

DEVELOPMENT OF MECHANISMS BY USING CONCEPTUAL SYSTEM DYNAMICS MODELS TO RESOLVE DELAY IN CONSTRUCTION PROJECTS

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INTRODUCTION

Rationale

- Delay is a major cause of concern in almost all construction projects.
- The reasons of delay could be : client/owner, contractor, design, construction, materials, equipment and project management

Main concern: Non **understanding** of the mechanisms and **not foreseeing** of the unwarranted events by the stakeholders and project management team, which lead to delay.

Literature relating to development of interventions of mechanisms are scarce.

INTRODUCTION

Contd.

Objective

To evolve mechanisms, which could assist the project stakeholders to identify the activities and events, comprehend and foresee the causal feedback relations among the variables that cause delay, and take appropriate actions to resolve the challenges of delay.

METHODOLOGY

A survey research methodology used to collect primary data from the various stakeholders in construction projects in India

Sample size: N= 120

Response rate: 85%

Likert scale was employed to measure the relative influence of the variables in terms of a delay index (DI)

Scale used : 1 to 5 (1= not influential, 2 = less influential, 3 = somewhat influential, 4 = significantly influential and 5 = most influential in causing delay)

Development of conceptual models by using SD modelling principles based on the systems thinking process

Table 1 Profile of respondents**Methodology contd.**

Type of projects	Project characteristics		Characteristics of Respondents		
	Number	Per cent	Respondents	Number	Per cent
Buildings	11	39.28	Owners/ Clients	13	12.75
Roads	6	21.42	Project managers	17	16.67
Bridges	4	14.29	Consultants	12	11.76
Railway	2	7.15	Architects	11	10.78
Power plants	2	7.15	Engineers	14	13.73
Industrial complexes	3	10.71	Contractors	13	12.75
Total	28	100.00	Estimators	11	10.78
			Skilled Technicians	9	8.82
			Total	102	100

Development of conceptual models

Methodology contd.

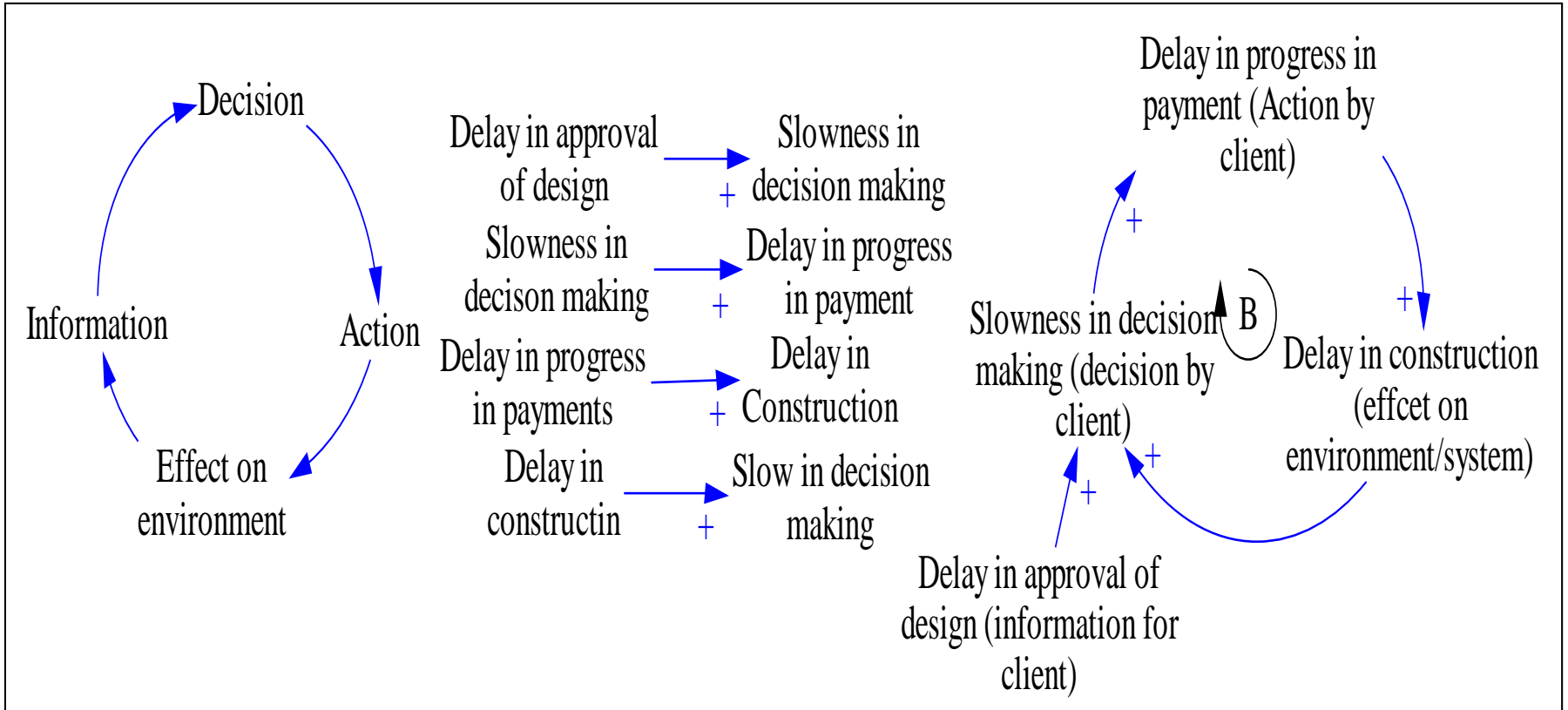
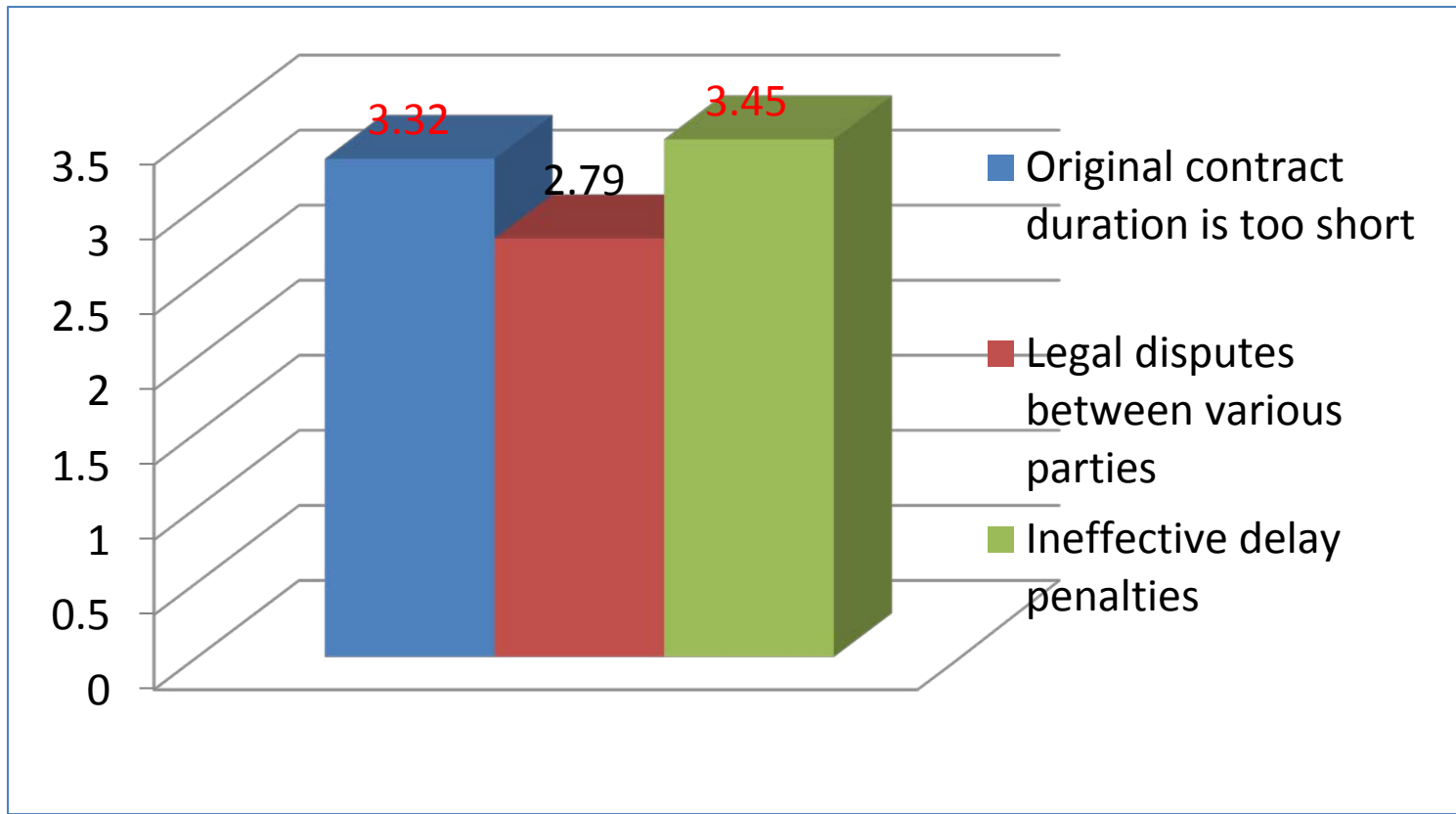


Figure 1: Example of process of development of causal feedback relations and conceptual SD model

RESULTS, CONCEPTUAL SD MODELS AND DISCUSSION

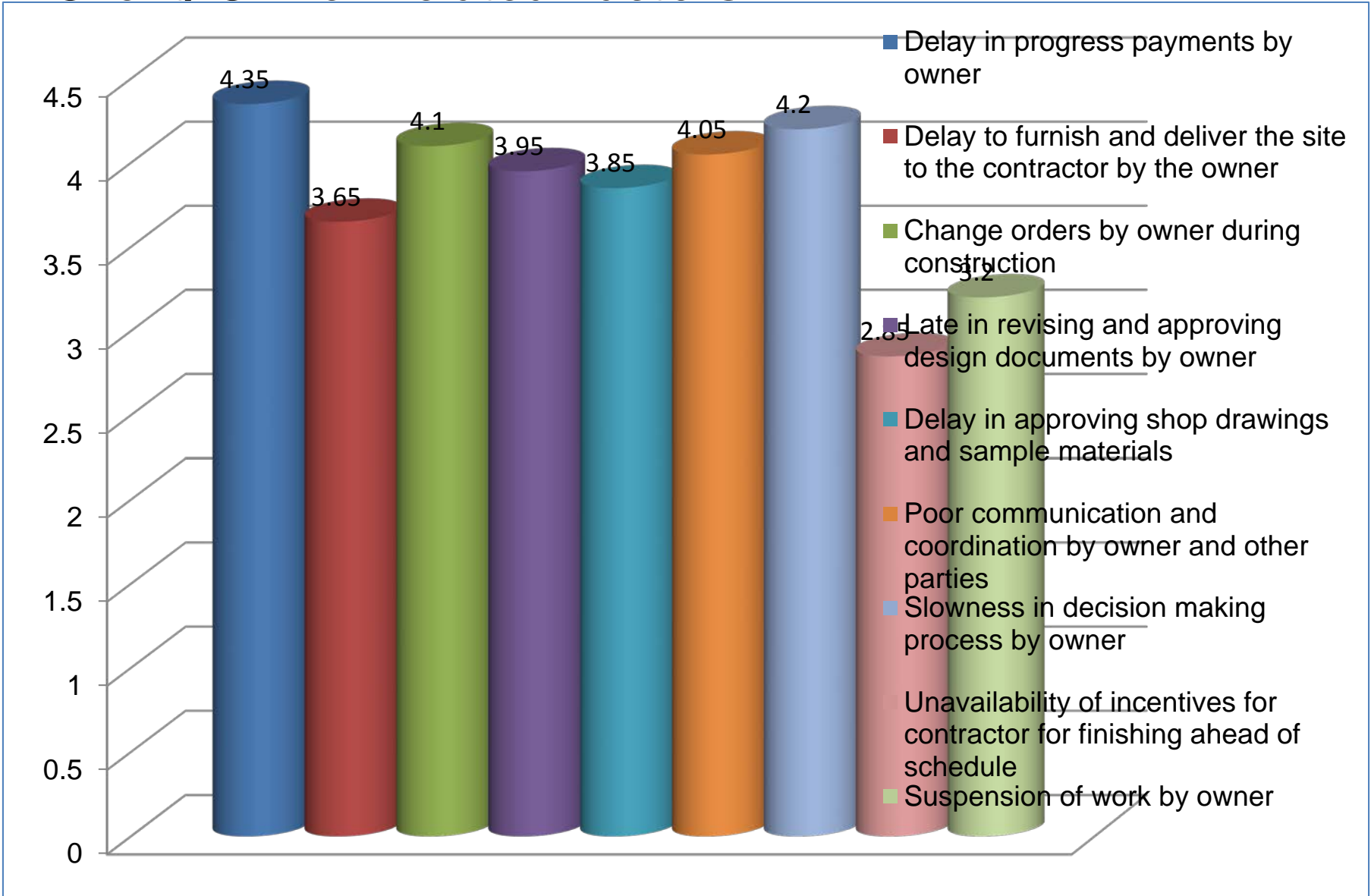
Major Factors Causing Construction Delay

Project Related factors

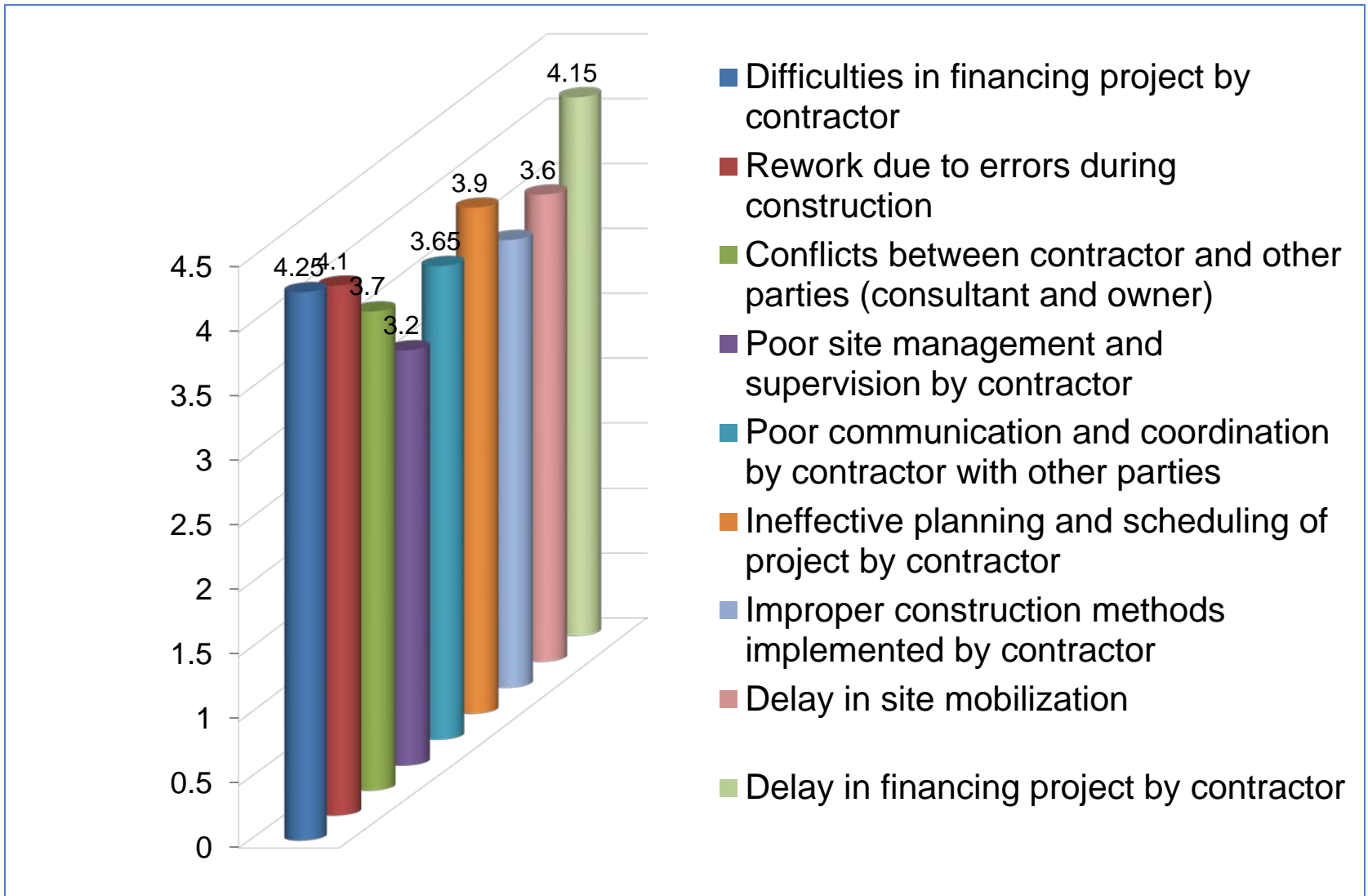


Client/ Owner Related Factors

Results contd.

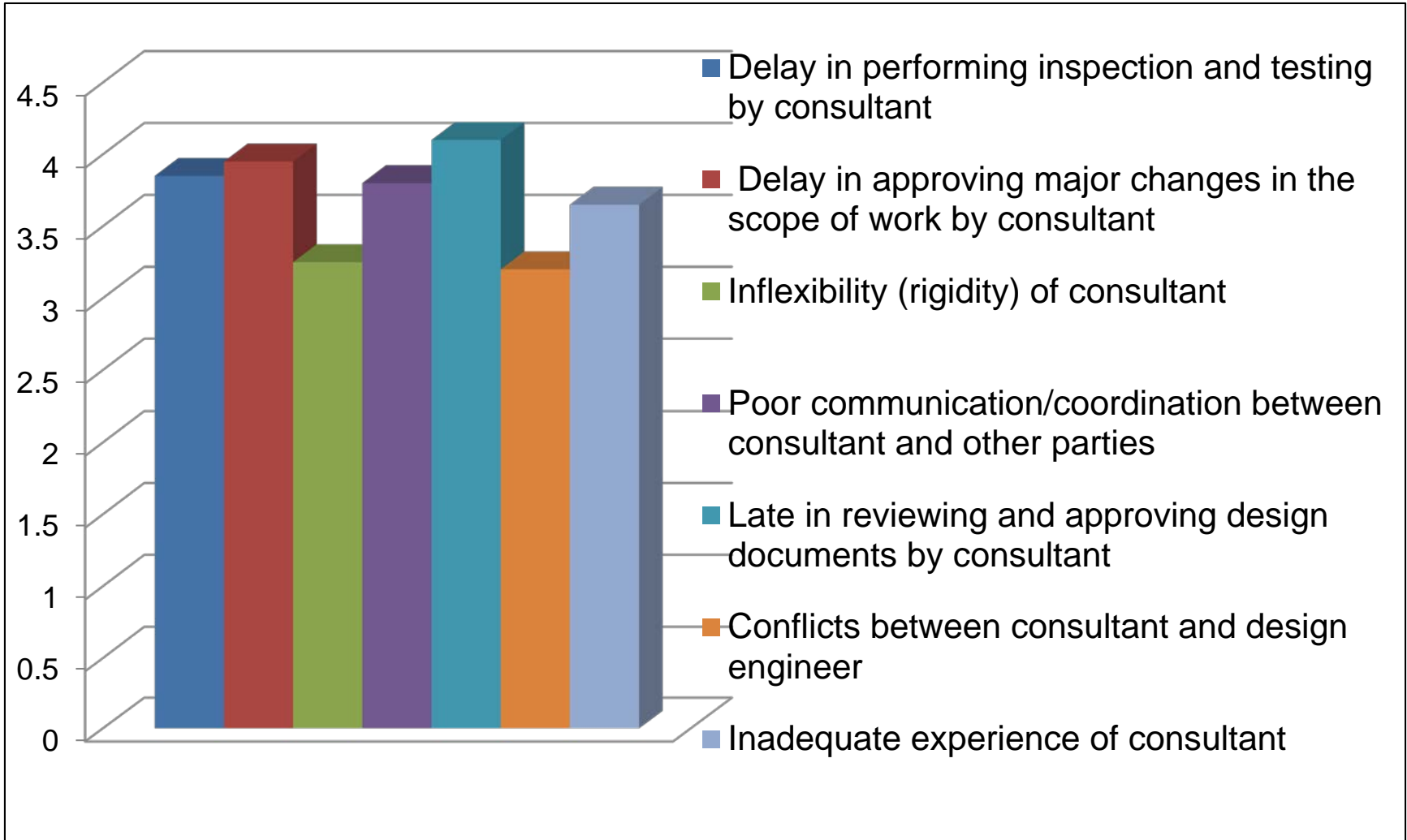


Contractor Related Factors

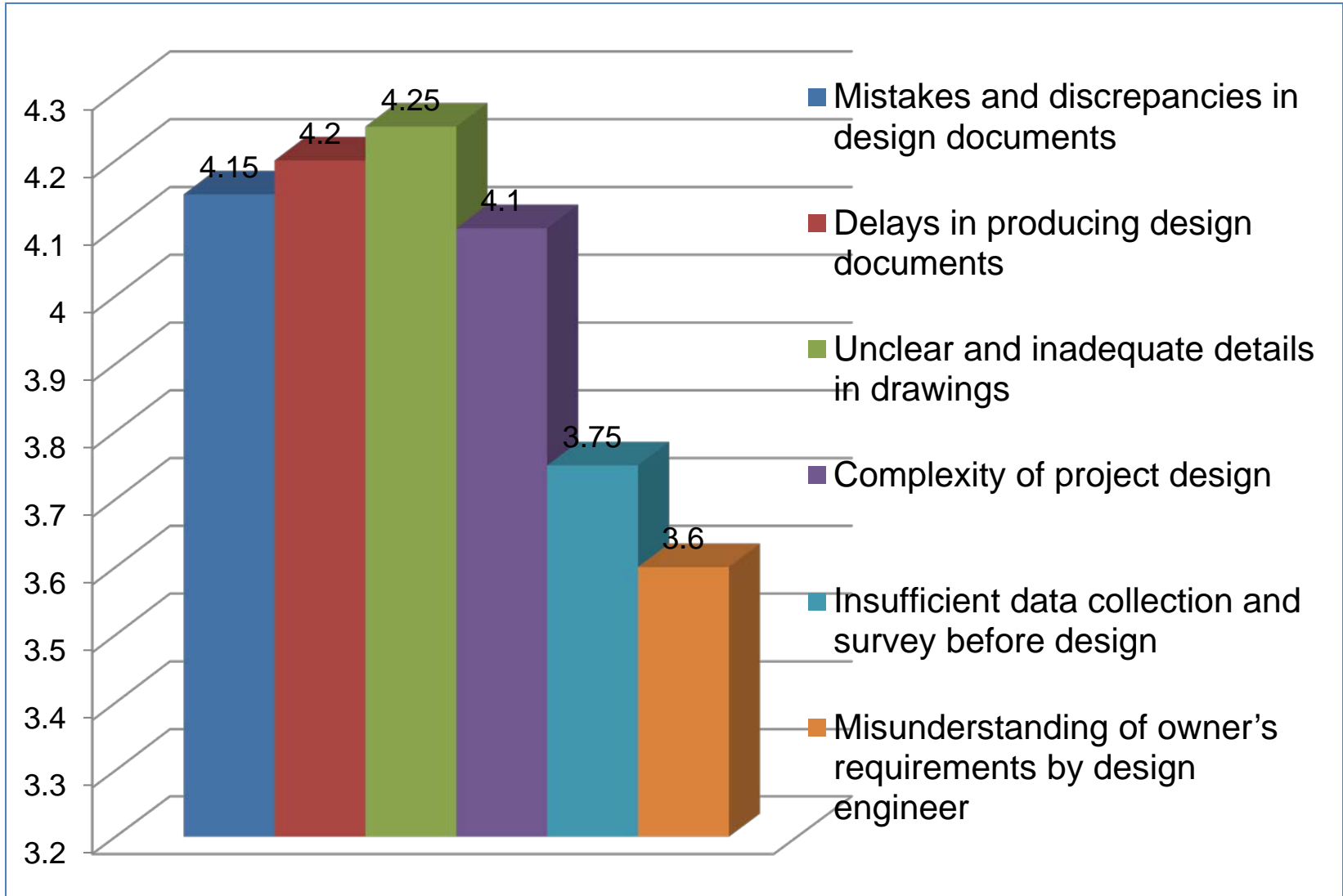


Consultant Related Factors

Results contd.

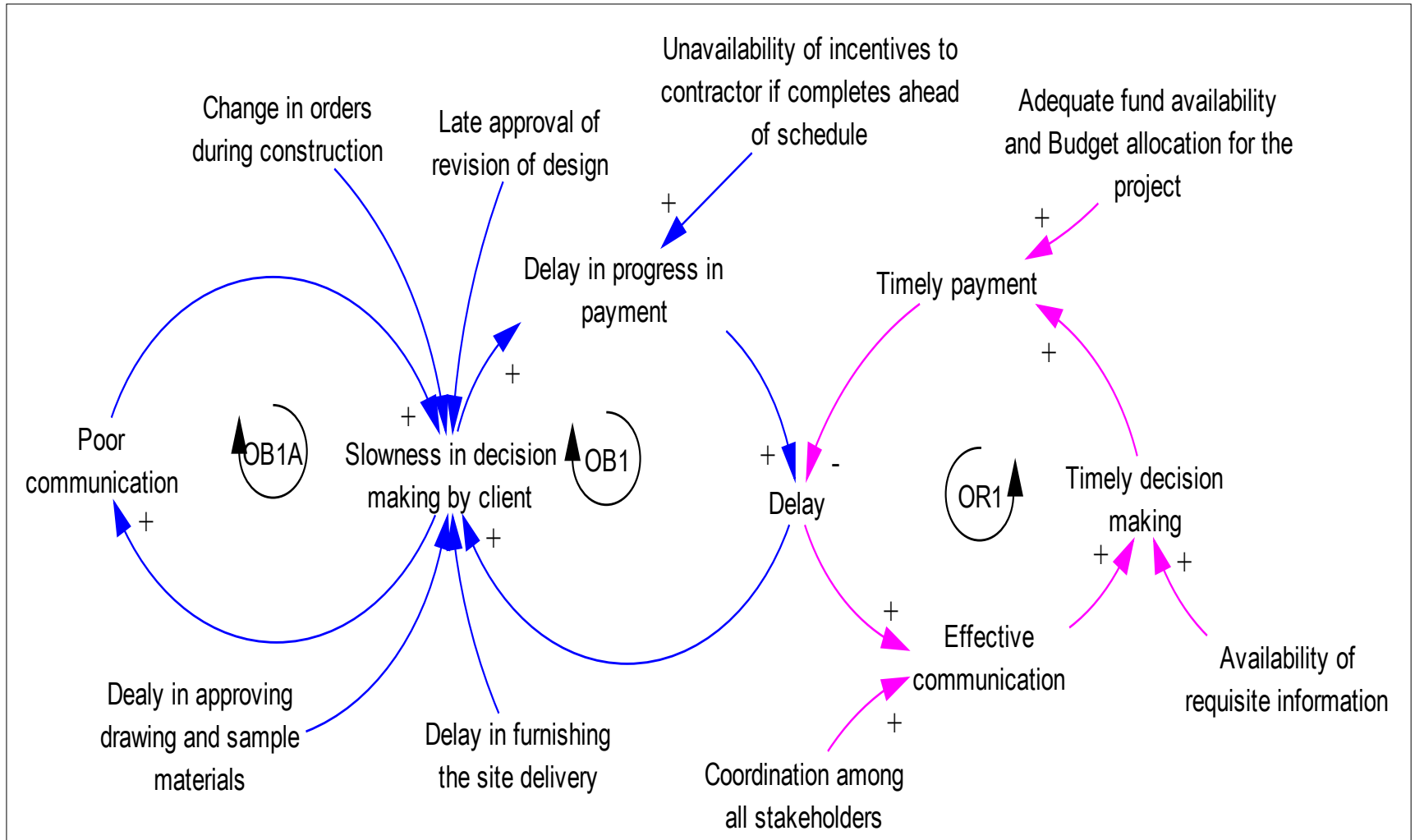


Design Related Factors



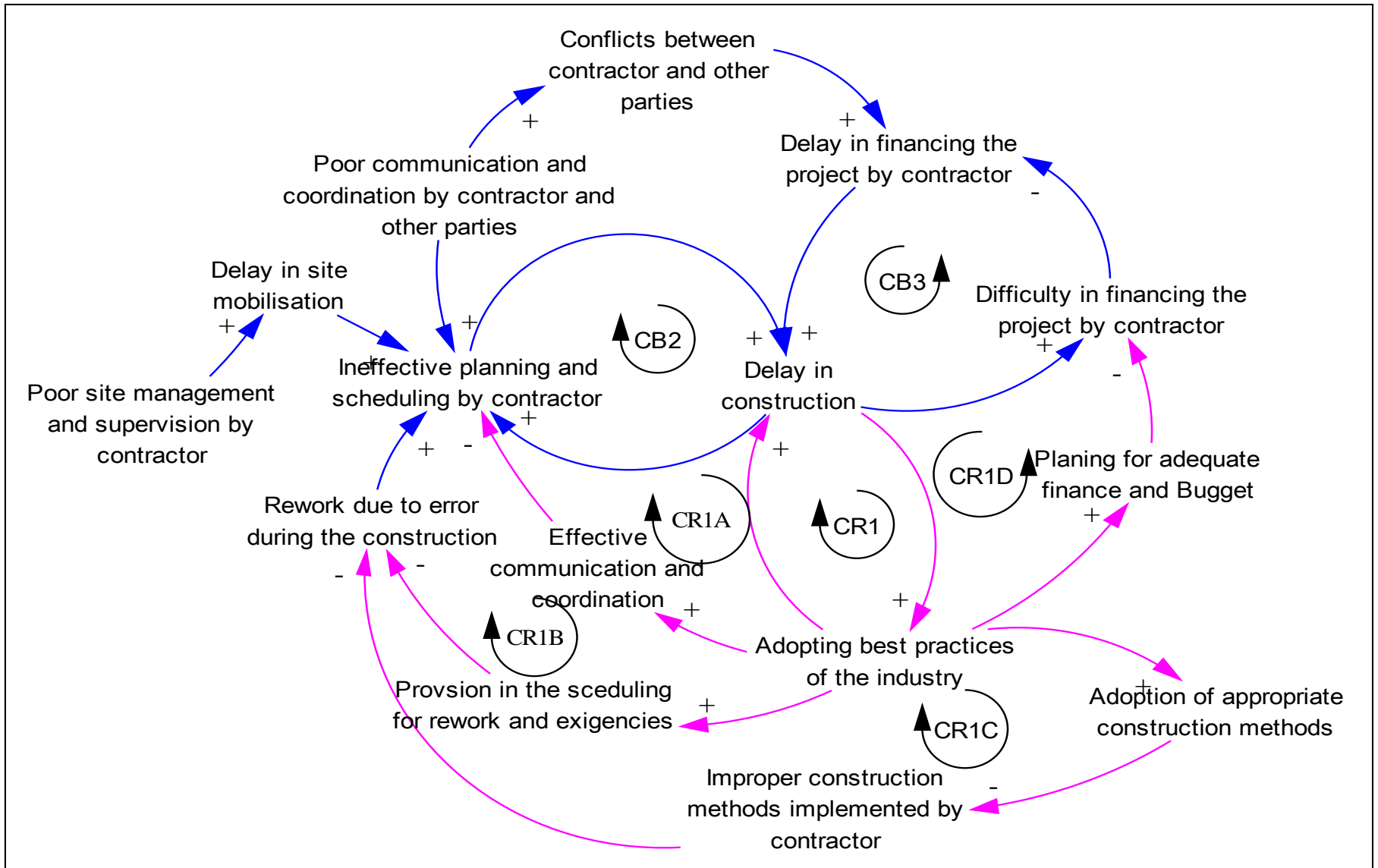
Conceptual Model and Mechanisms

Client Related Aspects



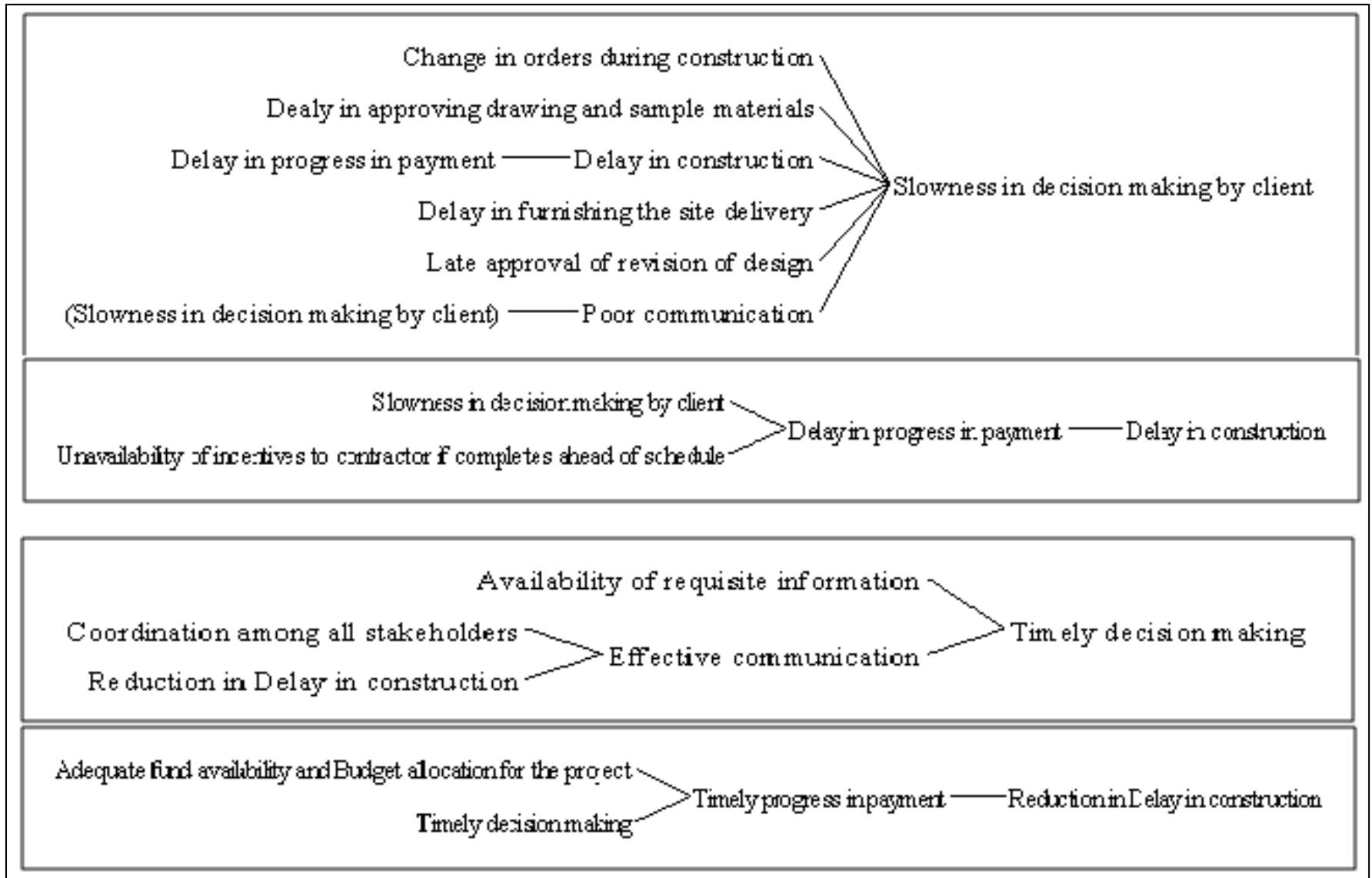
SD model based on causal feedback relations among the for client related factors causing delay

Contractor Related Aspects

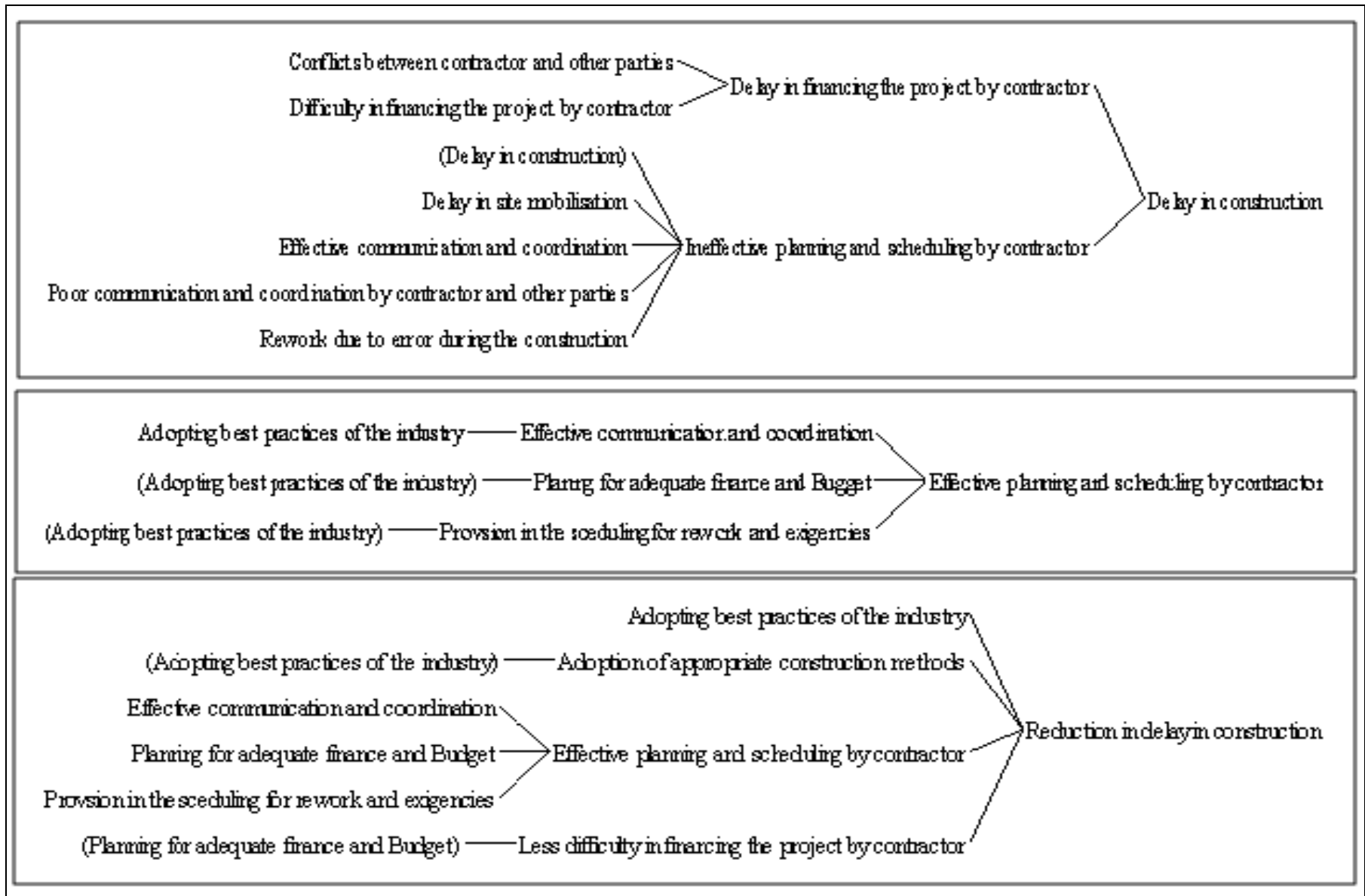


SD model based on causal feedback relations among the contractor related factors causing delay

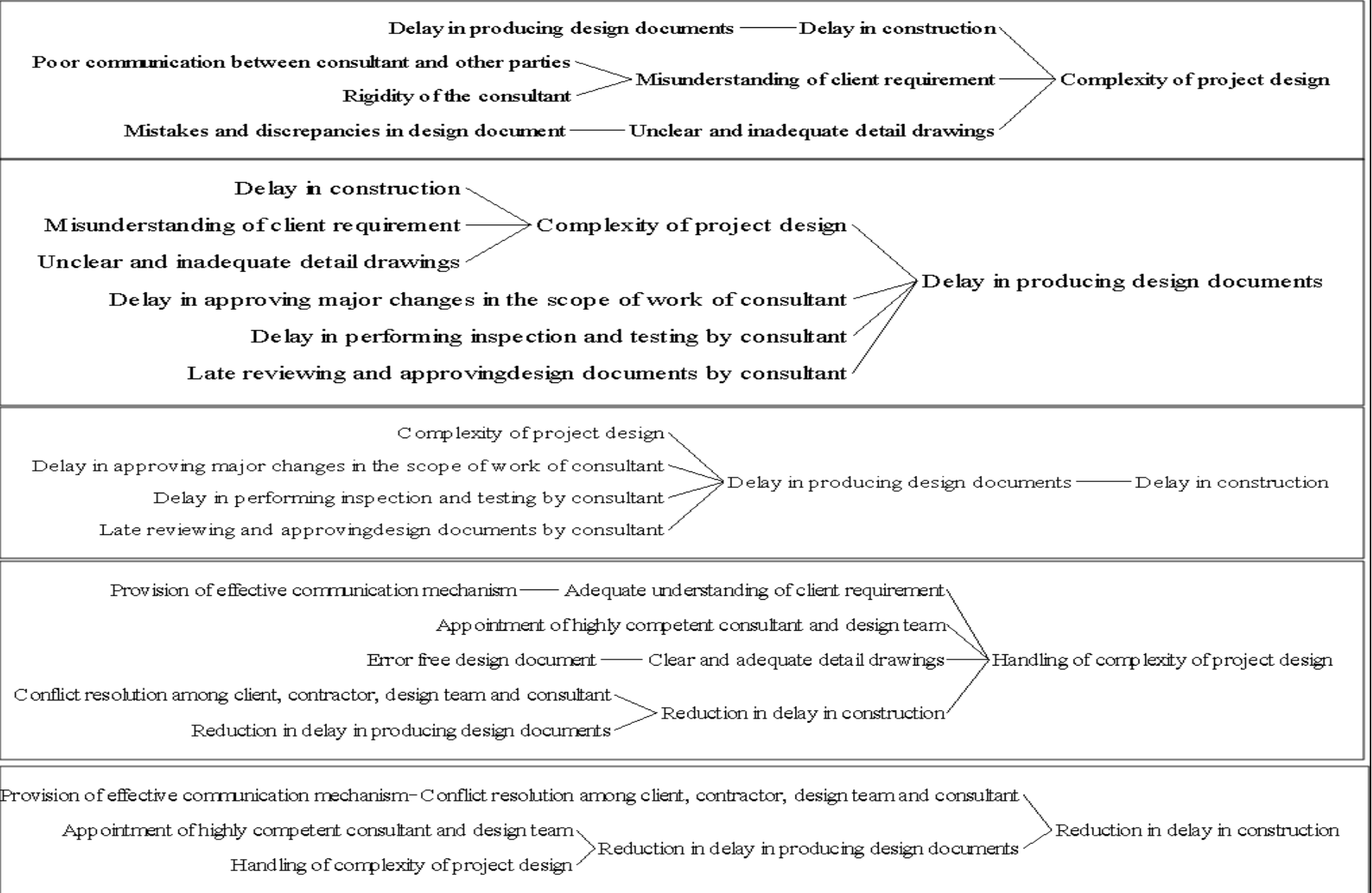
Mechanism to understand client related construction delay and its reduction



Mechanism to understand contractor related construction delay and its reduction



Mechanism to understand consultant and design related construction delay and its reduction



CONCLUSION

Parameters belonging to client/ owner, contractor, consultant and design aspects have major influence on the occurrence delay

Material, equipment and labour related issues have lesser significance

CONCLUSION Contd.

The causal feedback mechanisms which need to be considered while developing policy interventions to resolve the challenges of delay in construction:

(1) The causal feedback relationship among communication, decision-making, progress in payment and construction delay;

(2) the causal feedback mechanism involving effective planning and scheduling, planning for finance and budget ahead, adoption of construction methods, contingencies in planning for rework and exigencies by the contractor and construction delay

(3) the causal feedback mechanisms involving appointment of highly competent consultant and design team, delay in producing the design documents and delay in construction; and

(4) the provision of effective communication mechanism, conflict resolution and delay in construction.

Thank you

Questions and Comments

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