

MEMS/MST Collaborative Product Engineering for Silicon-based Fabrication Process Development

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Agenda

- Company introduction
- Motivation
 - Challenges of MNT development
- An Approach to MNT Product Engineering
 - The CORONA Project
- Requirements for Product Engineering
- Method and Tool integration outline
- Summary

Process Relations GmbH

Mission is to enable its customers to...

- (1) complete their developments faster and more cost-effectively by encouraging the -
 - optimal use of existing knowledge,
 - efficient use of virtual prototyping,
 - effective knowledge creation by reducing new experimentsand
- (2) comprehensively document, protect and transfer the results of these developments to their customers.

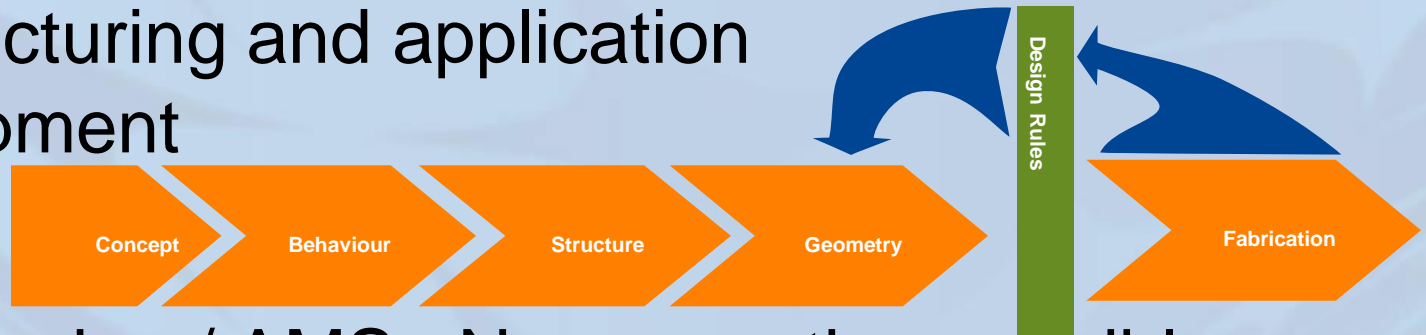
We deliver the easy to use, unique, world class Process Development Execution System (PDES)  **XperiDesk**[®] and consulting services.

Challenges of MNT Product Development

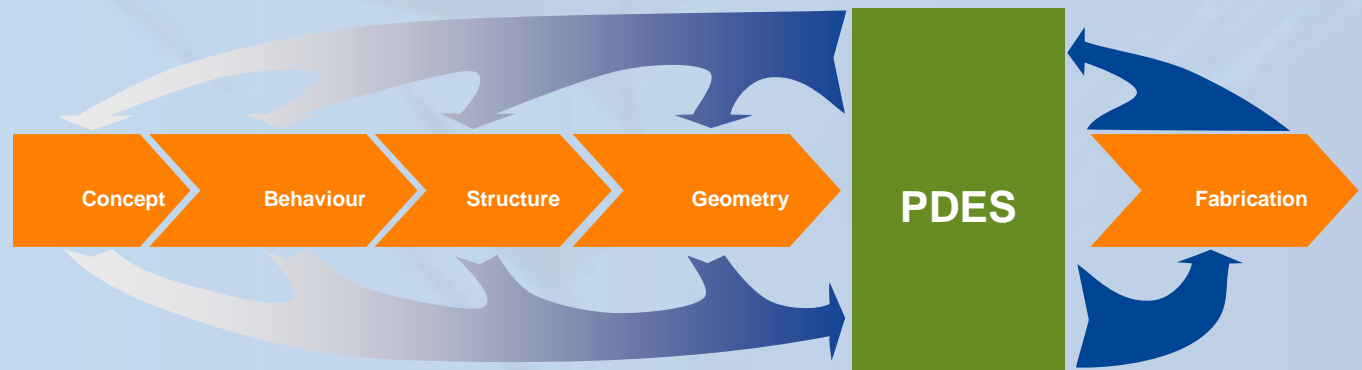
- „Time to Market“
 - Fast moving market
 - Short product lifecycles
 - Current MEMS/MOEMS development 4-5 years
- Variety and Diversity of
 - Product areas (e.g. Gyroscopes, DLP, Lab-on-Chip ...)
 - Technologies (e.g. Semiconductor, Laser, Imprint, ...)
- Technology-driven Product Design
 - Bottom-up approach
 - Technology constraints dominate product development

MNT Design Methodology

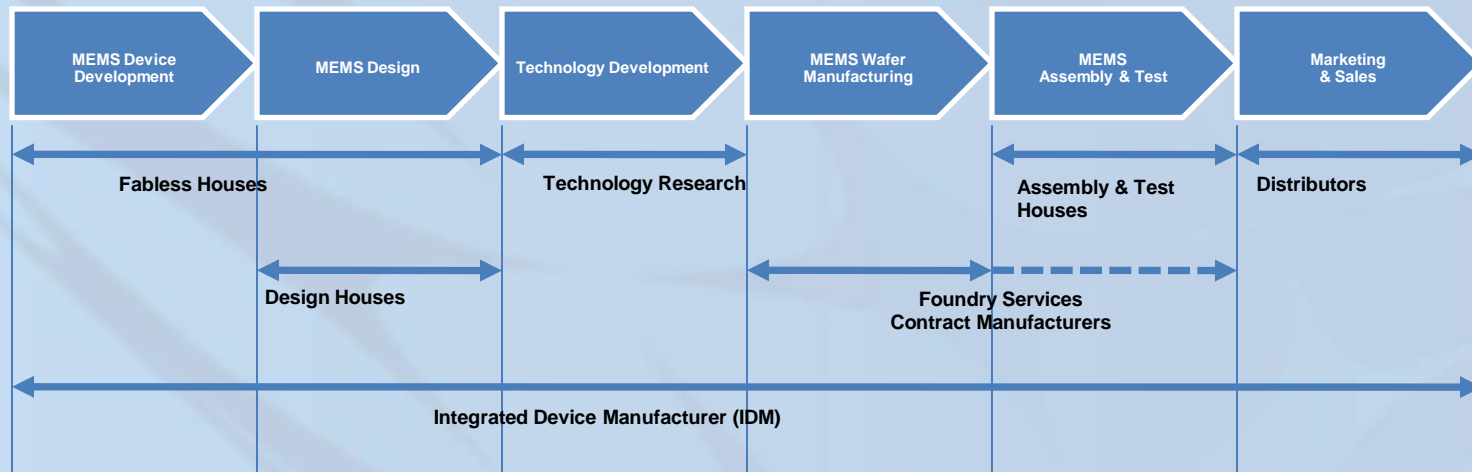
- Digital IC-Design: Clear separation between manufacturing and application development



- MNT-Design / AMS : No separation possible



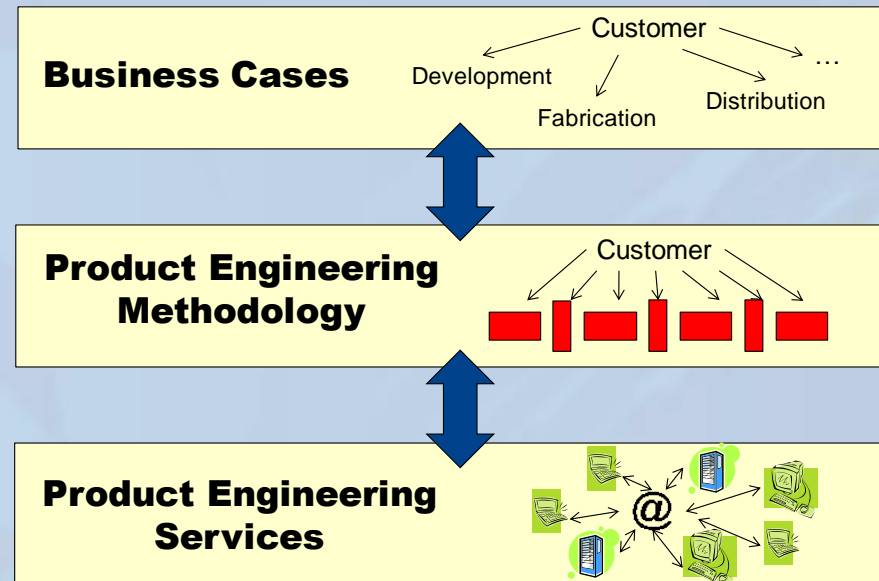
MEMS/MOEMS Value Chain



- Small and Medium Enterprises
 - Highly specialized on specific Technology/Application Area
 - Business model covers only parts of the value chain
- Cooperative Development and Manufacturing
 - Coordination issues
 - Intellectual property issues

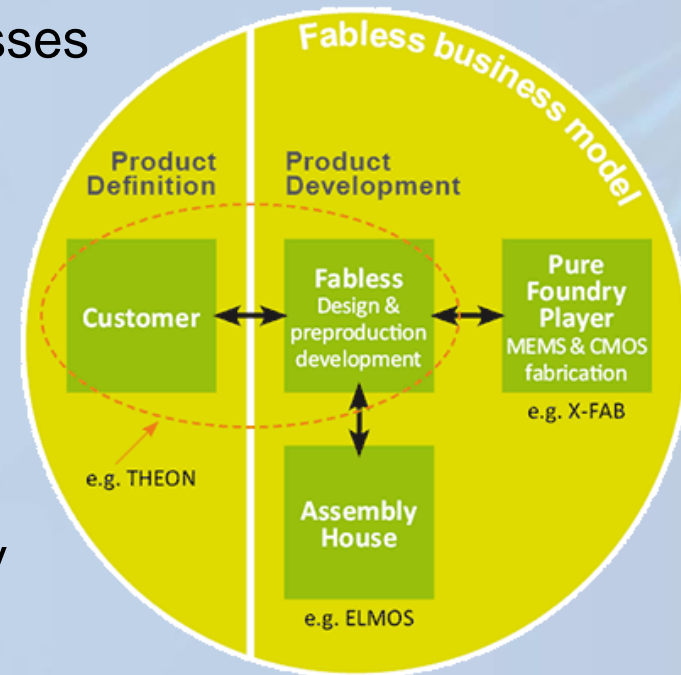
Consequences

- High involvement of the customer required
- Best approach: customer in control of product engineering process



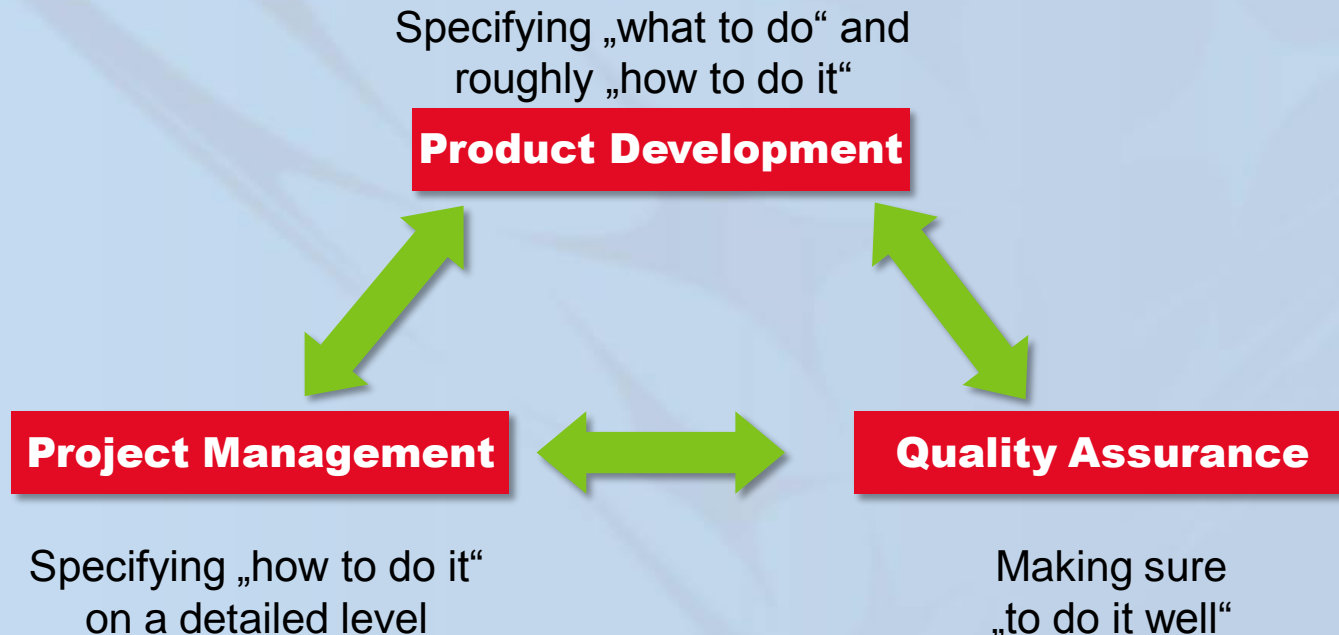
EU FP7 Project CORONA

- Partners cover all relevant business models
- Goals:
 - Faster Product Engineering
 - Multi-site Product Development
 - Knowledge Base on Design and Processes
 - ICT Structure on Communication and Tools
- Focus on
 - Technology-diversity
 - Distributed and smart production
 - Design Automation
- Approach
 - Analysis of current PE practices
 - Combined development of Methodology and Design Support Framework



Product Engineering ...

- is the process of gradually turning the idea of a technical device into a physical realisation.
- includes both the design *and* fabrication.



Requirements (1 / 2)

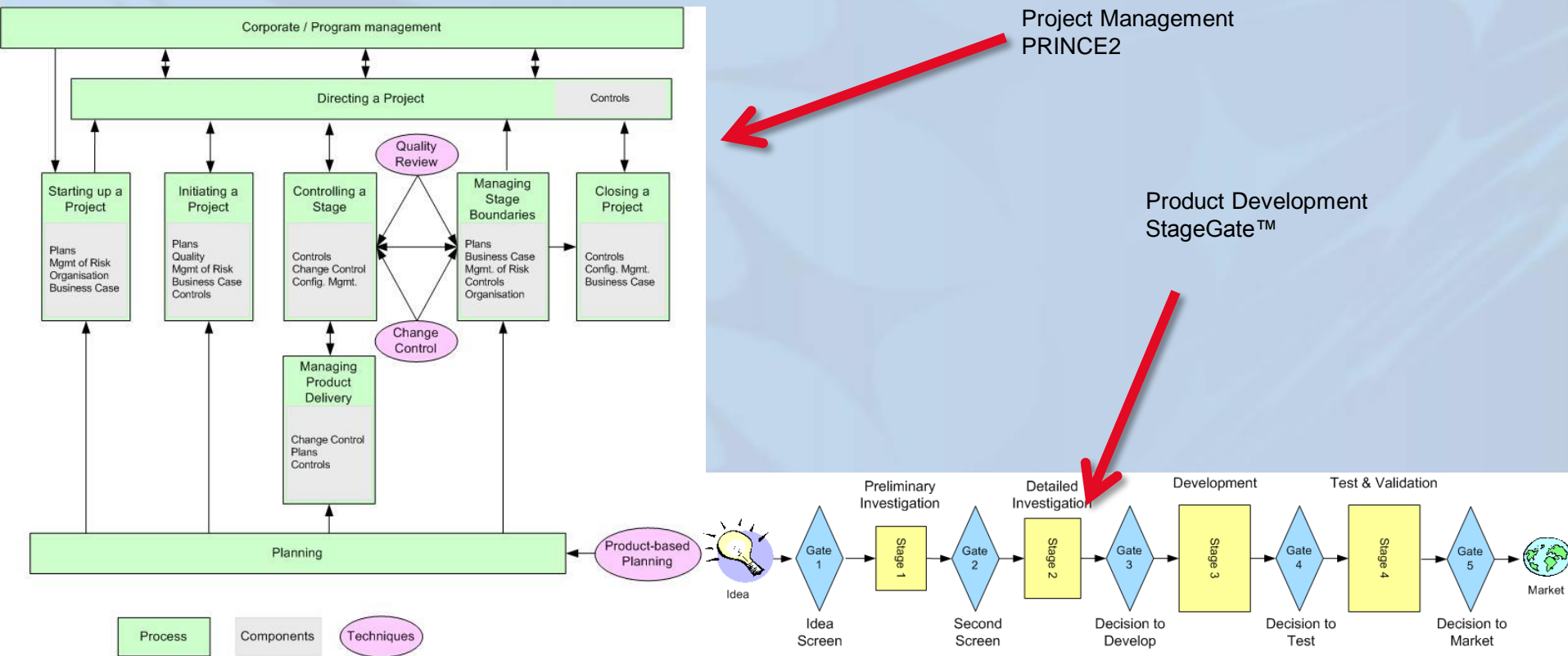
- Business process based approach
- Thorough but flexible approach complementing existing processes (mix & match)
- Focus on deliverable rather than task based planning
- High degree of customer involvement and transparency supported
- Minimal management overhead and interference

Requirements (2 / 2)

- Quality of execution
- Resource prioritization
- Inclusion of Marketing Tasks
- Early, stable products specs. with change procedures
- Parallel processing
- Support for cross-functional teams

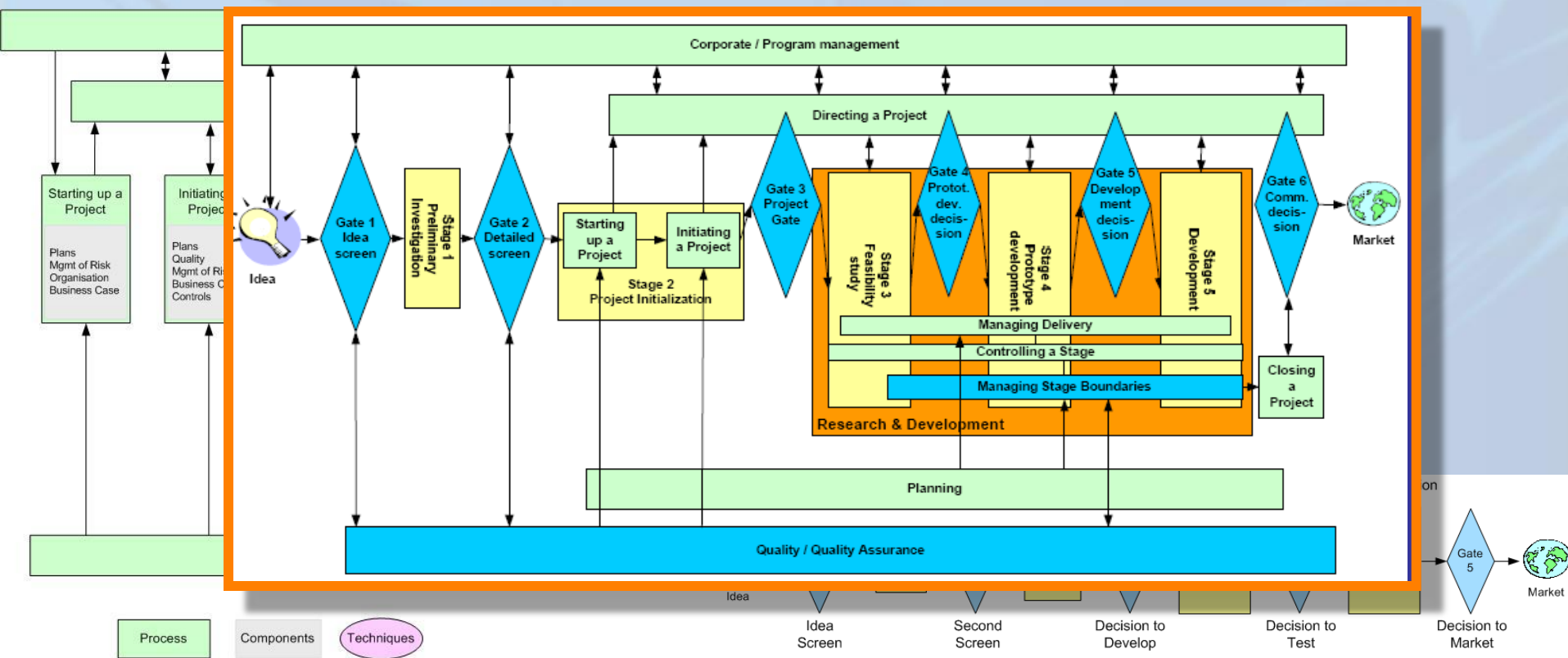
Product Engineering Methodology

- Combining Product Development and Project Management Views
- Formal PM and PD Methodologies include Quality Assurance



Product Engineering Methodology

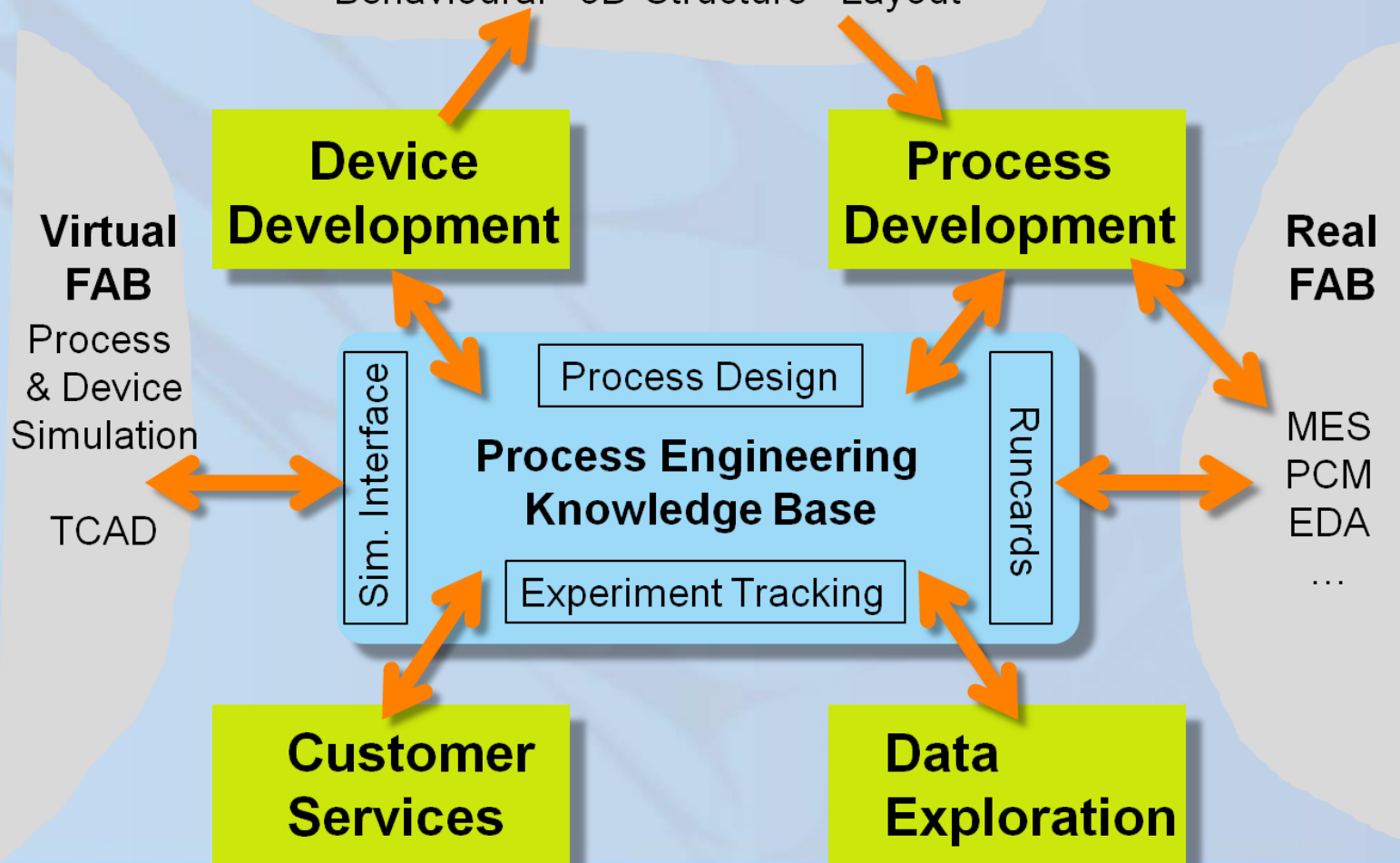
- Combining Product Development and Project Management Views
- Formal PM and PD Methodologies include Quality Assurance



Putting it all together

Design

Behavioural - 3D-Structure - Layout



Summary

- MNT Product Engineering is currently
 - Technology-driven
 - Distributed
 - Inefficient
- The CORONA Project will deliver
 - Streamlined methodology for distributed product engineering
 - Interface between device and process design tools



Acknowledgements



Thank you for your attention!

Any questions?

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