



From imagination to impact



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# Overcoming the first hurdle: Why organizations do not adopt CMMI

Nazrina Khurshid,  
Paul L Bannerman  
and Mark Staples



- Motivation
- Prior work
- Method
- Results
- Limitations
- Implications
- Conclusions



- Many studies on *SPI benefits* (why to adopt)  
(e.g., standardized processes; higher product quality; earlier defect detection; reduced time to market; lower post-release defects)
- Many studies on *SPI implementation* (how to adopt)  
(e.g., success factors; failure factors; risk factors)
- Practice-based standards/methods established  
(e.g., SEI's CMMI; ISO/IEC 15504 (SPICE))
- However, adoption slow (especially by SMEs)
- Non-adoption reasons received little attention  
(other than: expensive and better suited to large organizations)

**Why do organizations **not** adopt SPI?**

- Dominated by CMMI-related prescriptive studies
- SPI (CMMI) adoption research:
  - why has adoption been slow
  - key factors in SME adoption
  - demotivators for software practitioners
  - main motivators: project performance & product quality (not process improvement !)
- Only one study on organizational non-adoption
  - Staples et al. (2007)
  - Main reasons (other than size): too costly; no time; using another SPI
  - Main reasons based on size:
    - Small organizations: adoption infeasible ('could not' adopt reasons only)
    - Other organizations: adoption unbeneficial ('should not' adopt reasons or both)



## Australian study

- Government agency promotion
- Offered CMMI L2 Class B & C appraisals and support
- Multiple selection sources
- Offer sold by 3 sales consultants
- 2 month sales period ('04)
- Reasons for non-interest noted
- Data from 73 organizations
- Range of sizes (mostly small)
- Reasons classified; categorized
- Final sample: 40 companies

## Malaysian study

- Government agency promotion
- Offered 50% subsidy on CMMI L2 Class A appraisal
- Multiple selection sources
- Offer sold by 3 consulting firms
- 2 month recruitment period ('05)
- Reasons for non-interest noted
- Data from 85 organizations
- Range of sizes (mostly medium)
- Reasons classified; categorized
- Final sample: 45 companies

## Replicated field study

## Replication studies:

- Important in scientific method and empirical software engineering
- Help build knowledge and establish external validity of findings
- Results can be influenced by national socio-cultural differences (e.g., Asian countries characterized by fear of failure and low risk-taking; have different implementation strategies and institutional environments?)
- Supported findings implies national differences may not be important

## Research questions:

1. Why do organizations decide not to adopt CMMI?
2. How are these reasons related to organization size?

## Reason Classification

Reason	This Study Frequency (of 45)	Prior Study Frequency (of 40)	This Study Order	Prior Study Order
Too costly	15	14	1	2
No clear benefit	9	4	2	5
Small organization	8	17	3	1
Priorities	6	-	4	-
No time	4	10	5	3
Not applicable to our projects	3	2	6	7
Using other SPI	3	8	6	4
No customer demands	2	2	7	7
Potential benefits not wanted	2	3	7	6
Already know gaps	-	2	-	7
Risk of poor certification damaging business	-	1	-	8

## Reason Categorization

Group	Group frequency	Reason	Reason frequency
Could not	28	Small organization	8
		Too costly	15
		No time	4
		Not applicable to our projects	3
Should not	21	Priorities	6
		Using other SPI	3
		No clear benefit	9
		Potential benefits not wanted	2
		No customer demands	2
		Risk of poor certification damaging business	0

## Reason Categorization Comparison

Reason Group	This Study Frequency (of 45)	Prior Study Frequency (of 40)	This Study %	Prior Study %
Only could not reason(s)	24	23	53	58
Only should not reason(s)	17	8	38	20
Both could and should not reason(s)	4	9	9	23

Overall, organizations tended not to adopt CMMI because of its perceived infeasibility (i.e., 'could not' reasons)

## Prior study (Australia)

Most common reasons:

- Too small
- Too costly
- No time
- Using another SPI

## This study (Malaysia)

Most common reasons:

- Too costly
- No clear benefits
- Too small
- Priorities

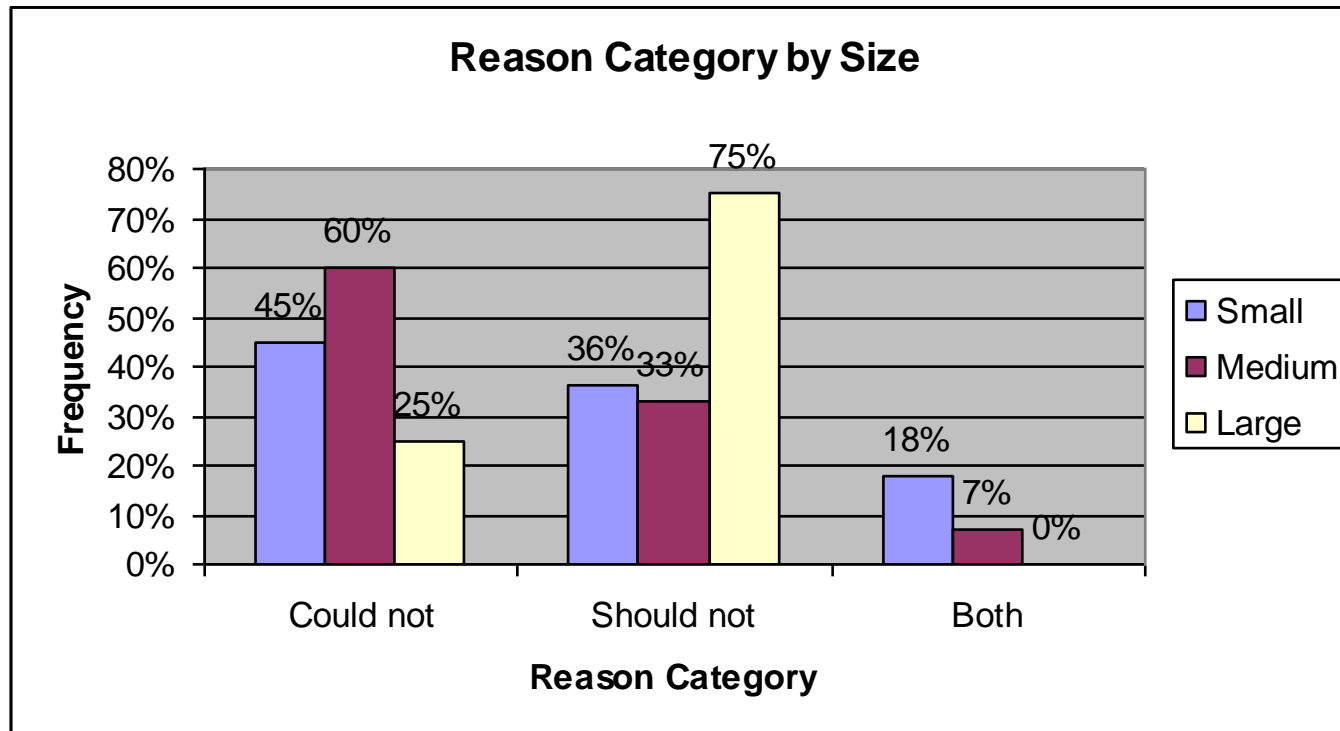
Having 'no time' and other 'priorities'  
may share common antecedents



# Results (5)

## Relating to organization size:

- Small & medium firms tended to give 'could not' reasons
- Large organizations tended to give 'should not' reasons
- Result consistent with prior Australian study



- Why do organizations decide not to adopt CMMI?:
  - the program is *too costly*
  - the *benefits are unclear*
  - the organization is *too small*
  - the organization has *other priorities*
- How are these reasons related to organization size?:
  - *small* organizations do not adopt CMMI for reasons of *infeasibility* (i.e. for 'could not' reasons)
  - *larger* organizations do not adopt CMMI because it is perceived to be *unbeneficial* (i.e., for 'should not' reasons)
- Results general consistent with earlier study
  - differences in frequency ordering of main reasons
  - variations may be due to socio-cultural differences



- Promotion targeted organizations from 10-50 staff
  - therefore, few very small or large organizations in study
- Size category issues
  - Australian and Malaysian definitions of SMEs differ
  - organization sizes were rounded (boundary sensitivity)
- Market research / sales data
  - data not collected with the intent of scientific analysis



# Implications (1)



## For research:

- Understanding organizational SPI adoption barriers as important as identifying implementation and sustainment factors
- Earlier adoption findings replicated and generally supported
- Further research needed on non-adoption reason antecedents (especially relating to organizational size and national culture)

## For practice:

- Need to further explore unique issues and needs of SMEs (most software development companies are SMEs)
- SMEs have less capacity to tailor SPIs than most methods assume (more appropriate methods with flexible access options are needed)
- Need to develop compelling cost-benefit justification for adopting SPI (view SPI as business investment; not just quality improvement technique)

Possible alternative approaches for SMEs (not in paper):

1. CMMI L2 Specific Practice implementation planning reference model (Xi Chen, 2007-2008):
  - analyzed dependencies between SPs and PAs based on WPs
  - informs adopters/implementers about possible process and practice interdependencies (absent in CMMI specification)
  
2. Adopt Agile as an SPI approach:
  - may be easier to adopt/implement (transition incrementally?)
  - short iterative development cycles promote rapid iterative learning and process improvement (Salo & Ahrahamsson, 2007)
  - three Agile CSFs: high-caliber team; practice Agile techniques; execute Agile delivery strategy (Chow & Cao, 2008)

- Replication study is largely supportive/consistent
- SPI (CMMI) is less feasible for small organizations (as opposed to large organizations)
- Need better understanding of path to business value from SPI/CMMI adoption
- Need more flexible, less costly, less resource-intensive SPI program entry options for SMEs

# Questions?

Thank you  
Paul Bannerman  
[paul.bannerman@nicta.com.au](mailto:paul.bannerman@nicta.com.au)





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