從**CMMI輔導** –
來看產學合作之實務與應用研究

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CMMI
能力成熟度整合模式

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INTRODUCTION TO CMMI

- Capability Maturity Model Integration
- Originated in Crosby, Established by SEI CMU
- Integrated (all-in-one)
- Comprising of 22 "process areas (PA)"
  - Viewing organization in terms of "process"
  - Thus modeling software organization's software business activities into "process areas"
- Twp representations. Five ML and six CL correspondingly.

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ML vs. CL

- Five ML
  1. Initial
  2. Managed
  3. Defined
  4. Quantitatively managed
  5. Optimizing

- Six CL
  0. Incomplete
  1. Performed
  2. Managed
  3. Defined
  4. Quantitatively managed
  5. Optimizing

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SEMANTICS IN ML/CL

- Initial or Incomplete:
  - Default to any software organizations
- Managed:
  - Similar projects have similar results
- Defined:
  - Processes are characterized and can be tailored during project planning/re-planning.
- Quantitatively Management:
  - Manage projects and processes by numbers
- Optimizing:
  - Continually efforts in identifying common causes and enhance core tech for org's better tomorrow

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CMMI, WHAT'S INSIDE?

- A what-to-do model that focuses on
  - Project management's processes/PAs
  - Engineering's processes/Pas
  - Supporting processes/PAs
  - Processes/PAs for managing the above processes

TWO THEMES IN CMMI

- Standard process (SOP) ??
- Institutionalized processes ??

- CMMI implementation has two themes:
  - To establish "standard processes"
  - To institutionalize these standard processes.

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MORE ON INSTITUTIONALIZATION

- A standard process alone cannot guarantee its real use.
- Still need more acts on four dimensions:
  - Commitment
  - Ability to perform
  - Directing implementation
  - Verifying implementation
- Example of these four dimensions?

WHAT-TO-DO IN INSTITUTIONALIZATION -- GENERIC PRACTICES

- 2-1 Establish policies
- 2-2 Plan the processes
- 2-3 Provide resources
- 2-4 Assign responsibilities
- 2-5 Train people
- 2-6 Manage configurations
- 2-7 Identify RS
- 2-8 Monitor & control the processes
- 2-9 Objectively evaluate the processes
- 2-10 Review status with the higher-ups

- 3-1 Define the processes
- 3-2 Collective performance data
- 4-1 Quantitatively manage projects
- 4-2 Quantitatively manage processes
- 5-1 Identify common causes
- 5-2 Continually improving processes

So technically speaking: ML

- Managed:
  - Implements the best practices for certain PAs on ML-2
  - Implement GP2-1~2-10
- Defined:
  - Implements the best practices for certain PAs on ML-2 &3
  - Implement GP2-1~3-2 for all PAs so far
- Quantitatively Managed:
  - Implements the best practices for certain PAs on ML-2,3 &4
  - Implement GP2-1~4-2 for all PAs so far
- Optimizing:
  - Implements the best practices for certain PAs on ML-2,3 ,4 &5
  - Implement GP2-1~5-2 for all PAs so far

So technically speaking: CL

- Managed:
  - Implements the best practices for a particular PA
  - Implement GP2-1~2-10 for that PA
- Defined:
  - Implements the best practices for a particular PA
  - Implement GP2-1~3-2 for that PA
- Quantitatively Managed:
  - Implements the best practices for a particular PA
  - Implement GP2-1~4-2 for that PA
- Optimizing:
  - Implements the best practices for a particular PA
  - Implement GP2-1~5-2 for that PA

INSTITUTIONALIZATION:
SOFTWARE ENGINEERING (SE) EXAMPLE

Verification & Validation

1. Establish standard V&V processes, for example?

    - Refer to a case of my client

2. To institutionalize the V&V processes, for example?

    - Refer to the same case

INSTITUTIONALIZATION: NON-SE EXAMPLE

- Your call! My explanation!!

CMMI IN TAIWAN

HOW ARE WE DOING?

- Nearly 80 organizations are certified
- Meaning what?
- How do software orgs. doing?
  - Answer two questions:
    - Why implementing CMMI?
    - Why getting certified?
- How do consulting companies doing?
  - What does process templates mean to them?
- How do software clients doing?
  - Are they doing better because of the certified suppliers they chose? (e.g. the *High Speed Rail* case)

HOW ARE WE DOING?

- It seems that CMMI (unless higher ML/CL) results in several ***problems***:
  - Process overwhelming (繁文縟節)
  - Process cramp (制度僵化，缺失創意)
  - Process bureaucracy
  - Too many steps to do
  - Too many documents write
- These may also occur in my clients!

VIEWPOINTS ON CMMI PROCESSES

- The frontline workers
  - that is, the "victims"
- The boss
  - Who wants to turn individual implicit experiences into organizational, explicit knowledge
- The client
  - Are they willing to give you next projects?
- The person who takes over your work
  - Either this people or the frontline workers are victims?
- So how do you design the processes?

RESEARCH ISSUE *1*

- Needs of ways to reduce or avoid the above problems.
- My way: problem oriented CMMI implementation
  - The NTC case。合作單位：南亞科技
  - The ESNE case。合作單位：翰昇環境科技
  - IPPD that cover cross-strait collaboration and management issue:
    - The FTC case。合作單位：台塑網
- Anything else? Welcome for discussion!!!

RESEARCH ISSUE *2*

APPLYING CMMI

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FIRST: CMMI ABSTRACTION

- Gee…not enough abstraction?
- The generality of CMMI lie in:
  - The model framework, e.g.:
    - the concept of process area, goals and practices
    - levels of maturity and capability
  - The concept of institutionalization
  - Process focus is the most critical criteria of applicability!
- Applying CMMI in other industries/fields
  - See the following examples (in Chinese)
  - Multi-disciplinary in nature… good for IM & IE researchers

EXAMPLE *1*

- Restaurant management (餐飲管理CMMI – a working paper by C.Y. Chen)
- How do you apply concept of CMMI in managing restaurant?
- See next (in Chinese)

餐飲管理CMMI：能力度意含

- 若把『烹飪』當成是一"流程領域"，依CMMI的CL設計，你覺得烹飪會有那些深化程度的差異？
  - CL-1：每次都能完成『烹飪』所規定的基本要求(what-to-do)
  - CL-2：對於烹調『蔥爆羊肉』每次都煮的差不多
  - CL-3：烹飪細節有更詳盡定義 (特徵化)及因人客要求而稍加變化。
  - CL-4：用各式數據來控制烹飪(鹽幾克、溫度、水份、時間等)
  - CL-5：嘗試不同的烹飪創新手法，創造更好吃，品質更穩定的『蔥爆羊肉』

Resource: NTC CMMI Speech

餐飲管理CMMI：成熟度意含

- 『烹飪』只是餐廳廚藝的一部分，還包括『採買』,『清潔廚房』,『廚藝創新』,『口味確認』……
  - ML-2：對於烹調『蔥爆羊肉』每次進行的『廚房管理(可能包括一些PA)』都有蠻一致的表現
  - ML-3：所有餐廳廚藝的所有流程有更詳盡定義及特徵化
  - ML-4：用各式數據來控制所有流程領域，每次的烹調都是經嚴格的量化要求
  - ML-5：對於各PA研究更正確的手法，並創造更多創新的菜餚
- 強調餐廳在餐廳廚藝上的**整體表現**。

Resource: NTC CMMI Speech

EXAMPLE *2*

- EB-CMMI (an accepted journal paper by C.Y. Chen)
- 合作單位：台北市電腦同業公會

OTHER APPLICATIONS?

- Teaching CMMI (a working paper)
  - A teacher with XX-level of teaching capability in ZZZ (e.g. "course planning" process area)?
  - A mature teacher in terms of xxx, yyy, zzz?
- Learning CMMI? (a working papers)
  - How to become a "mature" student??
  - A learning capability level XX student??
- 新聞製播及新聞媒體CMMI (a working paper)
  - Information quality is getting important in this information age…

END OF SLIDE

DISCUSSION

Welcome for a joint research
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