R&D

J. K. Kim

Top M.C. Consultant

1.

Life Cycle Model

R&D

.

DFSS   ,

DFSS

.

.

,

(LCM)   DFSS

,

.

,   DFSS

.

.

Life Cycle Model

Rel. 1.0

2.

![TOP M.C.]

❏

❏   (/   /   /   )

❏

❏

❏

❏

❏

❏

❏

Life Cycle Model

Rel. 1.0

3. DFSS

Life Cycle Model

R&D LCM

Life Cycle Model

ISO 9001 R&D

Life Cycle Model

TOP M.C.

R&D LCM

CTQ

| Define | Measure | Analyze | Design | Verify |

-
  - CTQ
-
-
-

Life Cycle Model

Rel. 1.0

TOP M.C.

```
        ┌─────────────────┐
        │        /        │
        └────────┬────────┘
                 ▼
        ┌─────────────────┐
        │        /        │
        └────────┬────────┘
                 ▼
┌──────────┐   ┌─────────────────┐   ┌──────────────┐
│   LCM    │─▶ │                 │◀─ │ Method/Tool  │
└──────────┘   │      R&D        │   └──────────────┘
┌──────────┐   │                 │   ┌──────────────┐
│ Standrad │─▶ └────────┬────────┘◀─ │              │
└──────────┘            ▼            └──────────────┘
        ┌─────────────────┐
        │                 │
        └────────┬────────┘
                 ▼
        ┌─────────────────┐
        │                 │
        └────────┬────────┘
                 ▼
        ┌─────────────────┐   ┌──────────────┐
        │                 │─▶ │              │
        └─────────────────┘   └──────────────┘
```

Life Cycle Model

TOP M.C.

Leverage Effects

Concept Design

Product Design

Process Design

Manufacturing

1000:1

100:1

10:1

1:1

Quality Improvement

Life Cycle Model

Rel. 1.0

Activity 1 Tasks

....

Activity N Tasks

1

...

N

:
Modularity
Responsibility

:
PDCA Cycle

Life Cycle Model

TOP M.C.

```
┌─────────────────────────┐
│         Process         │
└─────────────────────────┘
            │
   ┌────────┴────────────────────────┐
┌──────────────┐              ┌──────────────┐
│  Activity 1  │    .....     │  Activity N  │
└──────────────┘              └──────────────┘
       │                             │
  ┌────┴──────┐                      │
┌────────┐ ┌────────┐            ┌────────┐
│ Task 1 │ │ Task N │            │ Task 1 │
└────────┘ └────────┘            └────────┘
           .....
```

Life Cycle Model

PLAN

(, ..)

ACTION

(,)

DO

(,)

CHECK
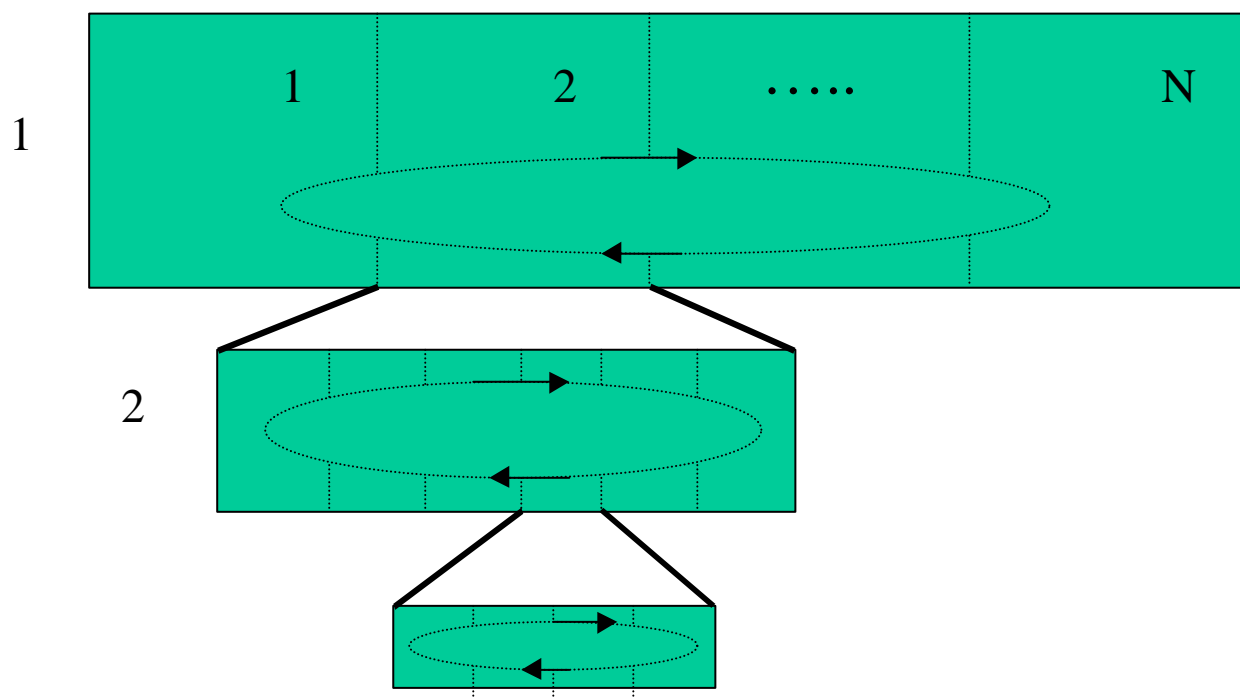
(,)

Life Cycle Model

Rel. 1.0

(Tool)   .

Life Cycle Model

❑ (Process)

Modularity Responsibility .

❑ (Activity)

,

.

❑ (Task)

❖ , (,)
(,)

❖ Will, Shall, Should, May
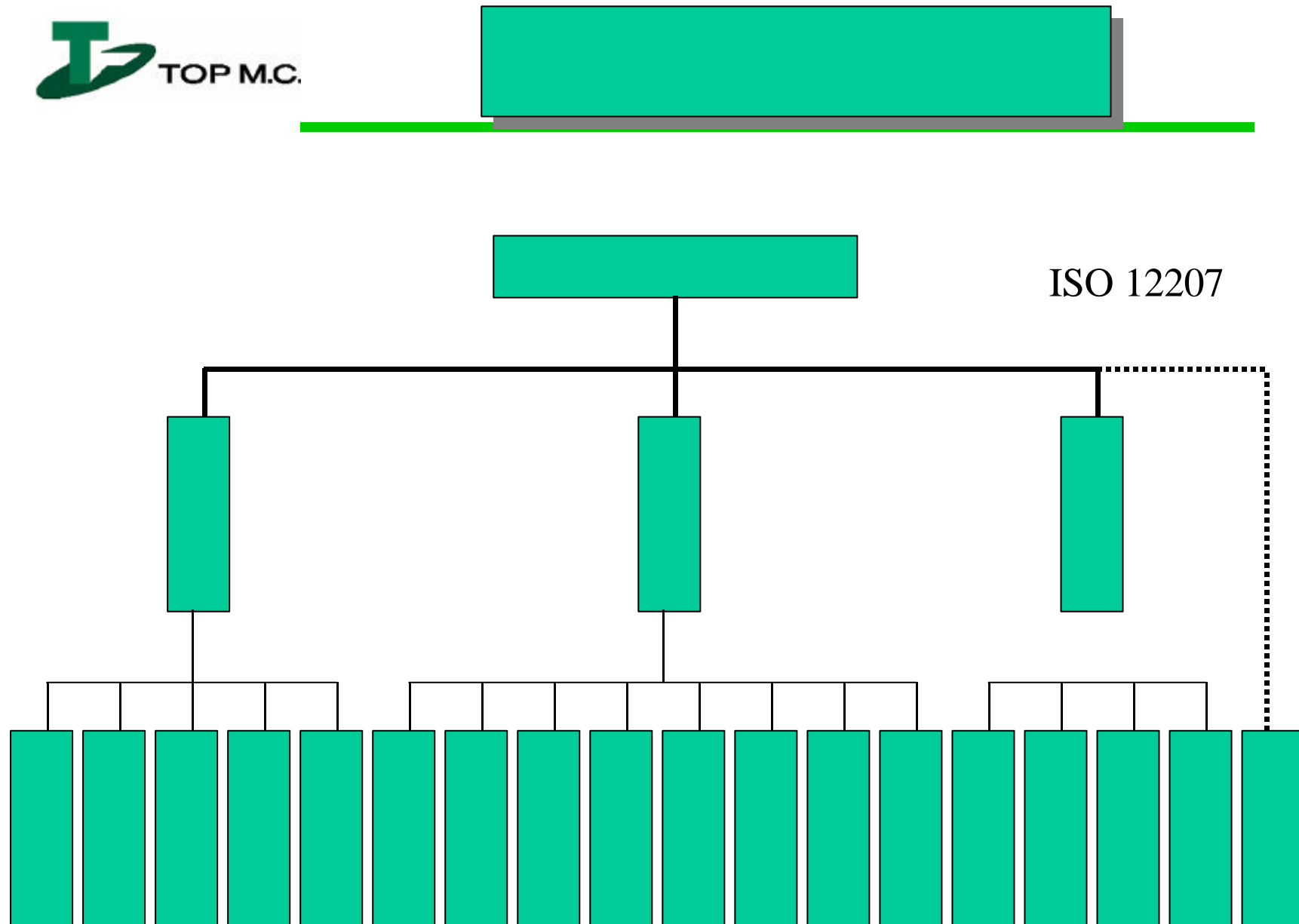
Life Cycle Model

ISO 12207

Life Cycle Model

TL 9000,SPICE   ISO 12207

TOP M.C.

(QA)

(PA)

| TL 9000 | SPICE |

ISO/IEC 12207

(PA)

Life Cycle Model

Rel. 1.0

personnel   management   financial
planning   by objectives   planning

(Management Processes)

development

purchasing

production
scheduling

production

distribution

service

(Core Processes)

(Supporting Processes)

quality   maintenance information
assurance   management

Life Cycle Model

TOP M.C.

( )
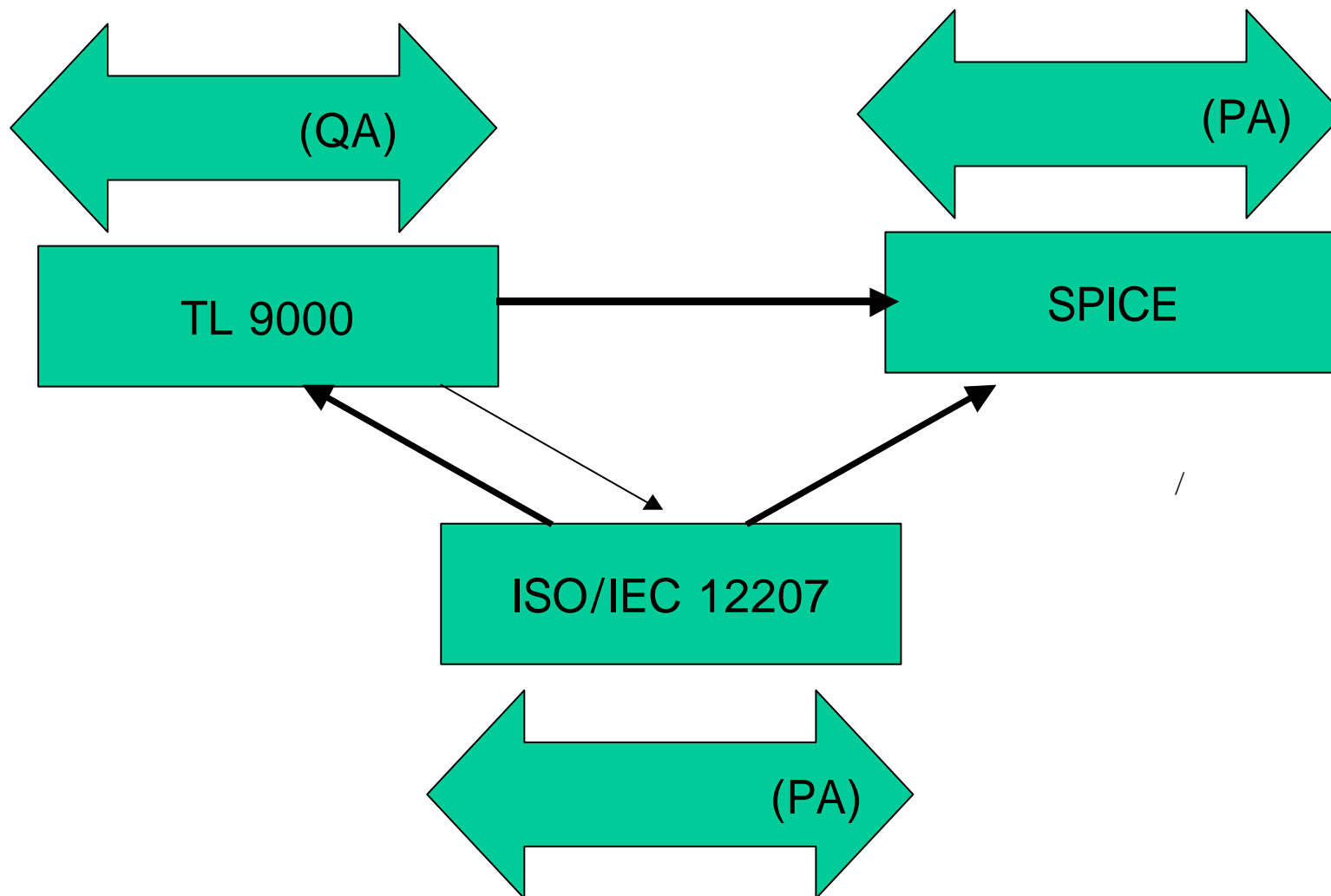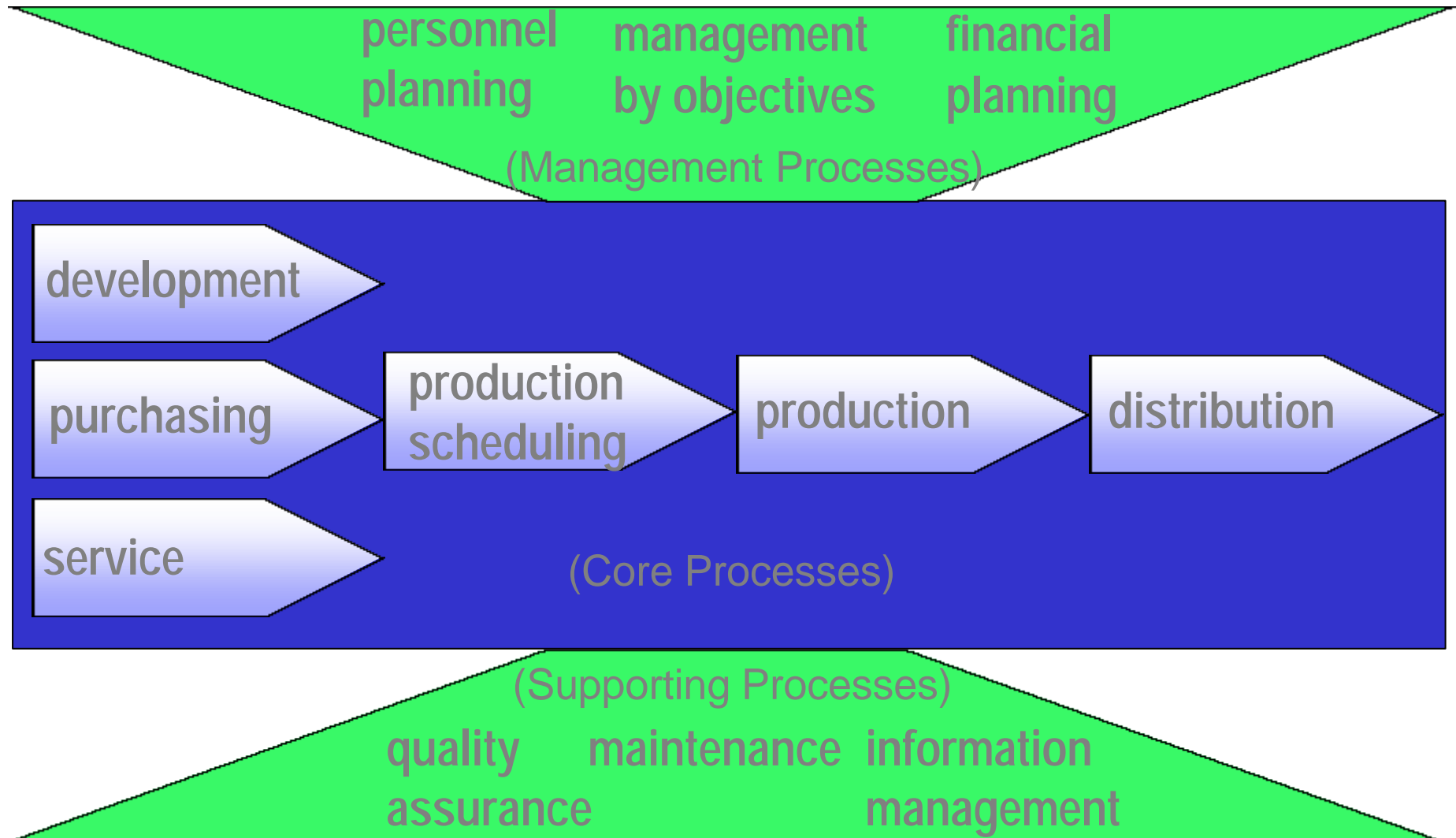
Processes

/   /

Phases

Activities

H/W, S/W

E/S   /

/

/

/

/   /   ,   /   /

Supporting Processes

TOP M.C.

LCM　　　　　　　　　（　）

-
-
-

-
-
-
-

- 　/
-
-
-

- 　/
- PBA
-
-
-

-
-
-
-

Life Cycle Model

Rel. 1.0

TOP M.C.

(- 1)

Step	Interface					Related Doc.	Related Format
	CEO	Design	QA	Prod.	Purch.		
Plan				Establish Plans		Production Planning Procedure HE-09-11	Production Planning Sheet HS-001-1
	Approval?		Review Yes No				
Do				Distribute			Criteria Dist. HS-007-3
			Implementation				
Check			Report		Action	Management Review Procedure HE-01-04	
Action			Anal./ Action? Yes No				
		Mana. Review Data					

Life Cycle Model

Rel. 1.0

TOP M.C.

（ - 2)

사업계획 수립 및 운영 업무흐름도

Life Cycle Model

Rel. 1.0

Activity No
02

Advanced Product Quality Planning for Company.CO.,LTD.

[개발목표설정, 제품설계, 시작품 제작, ESIR, 공정설계, 공정개발, TRY OUT, PILOT, ISIR 선행양산, 인수인계 및 초기관리, 양산 및 지속적 개선]

제품 공법 벤치마킹

주관부서 : 제품설계부서, 생산기술부서

협조부서 : 연구부서, 시험부서, 시작부서

활동시기 : 설계목표 수립 前

적용범위 : 신규차종

입력자료 :

자 료 명	출 처	비 고
신공법/신소재 자료 국/내외 유사제품 분석자료	연구부서 시험부서, 시작부서	

활동내용 : 계약검토자료, 국내 또는 국외의 세계수준 내지는 최고수준의 적절한 벤치마킹의 선정, 비교하기 위한 규격의 파악 및 측정 가능한 품질목표를 제공하기 위함.

업무흐름 :
- 제품설계부서장은 유사차종에 대한 제품에 대하여 Tier Down 을 실시하여 사양 비교표를 작성한다.
- 생산기술부서장은 유사차종에 대한 예상공법비교표를 작성한다.

결 과 물 : "유사제품 (사양/공법) 비교표 (XXXX-XXXX-XXXX)"

Life Cycle Model

TOP M.C.

Process
Definitions

Comments

Tasks

1

N

Process
Baselines

-
-
-

Life Cycle Model

Rel. 1.0

TOP M.C.
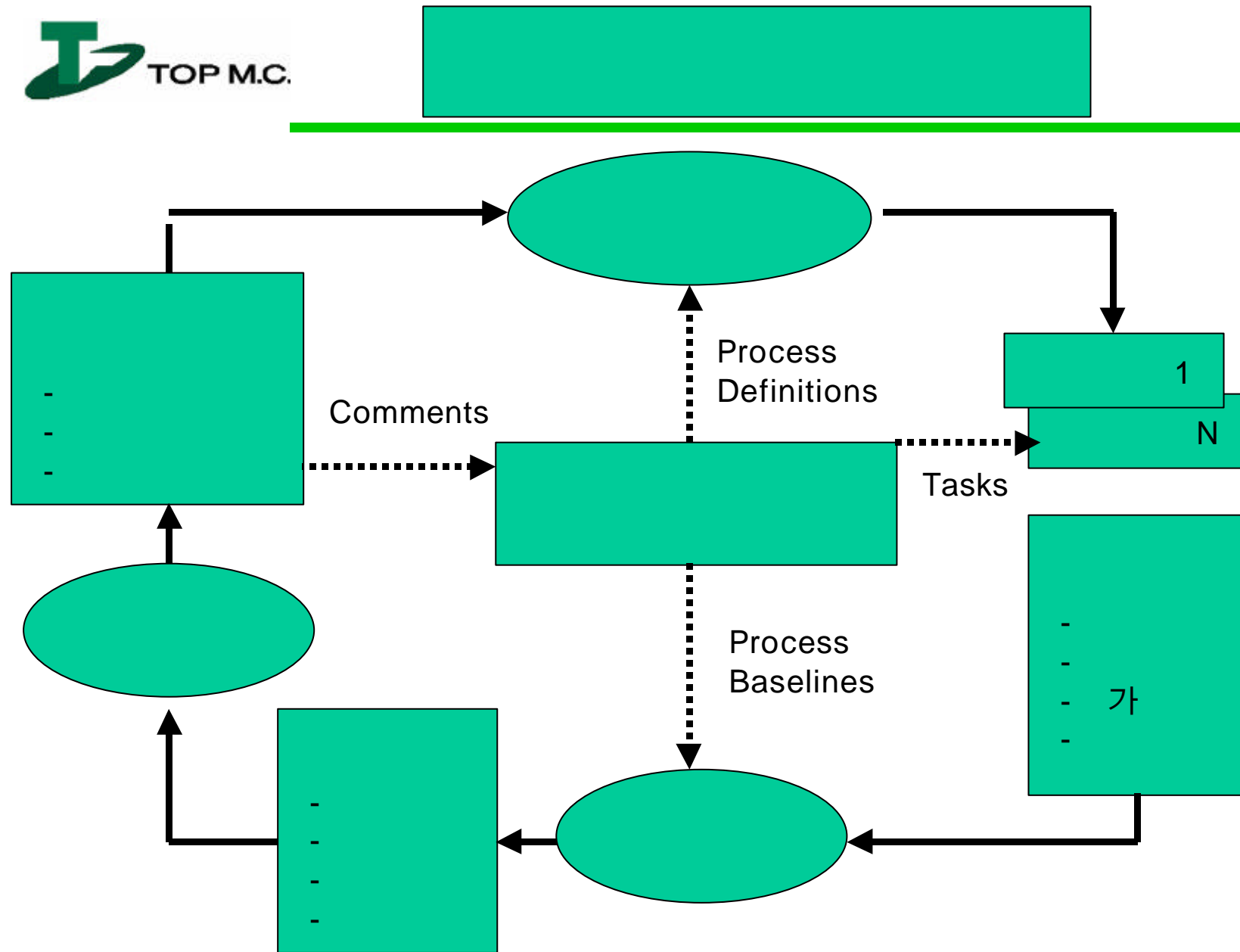
> TL 9000 Quality System Requirements

> ISO/IEC 12207 Software Life Cycle Processes

> ISO/IEC 15504 Software Process Assessment

> ISO 15228 System Life Cycle Processes

> SEI CMM Capability Maturity Model

Life Cycle Model

❖ Stage-Gate Process Model

❖ Waterfall Model

❖ Incremental Model

❖ Evolutionary Model

❖ Spiral Model

Life Cycle Model

4.

Life Cycle Model

Life Cycle Model

Rel. 1.0

TOP M.C.

V

/

/

/PCB

Life Cycle Model

TOP M.C.

Life Cycle Model

❖   /
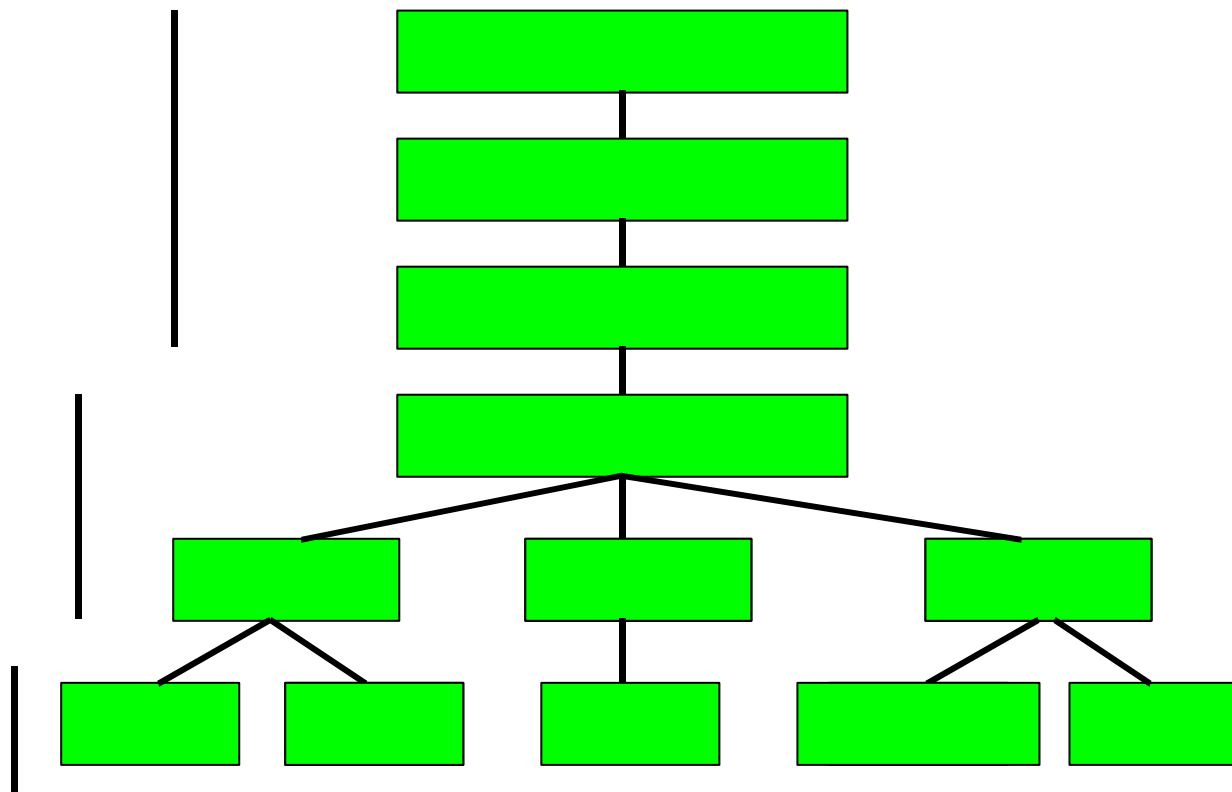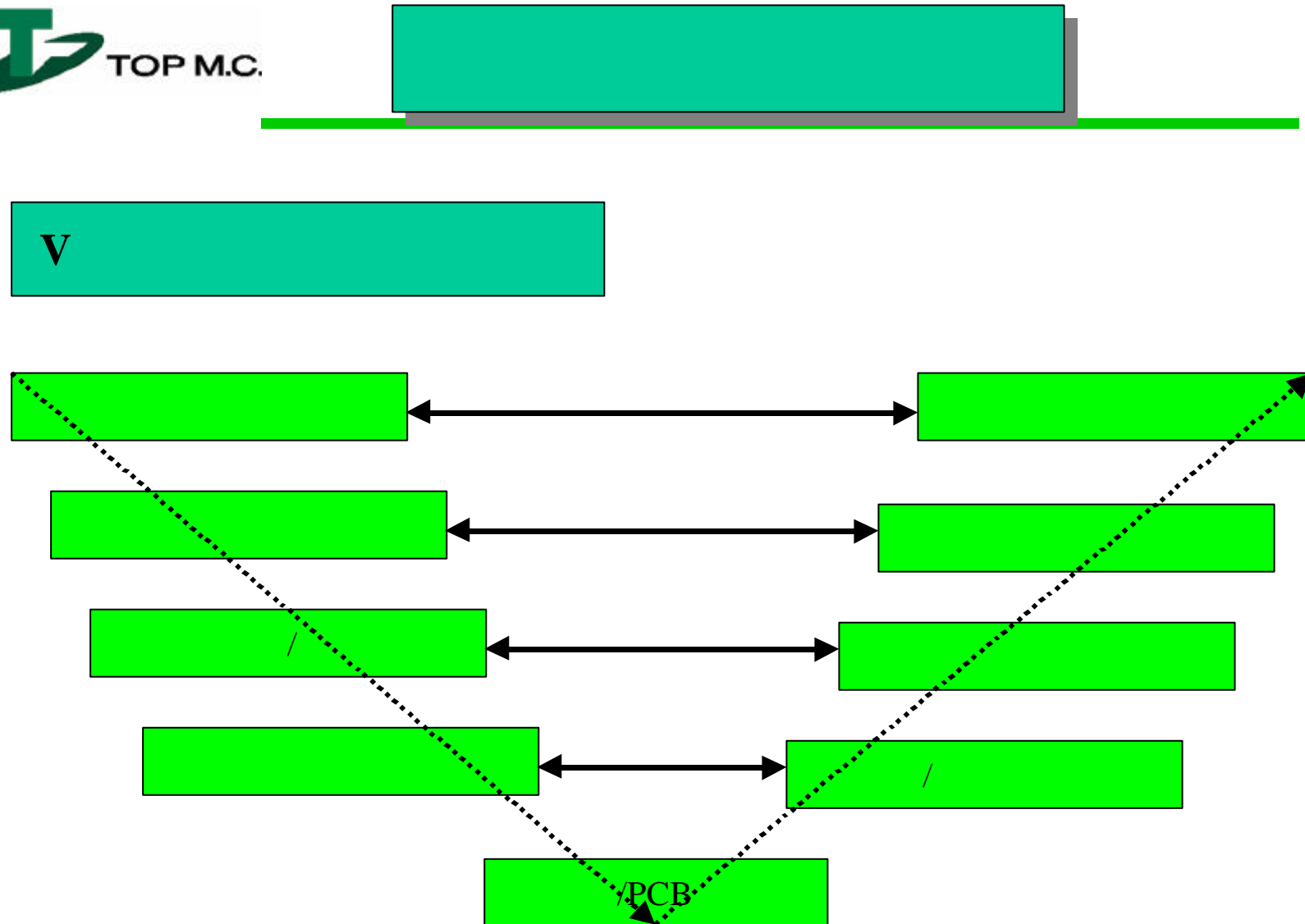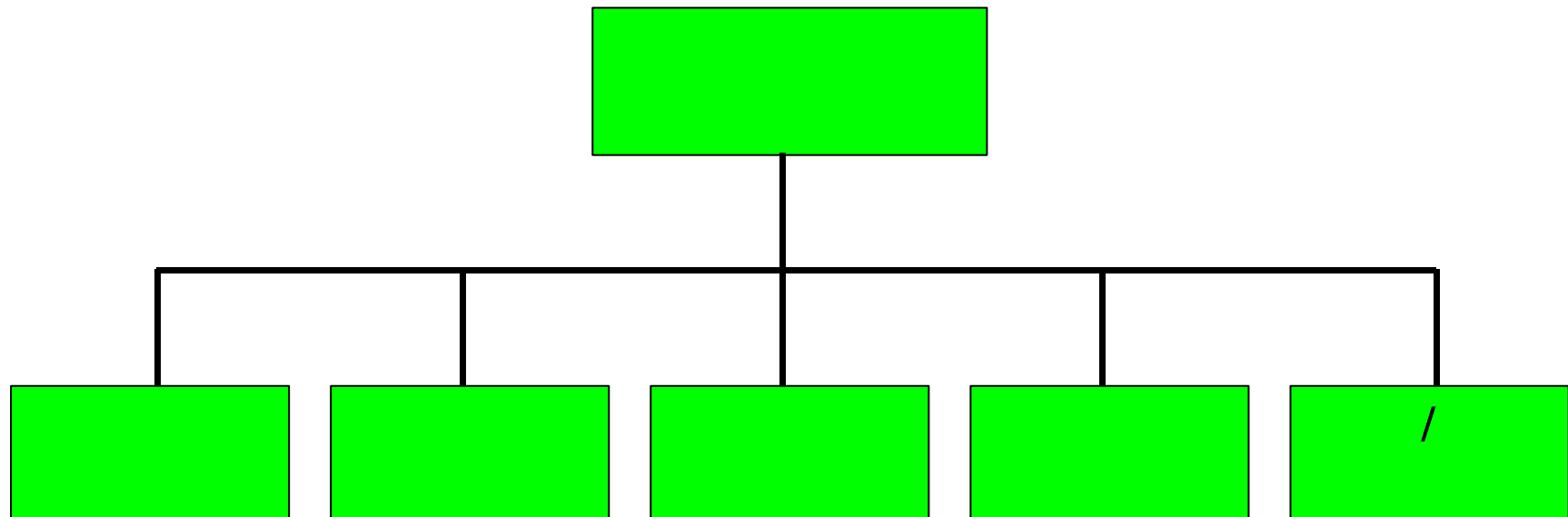
    ➢ ISO 9001/9004
    ➢ ISO 9000-3
    ➢ TL 9000
    ➢ ISO 12207
    ➢ ISO 15504(SPICE)
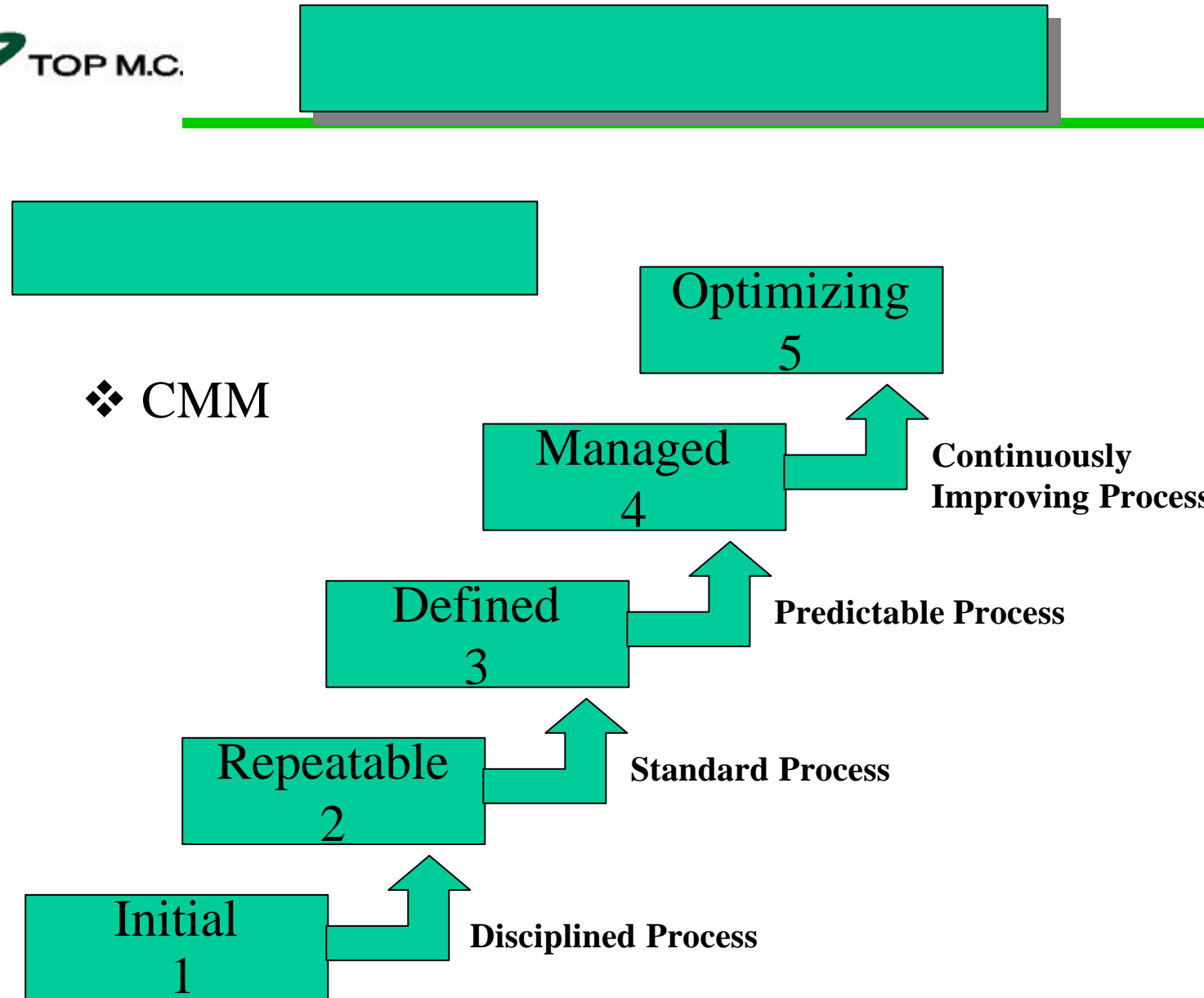
❖

    ➢
    ➢   (/   /   ….)
    ➢
    ➢
    ➢   ->   ->
    ➢   /

Life Cycle Model

TOP M.C.

❖ CMM

Optimizing
5

Managed
4

**Continuously
Improving Process**

Defined
3

Predictable Process

Repeatable
2

Standard Process

Initial
1

Disciplined Process

Life Cycle Model

Rel. 1.0

TOP M.C.

❖ ISO 15504

Life Cycle Model

TOP M.C.

SPICE

```
                    ┌─────────────────┐        ┌─────────────────┐
                    │     Part 1      │        │     Part 9      │
                    │  Concept and    │────────│   Vocabulary    │
                    │  Introductory   │        │                 │
                    └─────────────────┘        └─────────────────┘
                             │
        ┌────────────────────┼────────────────────────┐
┌─────────────────┐ ┌─────────────────┐      ┌─────────────────────┐
│     Part 7      │ │     Part 8      │      │     Part 1          │
│  Guide for use in│ │ Guide for use in│      │ Guide to Qualification│
│ Process Improvement│ │Determining Supplier│   │   Of Assessors      │
│                 │ │Process Capability│      │                     │
└─────────────────┘ └─────────────────┘      └─────────────────────┘
        │                    │
        └────────────────────┤
                  ┌─────────────────┐        ┌─────────────────┐
                  │     Part 3      │        │     Part 4      │
                  │  Performing an  │────────│ Guide to Performing│
                  │   Assessment    │        │   Assessments   │
                  └─────────────────┘        └─────────────────┘
                           │                          │
                  ┌─────────────────┐        ┌─────────────────┐
                  │     Part 2      │        │     Part 5      │
                  │ A Reference Model for│    │ An Assessment Model│
                  │ Process Capability│      │ and Indicator Guidance│
                  └─────────────────┘        └─────────────────┘
```

Life Cycle Model

Rel. 1.0

Process Assessment

Assessment Input

- Assessment purpose
- Assessment scope
- Assessment constraints
- Assessment responsibility
- Additional information to be collected

Assessment Activities

- Planning
- Data Collection
- Data Validation
- Process Rating
- Reporting

Process Assessment

Reference Process Model

- Process purpose
- Process attributes

Assessment Output

- Process profiles
- Assessment record

Life Cycle Model

Process Improvement

Process Improvement Request → **Process Improvement** ← **Validated and Institutionalized Improvement**

Process assessment request

Assessment Output
• Process profiles
• Assessment record

Process Assessment

Process Assessment Input

Model - Part 2
Model - Part 5

Life Cycle Model

Rel. 1.0

TOP M.C.
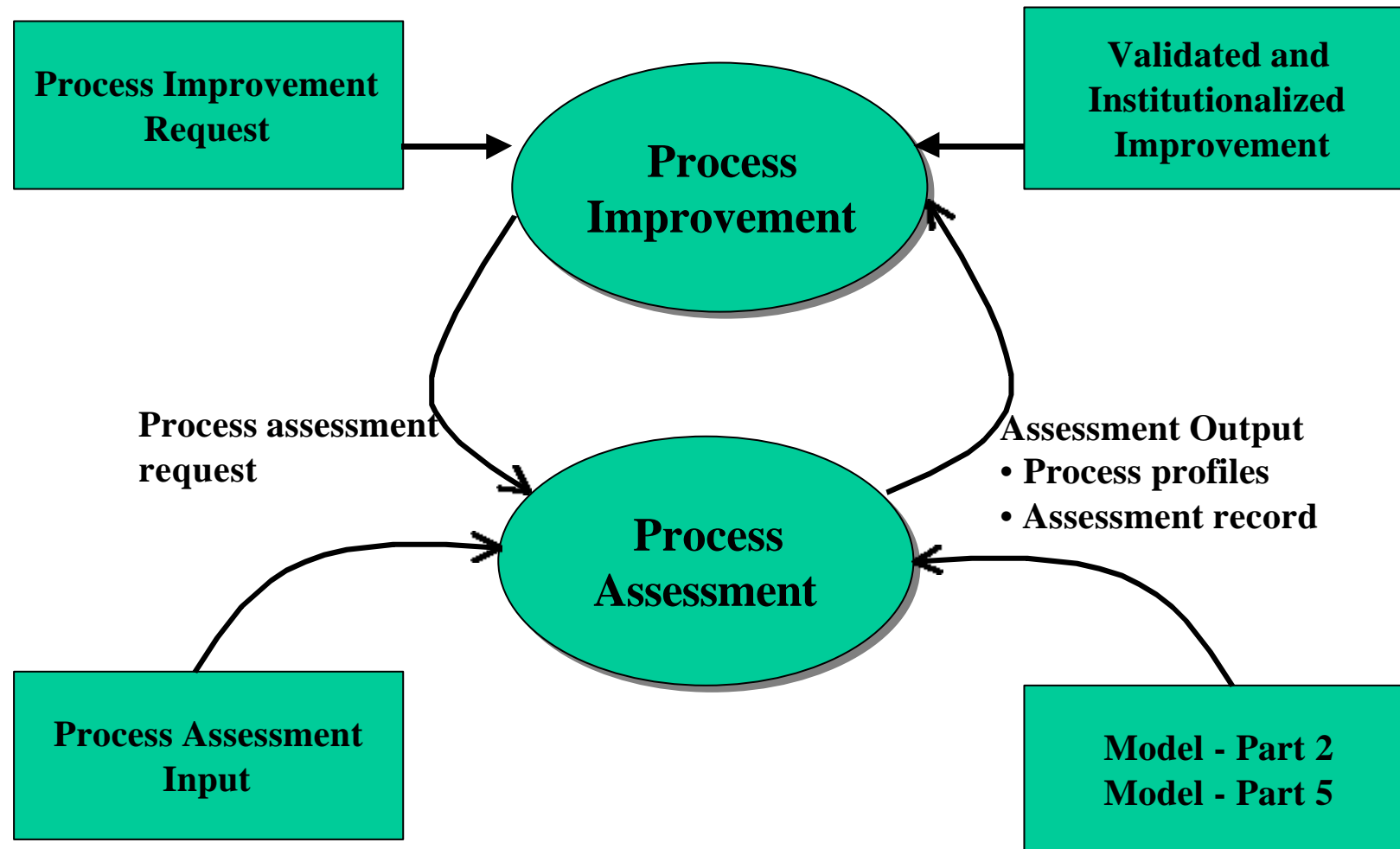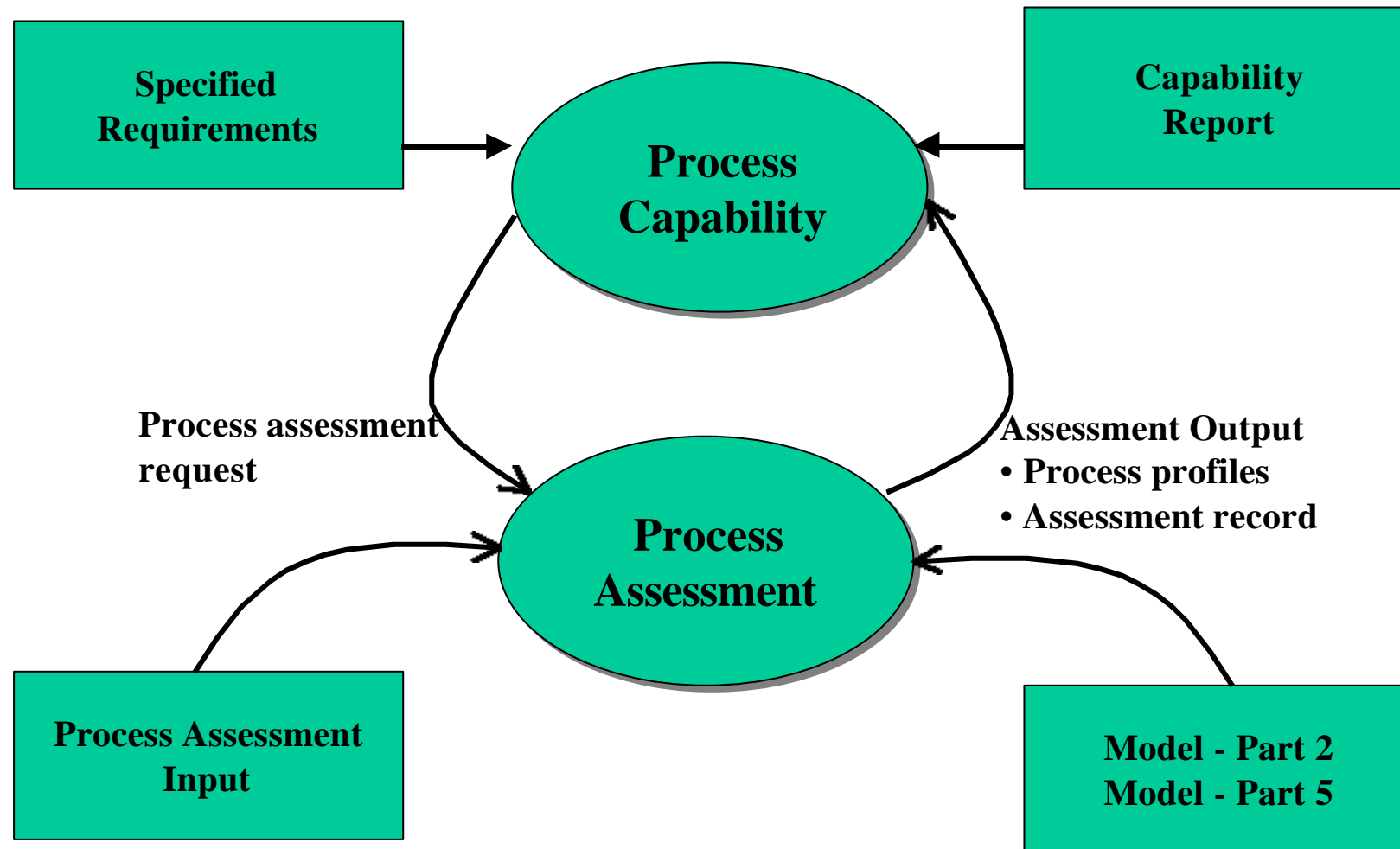
❖ High Maturity Organizations

    ❖ Level 4 Organizations : 51
    ❖ Level 5 Organizations : 38

❖ Non-US High Maturity Organizations

    ❖ Australia : 1 ML 4
    ❖ India : 16 ML 4/22 ML 5
    ❖ Israel : 1 ML 4

Life Cycle Model

CMM Key Process Areas

TOP M.C.

Process Categories Levels	Management Project Planning, Management, etc.	Organizational Training, Infrastructure, etc.	Engineering Requirements Analysis, etc.
Optimizing	Process change management	Technology change management	Defect prevention
Managed	Quantitative Process management		Software quality management
Defined	Integrated software Management Intergroup coordination	Organization Process focus Organization process Definition Training program	Software product Engineering Peer reviews

Life Cycle Model

CMM Key Process Areas

Process Categories Levels	Management Project Planning, Management, etc.	Organizational Training, Infrastructure, etc.	Engineering Requirements Analysis, etc.
Repeatable	Requirements Management Software project planning Software project tracking and oversight Subcontractor management Software quality assurance Software configuration management		
Initial	Ad hoc processes		

Life Cycle Model

CMM Common Features

TOP M.C.

Commitment to Perform

↓

Ability to Perform

↓

Activities Performed

↓

Measurement and Analysis

↓

Verifying Implementation

Life Cycle Model