프로세스 개선(SPICE, CMMI) and BSC (Balanced Scorecard)

한국경영정보학회 **SEM**연구회

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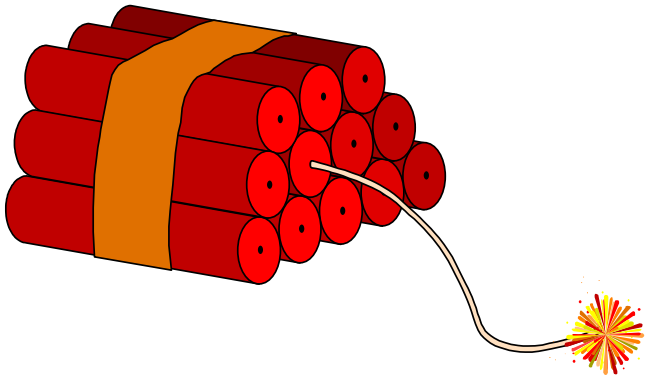
- **Part 1: Why processes?**
- **Part 2: Process models**
  1. **ISO/IEC 15504 (SPICE):** 프로세스 심사
  2. **CMMI**
- **Part 3: Balanced scorecard vs. process models**
- **Part 4: Final remarks**

Part 1: Why Processes ?

- 경쟁력 향상
- 고객 만족



소프트웨어 관련 문제점

Criterion	Failure Rate
Customer satisfaction	27%
Ability to meet budget targets	50%
Ability to meet schedule targets	55%
Product quality	28%
Staff productivity	32%

- Cutter Consortium: Agile Project Management Advisory Service, Executive Update, Vol. 6, No. 14, 2005.
  - Respondents: 232 projects around the world

소프트웨어 프로젝트 문제 해결 방안

- 기술적인 해결 방안
  - **New programming language, new methodology, etc.**
- 프로세스 개선
  - 능력 향상 **(capability improvement)**

프로세스 표준의 역할

Process (Capability) Improvement

5 단계 (고수의 세계)

4단계 (선형대수: **AX=b**)

3단계 (연립방정식: **2x+ y =3; x+2y = 3**)

2단계 (미지수 구하기: **2x + 3 = 9**)

1단계 (4칙 연산: 더하기, 빼기, 곱하기, 나누기)

0 단계 (?)

능력에는 단계가 있다. 즉, 사칙연산을 모르면 미지수 문제의 답을 구할 수 없다

누구의 잘못인가? 엄마 또는 아들

5 단계 (고수의 세계)

4단계 (선형대수: **AX=b**)

3단계 (*미지수 구하기: **2x + 3 = 9***)

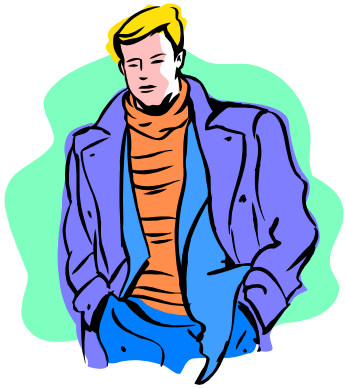
2단계 (*연립방정식: **2x+ y =3; x+2y = 3***)

1단계 (**4**칙 연산: 더하기, 빼기, 곱하기, 나누기)

0 단계 (?)

Question: 각 단계에서 정의된 항목이 올바른가?

Part 2: Process models



질문: CMM 모델의 종류는 ?

답: N개 (N>20)

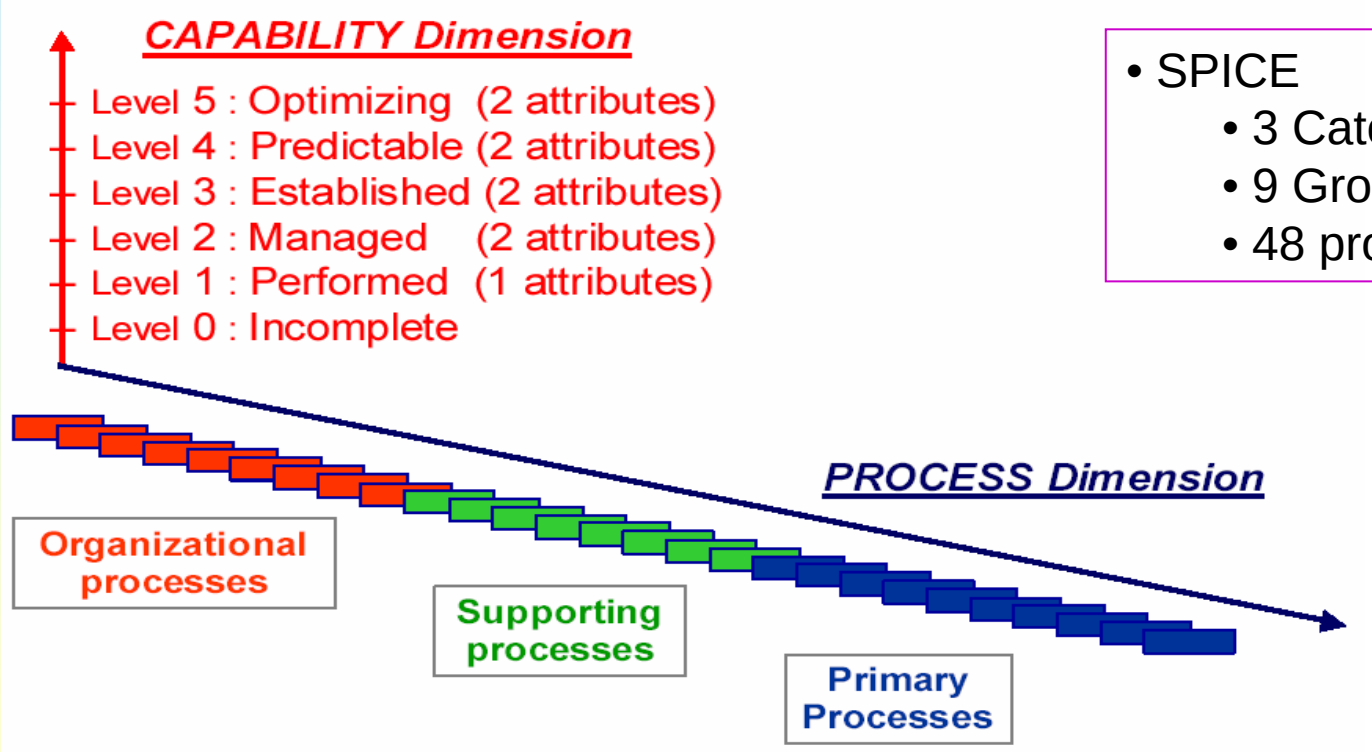
Process Models

- Process models: best practices을 선정하여 분류
  - ISO/IEC 15504 (SPICE): 48 Process, 9 Groups, 3 Categories
  - CMMI: 25 Process Areas, 4 Categories

- Best practices: 따라가면 효과 있다는 증거 있음 (evidence base)

- ISO/IEC 15504 (Process assessment; SPICE)
  - Member only: http://wg10.intranets.com/
  - Subscription: http://www.isospice.com/
  - Research: http://www.cis.strath.ac.uk/research/SPICE/
- SEI CMMI
  - CMMI (Capability Maturity Model Integration)
  - SEI: http://www.sei.cmu.edu/
  - CMMI: http://www.sei.cmu.edu/cmmi
- BOOTSTRAP, TRILLIUM → SPICE로 통합

ISO/IEC 15504 (SPICE): Two-dimensional capability architecture



- SPICE
  - 3 Categories
  - 9 Groups
  - 48 processes

SPICE processes

3 lifecycles
9 groups
48 processes

PRIMARY Life Cycle Processes

Acquisition Process Group (ACQ)
- ACQ.1 Acquisition preparation
- ACQ.2 Supplier selection
- ACQ.3 Contract agreement
- ACQ.4 Supplier monitoring
- ACQ.5 Customer acceptance

Supply Process Group (SPL)
- SPL.1 Supplier tendering
- SPL.2 Product release
- SPL.3 Product acceptance support

Engineering Process Group (ENG)
- ENG.1 Requirements elicitation
- ENG.2 System requirements analysis
- ENG.3 System architectural design
- ENG.4 Software requirements analysis
- ENG.5 Software design
- ENG.6 Software construction
- ENG.7 Software integration
- ENG.8 Software testing
- ENG.9 System integration
- ENG.10 System testing
- ENG.11 Software installation
- ENG.12 Software and system maintenance

Operation Process Group (OPE)
- OPE.1 Operational use
- OPE.2 Customer support

ORGANIZATIONAL Life Cycle Processes

Management Process Group (MAN)
- MAN.1 Organizational alignment
- MAN.2 Organization management
- MAN.3 Project management
- MAN.4 Quality management
- MAN.5 Risk management
- MAN.6 Measurement

Process Improvement Process Group (PIM)
- PIM.1 Process establishment
- PIM.2 Process assessment
- PIM.3 Process improvement

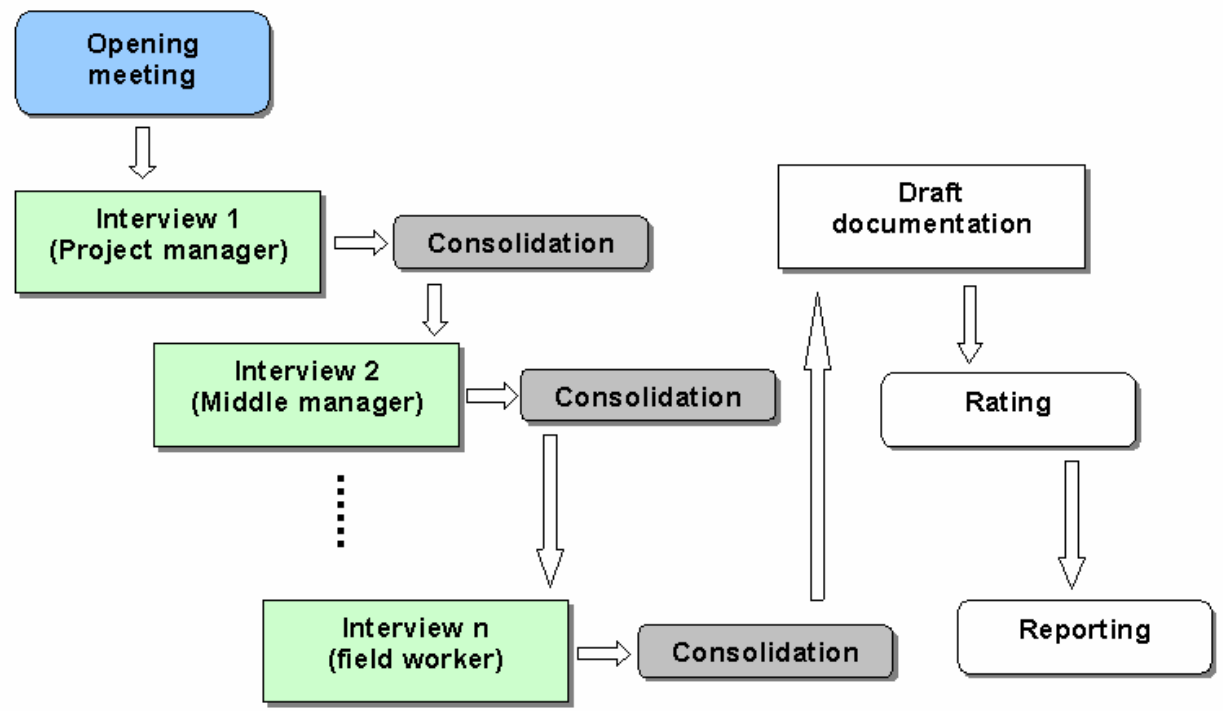
Resource and Infrastructure Process Group (RIN)
- RIN.1 Human resource management
- RIN.2 Training
- RIN.3 Knowledge management
- RIN.4 Infrastructure

Reuse Process Group (REU)
- REU.1 Asset management
- REU.2 Reuse program management
- REU.3 Domain engineering

SUPPORTING Life Cycle Processes

Support Process Group (SUP)
- SUP.1 Quality assurance
- SUP.2 Verification
- SUP.3 Validation
- SUP.4 Joint review
- SUP.5 Audit
- SUP.6 Product evaluation
- SUP.7 Documentation
- SUP.8 Configuration management
- SUP.9 Problem resolution management
- SUP.10 Change request management

KSPICE Assessment Procedure



KSPICE

- Korea has participated in the ISO/IEC JTC1/SC7 since the 4th plenary meetings in Sweden (1991).
- In fall of 1997, the Korean SC7/WG10 established a Local Trials Center to promote SPICE assessments in Korea.
  - The Center is called the Korea SPICE (KSPICE).
  - Local Trials Coordinator: Dr. Kyung Whan Lee
  - Secretary General: Dr. Ho-Won Jung
- KSPICE objectives
  - Representative of Korea WG10
  - Assessor trainings

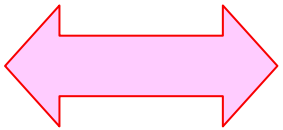
KASPA

- KASPA (Korea Association of Software Process Assessors) was established in 2000.
- Objective: Promote process improvement and contribute software process studies.
- Members
  - SPICE assessors
  - ISO 9000 assessors
  - CMMI assessors

KSPICE and KASPA

KSPICE

- Assessor training
- SPICE research
- SPICE benchmarking forum



Tightly Coupled

KASPA

- Assessor migration training (SPICE, CMMI)
- Assessment method training
- SPI forum
- SPICE benchmarking forum

SPICE Assessors

- SPICE assessors (including lead assessors): 523
  - 40 hours in class training
  - 2 hours class examination (pass rate: 65% to 70%)
- Lead assessors:33
  - Requires at least 120 hours:
    - Participate assessments
    - Participate SPI forum (every two month)
- Candidate lead assessors: 20
- Number of assessors participated in IS migration training: 90

Note that IS: International Standard ISO/IEC 15504.

Continuous representation (SE/SW/IPPD/SS, Version 1.1)

(25 Process Areas)

Process management	**Organizational Process Focus (3)**	OPF
	Organizational Process Definition (3)	OPD
	Organizational Training (3)	OT
	Organizational Process Performance (4)	OPP
	Organizational Innovation and Deployment (5)	OID
Project Management	**Project Planning (2)**	PP
	Project Monitoring and Control (2)	PMC
	Supplier Agreement Management (2)	SAM
	Integrated Project Management for IPPD (3)	IPM for IPPD
	Risk Management (3)	RSKM
	Integrated Teaming (IPPD) (3)	IT
	Integrated Supplier Management (SS) (3)	ISM
	Quantitative Project Management (4)	QPM
Engineering	**Requirements Management (2)**	REQM
	Requirements Development (3)	RD
	Technical Solution (3)	TS
	Product Integration (3)	PI
	Verification (3)	VER
	Validation (3)	VAL
Support	**Configuration Management (2)**	CM
	Process and Product Quality Assurance (2)	PPQA
	Measurement and Analysis (2)	MA
	Decision Analysis and Resolution (3)	DAR
	Organizational Environment for Integration (IPPD) (3)	OEI
	Causal Analysis and Resolution (5)	CAR

CMMI staged representation 25 process areas

Level	Focus	Process Areas
5 Optimizing	*Continuous process improvement*	Organizational Innovation and Deployment (OID) Causal Analysis and Resolution (CAR)
4 Quantitatively Managed	*Quantitative management*	Organizational Process Performance (OPP) Quantitative Project Management (QPM)
3 Defined	*Process standardization*	Requirements Development (RD) Technical Solution (TS) Product Integration (PI) Verification (VER) Validation (VAL) Organizational Process Focus (OPF) Organizational Process Definition (OPD) Organizational Training (OT) Integrated Project Management (IPM) *(IPPD)* Risk Management (RSKM) Integrated Teaming (IT) *(IPPD)* Integrated Supplier Management (ISM) (SS) Decision Analysis and Resolution (DAR) Organizational Environment for Integration (OEI) *(IPPD)*
2 Managed	*Basic project management*	Requirements Management (REQM) Project Planning (PP) Project Monitoring and Control (PMC) Supplier Agreement Management (SAM) Configuration Management (CM) Process and Product Quality Assurance (PPQA) Measurement and Analysis (MA)
1 Initial		

CMMI

- SEI CMMI: Introduction to CMMI
- Authorized CMMI attendees in Jung's classes: 164
  - Feb. 2004 ~ May 2005

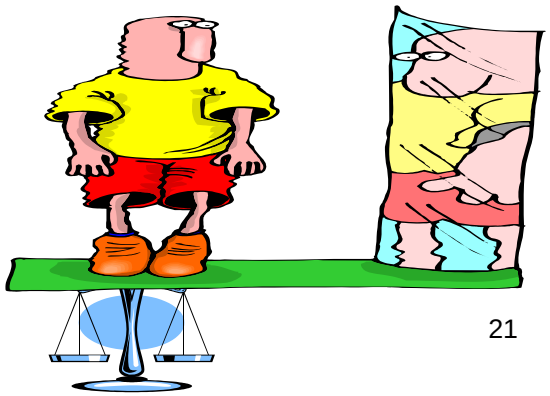
3. Balanced Scorecard vs. Process models

Process improvement의
기여도 측정 및 관리

어떤 질문 !!!

금년도 우리회사 이익이 3200억원이다.
프로세스 개선의 contribution 은 얼마인가?

측정 할 수 없으면 관리할 수 없다 !!!



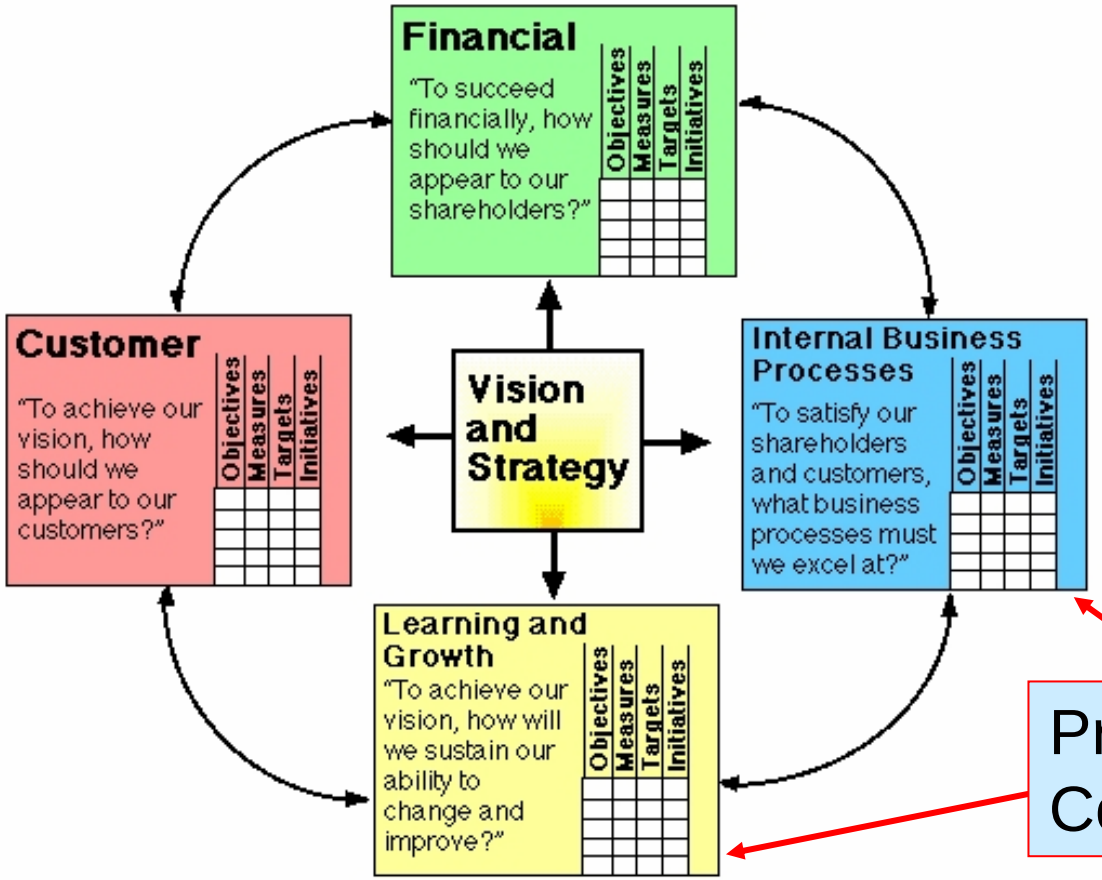
The Balanced Scorecard

- 조직의 성과와 건전성을 측정하고 관리

- Four perspectives of BSC
  - 재무 관점 (Internal Business Perspective)
  - 고객 관점 (Customer Perspective)
  - 내부 프로세스 관점 (Internal Business Perspective)
  - 혁신, 학습, 성장 관점 (Innovation, Learning and Growth Perspective)

Balanced Scorecard

- 조직의 성과와 건전성을 측정하고 관리 (4가지 관점)



Process model이 Cover하는 관점

BSC (Balanced scorecard)

GAO의 IT 성과측정 관점 및 성공요인

관점	목적 (성공요인)
IT 전략	조직 임무 목표, 포트폴리오 분석과 관리, 재무 및 투자 성과, IT 자원 사용
IT 고객	고객 참여, 고객 만족, 비즈니스 프로세스 지원
IT 내부 비즈니스 프로세스	응용 개발 및 유지보수, 프로젝트 수행, 인프라 이용성, EA 표준 준수
IT 혁신 및 학습	직원 능력 및 개발, 고급기술 사용, 최신 방법론 사용, 직원 만족 및 유지

IT는 정보시스템 보다 큰 개념

GAO (Government Accounting Office), 미국 의회 기관

(SPICE, CMMI) 와 BSC의 공통된 특징

- Business needs와 goals 에 초점
- 측정이 핵심 프로세스 (Measurement & Analysis)
- CMMI의 OPP (Organization Process Performance)는 BSC에 도움
- BSC의 개념은 CMMI의 continuous representation과 일치
  - 조직의 목적에 가장 잘 맞는 프로세스를 골라서 개선
  - 조직의 risk을 가장 효과적으로 완화 시킬 수 있는 프로세스를 골라서 개선
  - 얼마나 개선 할 것 인지를 결정 가능

CMMI를 성과관리나 위험관리와 연결하여 사용하려면
꼭 continuous representation을 사용해야 됨

CMMI Continuous Representation vs. BSC

- CMMI Continuous Representation
  - 조직의 목적에 가장 잘 맞는 프로세스를 골라서 개선
  - 조직의 risk을 가장 많이 완화 시킬 수 있는 프로세스를 골라서 개선
  - 얼마나 개선 할 것 인지를 결정 가능

CMMI를 성과관리나 위험관리와 연결하여 사용하려면
꼭 continuous CMMI 사용해야 됨

BSC를 지원하는 CMMI의 PAs

- BSC Internal Business Perspective
  - Measurement & Analysis
  - Organizational Process Definition
  - Organizational Process Performance
  - Quantitative Project Management
- BSC Learning and Growth Perspective
  - Organizational Training
  - Organizational Process Focus

BSC를 지원하는 ISO/IEC 15504 (SPICE) 프로세스

(CMMI에는 없는 프로세스)

- MAN.1 Organizational alignment
- MAN.2 Organizational management
- RIN.1 Human resource management

4. Final remarks

Final comments

- Seamless approach
  - Process improvement (CMMI)
  - Acquisition (CMMI-AM)
  - Performance management (BSC)

- **System 관점**
  - Software engineering의 관점에서 문제를 보면 안됨
  - 특히, BSC로 가면 software engineering과 관계 거의 없음

- 발표의 한계 및 방향
  - 미국에 초점
  - 사례 및 how를 포함하지 못함 (차후 다른 기회에…)

고려대학교

감사합니다.