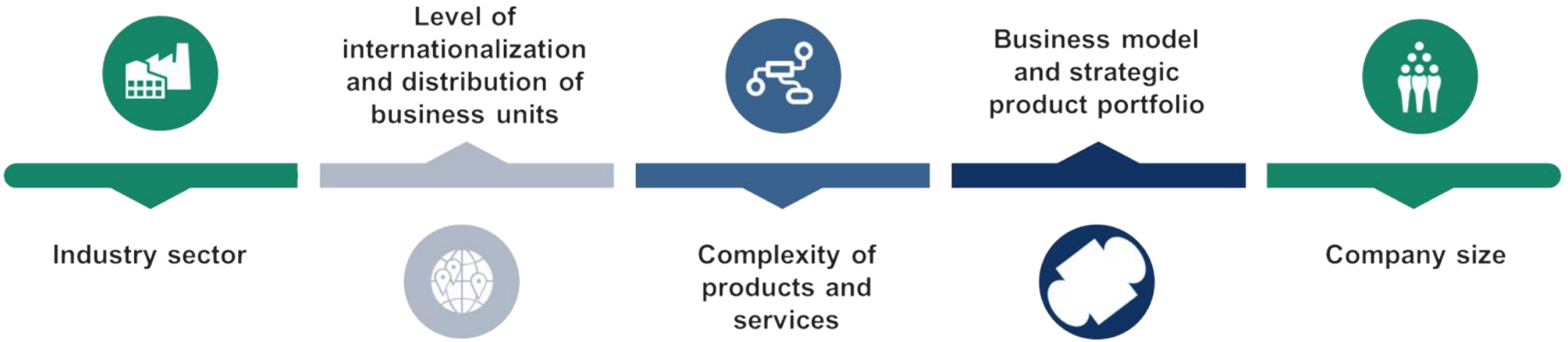
Drivers for Systems Engineering

- The complexity of products and system development projects is increasing enormously in nearby all industry sectors.
- Traditional development approaches with discipline-specific processes are reaching their performance limits. Methods and processes of Systems Engineering.

Characteristics of successful Systems Engineering

- Systems Engineering enables developing complex solutions in large projects.
- A general framework for action is provided by ISO 15288.
- Systems Engineering is based on cross-industry best practices.

Systems Engineering strategies require tailoring



Do I have to use the full blown space or military Systems Engineering approach

Which level and effort is good for our company to be successful in SE


UNITY
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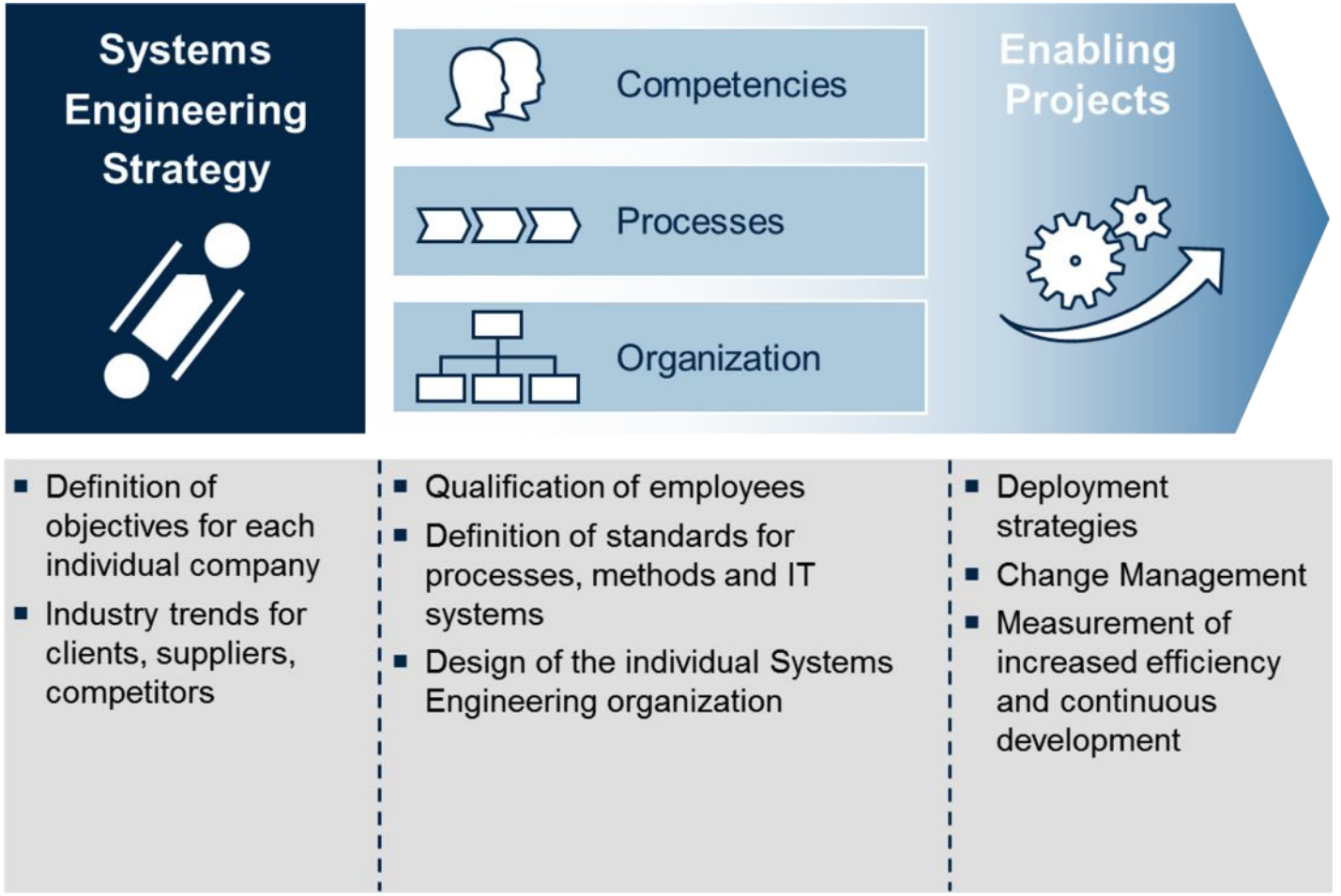
It‘s not enough to do your best;
you must know what to do
and then do your best.
W. Edwards Deming

Do you have all prerequisites in place?

- SE Quick check can help to start SE and improve it.
- A need for change is a prerequisites to start!



Methodology and procedure in 3 steps

1 Determination of an SE target image
- Identification of company-specific conditions
- Adaptation of a target image based on the characteristics of the company

Classification table, influence matrix

2 Determination of initial SE situation and consolidation of an individual SE target image
- Identification of the current SE competences and the initial situation
- Consolidation of an individual target image

SE-Quick Check

3 Elaboration of an SE-Roadmap (Master-Plan of Action)
- Derivation of actions
- Prioritization and implementation planning

Master-plan of Action

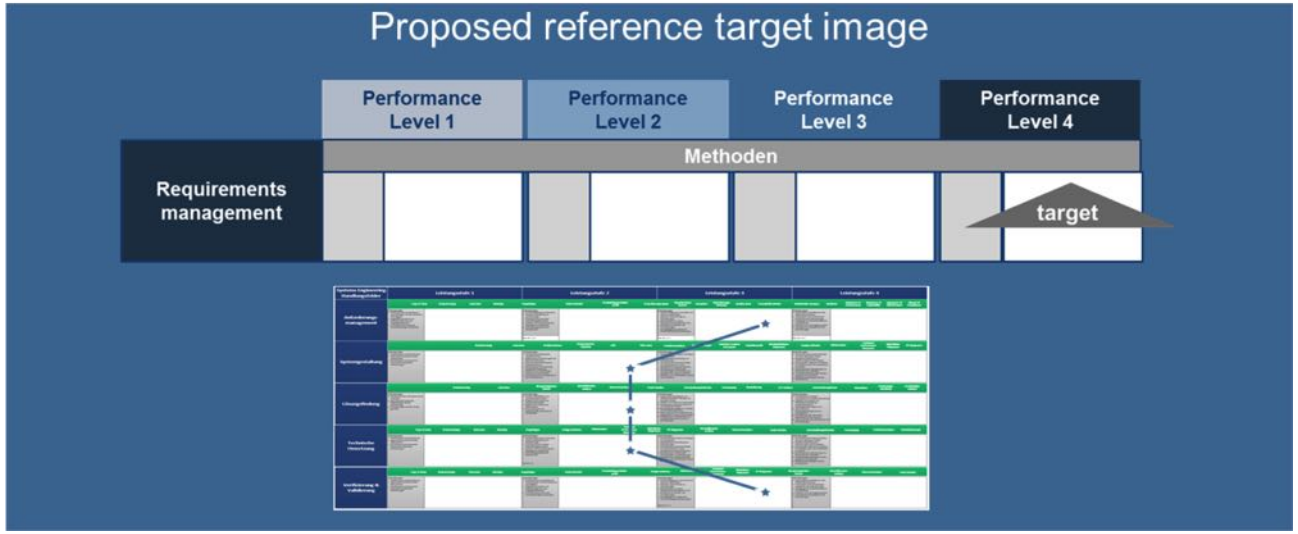
- SE Quick Check is a maturity model that supports its own procedure for introducing, tailoring and optimizing Systems Engineering.
- Companies can elaborate interdisciplinary processes and methods adapted to their constraints

Perform an interview with key stakeholder

- What are the changes the company faces?

  Business model, regulations, distribution of work, new disciplines, portfolio, ….

  To determine the „Reference Target Image“ based on the UNITY knowledge database.



1

Interview

Development duration

1 Less than 1 year

2 1 – 3 years

3 More than 3 years

Product complexity

1 Less than 50 elements

2 50-250 system elements

3 L>250 system elements

Ø As-Is-Time:

Life cycle

Lot size

Development sites

Size of the development department

Value type

Core markets

Certification effort/ burden of proof

Product connectivity

1 Single or contiguous countries

Market type

Market strategy

2 Individual continents / economic communities

Product portfolio

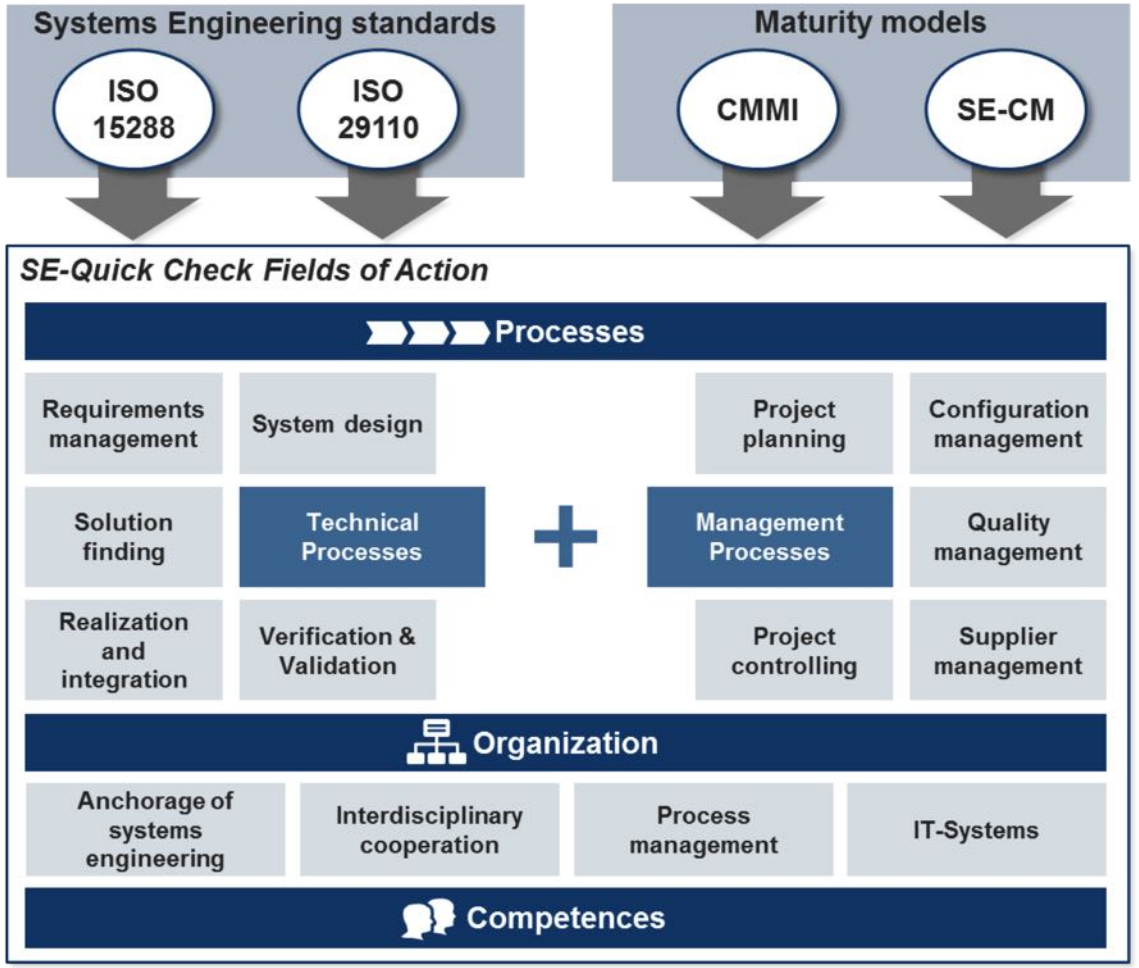
3 Several Continents / Worldwide

Manufacturing type

Fields of action

- The SE Quick-Check fields of action are assigned to three categories and based on existing standards, such as ISO 15288 and ISO 29110.

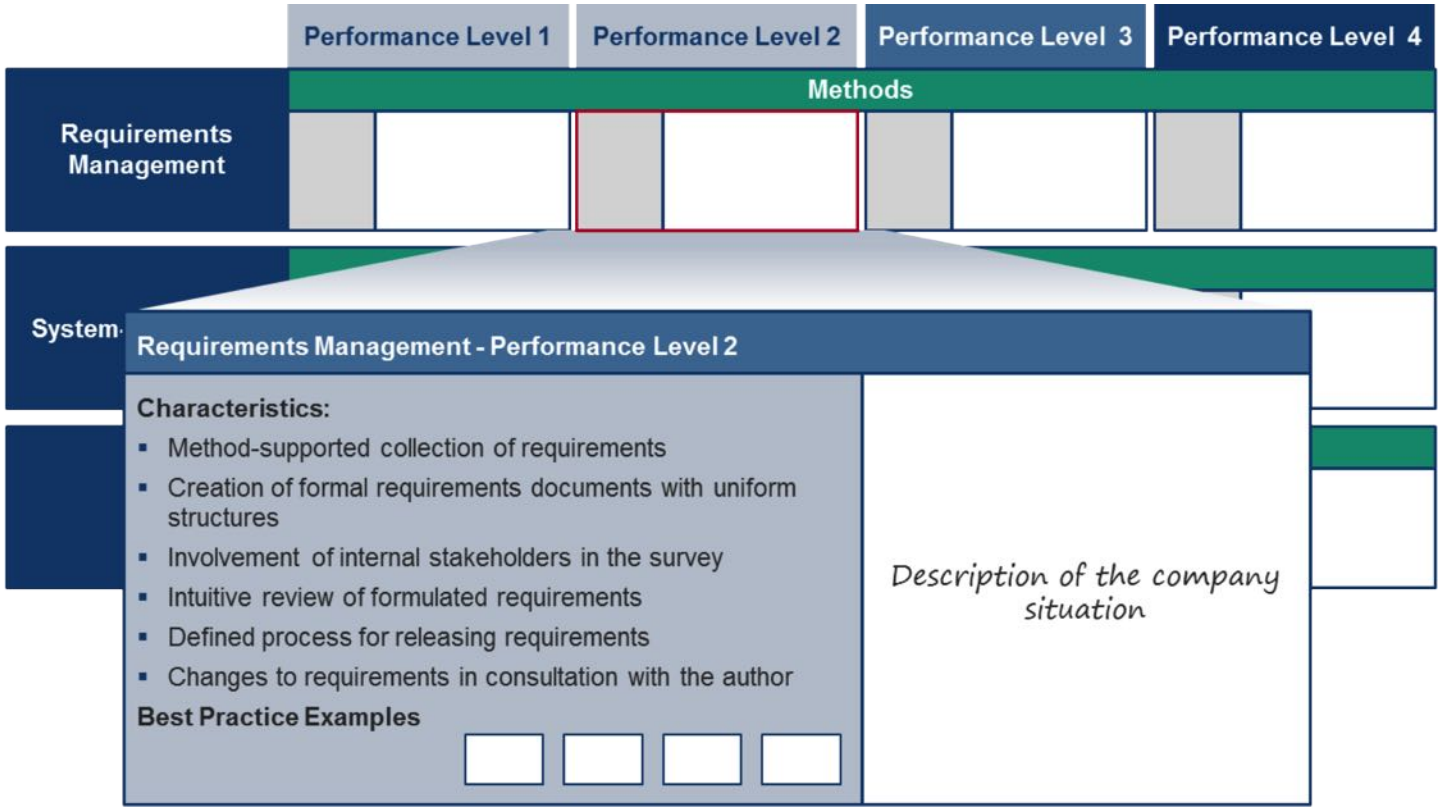
  At the center of the model are the process areas of development.



Performance levels

Practice-oriented description of characteristics in each field of action

- The performance level descriptions can be regarded as requirements that must be fulfilled in order to achieve a certain level of performance.
- They are based on best practices from project experiences in a wide range of industries and common standards.



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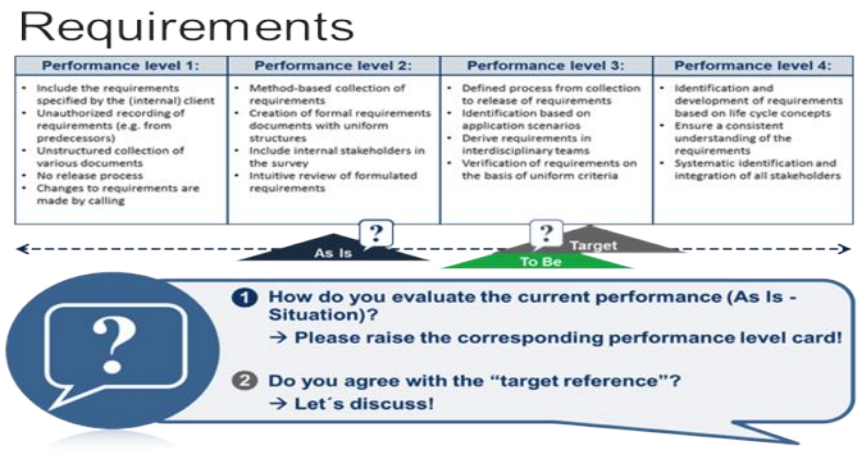
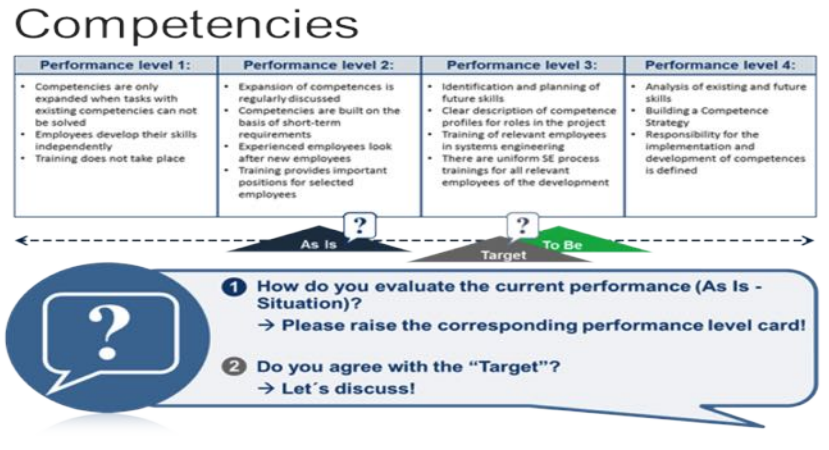
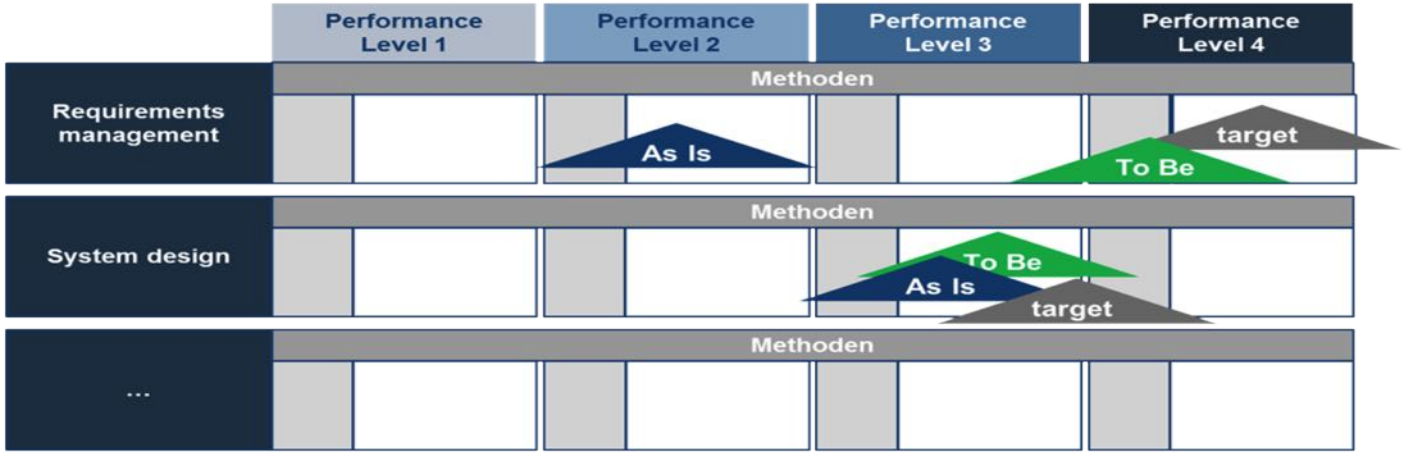
Workshop based evaluation with a team of stakeholders







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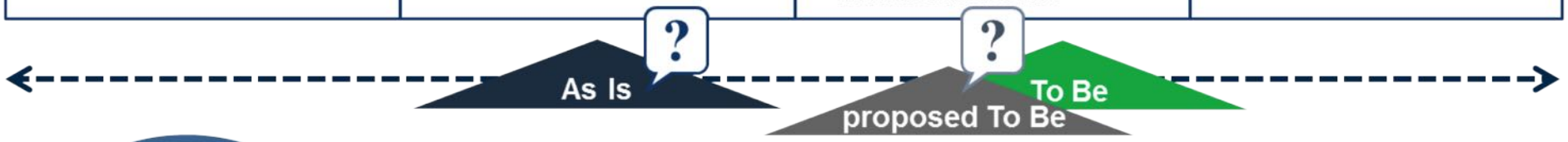
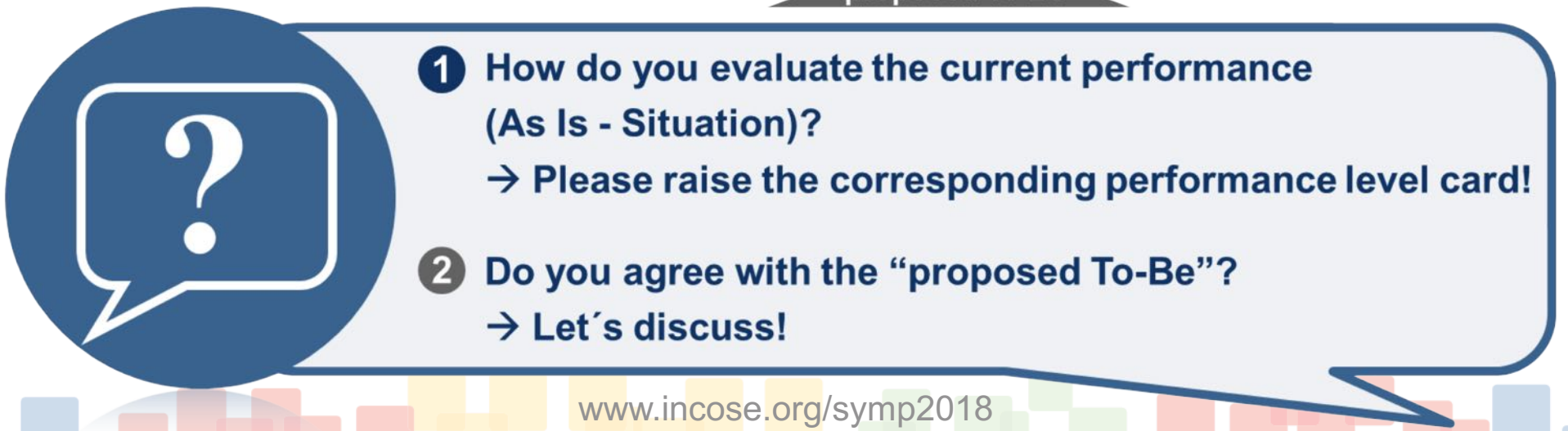
Example: V&V in a Workshop

Performance level 1:	Performance level 2:	Performance level 3:	Performance level 4:
• No uniformly defined approach for V & V • V & V measures start following the development • Tests are carried out as required • There are only real tests, no simulation • An acceptance test does not take place	• Early development of a uniform test plan on system level • Intuitive selection of test cases • Simulations are disciplined • Not all requirements are verified • Approval-relevant tests are carried out	• Development of test plans at all levels of the system • Defined process and uniform methods for V & V • All requirements are verified • Early validation of requirements • V & V activities take into account the future deployment environment • Review of the V & V results with relevant stakeholders	• Uniform standards for the selection of V & V activities • Coordinate a V & V strategy with all relevant stakeholders at the beginning • Formal reviews for the analysis of results with clearly distributed roles • Regular audits and development ofV&V





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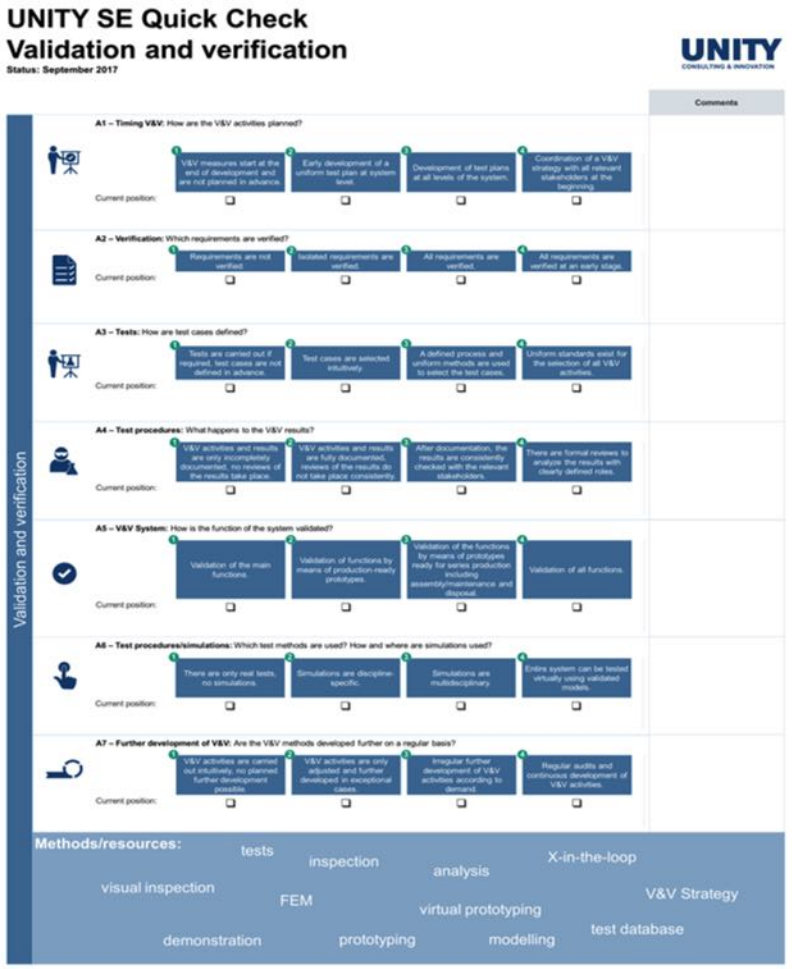
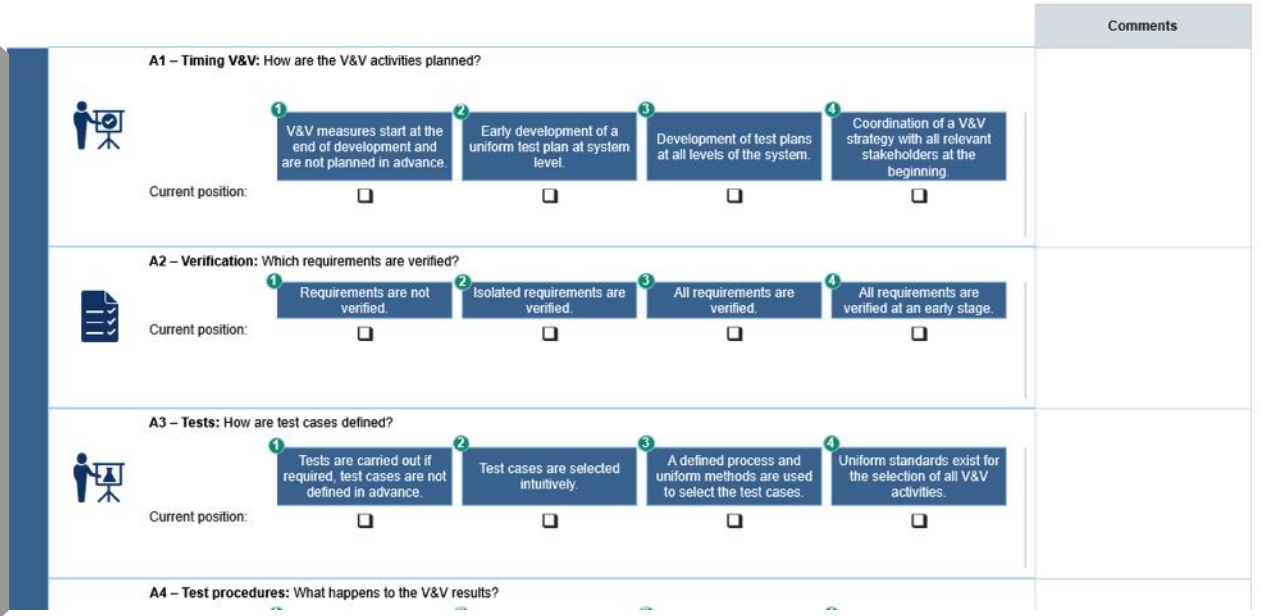
Example: V&V questions to evaluate “As-Is” interview / mailing





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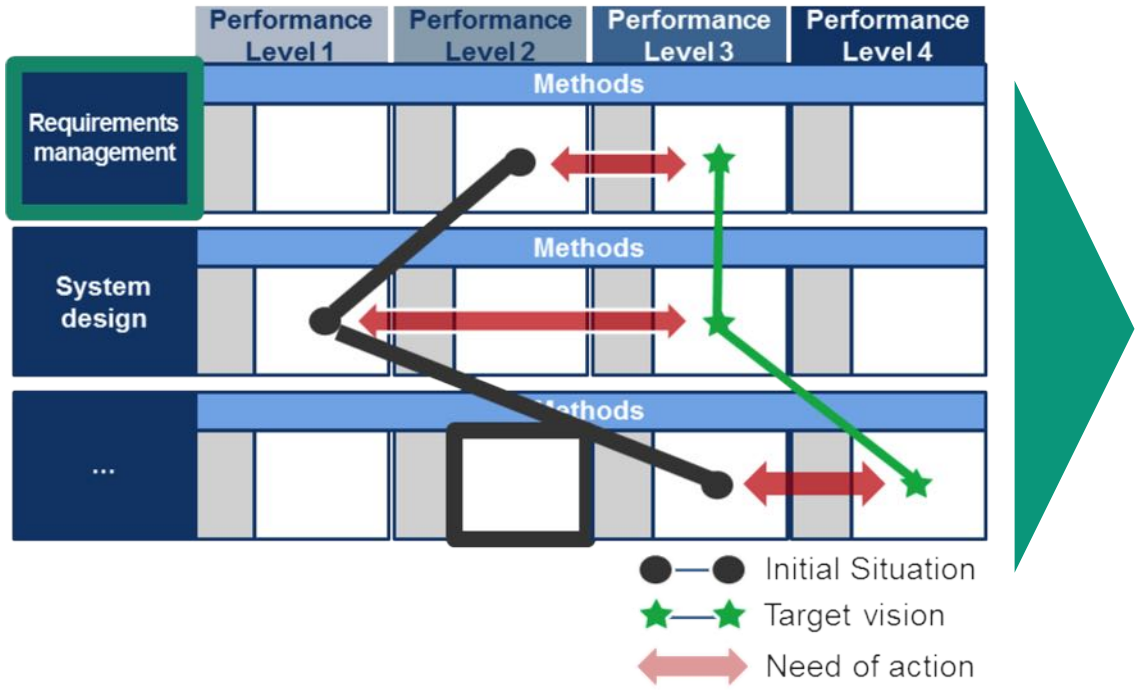
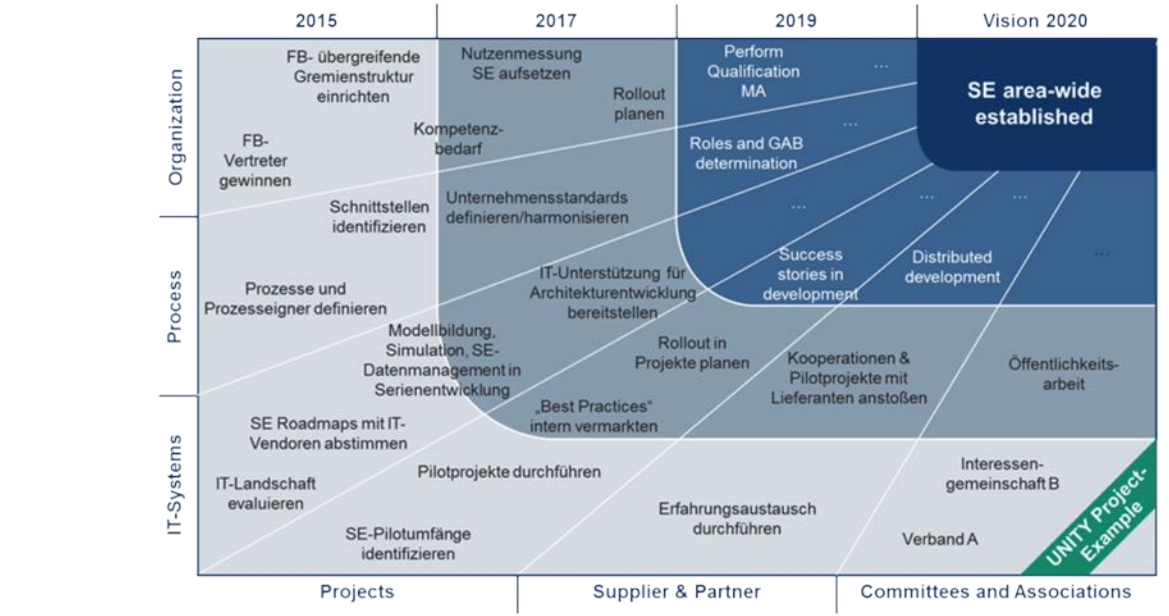
Initial situation and individual target





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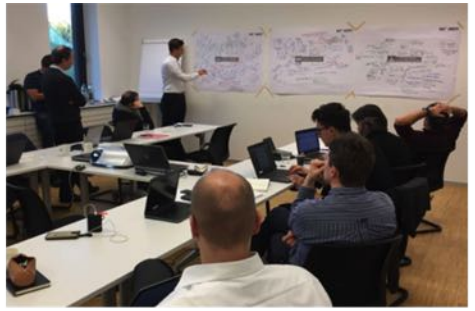
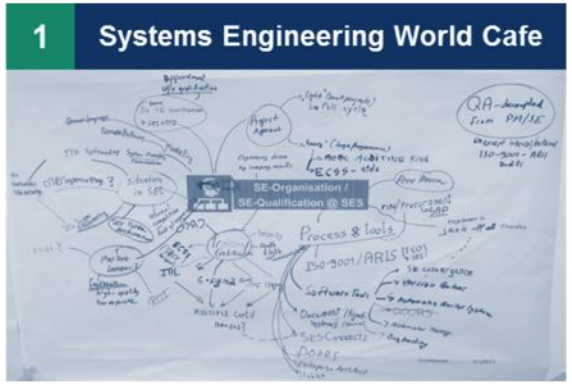
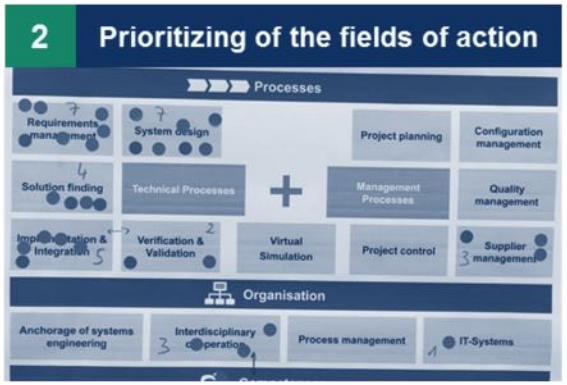
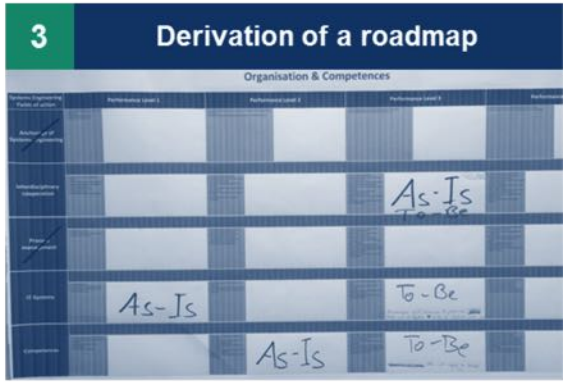
The characteristics are used both to assess the initial situation and to determine an individual target performance level. The sequence and timing of implementation can be transferred to a strategic roadmap.

Workshop impressions from a project

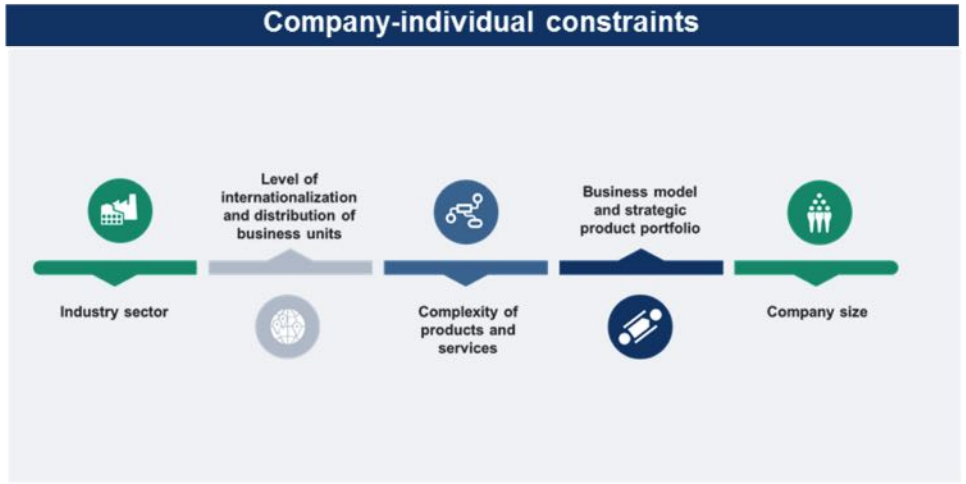




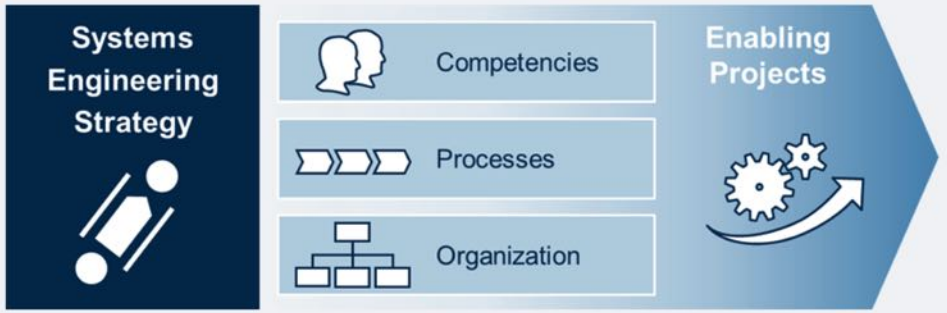




Conclusion



SE Quick-Check



- Tailored strategy to individual constraints
- Holistic approach
- Assessment, strategy development and transformation aspects included
- …
- …

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Presented by Sven-Olaf Schulze & Dr. Daniel Steffen

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