

## Case Studies or Anecdotal Evidence?

Professor Per Runeson



## CV

1987-1991 Civilingenjör D  
1991-1998 Konsult (Q-Labs)  
1993-1997 Forskarstuderande  
1998 Tekn. Dr  
1998-2001 Lektor  
2001-2004 Docent  
2002/2003 Fulbright grant WSU  
2004- Professor  
2005-2007 Rådsforskare VR



## Research direction

Quantifiable Software Quality Management



## Research areas

- Empirical software engineering
- Software process improvement (SPI)
- Improvement of the V&V process
- Improvement of V&V techniques
- Software reliability engineering
- Estimation of defects after inspection
- Software quality and management
- Agile methods in a gate-model context



## Case Study or Anecdotal Evidence?

Professor Per Runeson



"...redan efter 45 minuter så hörde jag att motorn tystnade, det som rasslade och skramlade innan var som bortblåst och efter två timmars körning så blev det som en helt annan bil..."

Annons i Teknikens Värld 8/04



**"Renovera medan du kör"**

"Egentligen säger ett kompressionstest väldigt lite..." säger Nils Engström på Rototest

Teknikens Värld 11/04

**IVS RENOVERA MEDAN DU KÖR motor, växellåda, bakaxel**

...Före behandlingen var kompressionen något ojämn, framför allt första cylindern halkade efter. Efter behandlingen var kompressionen betydligt jämnare, som genom ett trollslag hade också ettans cylinder hostat upp sig från 7,4 till 9,4..."

Annons i Teknikens Värld 17/04

**Case Study or Anecdotal Evidence?**

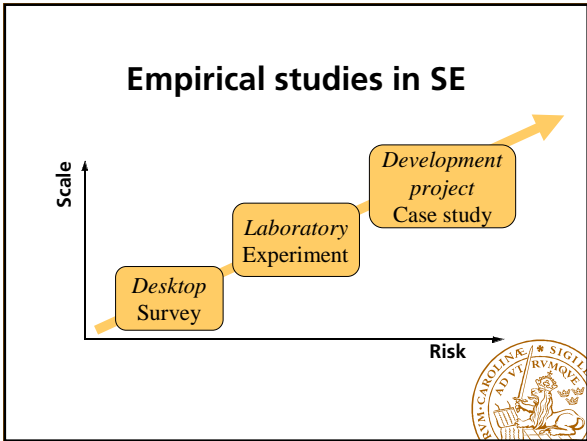
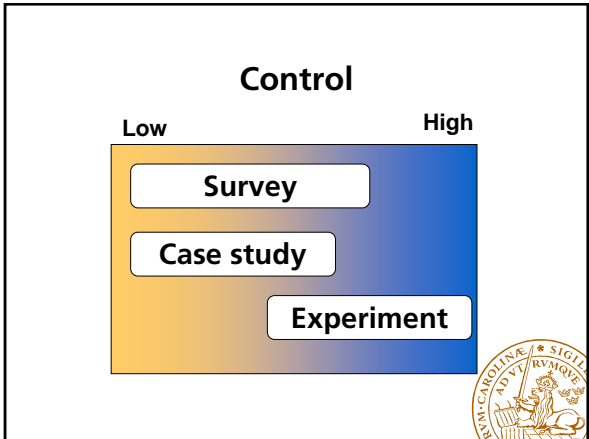
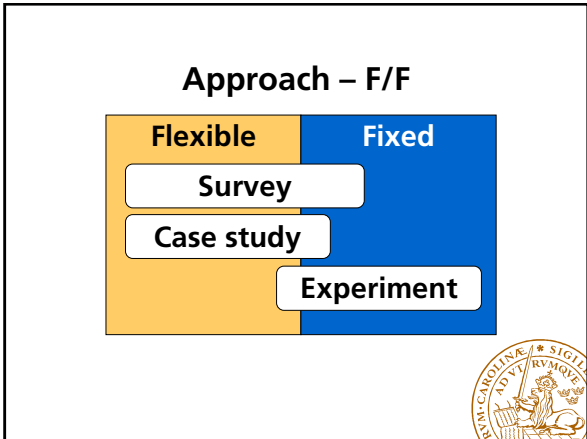
- Purpose
- Approach
- Control
- Validity

**Purpose**

Rosengren/Arvidsson 2002

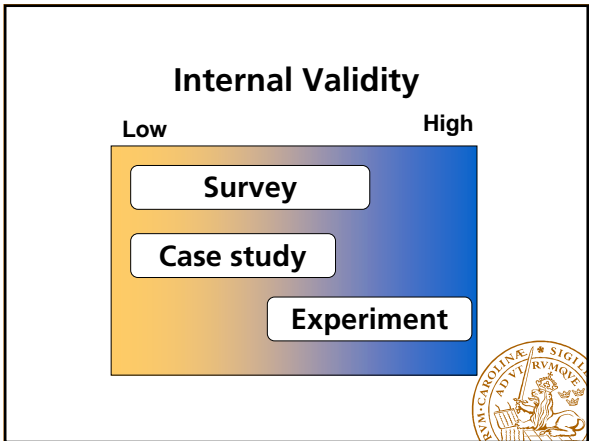
**Comparisons in research**

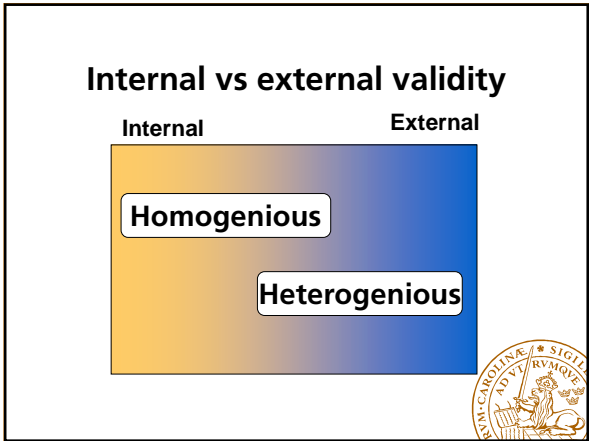
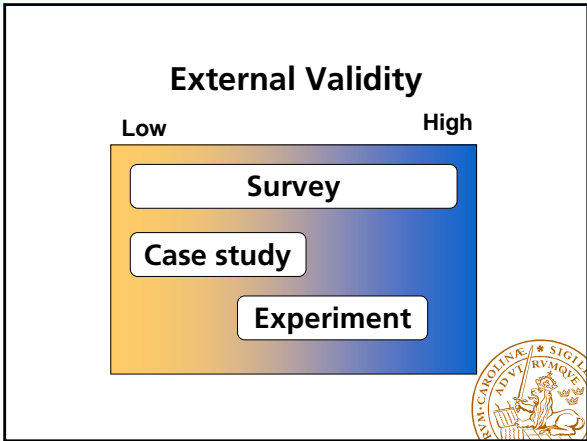
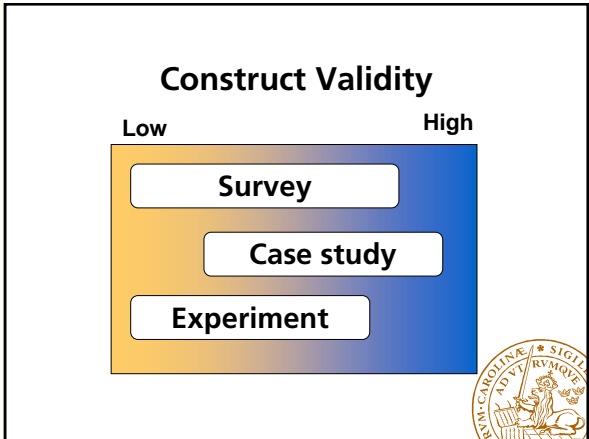
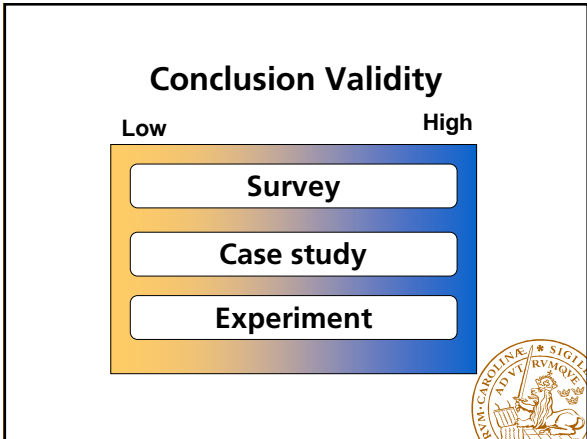
**Approach – Q/Q**



- ### Validity
- **Internal**  
Is the study conducted well?
  - **Conclusion/reliability**  
Are the statistics/analyses used correctly?
  - **Construct**  
Are we measuring/observing the right thing?
  - **External**  
Is the setting representative?
- 

- ### Validity of Qualitative Studies
- **Alternative classification**
    - Credibility
    - Transferability
    - Dependability
    - Confirmability
- [Robson 1993, Lincoln and Guba 1985]
- 

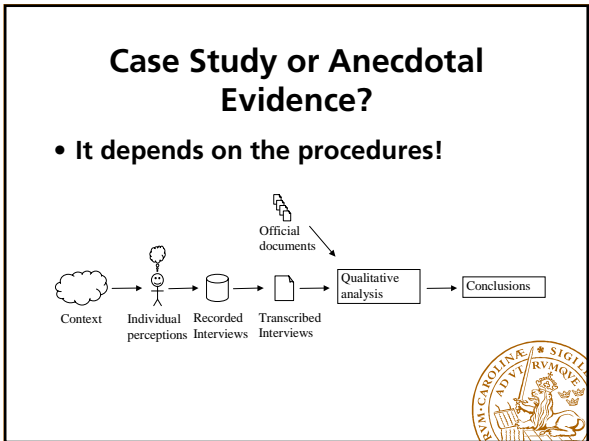




### Validity - Countermeasures

Strategy	Reactivity	Researcher bias	Respondent bias
Prolonged involvement	-	+	-
Triangulation	-	-	-
Peer debriefing	0	-	0
Member checking	-	-	-
Negative case analysis	0	-	0
Audit trail	0	-	0

[Robson 2002]



## Characteristics of a "good" flexible design

1. Rigorous data collection
2. Framed with assumptions
3. Understanding of many traditions
4. Procedures from many traditions
5. Idea leads to understanding
6. Detailed methods for collection, analysis and writing
7. Analysis on multiple levels
8. Clear writing



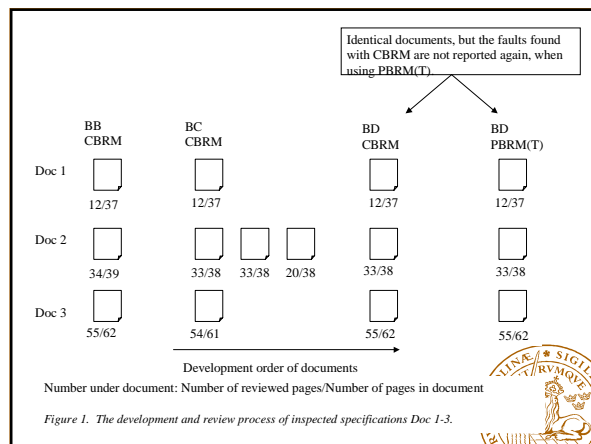
## Case study of three case studies

- Aggregating viewpoints for strategic software process improvement-a method and a case study - Karlström Runeson Wohlin
- Evaluation of a perspective based review method applied in an industrial setting - Berling Runeson
- Integrating Agile Software Development into Stage-Gate Managed Product - Karlström Runeson



## Evaluation of a ...

- Case study of the use of two review methods – CBRM and PBRM(T)
- One case:
  - Ericsson Microwave Systems
  - Three documents
  - Three increments



## Evaluation of a ... Case Study or Anecdotal Evidence?

- Purpose – Evaluation
- Approach – Quantitative
- Control – Medium
- Validity – ...



## Evaluation of a ... Validity

	Threat	Countermeasure
<b>Internal</b>	History	Bias adjustment
<b>Conclusion</b>	Implementation	Reporting Bias adjustment
<b>Construct</b>	Mono-method	Qualitative and quantitative
<b>External</b>	Generalizability	Reporting



### Evaluation of a ... Results

- PBRM(T) more effective and efficient than CBRM
- PBRM(T) provides more confidence to engineers



### Aggregating viewpoints...

- Case study of application of an SPI method
- One case: Fuji Xerox, Tokyo
- Survey within the case study – sampling, web-based data collection



### Aggregating viewpoints... Case Study or Anecdotal Evidence?

- Purpose – Feasibility study
- Approach – Quantitative
- Control – Low
- Validity – ...



### Aggregating viewpoints... Validity

	Threat	Countermeasure
<b>Internal</b>	Maturation Instrumentation Selection	Randomize order Consistency check
<b>Conclusion</b>	Implementation	Japanese translation
<b>Construct</b>	Apprehension	Management decision
<b>External</b>	Generalizability	Reporting



### Aggregating viewpoints... Results

- Case study
  - Methods are adequate
- SPI methodology
  - Identified similarities and discrepancies between managers and engineers



### Integrating Agile...

- Case study of application of an XP in project management context
- Two cases: ABB, EMW



**Integrating Agile...**  
**Case Study or Anecdotal Evidence?**

- Purpose – Describe
- Approach – Qualitative
- Control – Low
- Validity – ...



**Integrating Agile ...**  
**Validity**

	Threat	Countermeasure
<b>Internal</b>	Data collection	Several sources Inconsistencies
<b>Conclusion</b>	Misunderstanding	Feedback Peer review
<b>Construct</b>	Other factors	Long term involvement
<b>External</b>	Generalizability	Reporting



**Integrating Agile...**  
**Results**

- Agile vs. non-agile
- Management vs. engineers
- EMW vs. ABB



**Case Study or Anecdotal Evidence?**

