



# Assessment of Readiness for Internal Technology Transfer

## - A Case Study

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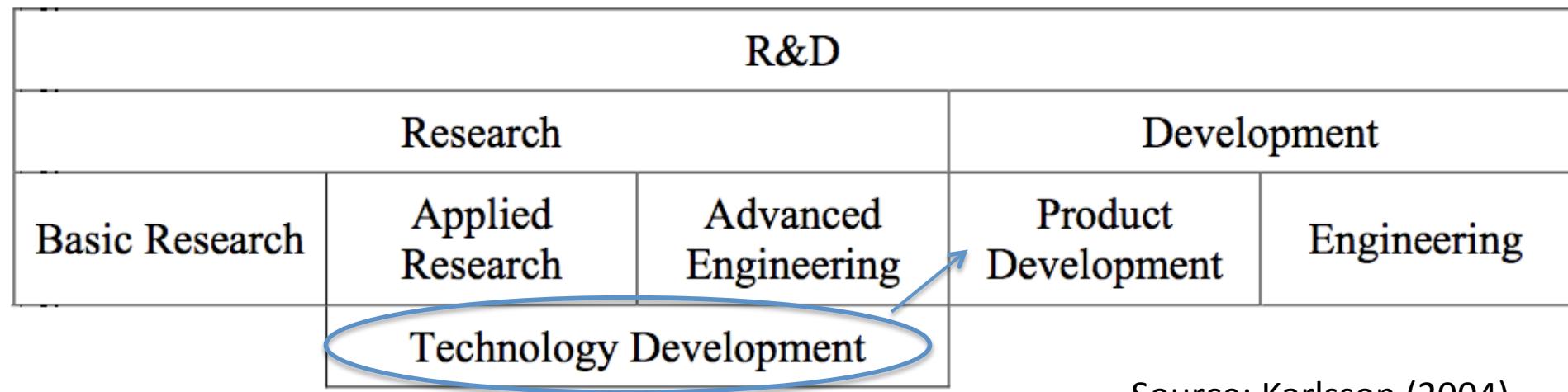
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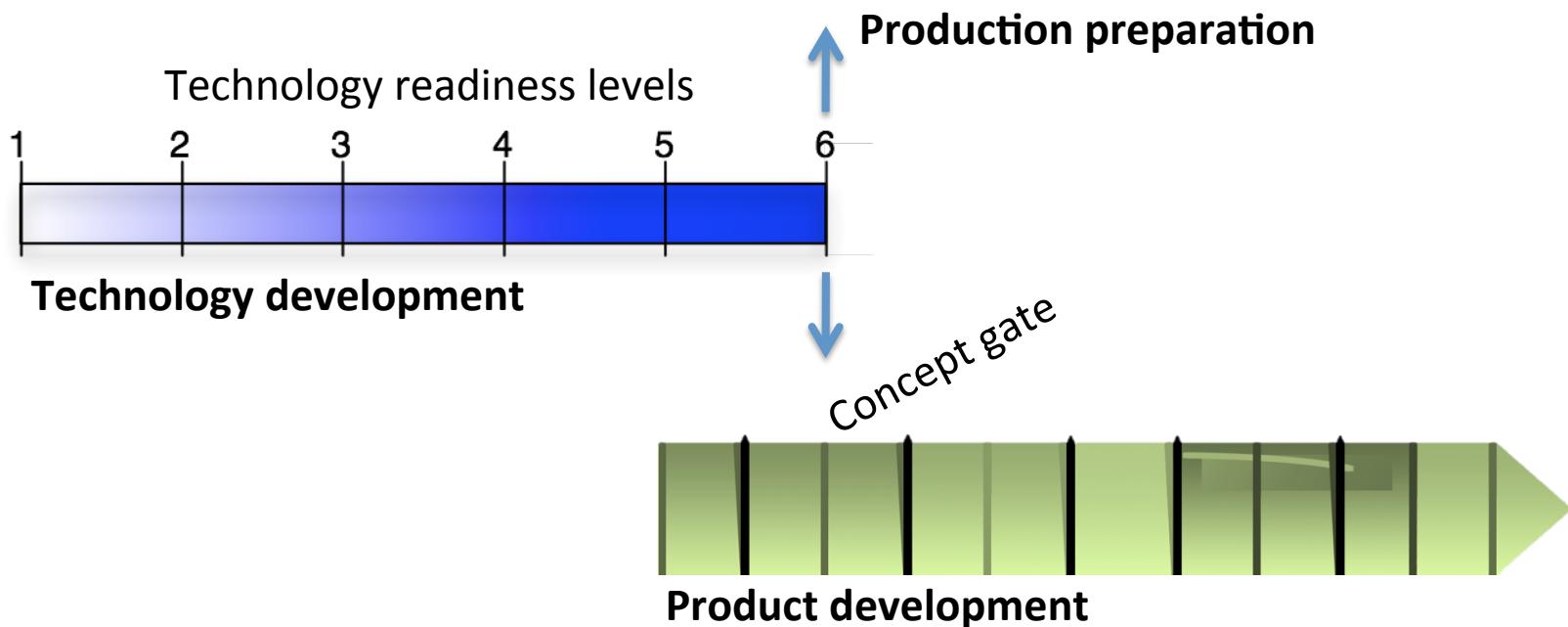
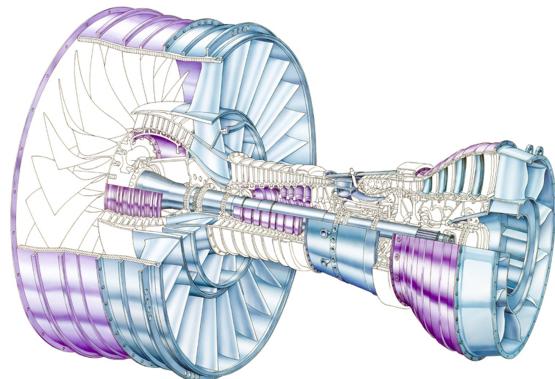
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# Internal technology transfer



# Technology development at the case company



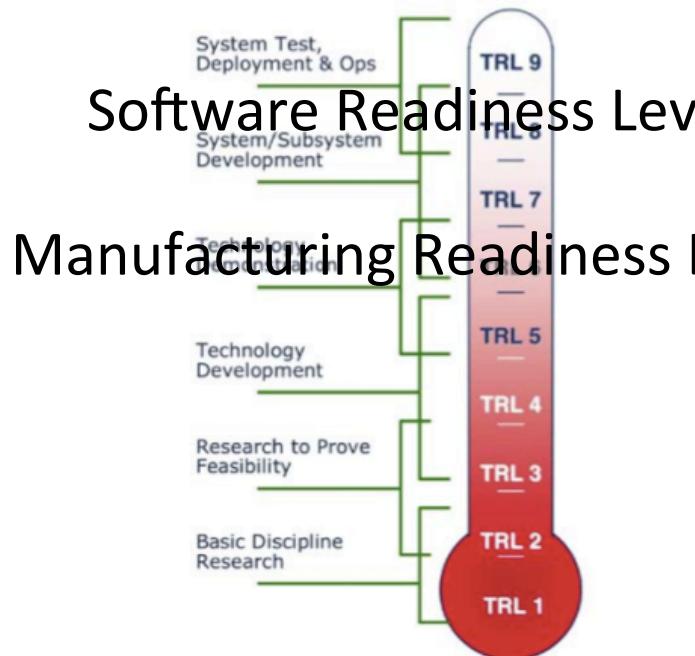
# Frame of reference

- Transfer content
  - General information, specific information, procedures/practice and hardware (Rebentisch, 1995)
  - Blueprints, prototypes, persons, methods, procedures, test results, alternative concepts, supplier suggestions, engineering reports and lessons-learned books. (Nobelius, 2002)
- Transfer timing
  - Align with concept gate (Eldred & McGrath 1997b)
  - Balance between time-to-market and risk (Magnusson & Johansson, 2008)
  - Readiness vs preparedness (Nobelius, 2003)
- Transfer management
  - It's a process (e.g. Leonard-Barton, 1995)
  - Uncertainty dictates mode of transfer (Stock & Tatikonda, 2000)

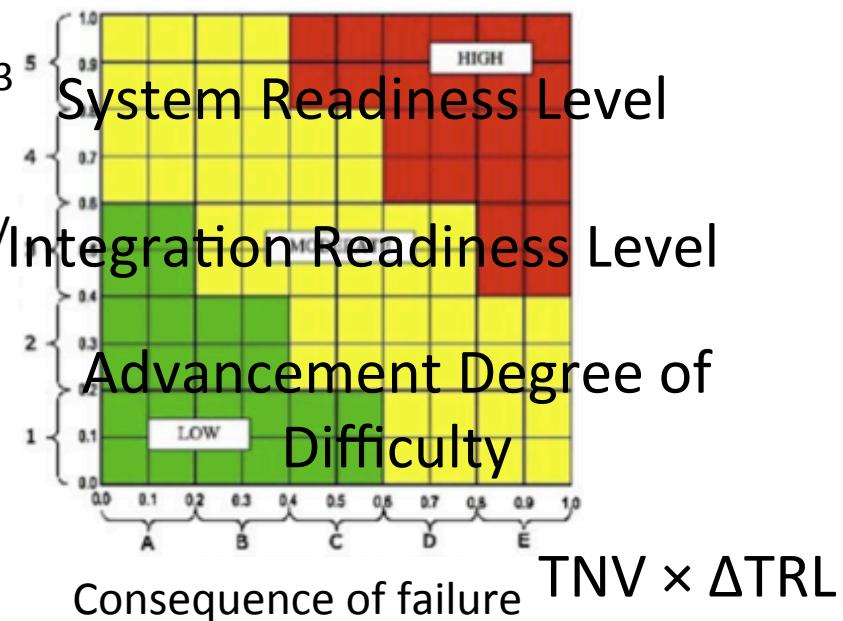
# Frame of reference (2)

- Readiness assessments

## Technology Readiness Level



# R&D Degree of Difficulty



Sauser et al. (2006), Mandelman (2009), Borch (2007), Nolte (2008) ...

# Purpose

- Research Question 1:
  - *What are the most important factors for determining the timing and content for internal technology transfer at the case company?*
- Research Question 2:
  - *How can these factors be addressed in the methods for assessing technology readiness?*

# Methodology

- Pre-study
  - Semi-structured interviews (15) during 2009
- Literature study
  - Articles on technology transfer
- Main study
  - Semi-structured interviews (7) during 2010
  - Attended meetings
  - Review of project documentation

# Results

# What transfer content is there?

- Technical
  - Test reports
  - Robustness
  - Specifications
- Business Case
  - Profitability
  - Risk analysis
- Implementation
  - Education
  - Equipment
  - Plans
- Personnel

# How is readiness assessed?

- Gated process with technical reviews
- Checklists based on TRL as gate criteria
- TRL 6 used for transfer readiness (Prototype demonstration in relevant environment)
- Gate criteria were seen as project objectives

# Challenges

- Interpreting readiness definitions
- Knowing the target application
- Avoiding rework during product development
- Personnel to support implementation
- Background knowledge
- Preparations for implementation
  - Allocating budget
  - Educating operators
  - Ready for full-scale operating conditions

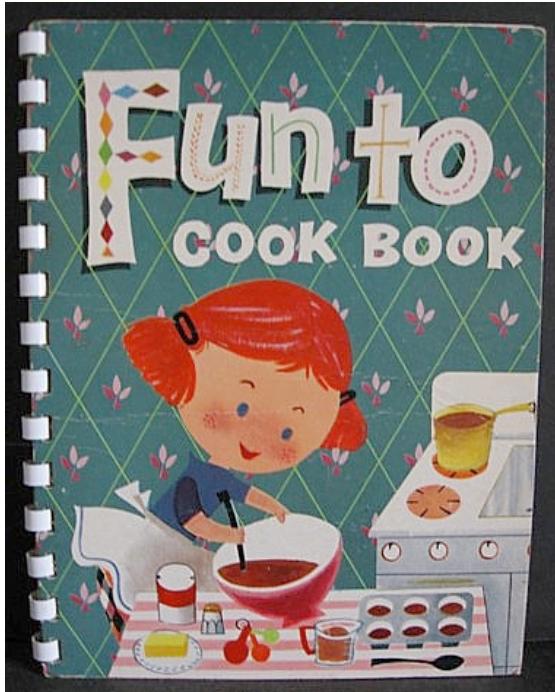
# Discussion

# Target deliverables



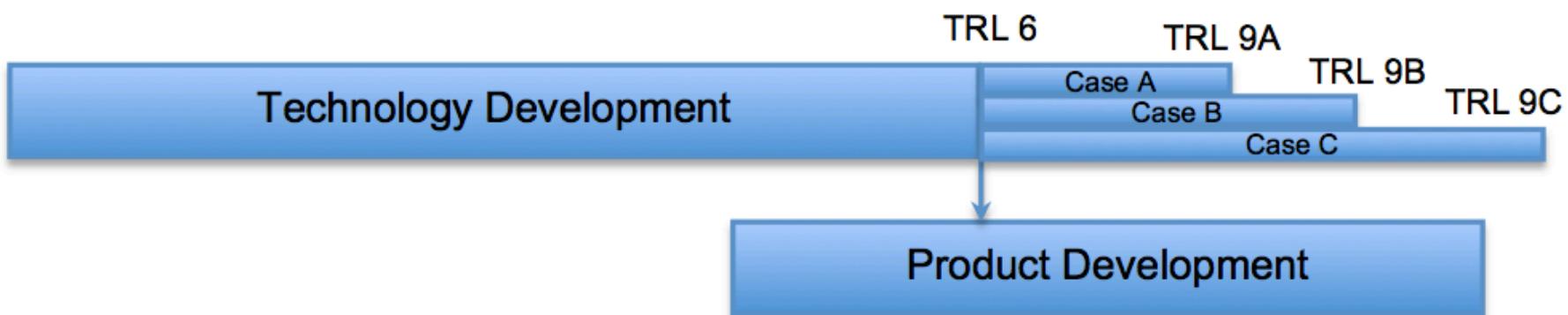
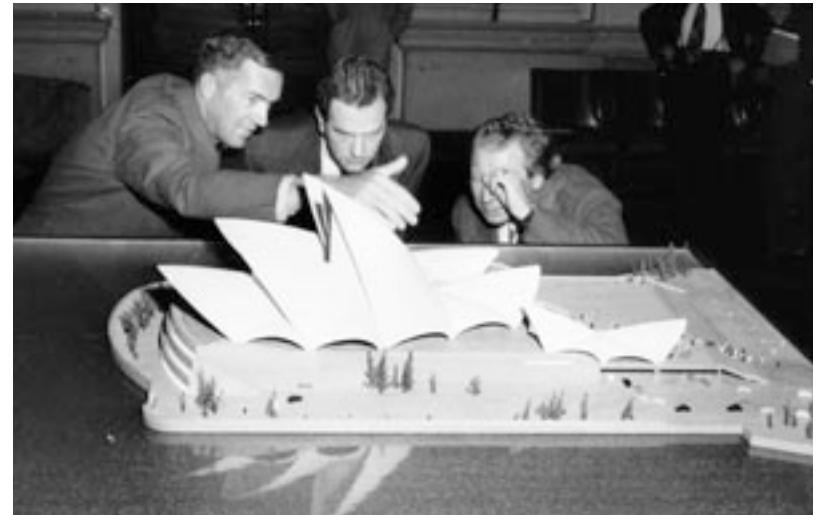
- Should there be more items in the checklist?
- Is TRL 6 the right level for transfer?
- Negotiate criteria with recipients?

# Quality of transfer



- Longer overlap between TD and PD?
- Transfer personnel?
- More preparation for implementation?

# Measure readiness

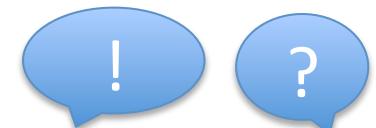
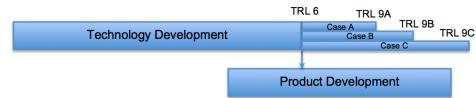


# Conclusion

# RQ1: Factors for determining timing and content of transfer

- TRL-based checklist works well
- Difficulty of further maturation not addressed
- Interpreting the readiness definition
- Transfer personnel to support implementation

| TGX, Base Criteria     |  |               |
|------------------------|--|---------------|
| Section                | Deliverables   | Required FUD  |
| Technical Aspects      | Generic Deliverables <ul style="list-style-type: none"><li>→ Insert implementation module</li><li>→ Insert additional relevant deliverables and/or milestones through implementation deliverables with explanation</li></ul> |               |
| Business Case          | Generic Deliverables <ul style="list-style-type: none"><li>→ Insert additional relevant deliverables and/or milestones through implementation deliverables with explanation</li></ul>  |               |
| Implementation Aspects | Generic Deliverables <ul style="list-style-type: none"><li>→ Insert implementation module</li><li>→ Insert additional relevant deliverables and/or milestones through implementation deliverables with explanation</li></ul> |               |
|                        |  | Next gate     |
|                        |  | Final TGD(=1) |



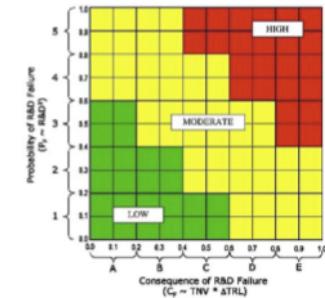
# RQ2: How can the assessments be improved accordingly?

- Adapt and negotiate readiness definition
- Multiple readiness checklists
  - Large/small
  - Critical/noncritical
  - Type of technology

| TGX, Base Criteria     |   |                                 |
|------------------------|---|---------------------------------|
| Section                | Deliverables  | Required Fulfill                |
| Technical Aspects      | Generic Deliverables<br>-> Insert technical module<br>-> Insert additional relevant deliverables and/or strikethrough irrelevant deliverables with explanation      |                                 |
| Business Case          | Generic Deliverables<br>-> Insert additional relevant deliverables and/or strikethrough irrelevant deliverables with explanation                                    |                                 |
| Implementation Aspects | Generic Deliverables<br>-> Insert implementation module<br>-> Insert additional relevant deliverables and/or strikethrough irrelevant deliverables with explanation |                                 |
| Next gate              |   | Tailor TG(X+1) in collaboration |

| TGX, Base Criteria     |   |  |
|------------------------|---|--|
| Section                | Deliverables  | Required Fulfill Level                                 |
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| Business Case          | Generic Deliverables<br>-> Insert additional relevant deliverables and/or strikethrough irrelevant deliverables with explanation                                    | LOW  |
| Implementation Aspects | Generic Deliverables<br>-> Insert implementation module<br>-> Insert additional relevant deliverables and/or strikethrough irrelevant deliverables with explanation | LOW  |
| Next gate              |   | Tailor TG(X+1) in collaboration with TGX decision body |

- Measure preparedness
  - More criteria for implementation
  - Measures for difficulty



# Thank you for listening...

...and let's hear some comments and  
questions!