PROJECT of the PEGASUS FAMILY

VERIFICATION VALIDATION METHODS

Final Event 21 / 22 November 2023

How VVM defines and operationalizes a safety case structure for ADS

Jan Reich, Fraunhofer IESE

Supported by:

Federal Ministry for Economic Affairs and Climate Action

on the basis of a decision by the German Bundestag

The VVM assurance framework enables arguing normative requirements

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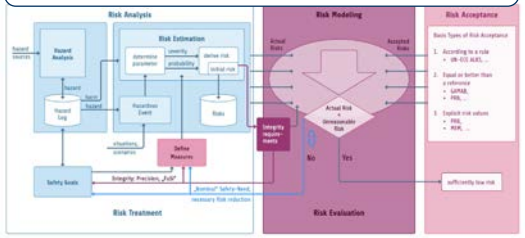
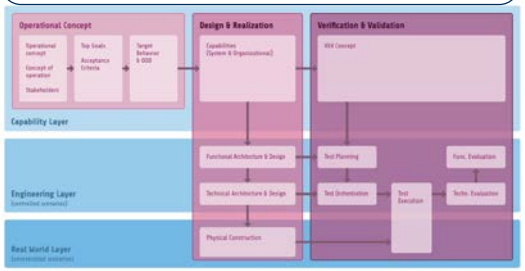
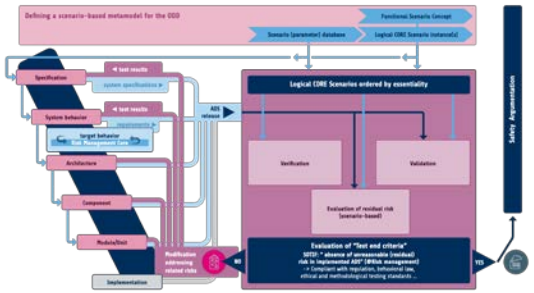
Risk Management



Capabilities, Engineering, Real-World



Scenario approach



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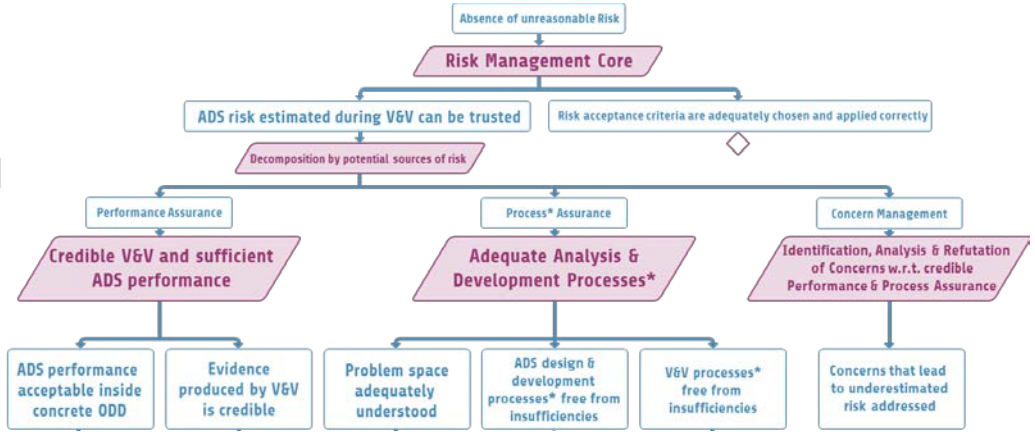
Explicit safety case including argument and evidence



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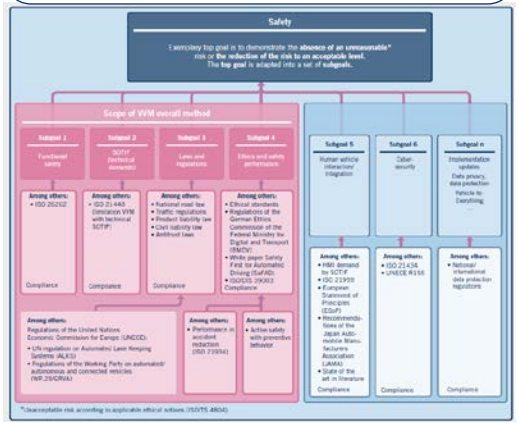
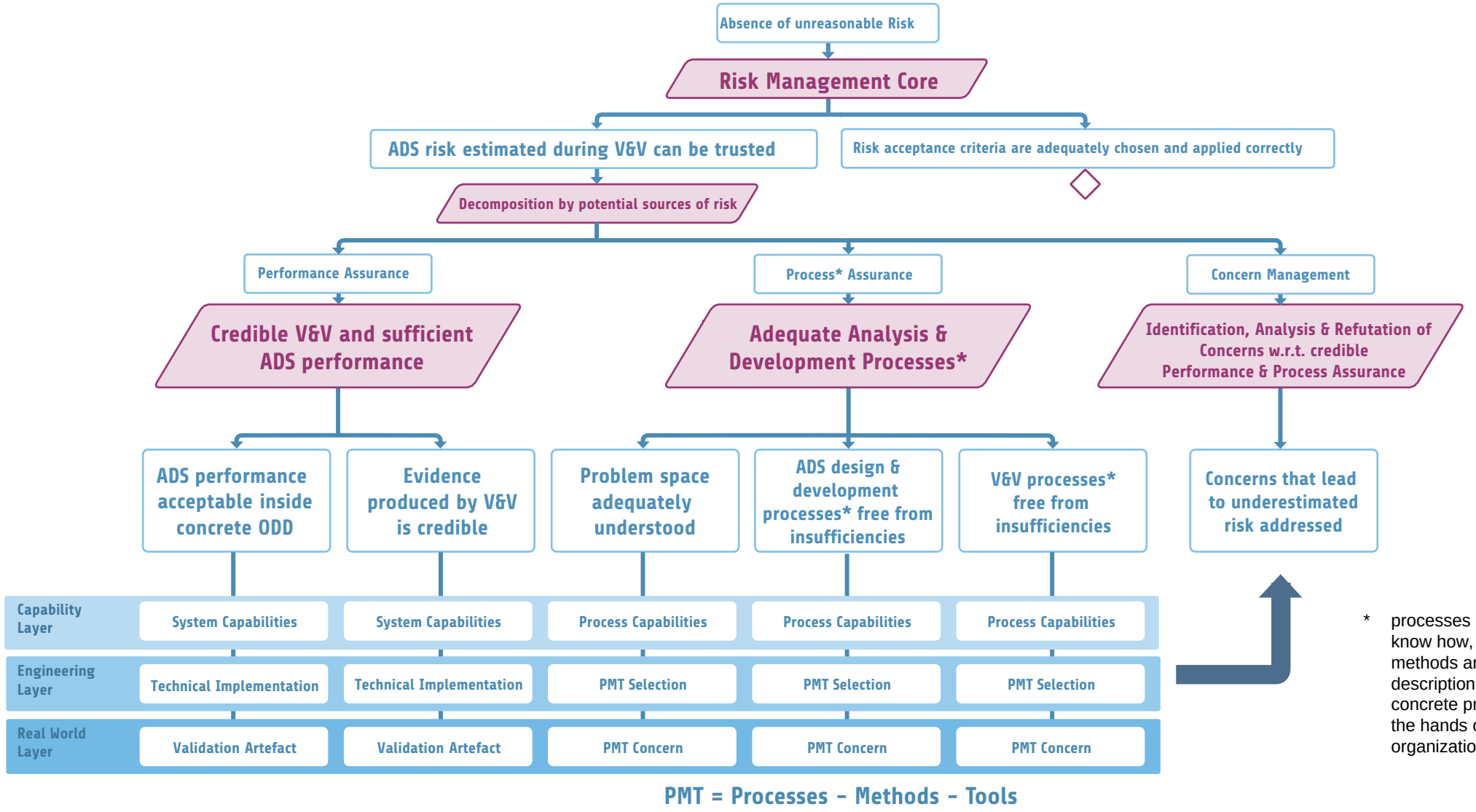
Explainable compliance with normative requirements



What is special about the VVM safety case pattern?



* processes are core in-house know how, VVM focusses on methods and problem space description. This leaves concrete process argument in the hands of individual organizations.

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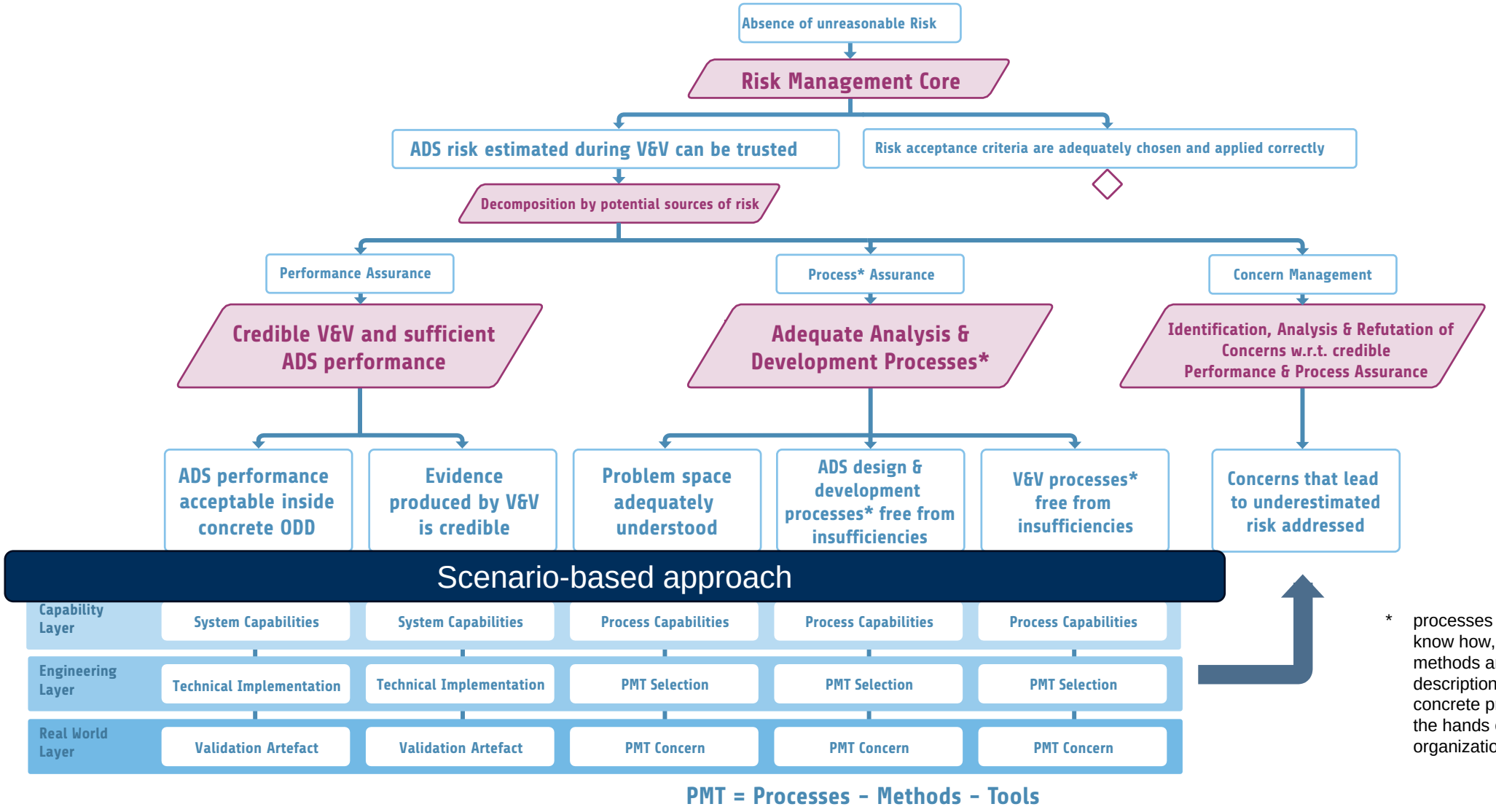

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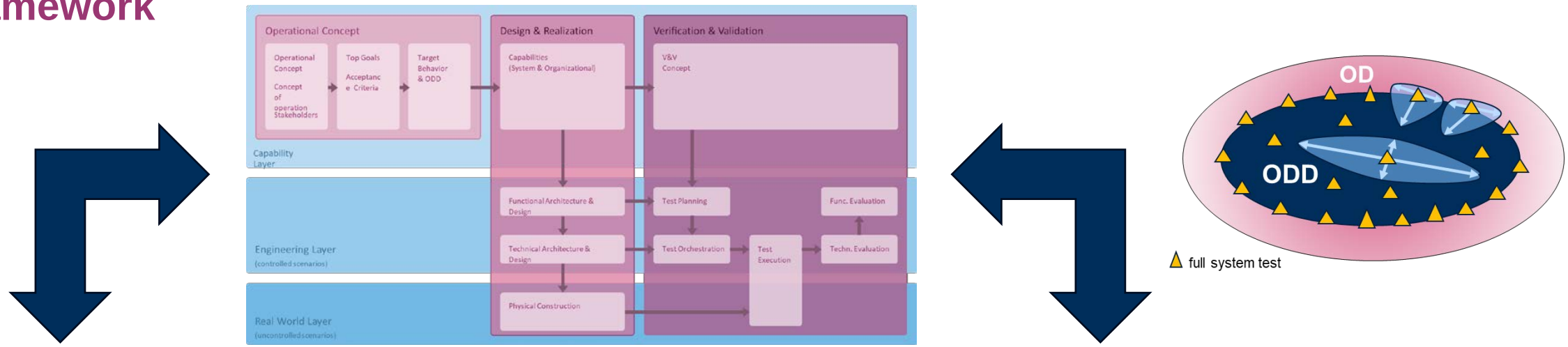
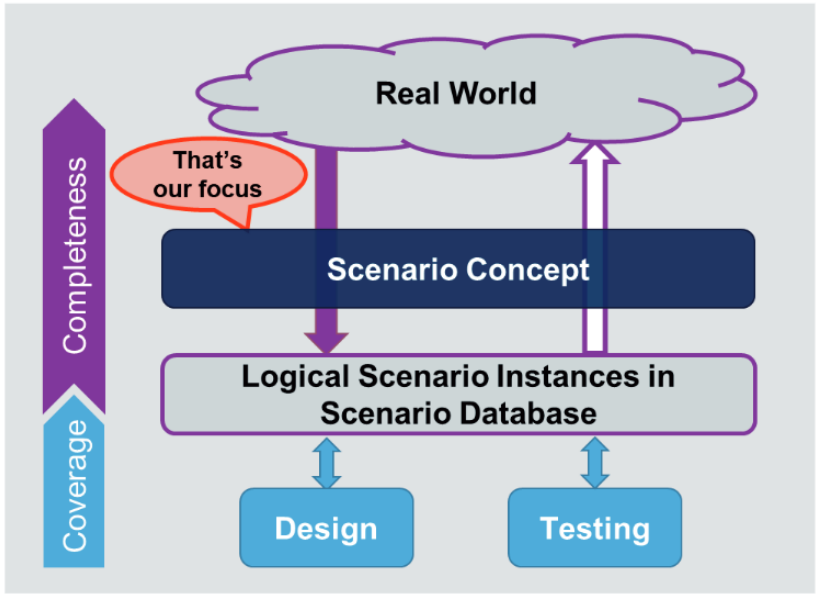
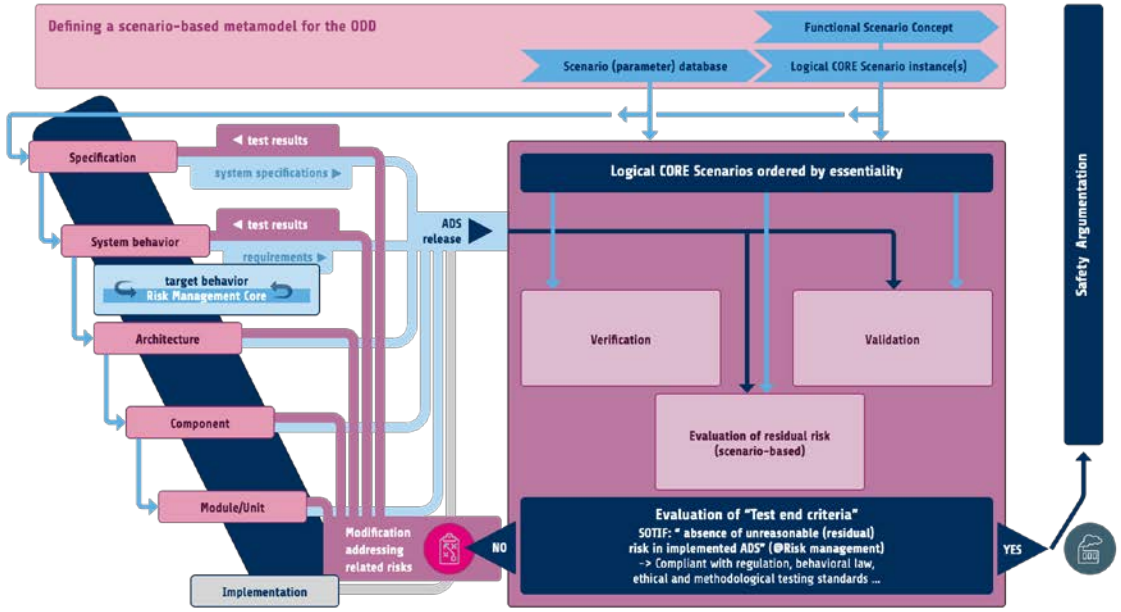
#1 VVM embedded scenario-based approach into holistic assurance framework







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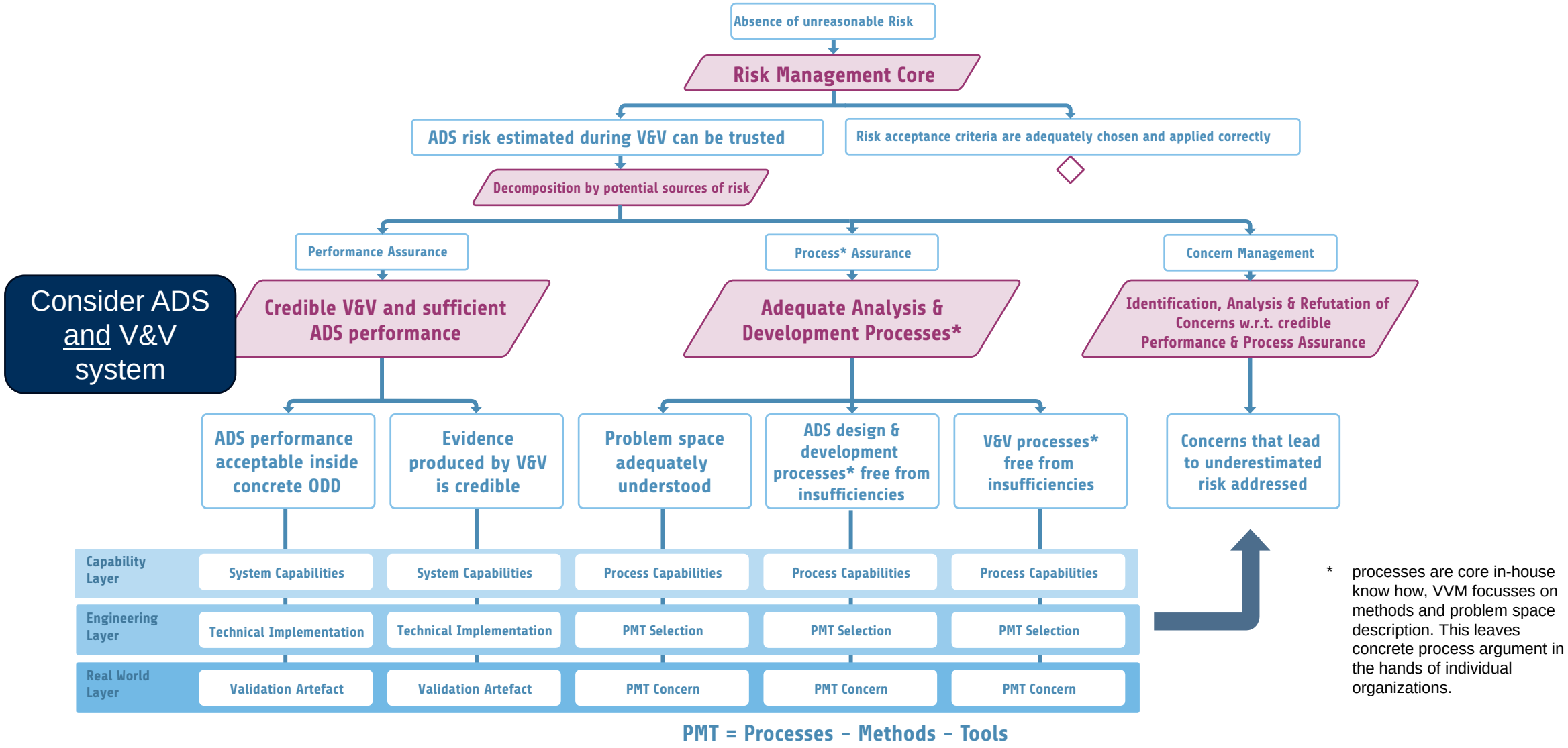

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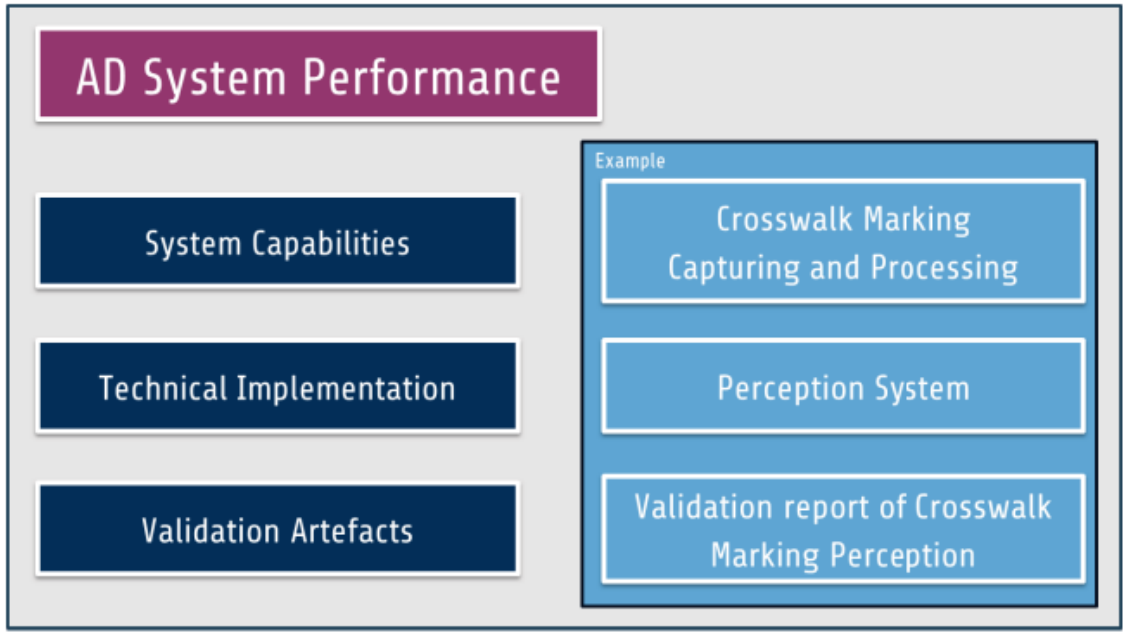
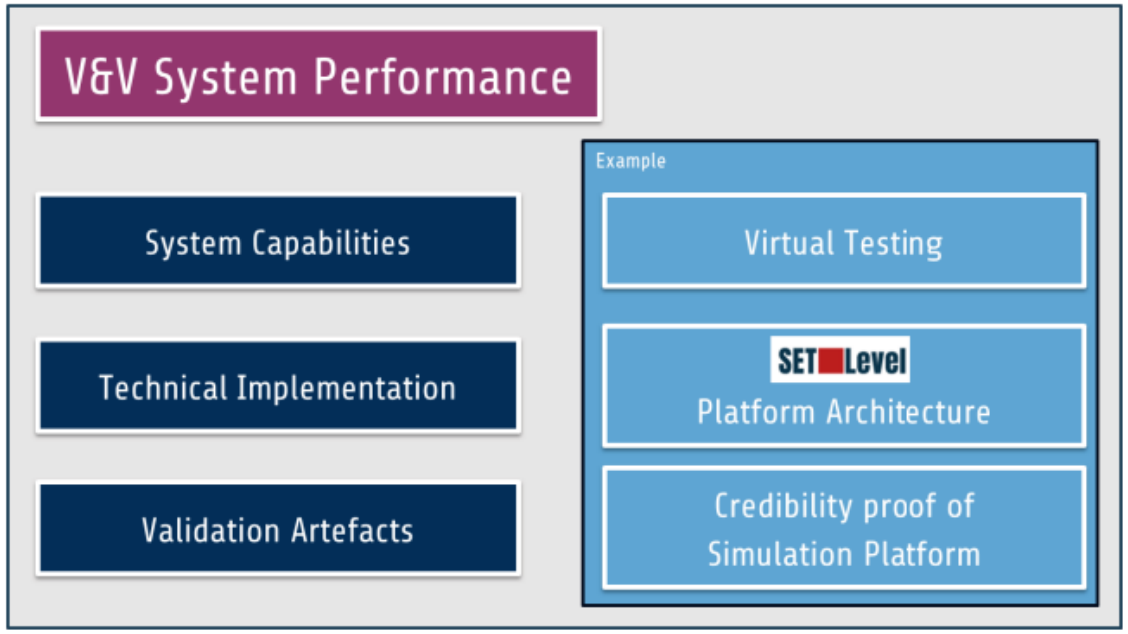
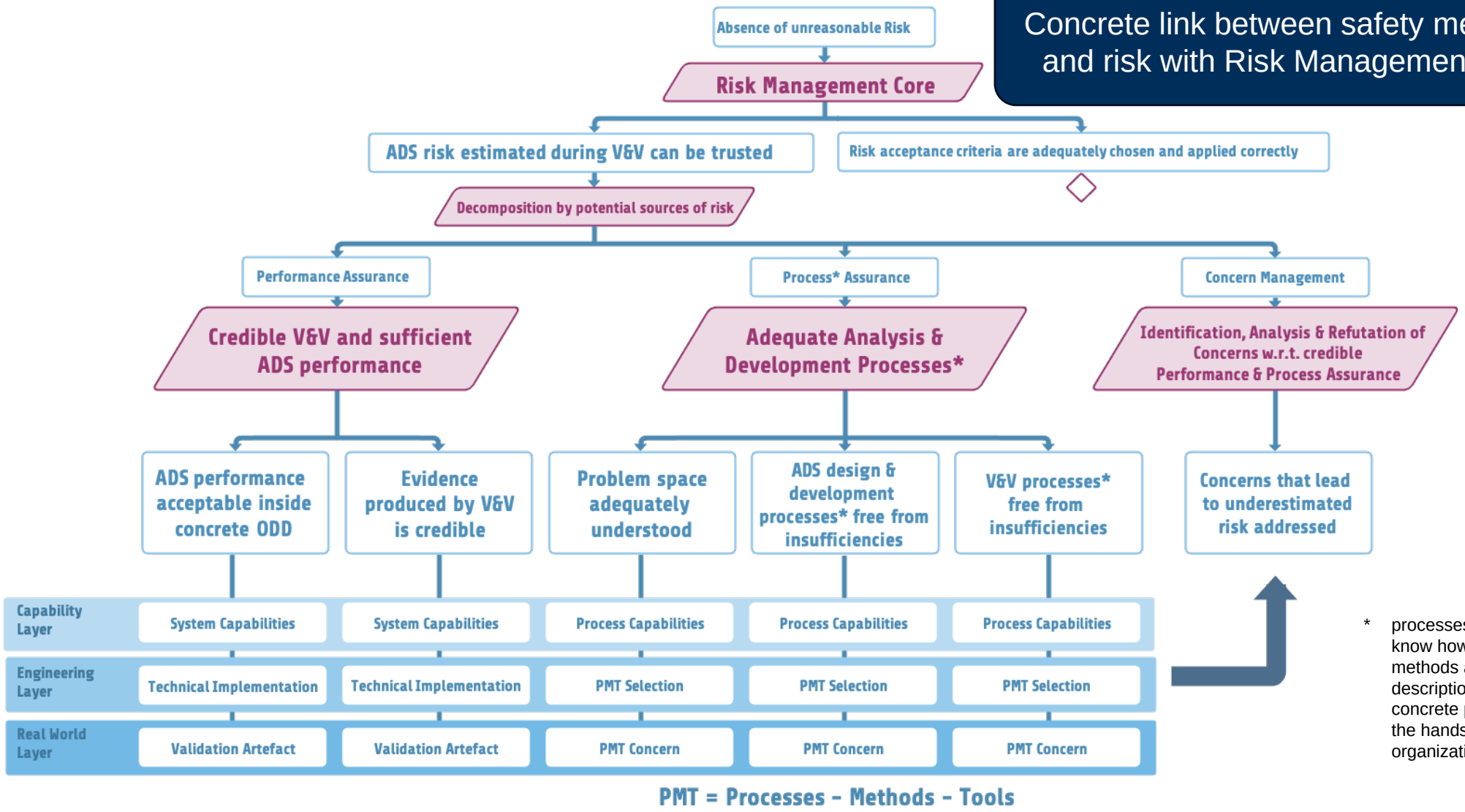
#2 V&V system is a first-class citizen for a convincing safety argument





What is special about the VVM safety case pattern?

Concrete link between safety measures and risk with Risk Management Core



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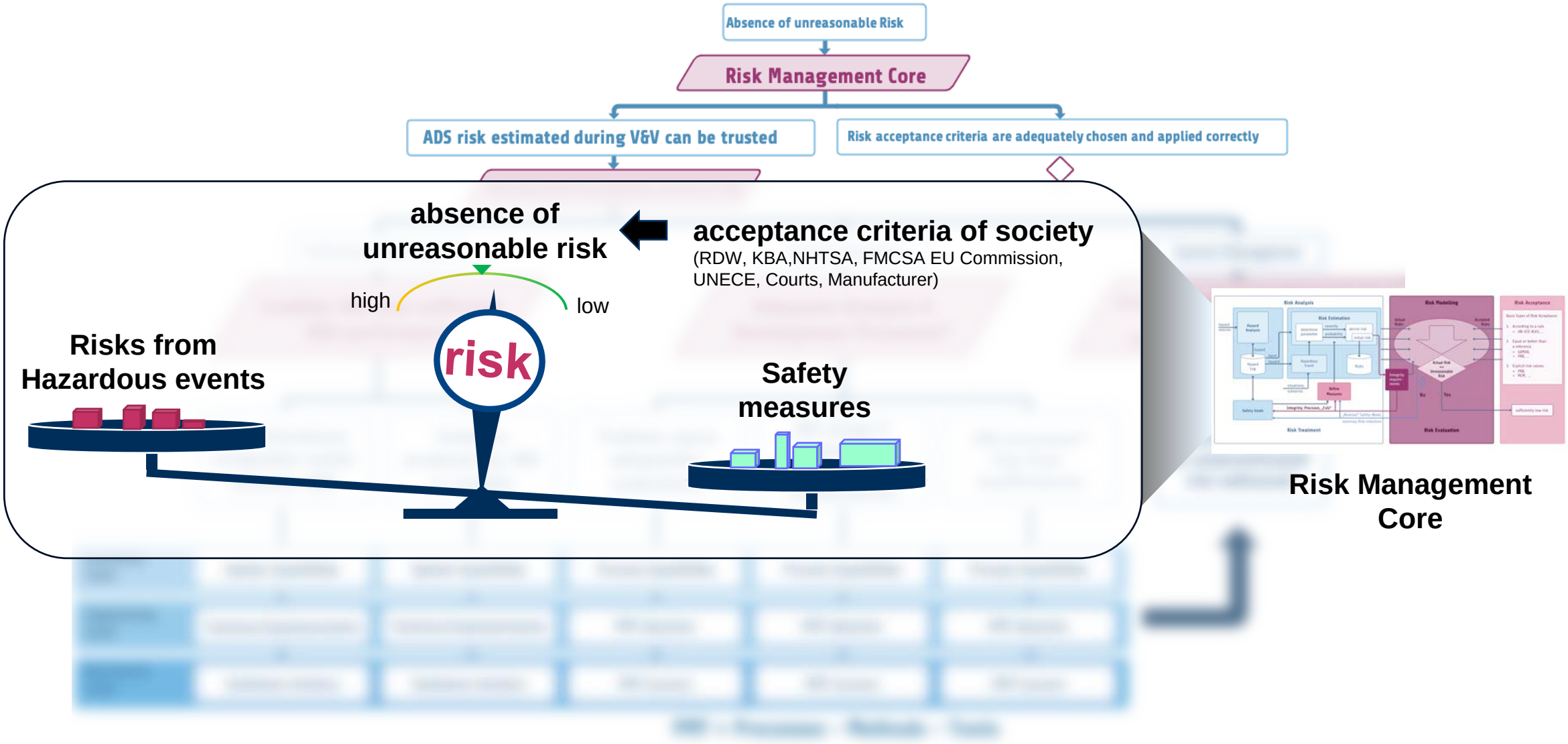
#3 VVM concretized relationship between assurance measures and risk



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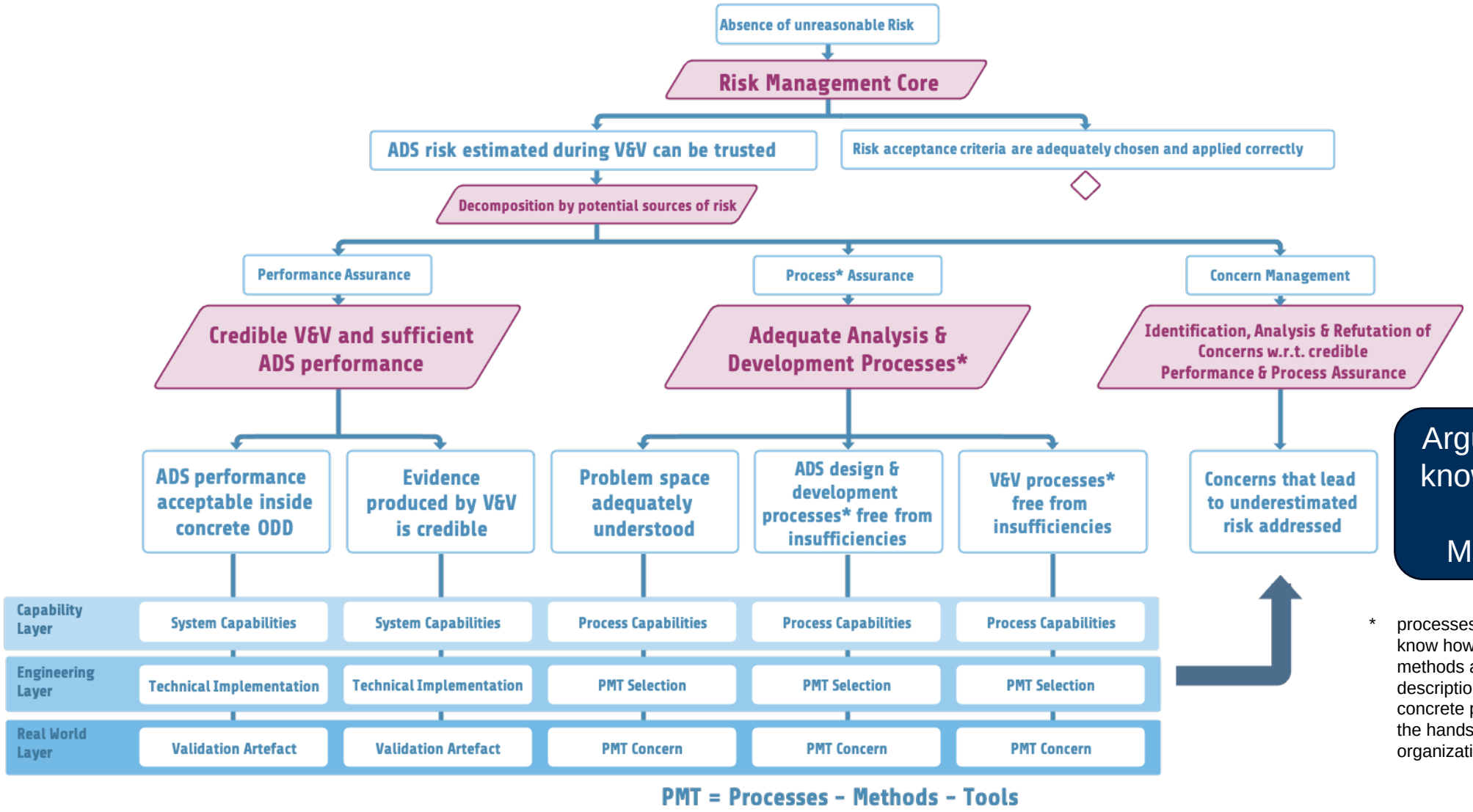

Argumentation or knowledge gaps? Concern Management!

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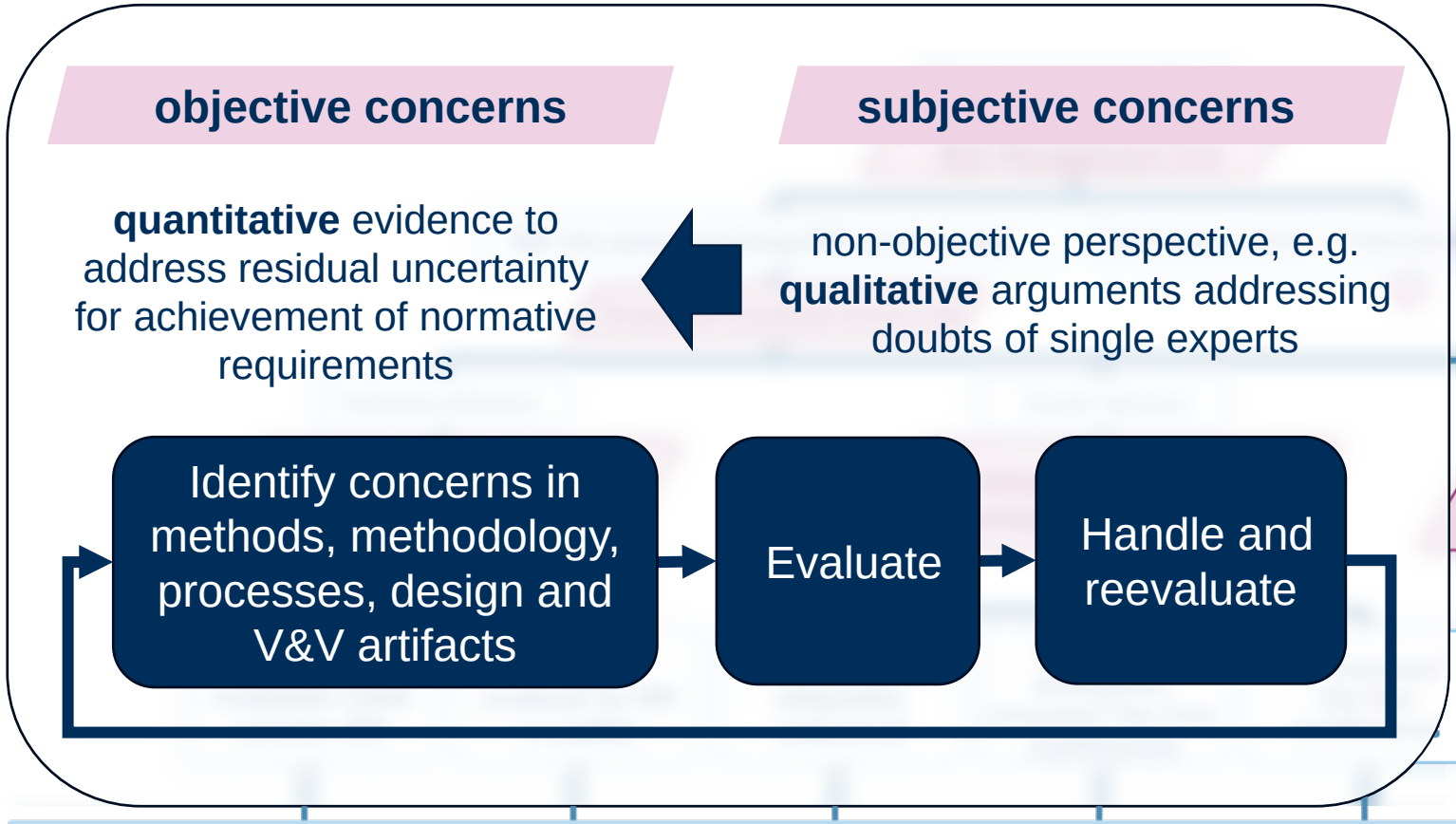
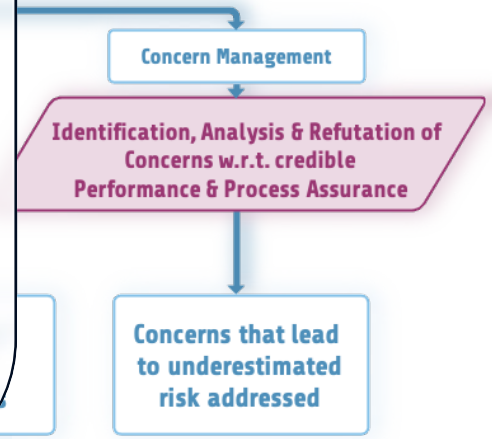
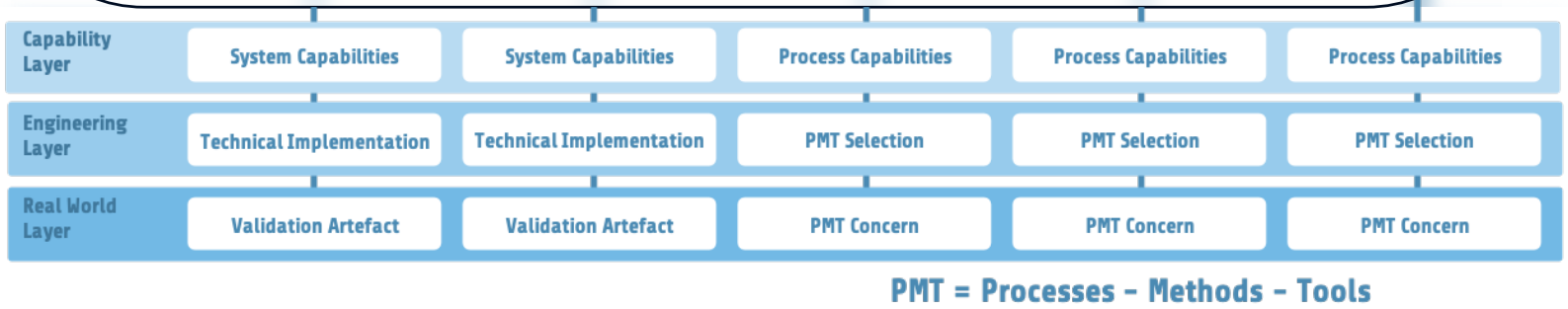
#4 Concern management through dialetics is key to manage uncertainty

VERIFICATION VALIDATION METHODS







PMT = Processes – Methods – Tools

The VVM safety case key takeaways at a glance

VERIFICATION VALIDATION METHODS

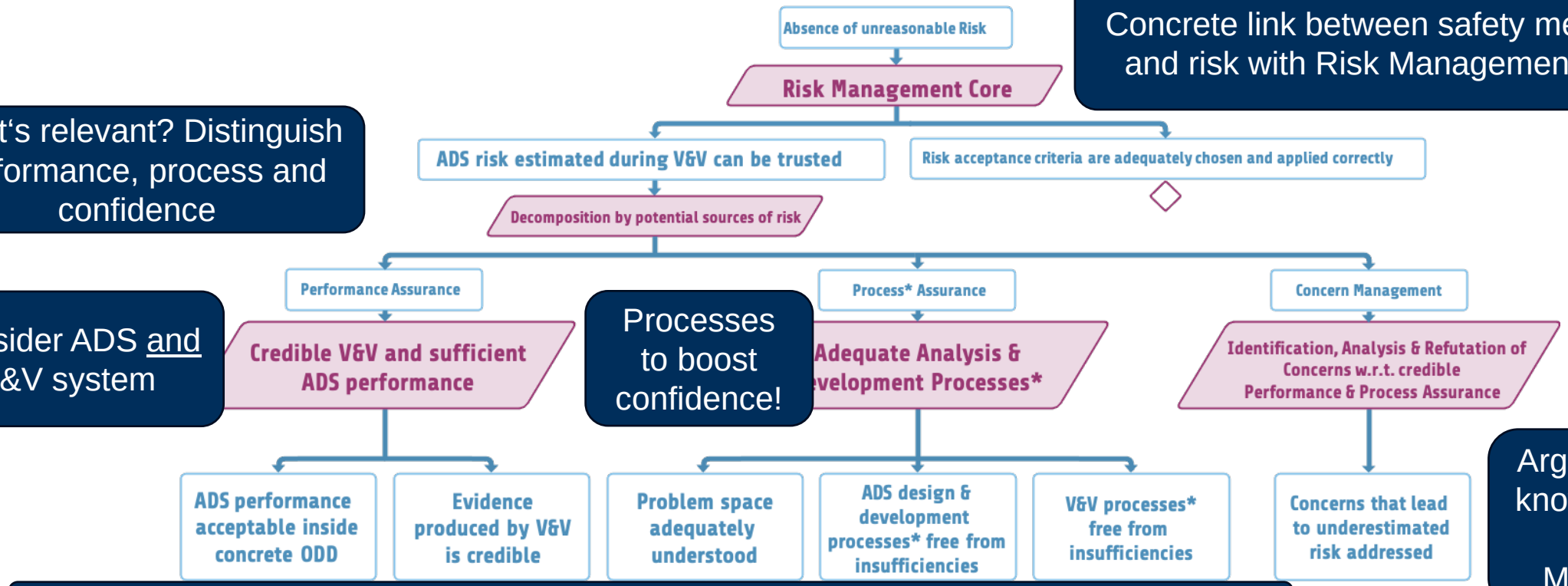
Concrete link between safety measures and risk with Risk Management Core

What‘s relevant? Distinguish performance, process and confidence

Consider ADS and V&V system

Processes to boost confidence!

Argumentation or knowledge gaps? Concern Management!



Scenario-based approach

Pattern for arg. concretization based on capabilities, engineering and real-world perspectives

PMT = Processes – Methods – Tools

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VERIFICATION
VALIDATION
METHODS

Thank you!

Jan Reich, Fraunhofer IESE

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linkedin.com/in/jan-reich/

PROJECT of the PEGASUS FAMILY

VDA LEITINITIATIVE

A project developed by the VDA Leitinitiative
autonomous and connected driving

Supported by:

Federal Ministry
for Economic Affairs
and Climate Action

on the basis of a decision
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