



intel



digital twin.
CONSORTIUM

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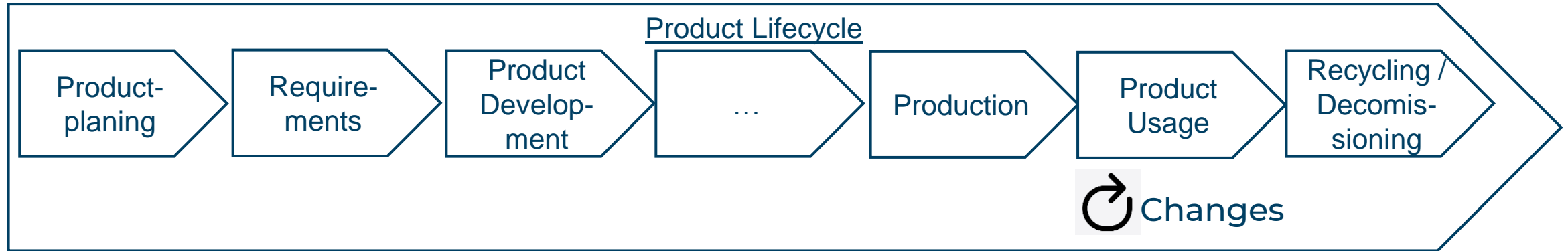


Data-driven intelligence by digital twins – The Verification and Validation Task Group

Detlev Richter, Michael Pfeifer, Marcel Wagner, Jens Lachenmaier

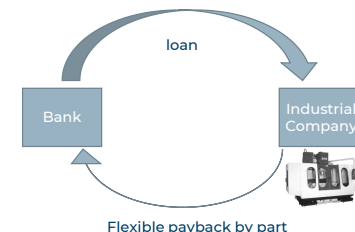
DTC Meeting Heilbronn, Jan, 28th, 25

Starting Point: Risk Analysis during Product Development



Example Products:

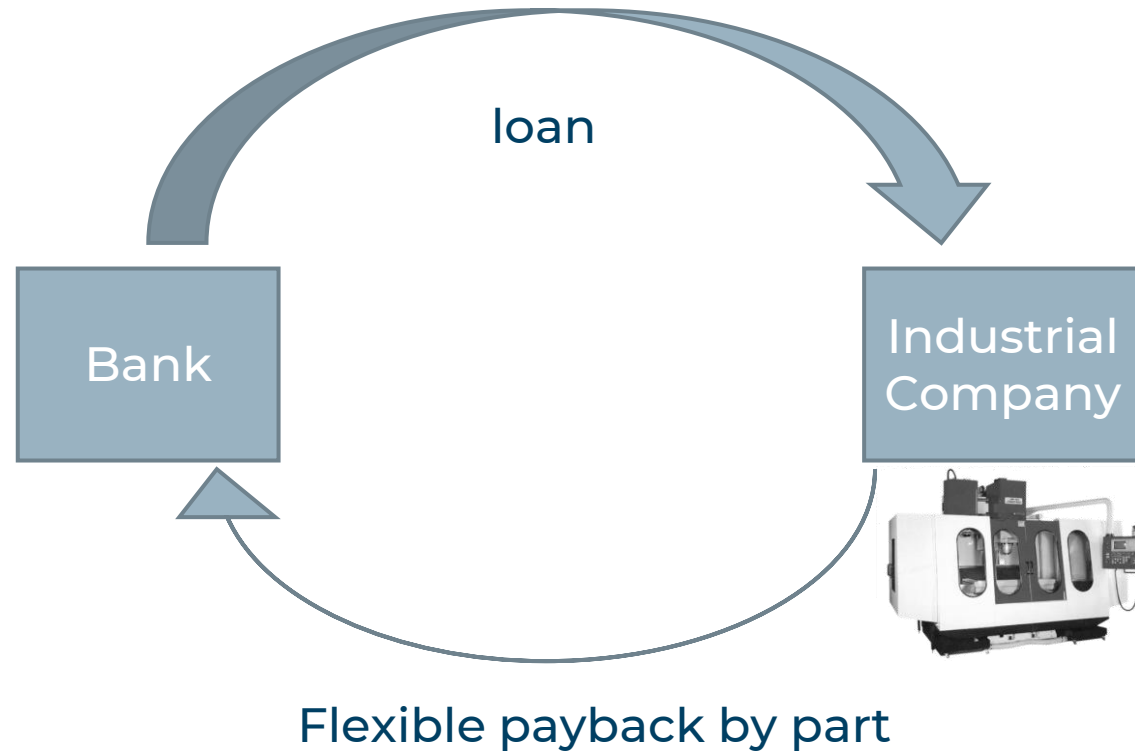
- Case A: A vehicle
- Case B: surveillance solution that identifies people that are drowning in the water
- Case C: A flexible financing service for machine, with pay-per-part back payment



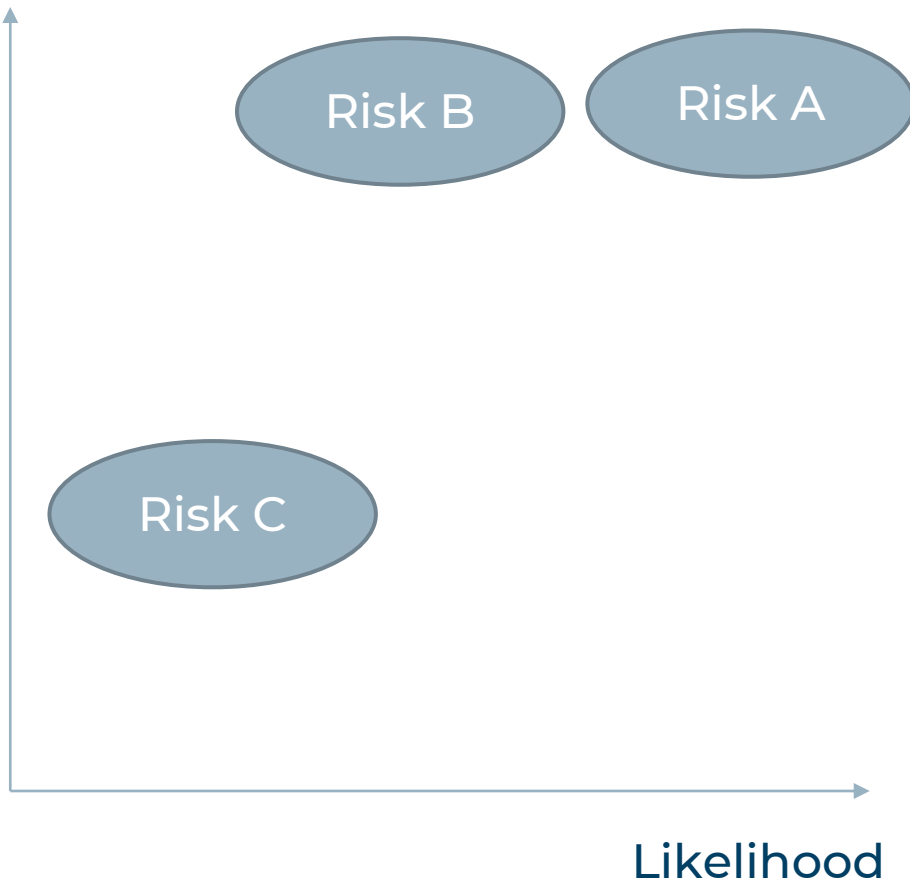
Risk Analysis
(e.g. FMEA)



Risk Analysis

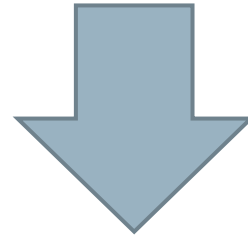


Potential Damage



- Examples of risks:
 - Case A (car): risk of break degradation (high likelihood over time, and high potential damage)
 - Case B (surveillance): risk of non-availability (medium likelihood, high potential damage)
 - Case C (finance): risk of not getting correct numbers on goods produced (low likelihood, medium damage)
- Example risk mitigation:
 - Case A:
 - a) recommend maintenance procedures or
 - b) design a digital twin to analyze the behavior of the car (DT capability)
 - Case B: add a watchdog that pings the drone
 - Case C: Unknown

- The company behind the product will make claims:
 - Case A:
 - a) If maintained according to recommendations, the breaks will not fail.
 - b) we can detect problems with the breaks
 - Case B: We have a reliable surveillance solution.
 - Case C: You pay according to what you actually produced



TRUST: Do „we“ trust those claims?

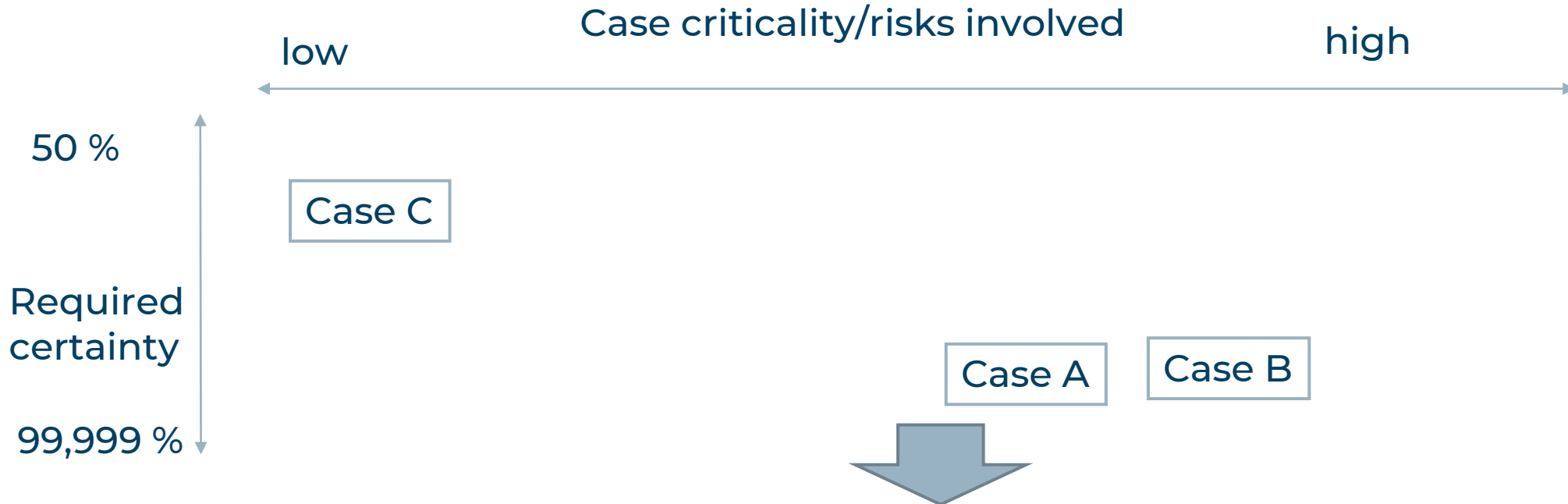
Yes. → Fine

No. → Need for Validation&Verifaction

Because:

- Unacceptable risk
- Not-knowing the business partner
- Innovative solution
- ...

Requirements for Verification, Validation (based on case criticality and required certainty)



Requirements for Verification and Validation			
Frequency of V+V	once	with each update	continuous
Data basis for V+V	additional sensor data	Data from company information systems	...
Auditor	Independent 3rd party	No external audit required	...

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