Climbing the Stairway to Heaven

Towards Software Engineering As A Competitive Advantage

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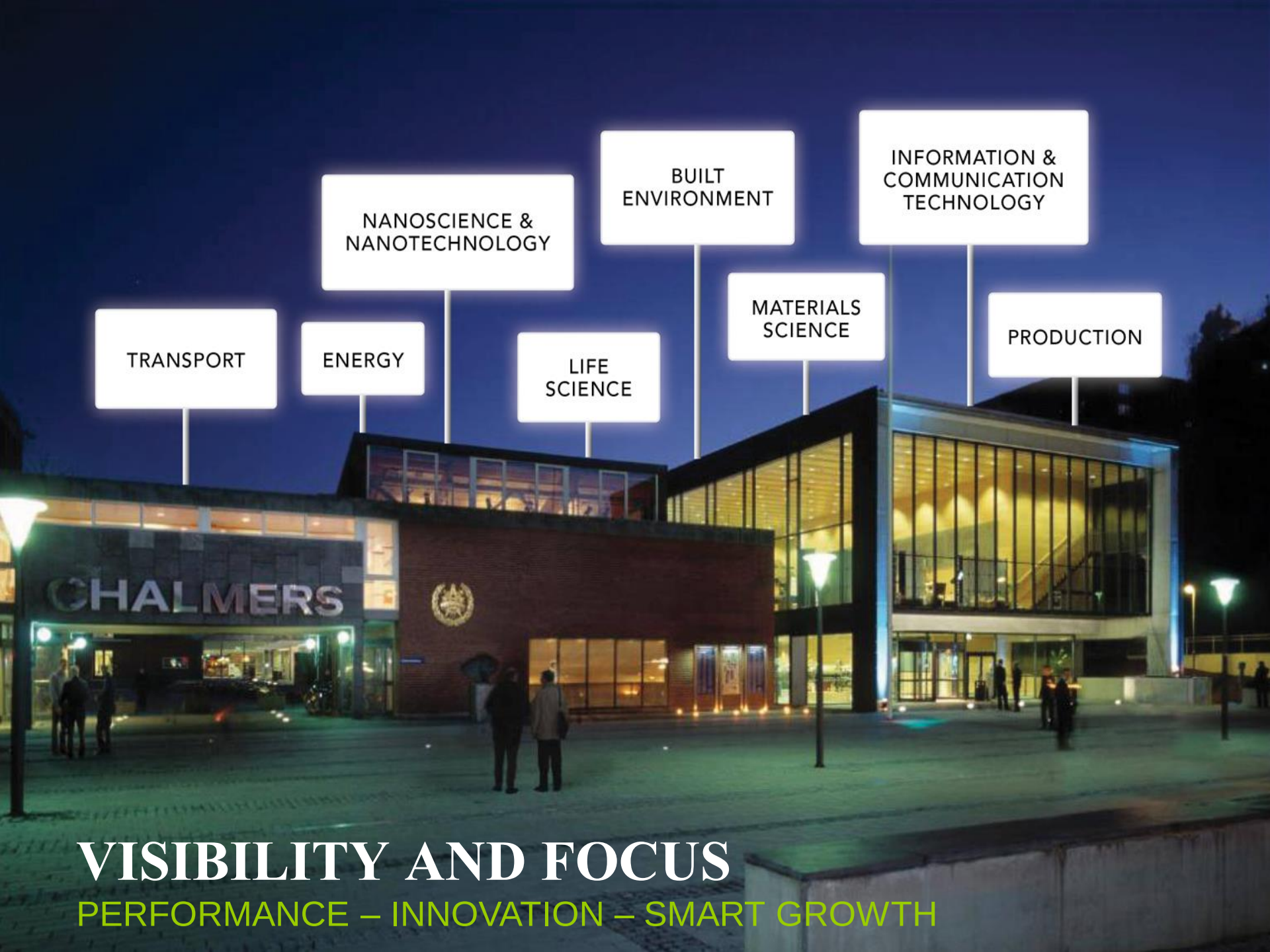
Overview

- About Chalmers
- Stairway to Heaven
- Software Center
- Research areas



VISIBILITY AND FOCUS

PERFORMANCE – INNOVATION – SMART GROWTH

Chalmers

1829

Chalmersska Slöjdeskolan is founded by the will of William Chalmers

1932

Chalmers becomes a governmental university with the authority to award doctoral degrees

1994

Chalmers becomes a foundation university

”Gothenburg Arena” offers

PUBLIC

- 600.000 inhabitants in ”Göteborg”
- 1.200.000 inhabitants in the Region ”West Sweden”

PRIVATE

AstraZeneca, Ericsson, Nobel Biocare, RUAG, Saab, SCA, SKF, Stena, Volvo……

INSTITUTE

Acreo, SwerealVF, SIK, IVL, SP, CIT(Chalmers)….

UNIVERSITY

- **Chalmers**
  10 000 students, 1100 PhD students, 2800 employees,
  40 Masterprogram
  University of Gothenburg
  40 000 students , 5500 employees

MEETING PLACES

- Science Parks; Lindholmen, Sahlgrenska, Johanneberg
- Research Infrastructures
- Science Center

Research Infrastructures

Nanofabrication Laboratory

A state-of-the-art cleanroom facility

European transnational access facility

Onsala Space Observatory

A national research facility

Three Science Parks

Gothenburg Schools of Entrepreneurship

GO-Inn Innovation System

Lighthouse simulator laboratory

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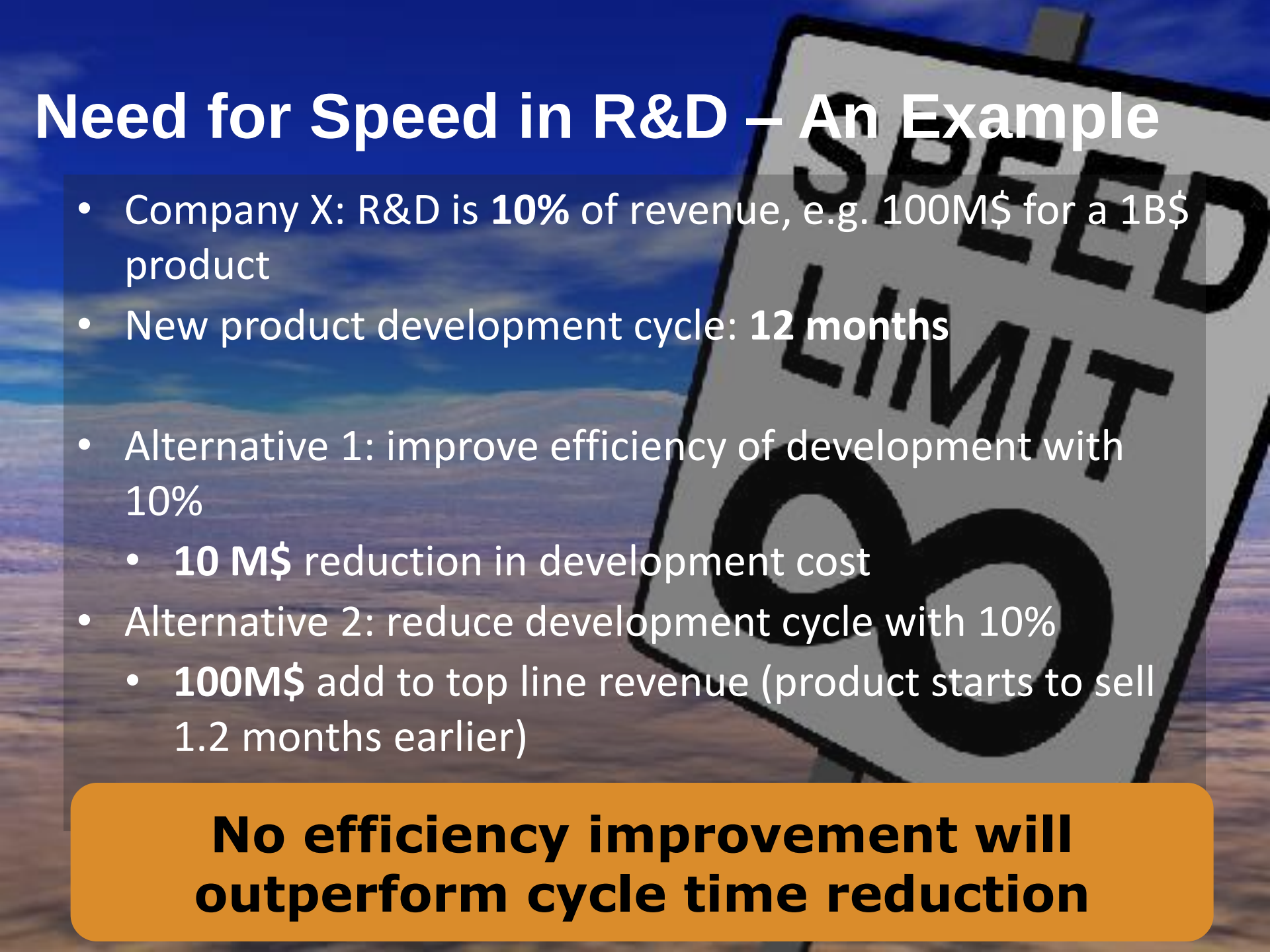
Customers don’t know what they want. It’s very hard to envision the solution you want without actually seeing it.

Marty Cagan

[The assumption that a] reasonably well-defined set of requirements exists, if only we take the time to understand them, is wrong

Dean Leffingwell

Need for Speed in R&D – An Example

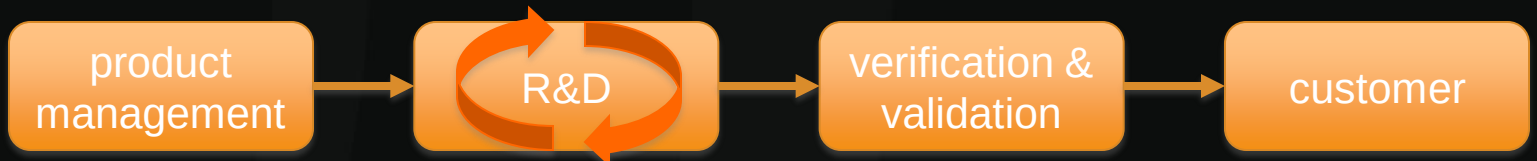


- Company X: R&D is **10%** of revenue, e.g. 100M$ for a 1B$ product
- New product development cycle: **12 months**

- Alternative 1: improve efficiency of development with 10%
  - **10 M$** reduction in development cost
- Alternative 2: reduce development cycle with 10%
  - **100M$** add to top line revenue (product starts to sell 1.2 months earlier)

No efficiency improvement will outperform cycle time reduction

Stairway to Heaven



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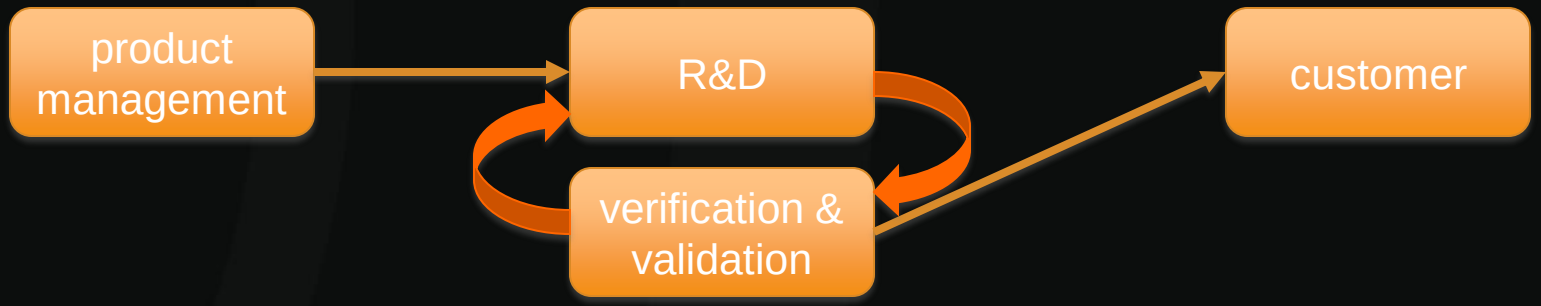

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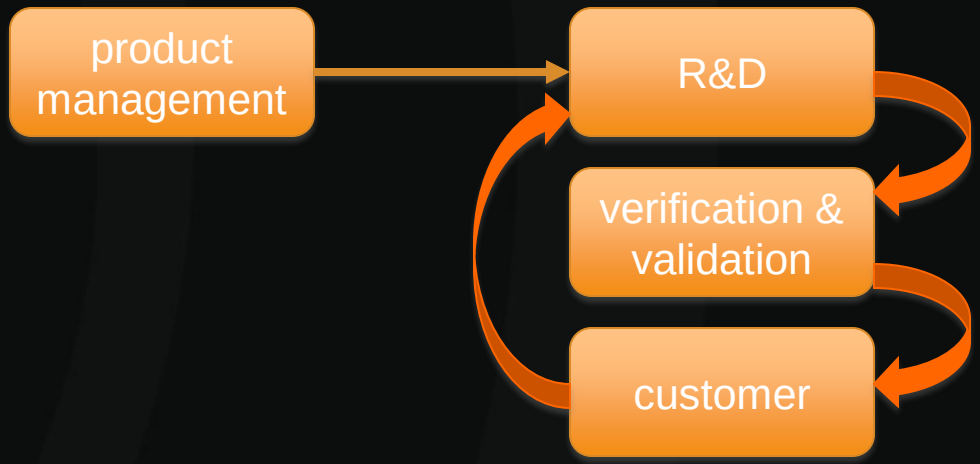

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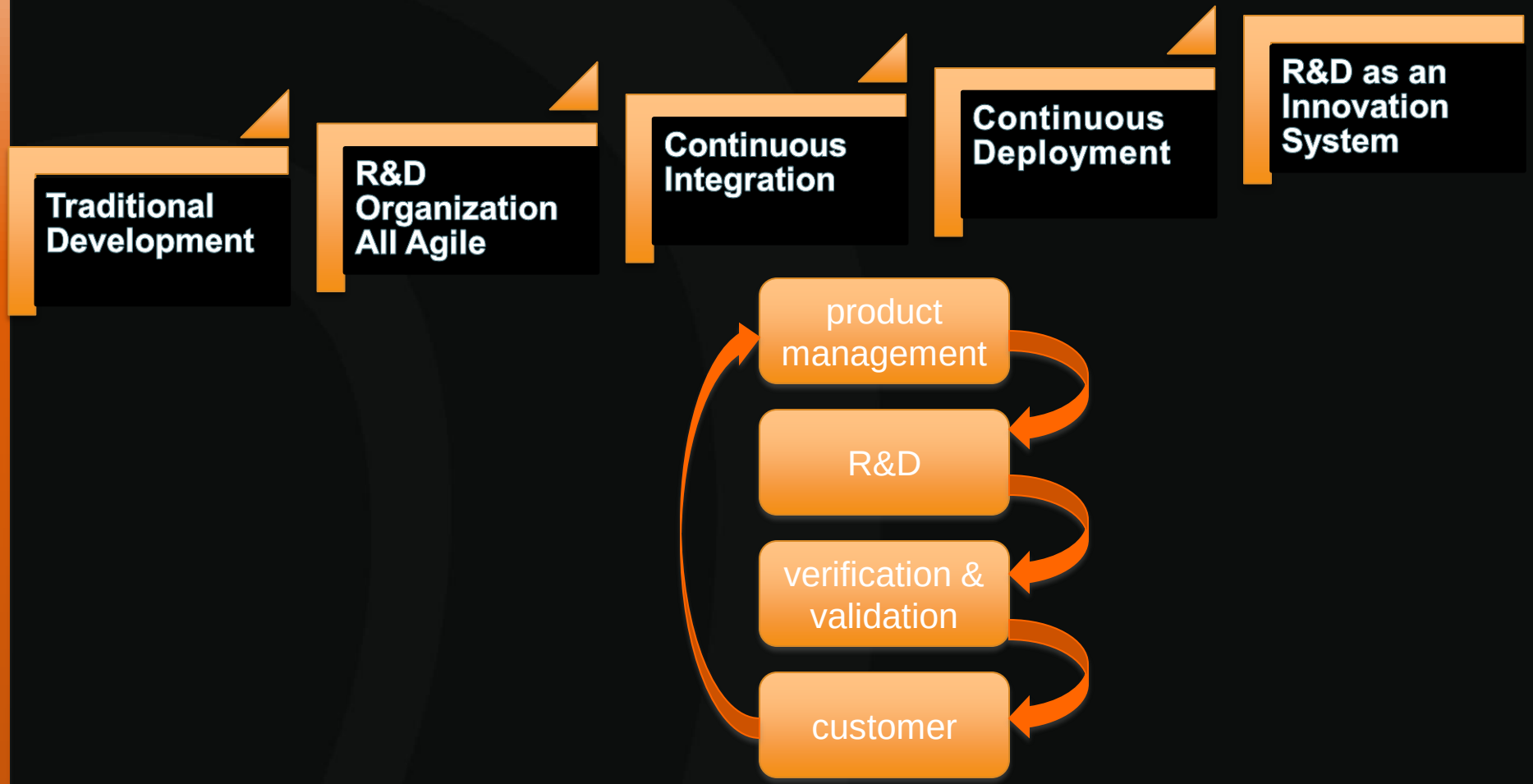

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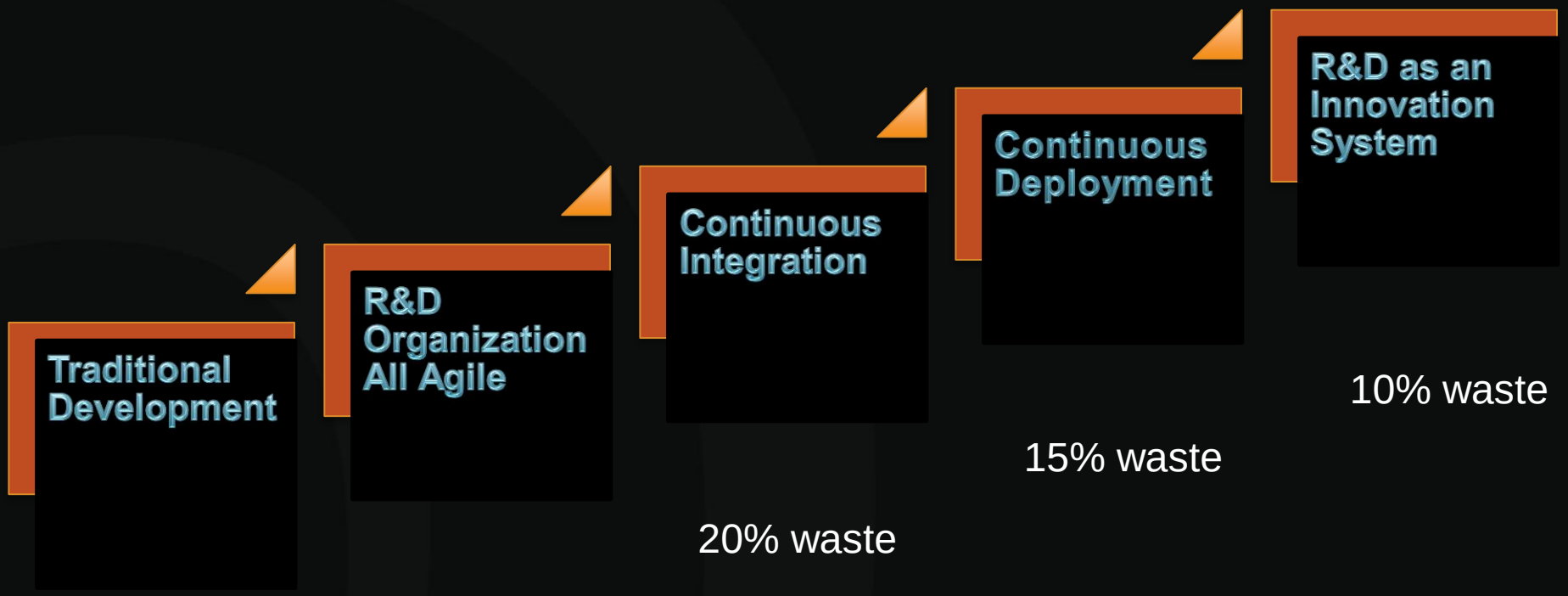

Rough estimation of waste and benefits

Financial Impact Potential

Ericsson

- R&D budget July 2011 – June 2012: 4,864 M$
- Software R&D (80%): 3891 M$
- Value of removing 5% waste: **195 M$ (1280 MSEK)**

AB Volvo

- Revenue 2011: 310 BSEK
- R&D budget 2011 (est. 5%): 16 BSEK
- Software R&D (15%): 2.4 BSEK
- Value of removing 5% waste: **120 MSEK**

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Software Center @ Chalmers

- Mission: Improve the software engineering capability of the Nordic Software-Intensive Industry with an order of magnitude (“10X in 10 years”)
- Theme: Fast, continuous deployment of customer value
- Founding members

- Dual success metrics
  - Academic excellence
  - Tangible industrial impact

A New Collaboration Model

Initiate and run research projects in active, close, and long-term collaboration with industrial partners and academic partners

- Technical, business, and organizational aspects
- Industry is involved with the research as it unfolds
- Research is performed in 6-month sprints
- Long term goal; short term value
- System-level, holistic perspective
- *Connected to strategic change agenda of partners*

Projects

Scale: 10+ researchers, 20+ active company participants

1. Towards continuous deployment
   - Continuous Integration
2. Speed in large scale SW development
   - Role of architecture and architect
3. Organizational metrics
   - Heatmaps, change waves, dashboard, etc.
4. *Model-driven development*
5. *Customer feedback techniques*

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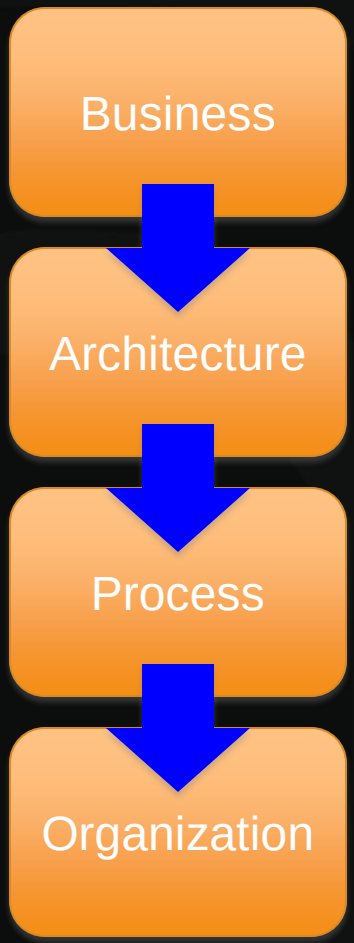
Research Areas



Changing business models and their implications
Software ecosystems
Data-driven customer involvement in R&D

Architectural solutions for continuous deployment, especially in connected, embedded systems
Changing role of the software architect

New ways of working, including cross functional teams
Continuous integration and deployment processes
Speed inhibitors and accelerators in large scale R&D

Organization performance metrics
Organizational implications of new WoW

Software Center

Chalmers/Gothenburg University