Chapter 4 제품 및 서비스 설계 (Product and Service Design)

* Product life cycle

<1> Product Design Process

(1) Typical Phase of Product Development

①Concept Development :고객의 요구, 이용 가능한 기술로부터 아이디어
실행 가능한 아이디어: 시장 잠재력, 재무적 타당성, 생산적합성을 만족

②Product Planning : early system prototype

③Product/Process Engineering :

- full-scale prototypes(원형) : 비용, 품질 및 제품 성능 간의 상충관계 고려
  기술적 test & 시장 test : (설계변경)
- design of the process

④Pilot Production/Ramp-Up (시험생산) : Build pilot unit in commercial process

⑤Market Introduction (양산) : Ramp up plant to volume target
(meet targets for quality, yield, and cost)

(cf) (pp.95-101, <도표 4-1>)

Phase 0 : Planning
Phase 1 : Concept Development
Phase 2 : System-Level design
Phase 3 : Design Detail
Phase 4 : Testing and Refinement
Phase 5 : Production Ramp-up

(2)Concurrent Engineering

- Traditional Approach :

  We design it, you build it or Over the wall

- Concurrent Engineering :

  Let`s work together simultaneously

·The simultaneous development of project design functions, with open and interactive communication existing among all team members for the purposes of reducing time to market, decreasing cost, and improving quality and reliability.

<2> Designing for the customer

(1) 품질기능전개(QFD, quality function deployment) :
(pp.106-108)

- Procedure for transform customer requirement (Voice of the customer) & competitor capabilities into provider target (technicl design requirement)

· Interfunctional teams from marketing, design engineering, and manufacturing

* House of Quality：

Customer requirements information forms the basis for this matrix, used to translate them into operating or engineering goals.

Step1) CA(customer attribute)파악, Importance
Step2) competitive assessment
Step3) EC(engineering characteristics)개발
Step4) relationship matrix, tradeoff matrix
Step5) technical assessment
Step6) Target values

* VOC, Kano Model of Quality

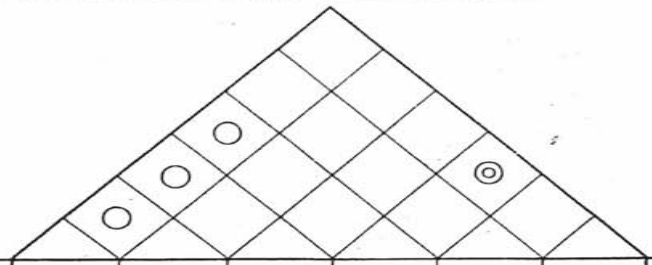
(QFD) Quality FunctionDeployment

강 : 관계 강함 : 9
중 : 관계 중간 : 3
약 : 관계 약함 : 1

(고객 요구) * 만족의 방향 →

		표면거칠기 ○	마모강도 ↑	접촉압력 ○	도금재질 ○	접촉면적 ↑	고객요구중요도	고객 경쟁력 평가 KEC : O L사 : X 1(최악)	2	3	4	5(최선)
DY PLUG PIN이 잘 빠지지 않을 것	충분히 결합될수있는 길이일것	중	약	중	약	강	2					
	잘빠지지 않는 형상일것	약	강	중	약	강	5					
	TERMINAL에 적합한 두께일것	중	강	약	중	강	4					
기술 중요도		23	83	25	20	99						
특성목표치	단위	um	kgf			mm2						
	목표	1.6	3			3						
기술 벤치 마킹 O : KEC X : L사	5											
	4											
	3											
	2											
	1											

EXHIBIT 3–4 "House of Quality" Dry Cleaners

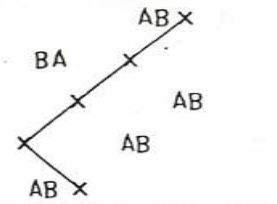


Correlation:
- ◎ Strong positive
- ○ Positive
- × Negative
- ✳ Strong negative

Customer requirements	Importance to customer	Good training	Clean D.C. solvent	Clean D.C. filters	No rust in S.P. lines	Firm press pads	Good equipment maintenance
Completely clean	1	○	◎	◎	◎		◎
Perfect press	2	○				◎	◎
No delay at counter	5	○					
Quick turnaround	3	○					△
Friendly service	4	○					
Importance weighting		15	9	9	9	9	19
Target values		4-hr formal, 2-wk. OJT	Visual daily	Visual daily, clean monthly	Visual daily	Change monthly	Monthly, plus as needed
Technical evaluation		B, A	A, B	A, B	B, A	B, A	A, B

Competitive evaluation

X = Us
A = Comp. A
B = Comp. B
(5 is best)



Relationships:
- ◎ Strong = 9
- ○ Medium = 3
- △ Small = 1

(2)가치분석/가치공학 (VA/VE) (pp.108-109)
(Value Analysis/Value Engineering)

- Achieve equivalent or better performance at a lower cost while maintaining all functional requirements defined by the customer.

- 가치 = 유용성 / 비용

비용 : 제품이나 서비스의 가치를 창출하는데 드는 자원의 절대적 개념

유용성: 품질, 신뢰도 및 제품의 성능

.Brainstorming such questions as (p.109)

<3> Designing Product for the Manufacturing and Assembly (pp.110-112)

Greatest improvements related to DFMA arise from simplification of the product by reducing the number of separate parts:

- During the operation of the product, does the part move relative to all other parts already assembled?
- Must the part be of a different material or be isolated from other parts already assembled?
- Must the part be separate from all other parts to allow the disassembly of the product for adjustment or maintenance?