

# Introduction

## The Construction Industry, Fundamentals of Cost Planning & Management

401.649 Cost Planning for Construction Projects

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### Moonseo Park

Associate Professor, PhD

39동 433

Phone 880-5848, Fax 871-5518

E-mail: mspark@snu.ac.kr

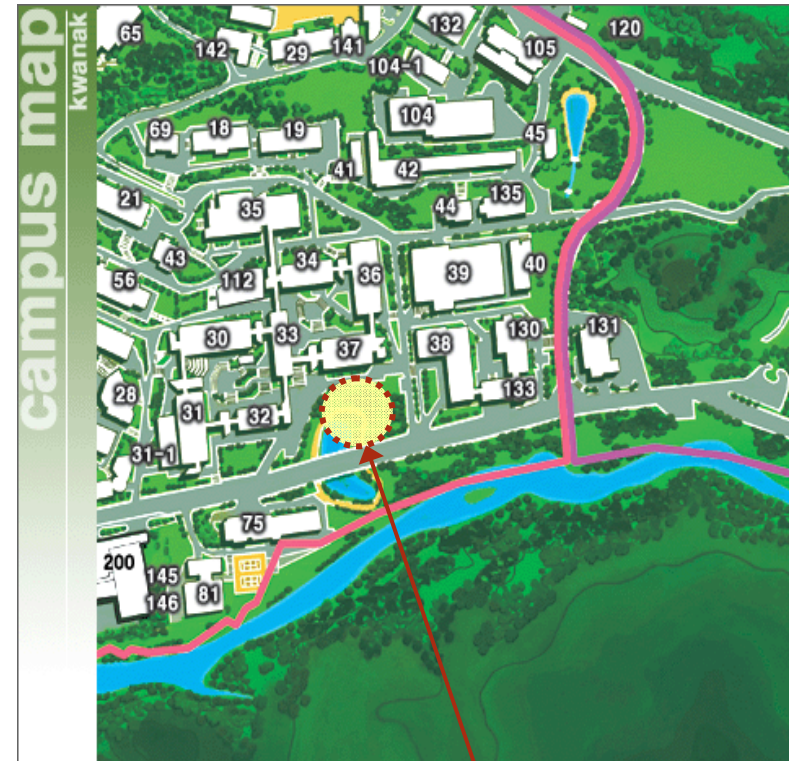
Department of Architecture  
College of Engineering  
Seoul National University



# Suppose SNU is planning to build...

A new IT research center near the College of Engineering (37동), for which a budget of U\$ 100 M was assigned.

The research center will consist of multiple intelligent buildings equipped with many high-tech facilities.



Project site for the proposed IT research center



# As project manager...

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Assuming that you are appointed as a project manager,

- What would you do to ensure this campus expansion project will be completed within the initial budget?
- By generalizing your answer, define *Cost Planning* in construction projects.



# Cost Planning

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- Predicting the construction cost during the design phase using relevant data
- Allocating balanced cost for construction elements



# Lecture Outline

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- Features of the Construction Industry and Construction Projects
- Paradigm Shift in Construction
- Defining Cost Planning & Management
- Course Administration



# The construction industry

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- Highly segmented
- 6 to 12% of GDP in most countries
- Deals with a single, unique end product
- Labor intensive industry



# The construction industry

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- Mainly for domestic consumption
- Sustainable development
- Sensitive to short-term economic conditions: social, political context



# Features of construction

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- Provides products and services
- No fixed assets or means: process-based, in the framework of a project
- Learning rarely happens across projects: implemented by temporary alliance among different organizations in different places





# Features of construction

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- Highly dynamic complexities: an interdependent system that continuously changes over time under open environment
- Longevity: low failure threshold, durability
- Social & Political Context: benefits from continuing demands



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# Rethinking construction...

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- What is construction?
- What is the objective of the whole process of construction?
- What is the aim of any project?



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# Who Is Making Money?

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# The “old” paradigm

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Under the “old” paradigm costs are reduced by:

- Effective planning organised at the highest levels
- Long production runs
- Reducing time in sequential workflow tasks
- Using dedicated skilled labour with rigid job description.



# The “new” paradigm

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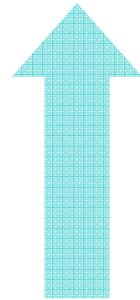
Under the new paradigm costs are reduced by:

- Implementing strategies on the spot
- Making small production lots, and concentrating on quality
- Working in parallel
- Using multi-skilled work forces, with flexible job descriptions

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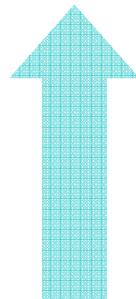
# Paradigm shift in construction

## The "Old" Paradigm

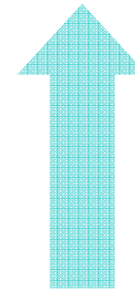


Driving  
**Quality** Up

While  
Pushing  
**Cost** Up

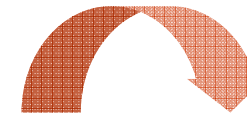


## The "New" Paradigm



Driving  
**Quality** Up

While  
Pushing  
**Costs** Down



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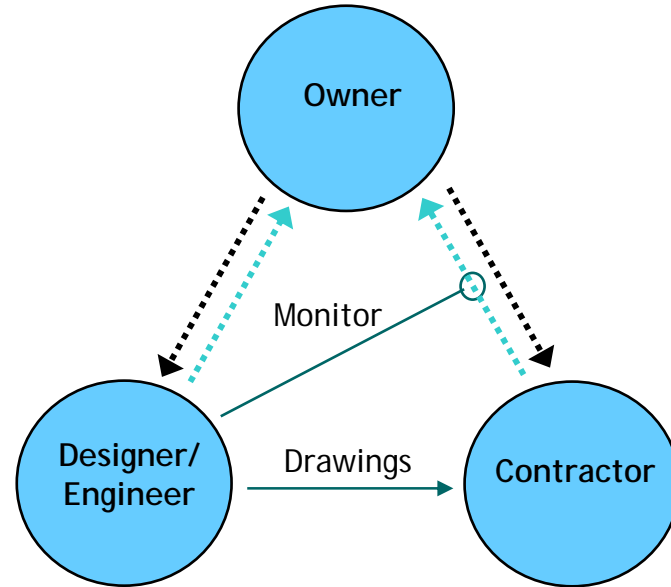


# Cost Planning and Management

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- Starting with the selection of an appropriate delivery system
- Earlier actions more opportunities
- Based on precise estimate
- Requiring timely & effective control
- In a way of adding value to a project
- Executed across whole project span
- Managing project profitability

# Selection of an appropriate delivery system



\* Contractual Relation

Money

Service (with quality & in time)



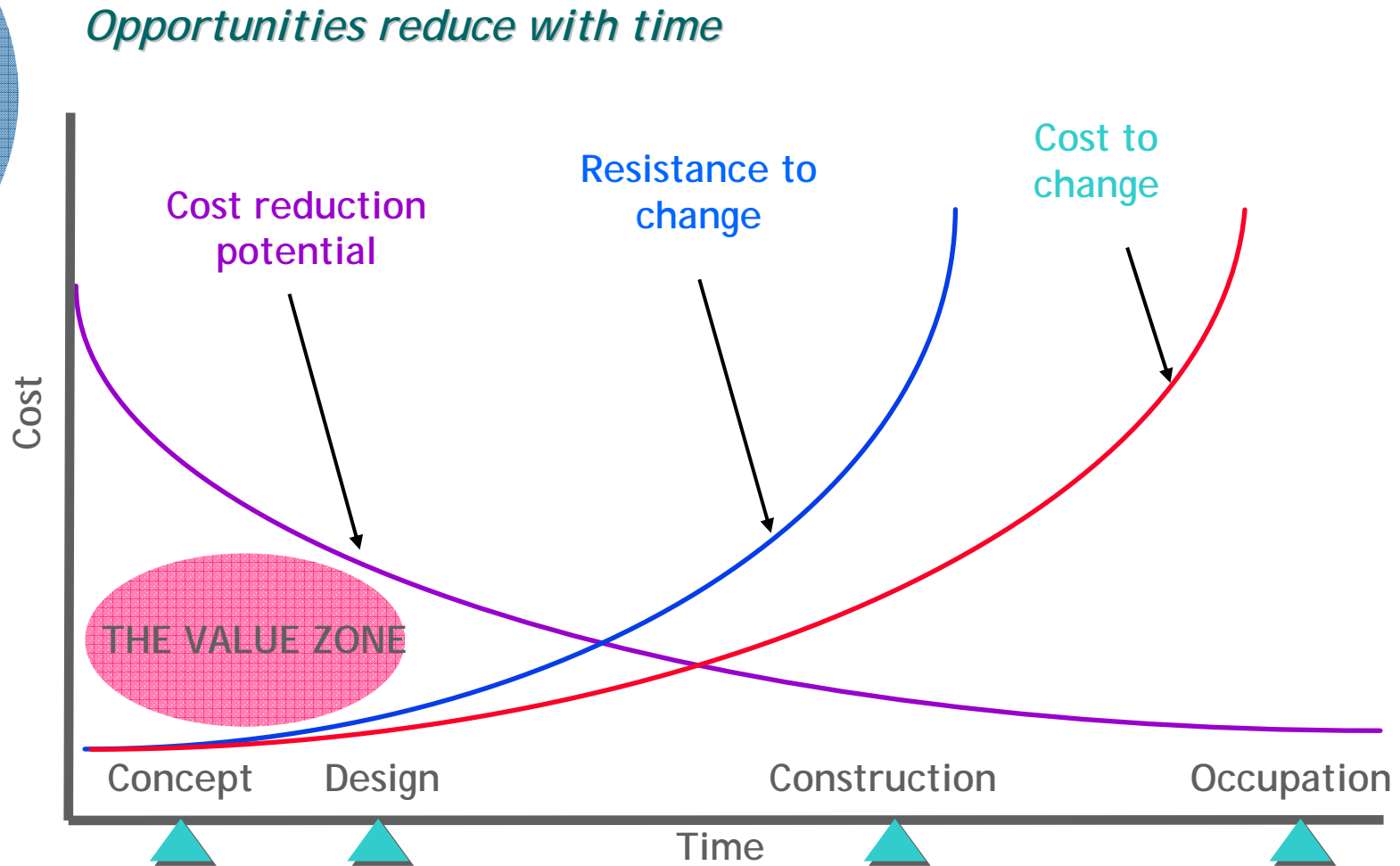
\* Functional Relation

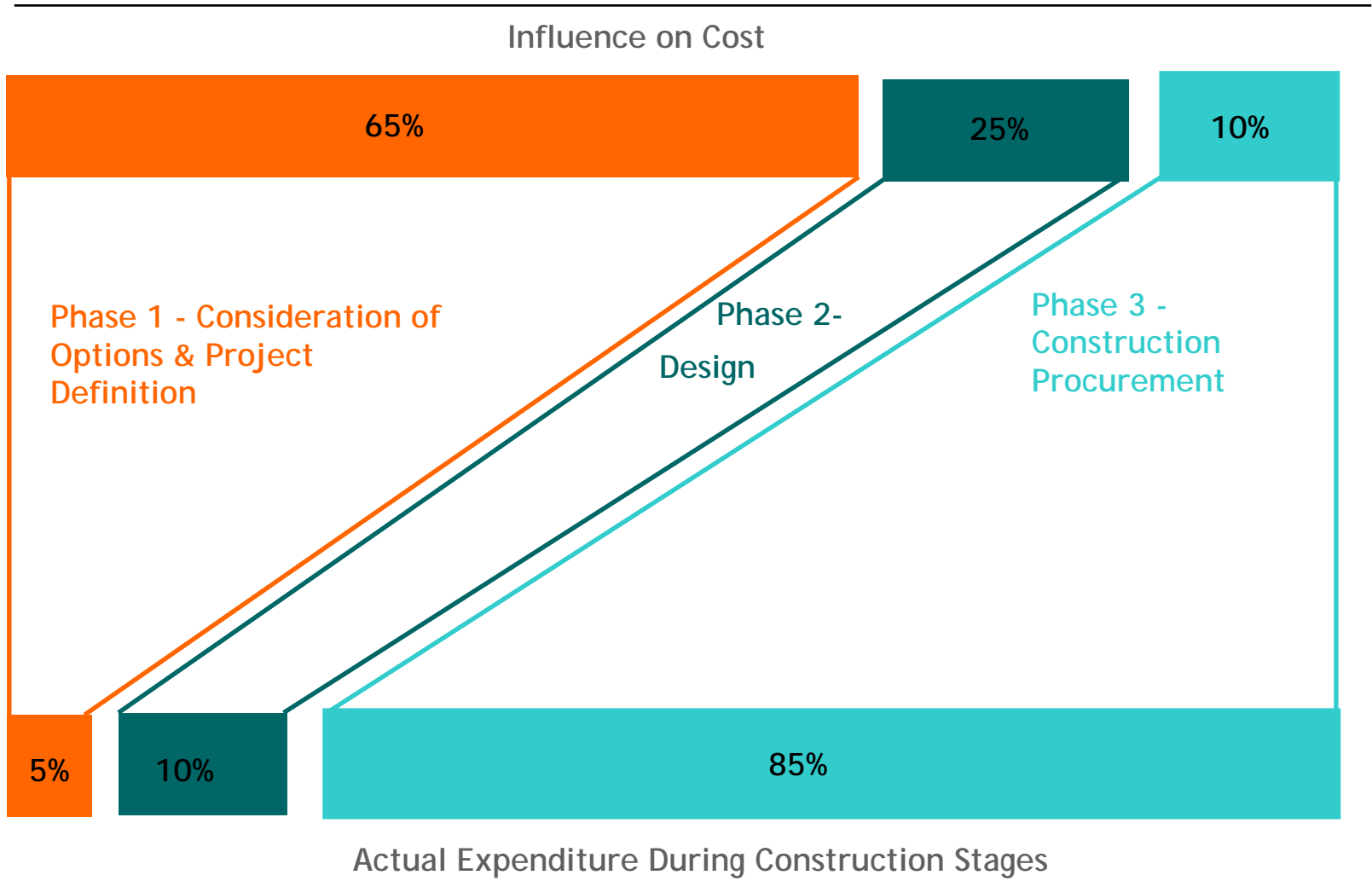
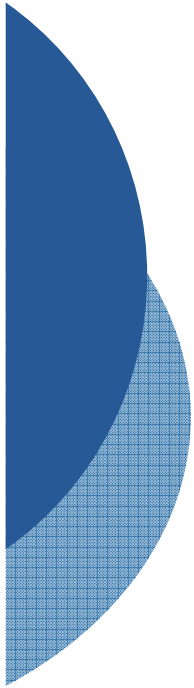


Functional & Contractual Relationships vs. Design Efficiency and Quality (GC Example)

- What if the designer provides low buildability design?
- What if the designer is too strict during monitoring the construction process?
- Who would be cats and dogs? And what would be potential problems?

# Earlier actions more opportunities







# Cost Estimate

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A specific indication of the construction related costs, which gives vital information

- to the owner: to verify the project economic viability and cash flow needs.
- to the designer: to confirm the viability of its design and to meet the projected investment.
- to the contractor: to set the potential profit.



# Budgeting

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- Aims to **set a cost or money target** for each material, labor, and subcontract cost.
- Converted from the cost estimate.
- **Baseline for cost control** programs and a performance index on meeting the project's financial goal.
- Usually broken down into detailed accounts.

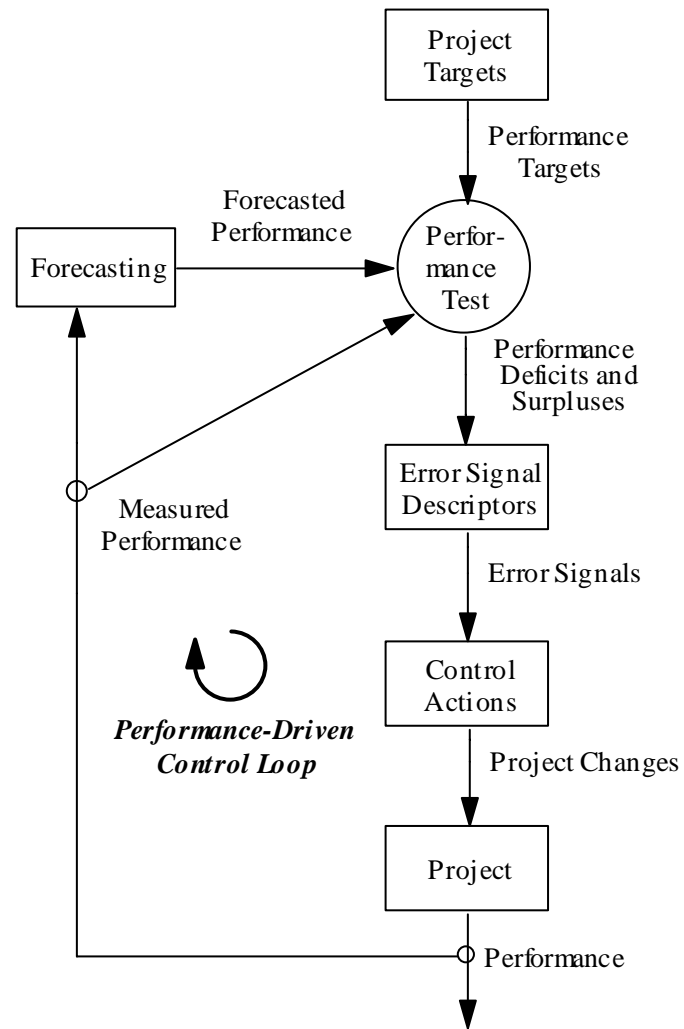


# Cost Control

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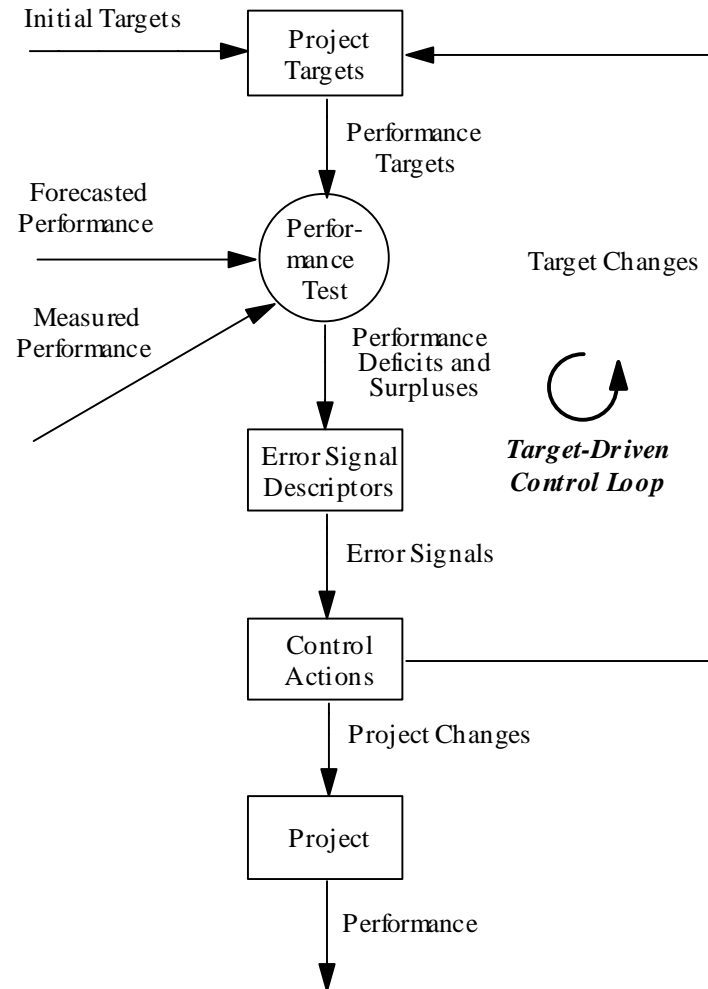
- vs. Cost Planning
- Performance-Driven Control  
(e.g., Resource Leveling)
- Target-Driven Control  
(e.g., Budget Control)

# Performance-Driven Control





# Target-Driven Control

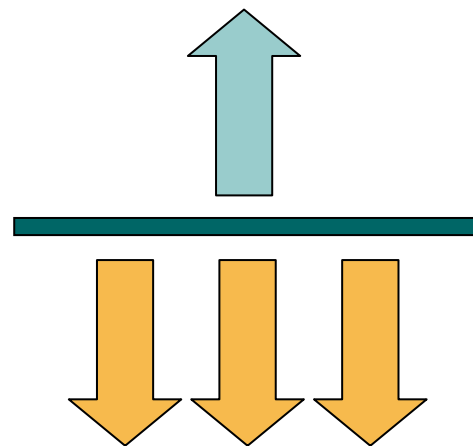


# Adding value to a project

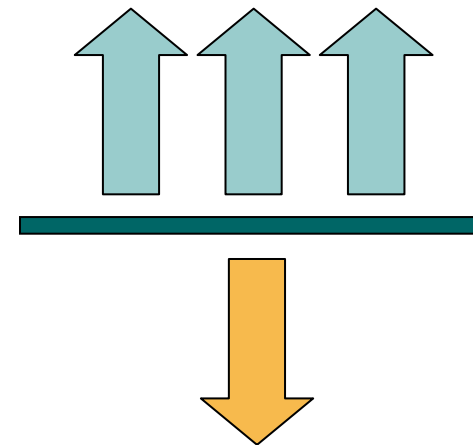
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*"Value = Function/Cost"*

Adding Functions



or



*No-one got rich from getting smaller*



# Value Management

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- A service that maximises the functional value of a project
- by managing its development from concept to completion
- through the comparison and audit of all decisions against the value system initially determined by the client

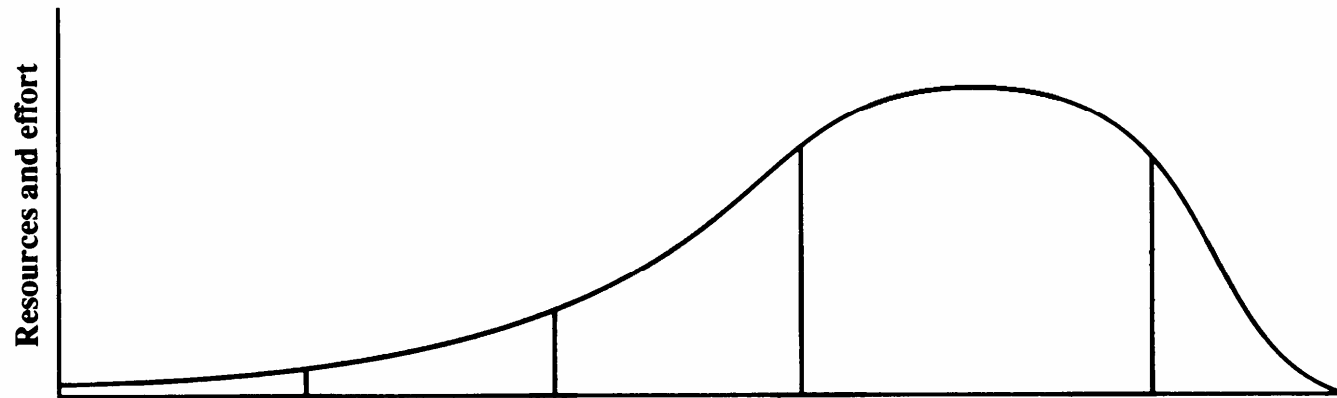


# Value Engineering

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- VE is essentially retrospective and tends to take place during the detailed design stage in response to a projected cost overspend.
- In Summary, VE looks at 'hard' issues, while VM addresses soft issues.

# Executed across whole project span: LCC Management

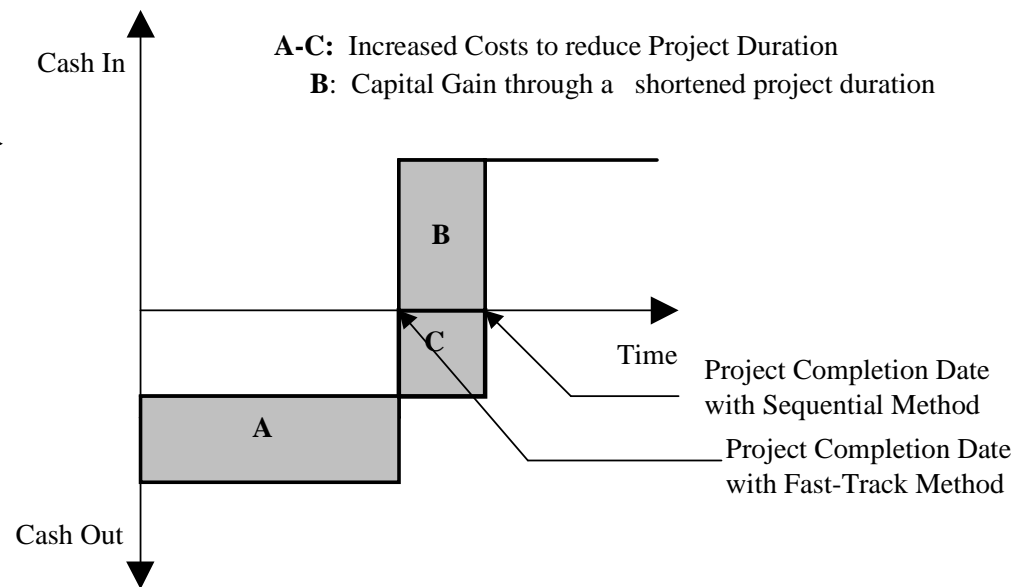


<b>Phase 1</b>	<b>Phase 2</b>	<b>Phase 3</b>	<b>Phase 4</b>	<b>Phase 5</b>
<i>Conceptual design</i>	<i>Advanced development</i>	<i>Detailed design</i>	<i>Production</i>	<i>Termination</i>
<ul style="list-style-type: none"> <li>• Goals</li> <li>• Scope</li> <li>• Baseline</li> <li>• Requirements</li> <li>• Feasibility</li> <li>• Desirability</li> </ul>	<ul style="list-style-type: none"> <li>• Plan</li> <li>• Budget</li> <li>• Schedule</li> <li>• Bid proposal</li> <li>• Management commitment</li> </ul>	<ul style="list-style-type: none"> <li>• Responsibility definition</li> <li>• Team</li> <li>• Organizational structure</li> <li>• Detailed plan</li> <li>• Kickoff</li> </ul>	<ul style="list-style-type: none"> <li>• Manage</li> <li>• Measure</li> <li>• Control</li> <li>• Update and replan</li> <li>• Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• Closeout</li> <li>• Document</li> <li>• Suggest improvements</li> <li>• Transit</li> <li>• Reassign</li> <li>• Dissolve team</li> </ul>

# Managing project profitability

- Pre Construction Stage: Financial Feasibility Study
- During Construction: Cash Flow Management

Fast-Tracking Example ▶





# Lecture Outline

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# Course Objectives

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**“To appreciate the importance of cost planning & management for construction projects and to acquire the related advanced knowledge focusing on different practices under various delivery systems”**



# Syllabus

Week (Date)	Lecture	Reference	Assignment/Term Pj	
	Title		Out	Due
1 (3/6)	Introduction	PCM1, ACP 1	A1	
2 (3/13)	Selection of Delivery Systems as Part of Cost Planning		A2	A1
3 (3/20)	Strategic Selection of Delivery Systems	R1	A3	A2
4 (3/27)	Public Infra structure Development Systems		A4	A3
5 (4/3)	Financial Feasibility Analysis Case I	R2	A5	A4
6 (4/10)	Financial Feasibility Analysis Case II		A6	A5
7 (4/17)	Mid-Term Exam			
8 (4/24)	Financial Feasibility Analysis Case III		A7	A6
9 (5/1)	Financial Feasibility Analysis Case IV		A8	A7
10 (5/8)	Financial Feasibility Analysis Case V		Term Project	A8
11 (5/15)	Estimating & Budgetary Planning	ACP 6	A9	TP Proposal
12 (5/22)	EVM, LCC	PCM 13, CME 18	A10	A9
13 (5/29)	VM/E	PCM 15	A 11	A10
14 (6/5)	Strategic Planning for Corporations	R3		A11
15 (6/12)	Term Project Presentation			Term Project



# Grading

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- Assignments: 55% (11 x 5%)
- Mid-Term Exam: 15%
- Term Project: 30% (Peer Review)



# Reading

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- ACP: 김문한, “건축의코스트계획”, 기문당, 2005
- CME: 김문한외 공저, “건설경영공학”, 기문당, 2002
- PCM: Donald Barrie and Boyd Paulson, “Professional Construction Management”, McGraw Hill, 3rd Edition (건설관리의 개념과 실제, 한국건설관리학회 역, 한국맥그로힐(주), 2000)
- R1: Christopher M. Gordon, “Choosing appropriate construction contracting method”, J. of Construction Engineering & Management, Vol. 120, No. 1, 1994
- R2: Stephen C. Wooldridge, John B. Miller, “Effects of Accounting and Budgeting on Capital Allocation for Infrastructure Projects”, J. of Management in Engineering, Vol. 17, No. 2, 2001
- R3: D. Macomber, “Strategic planning for contractors”, Construction Business Review (to be distributed)



# Others

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- Lecture materials will be posted at <http://etl.snu.ac.kr>.
- Assignments (A1 to A11) and one term project will be done and assessed in a group of 3 students.
- Hard & soft copies (thru etl) of the assignments are to be submitted before lecture (\* 50% deduction on marks will be applied to late submission).
- Assignments are to be prepared in Power Point format and presented in the following week class.

# Lecturer

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180 cm, 83kg  
Assistant Prof.,  
PhD from MIT  
E-mail: [mspark@snu.ac.kr](mailto:mspark@snu.ac.kr)



# References

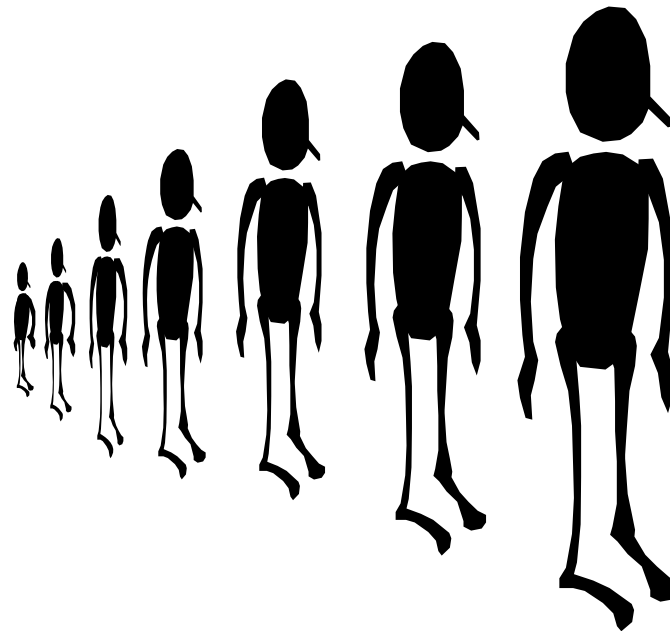
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- Avraham Shtub, Jonathan F. Bard, Shlomo Globerson, "Project management : engineering, technology, and implementation", Englewood Cliffs, NJ, Prentice Hall, 1994
- Frederick E. Gould, Nancy Joyce, Chapter 8, "Construction project management", Upper Saddle River, NJ, Prentice Hall, 1999
- James M. Lyneis \*, Kenneth G. Cooper, Sharon A. Els, "Strategic management of complex projects: a case study using system dynamics", System Dynamics Review, Vol. 17, No. 3, 2001
- Christopher M. Gordon, "Choosing appropriate construction contracting method", J. of Construction Engineering & Management, Vol. 120, No. 1, 1994
- Feniosky Pena-Mora, Jim Lyneis, "Project control and management", MIT 1.432J Lecture Material, 1998
- Barrie, D.S., and Paulson, B.C., "Professional Construction Management", McGraw Hill, 1992
- Halpin, D.W., "Financial and Cost concepts for construction management", John Wiley & Sons, 1995
- Yehiel Rosenfeld, "Project Management", MIT 1.401J Course Material, 2000
- Sarah Slaughter, "Innovation in construction", MIT 1.420 Course Material, 1999
- Gray and Hughes, "Building Design Management", .
- Murdoch and Hughes, "Construction Contracts: Law and Management", E&FN SPON, 1996
- Gray, Hughes and Bennett, "The Successful Management of Design", Reading, 1994

# Discussions

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- Case/Presentation/Discussion-oriented Class
- English
- Organizing Assignment Team





# Assignment 1

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Reviewing one of the following issues:

- a) Delivery Systems in US, UK, Japan
- b) Delivery Systems in Korea and Critique
- c) Cost Planning in practice in UK (activities, players including Quantity Surveyor)
- d) Cost Planning in practice in Korea (activities, players) and Critique

\* Note

- Key terminologies both in English & Korean





# References for Assignment 1

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- 김예상, “미국건설산업 왜 강한가?”, 보성각, 2003 → a
- 이상호, “한국건설산업 대해부”, 보성각, 2003 → b
- 김한수, “영국 건설산업의 혁신전략과 성공사례”, 보성각, 2003 → a, c
- 서용철, “대형공사 발주방식 선정방법”, 한국건설관리학회 CM포럼 2003 → b
- 최병선, “건설공사 발주 방식”, 건설산업연구원, 2004 → b
- 최병선, “건설공사 발주 방법과 경제성 비교연구”, 건설산업연구원 → b
- 최병선, “건설공사 발주 방식 -한국과 미국의 발주방식, 입-낙찰 방법과 절차 비교”, 한국건설산업연구원 → a, b
- 한국엔지니어링진흥협회, “코스트엔지니어링1”, 2002 → d
- Project Management Institute, “Project Management Body Of Knowledge”, 2000 → d