

神經與行為模型建構 (Neural & Behavioral Modeling)

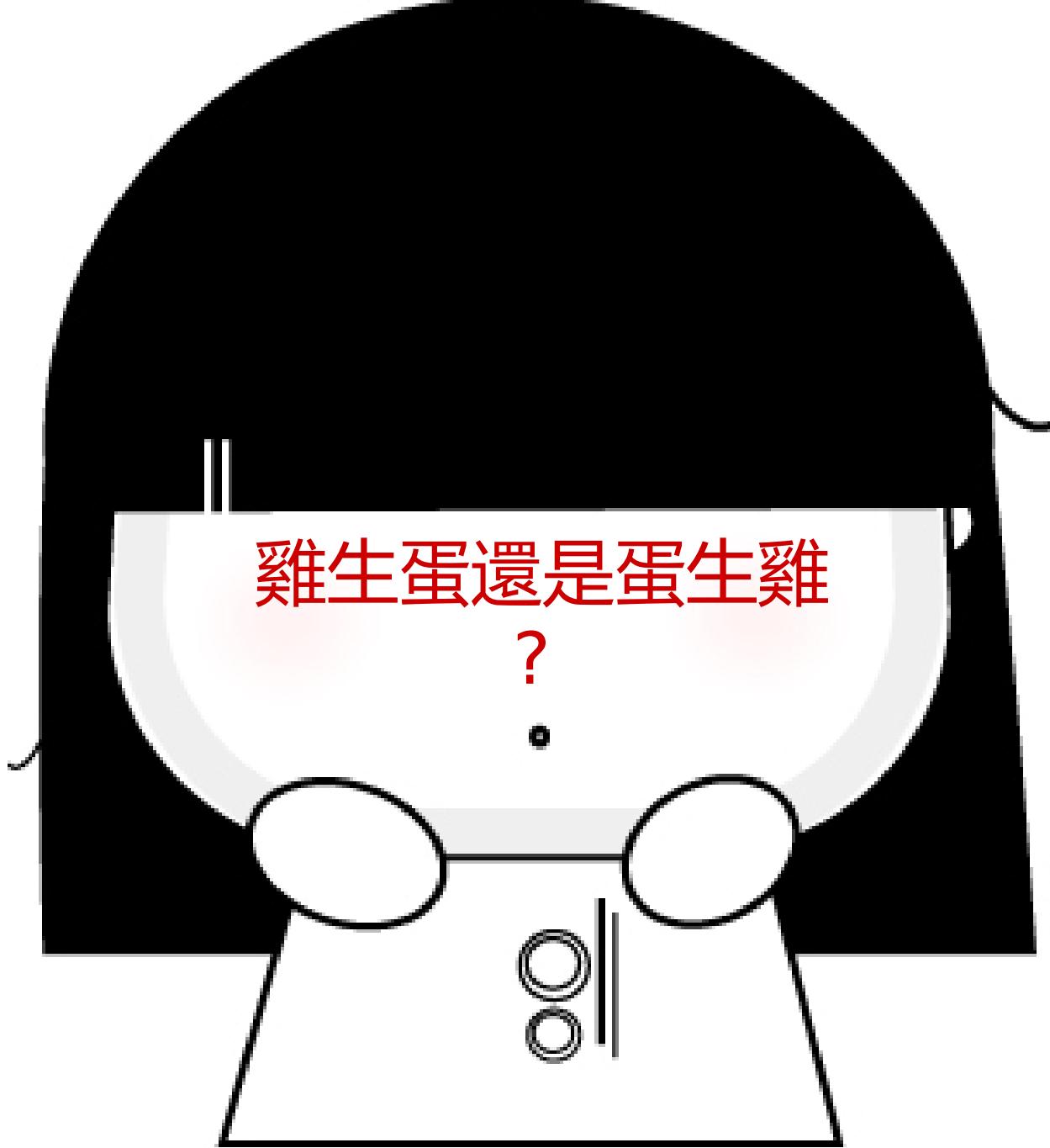
課號：Psy7277

識別碼：227M9280

教室：北 206

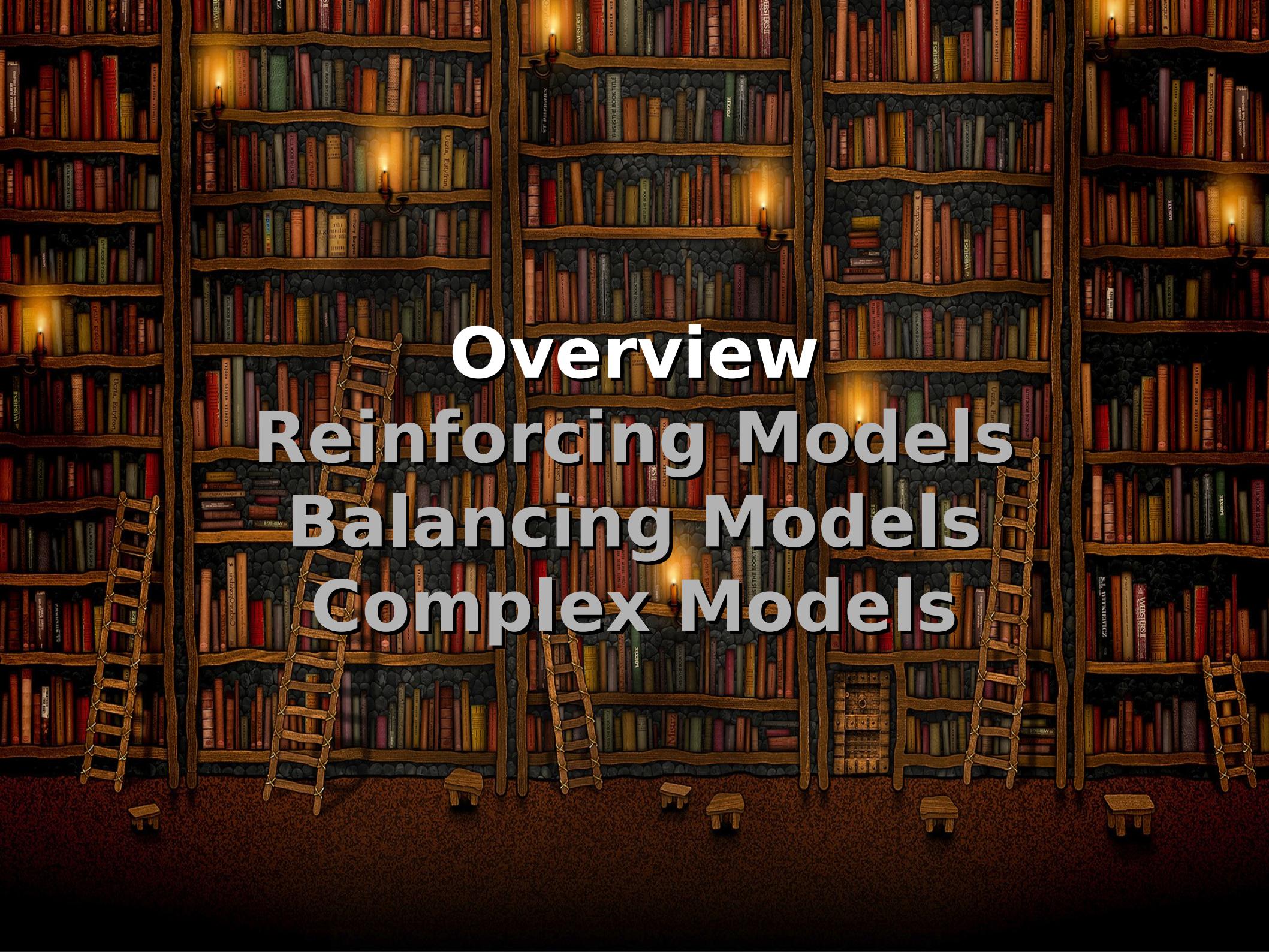
時間：五 234





雞生蛋還是蛋生雞
？





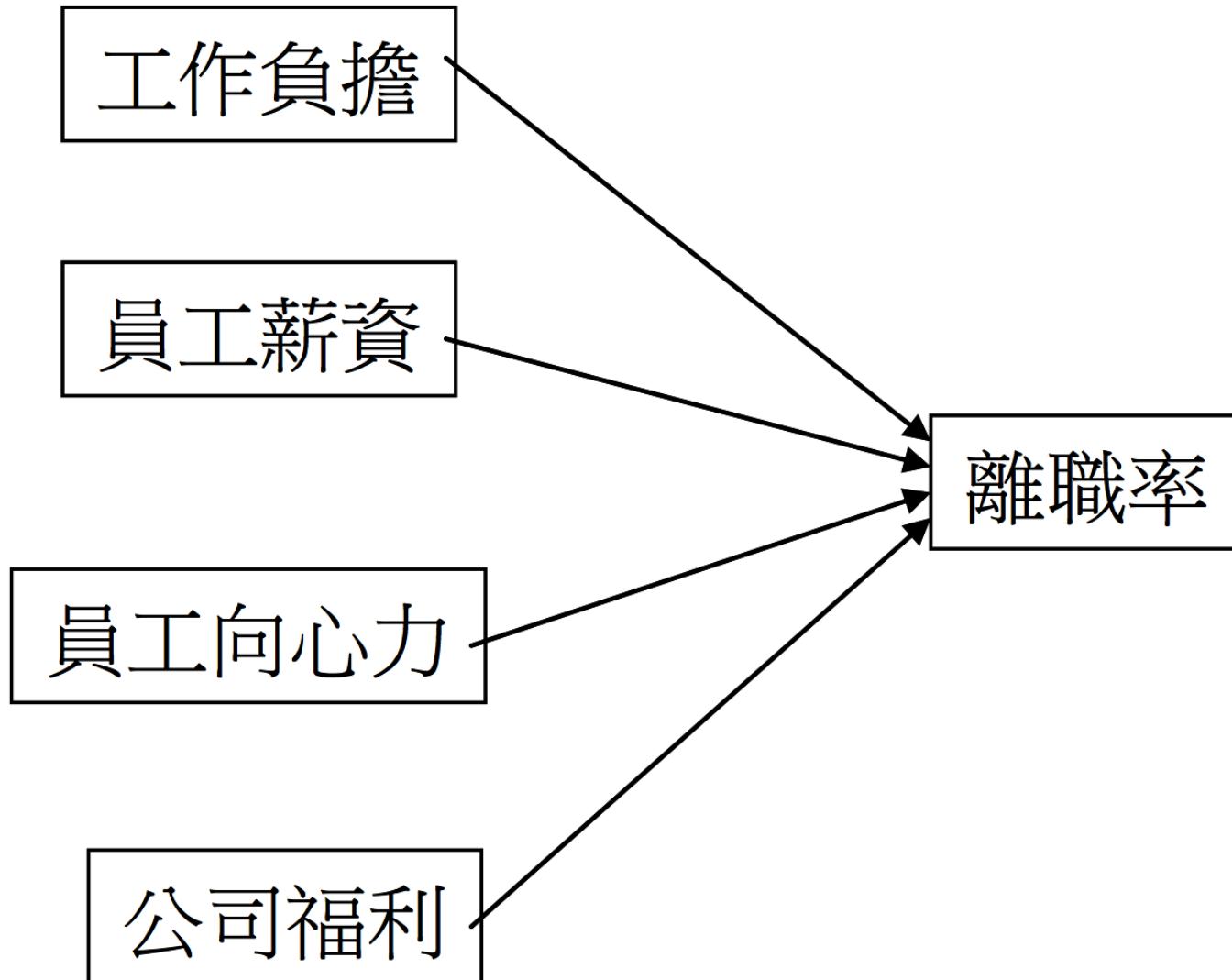
Overview

Reinforcing Models

Balancing Models

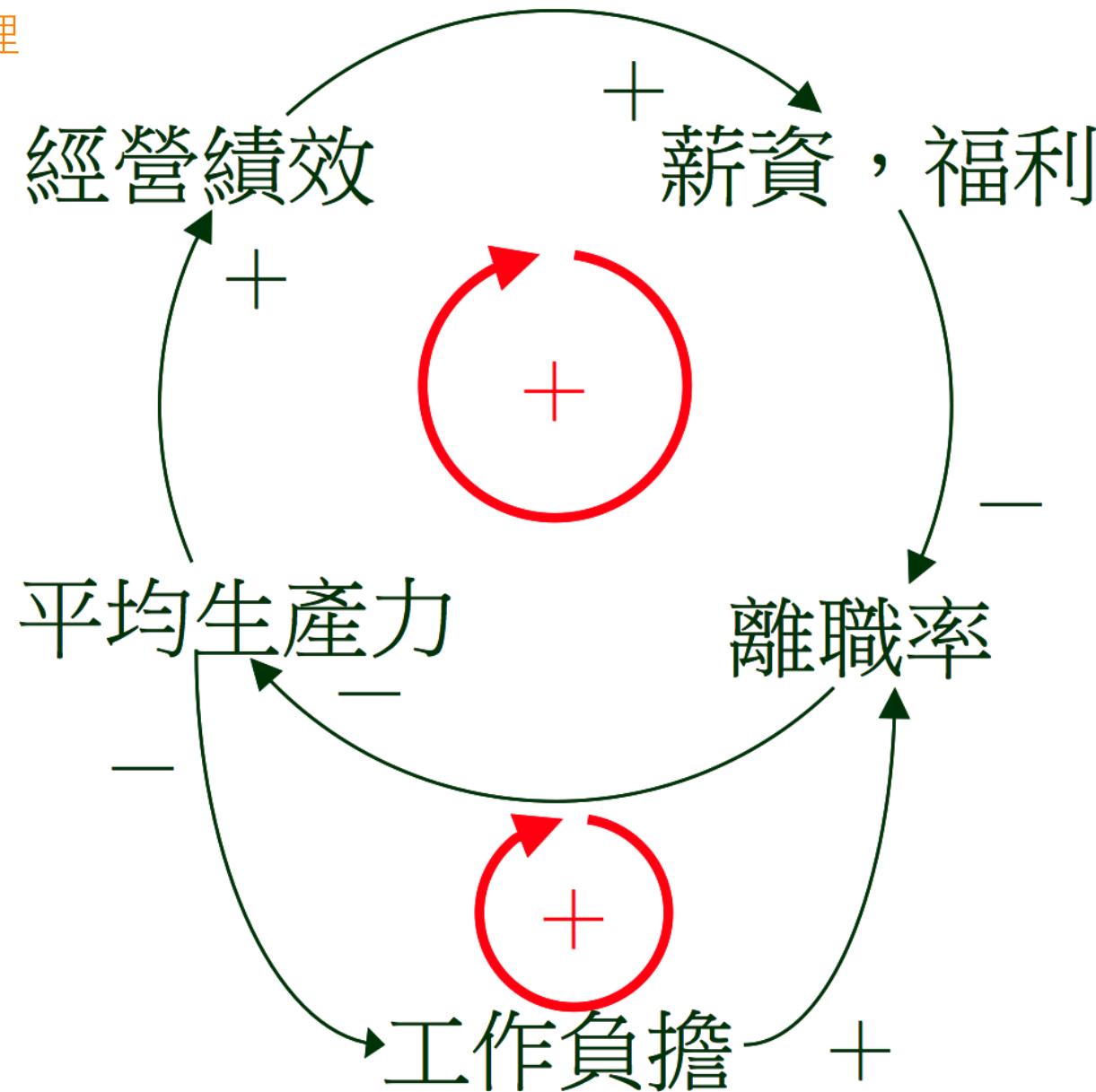
Complex Models

員工離職：單向因果的線性思考

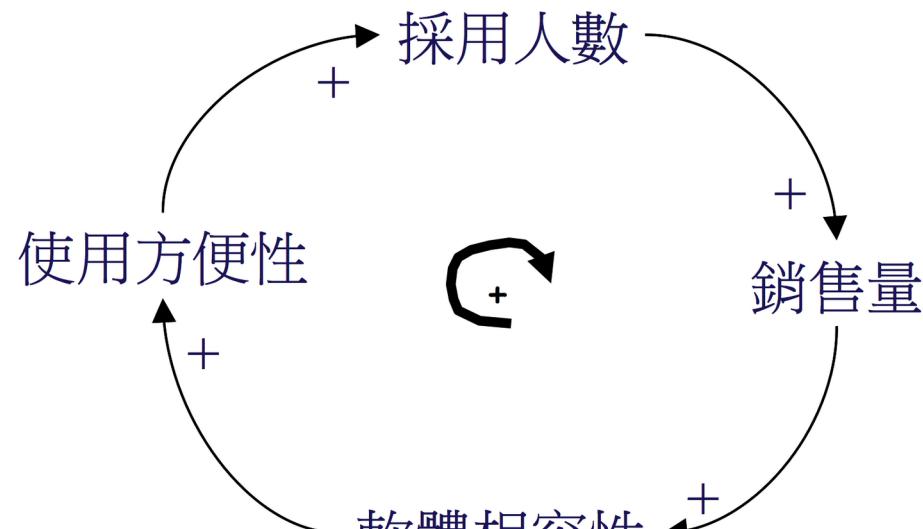
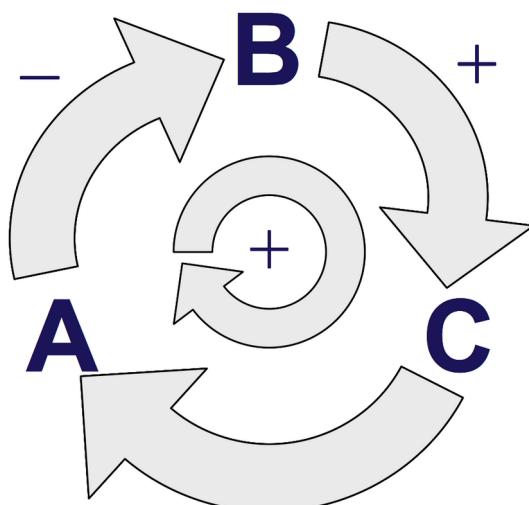


員工離職：互為因果的系統思考

！！！因果相依！！！與傳統社會科學模型看因到果是線性的不同
魔鬼藏在細節裡

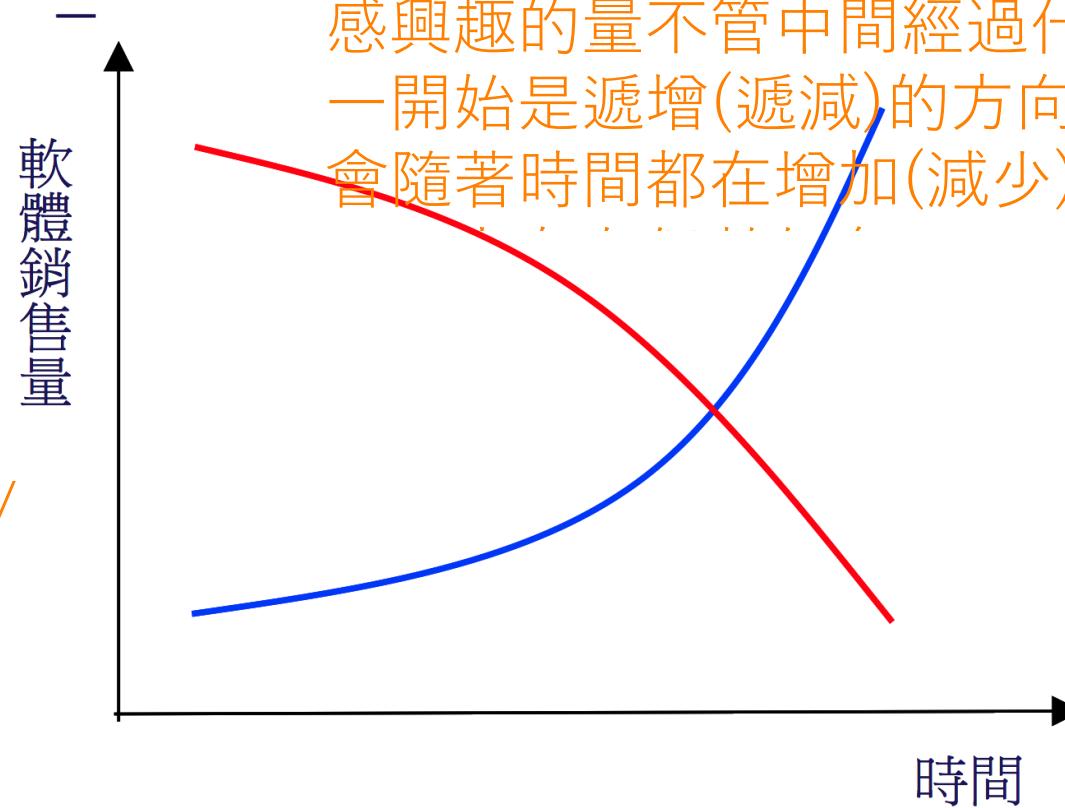


正迴路 (Positive Loop)



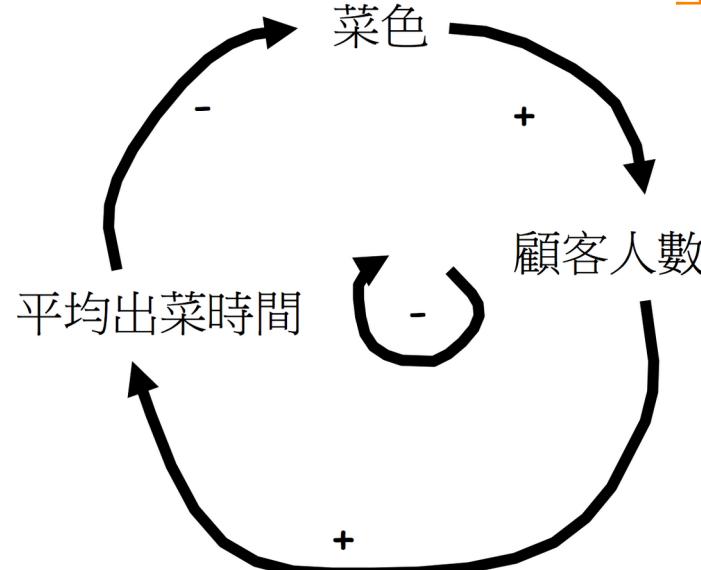
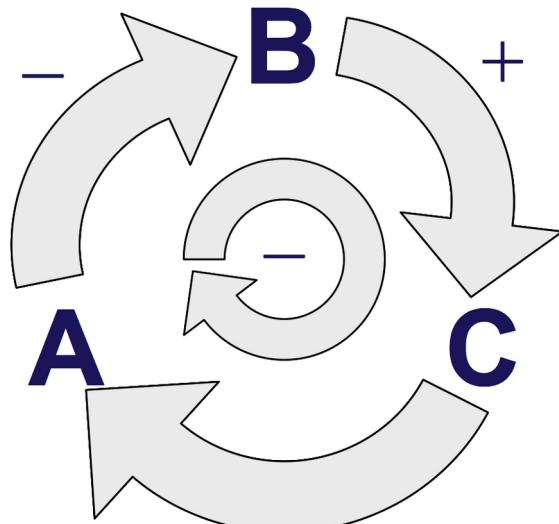
感興趣的量不管中間經過什麼，一開始是遞增(遞減)的方向，他之後會隨著時間都在增加(減少)

想想紅色為什麼是下降的
(他可能沒達到某個 critical mass / threshold)
 $dy/dt = y - CM$



負迴路 (Negative Loop)

基數個負



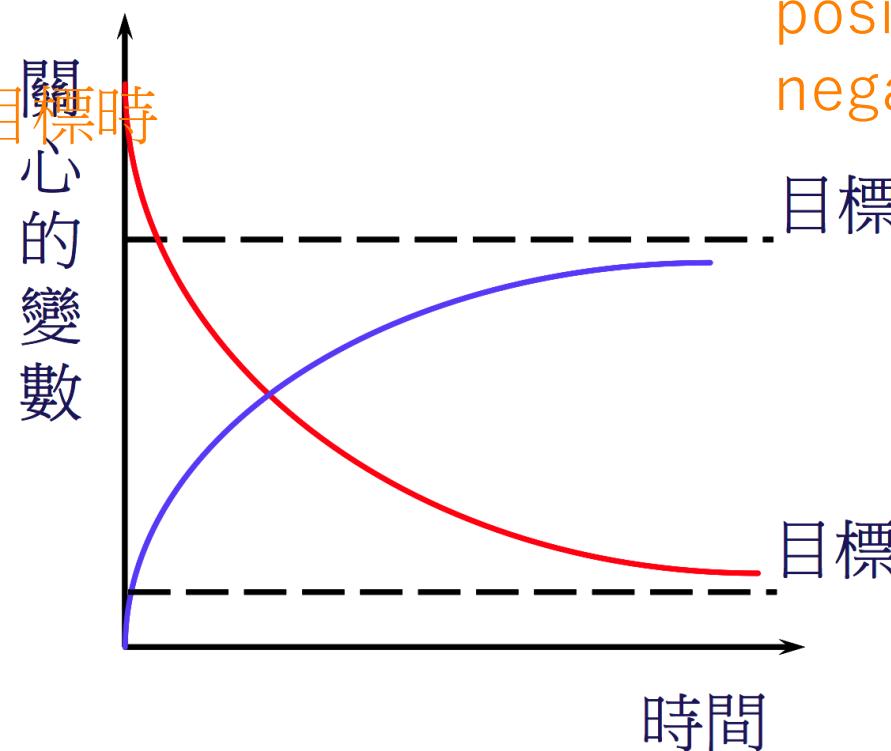
$$dy/dt = \text{Goal} - y$$

當初使值還沒到達目標時

他會增加

但超過該目標時

卻會開始下降



positive loop 遠離目標

negative loop 接近目標

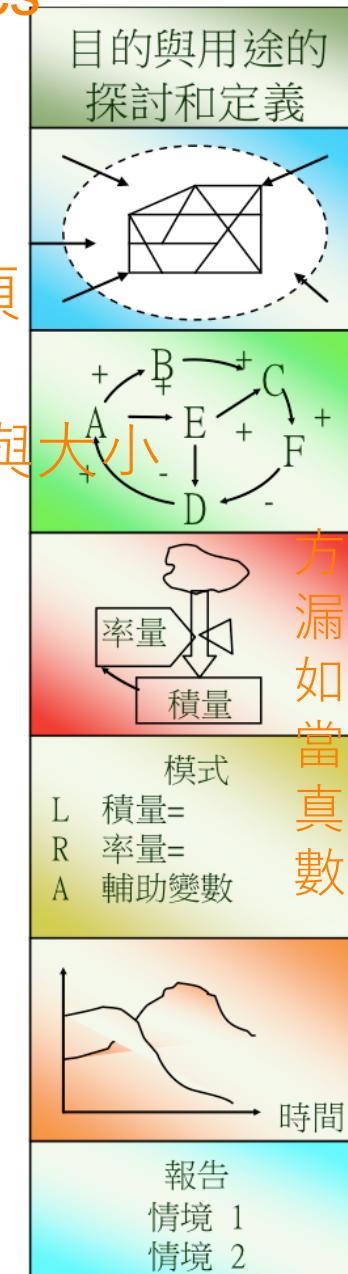
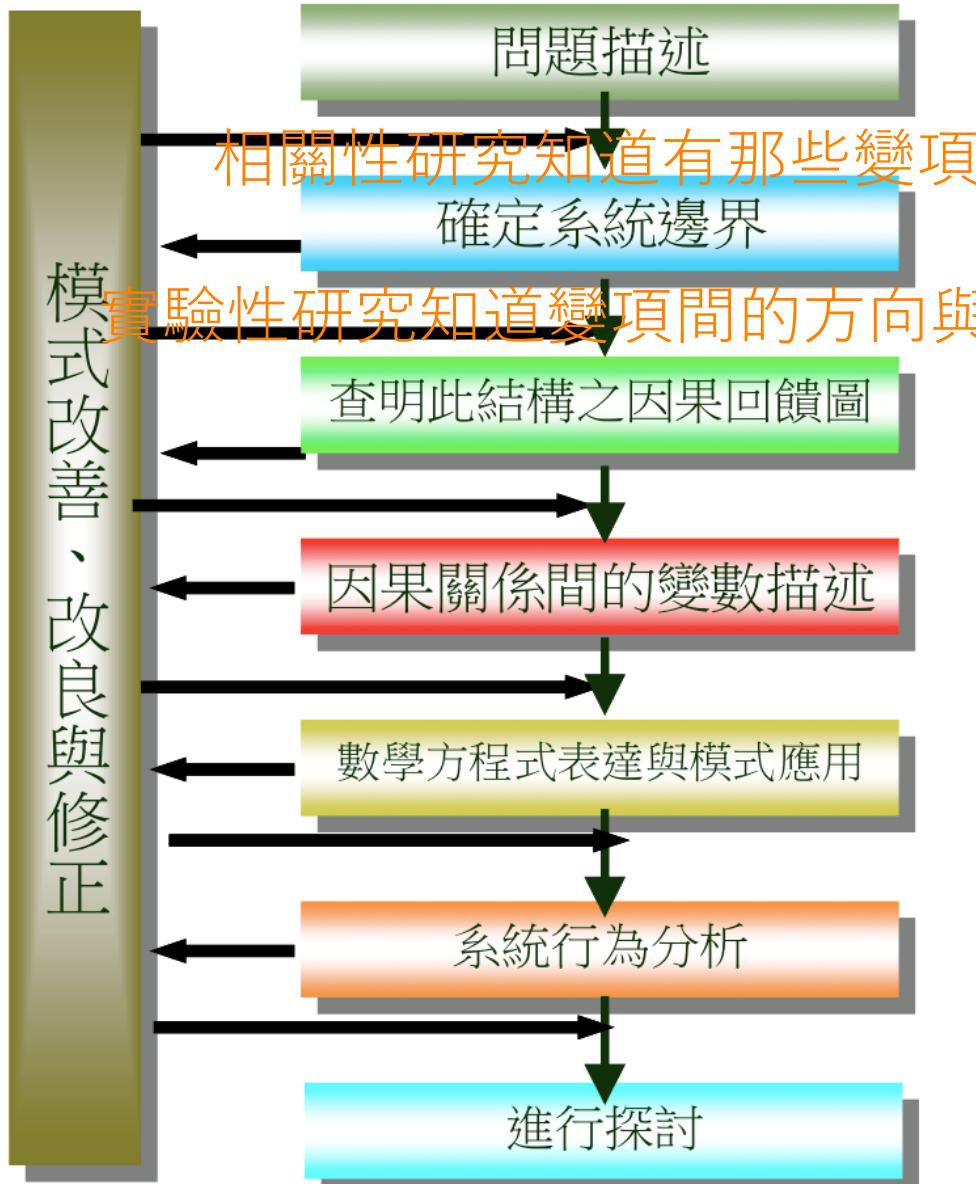
目標

目標

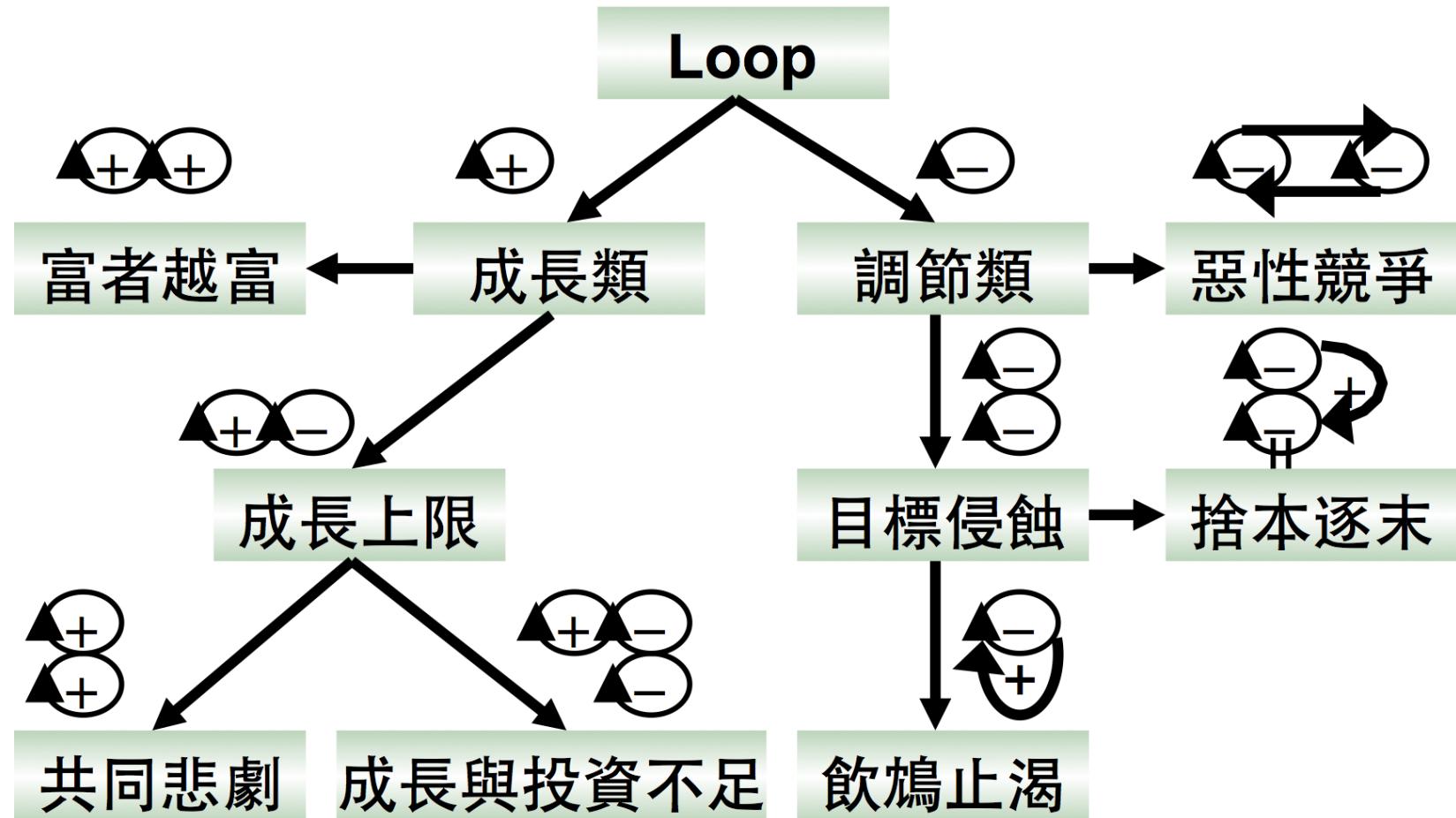
時間

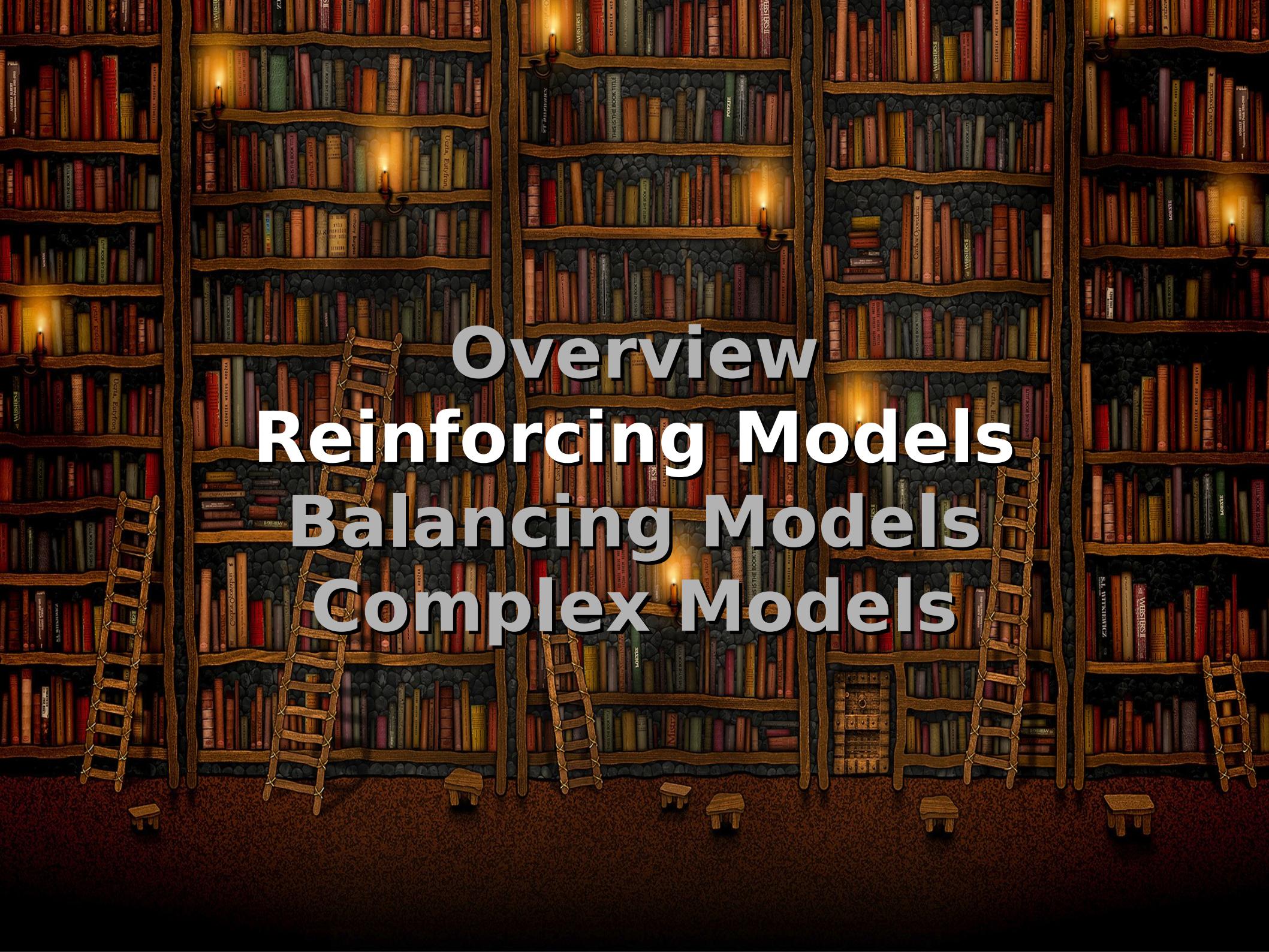
系統模型建構：流程

https://en.wikipedia.org/wiki/System_dynamics



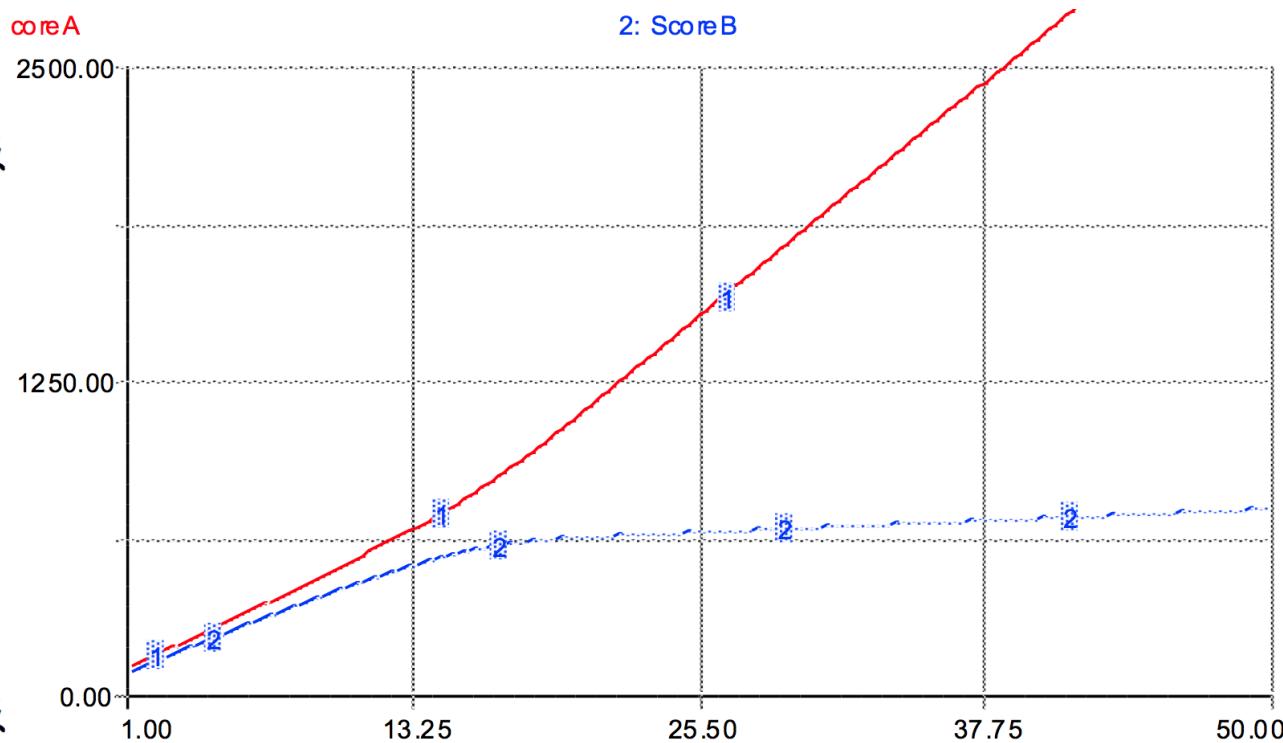
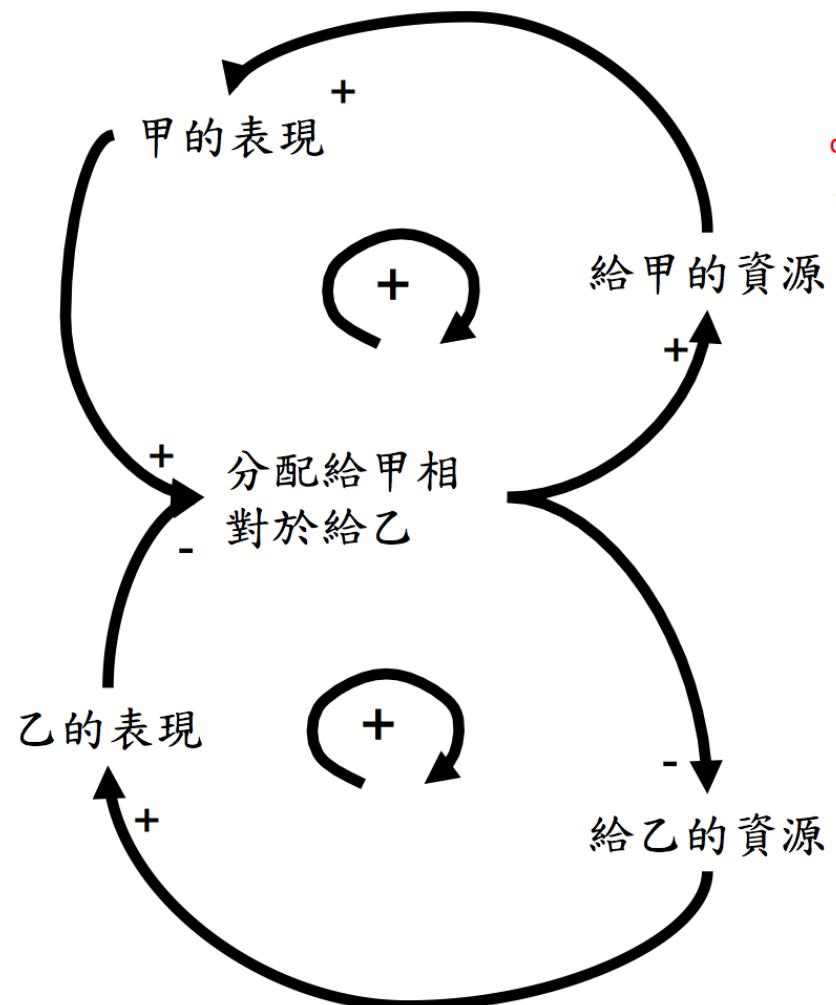
系統基模 (System Archetypes)



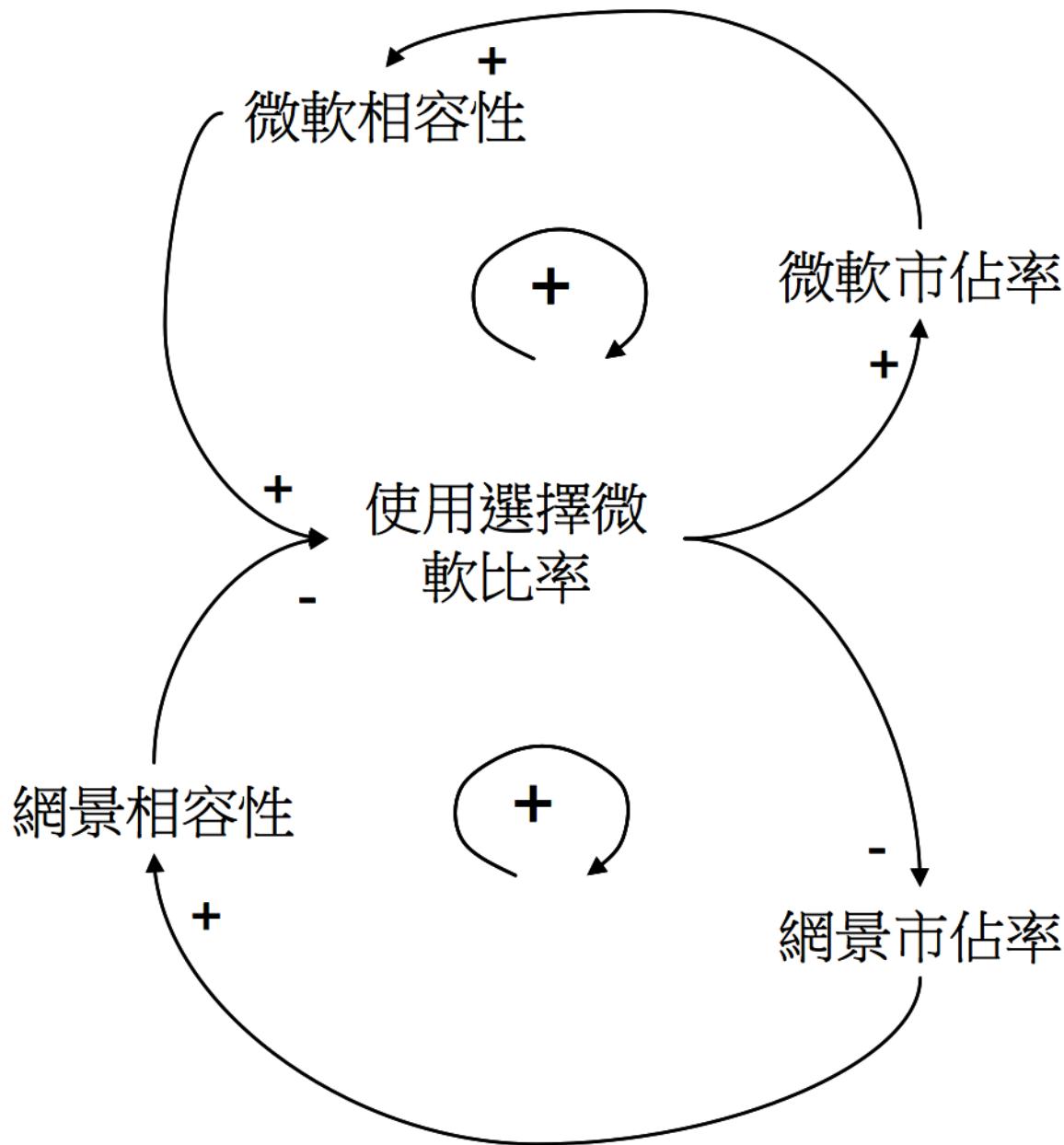


Overview Reinforcing Models Balancing Models Complex Models

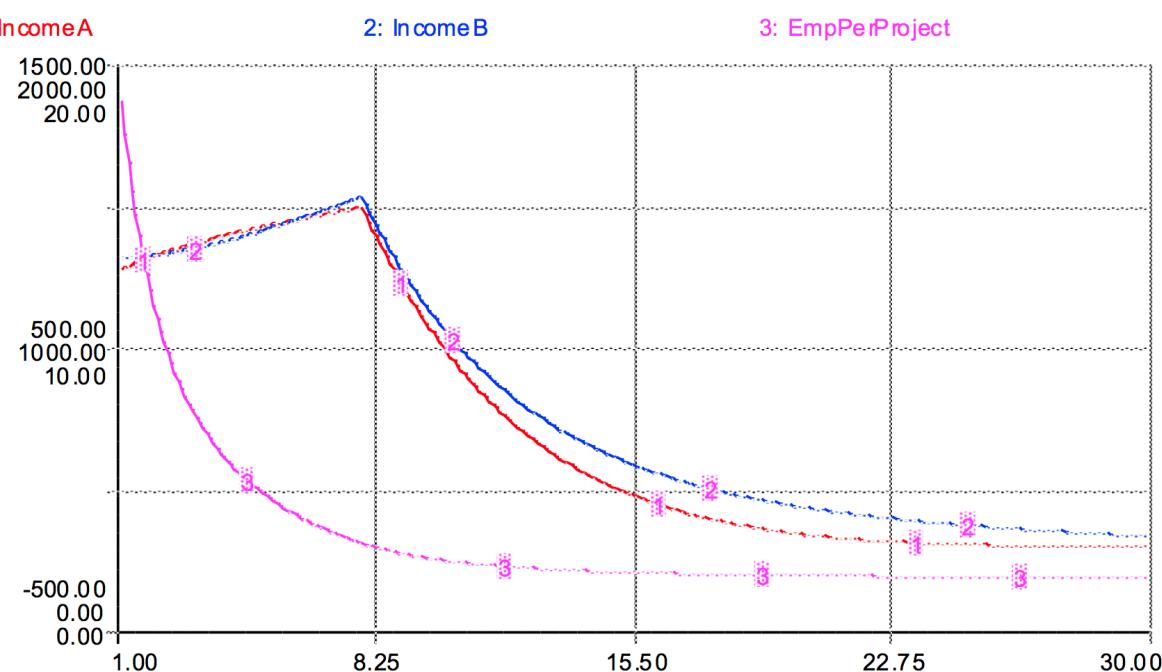
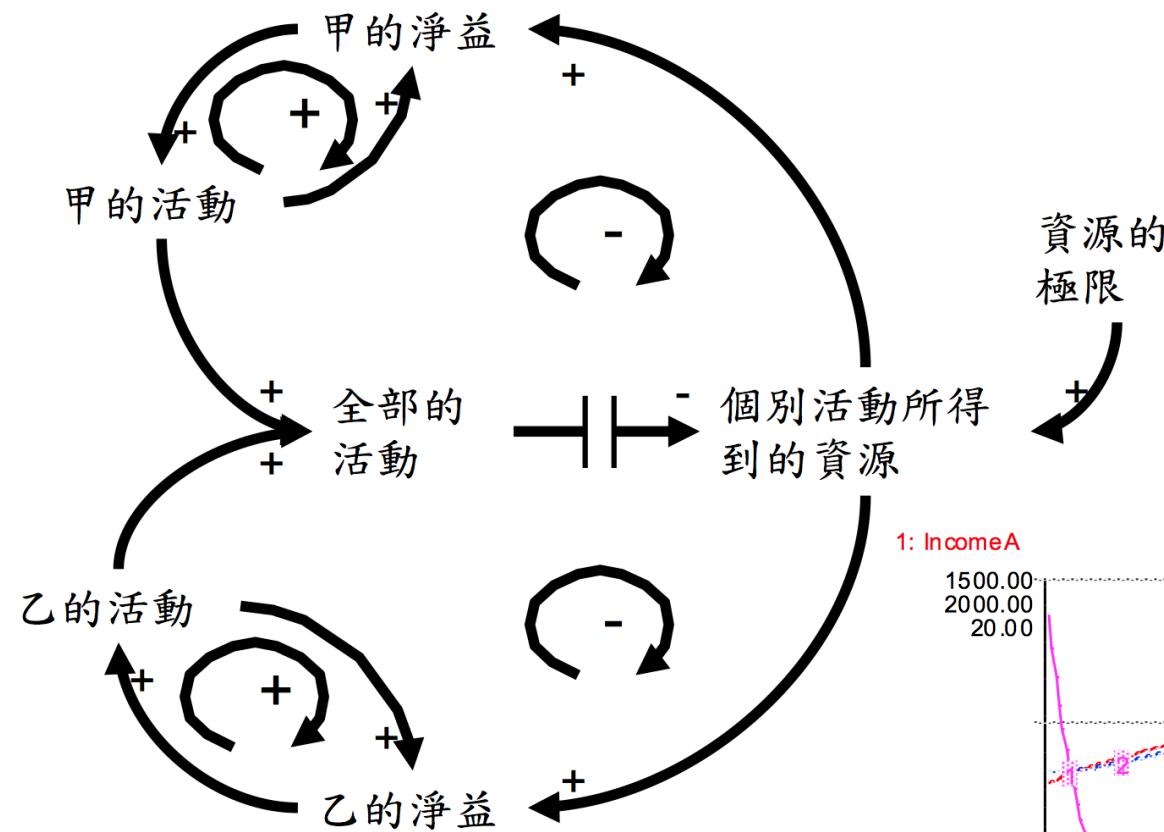
富者愈富：M型化 (success to the successful)



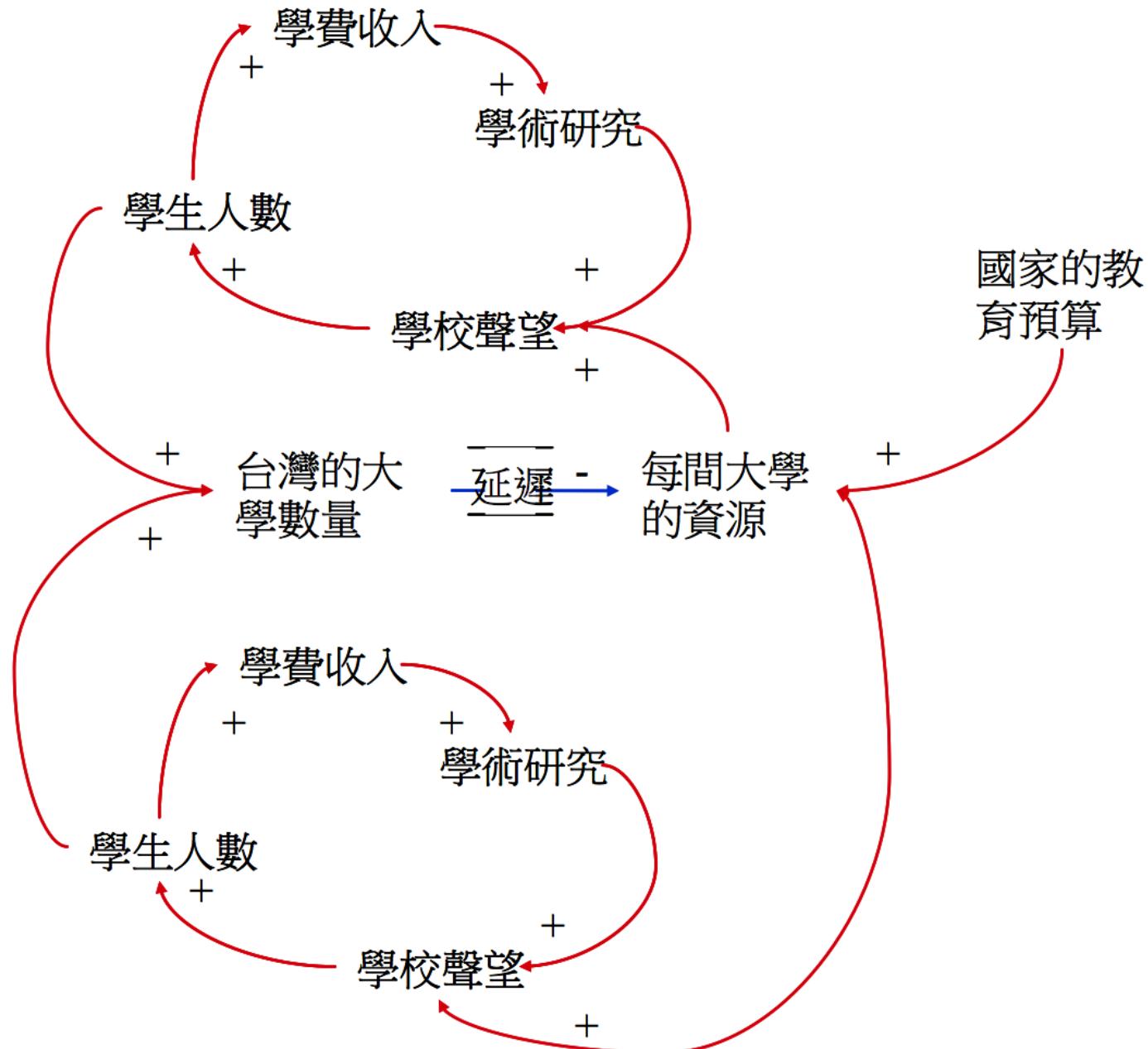
富者愈富：範例



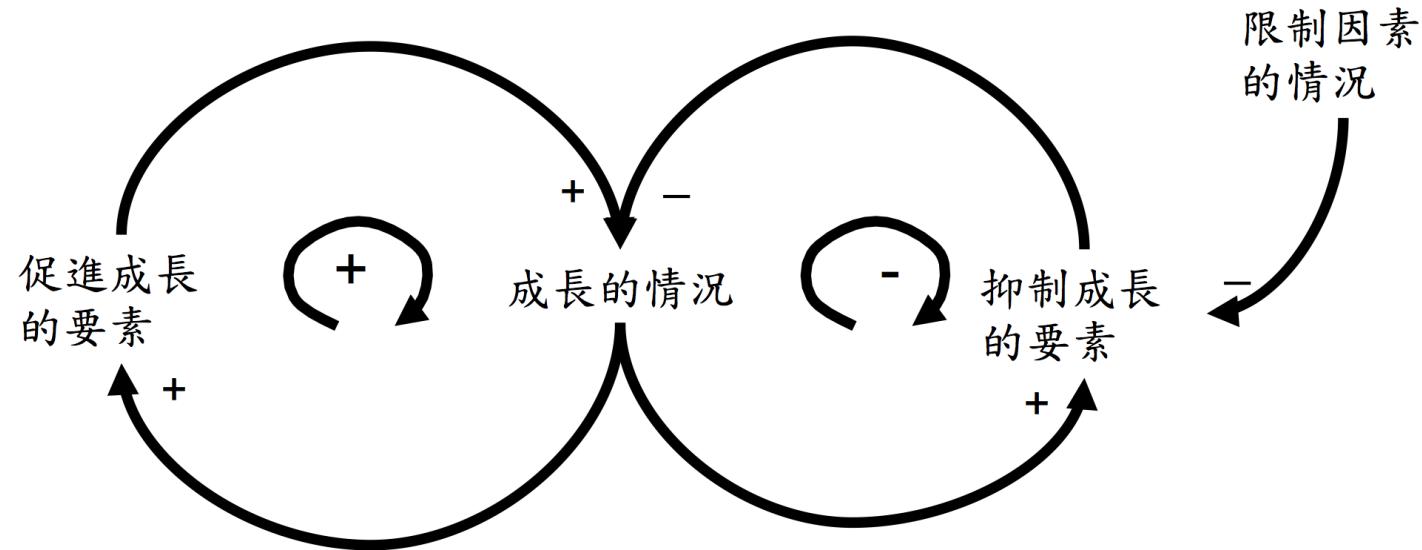
公地的悲劇：表面贏了其實雙輸 (Tragedy of the Commons)



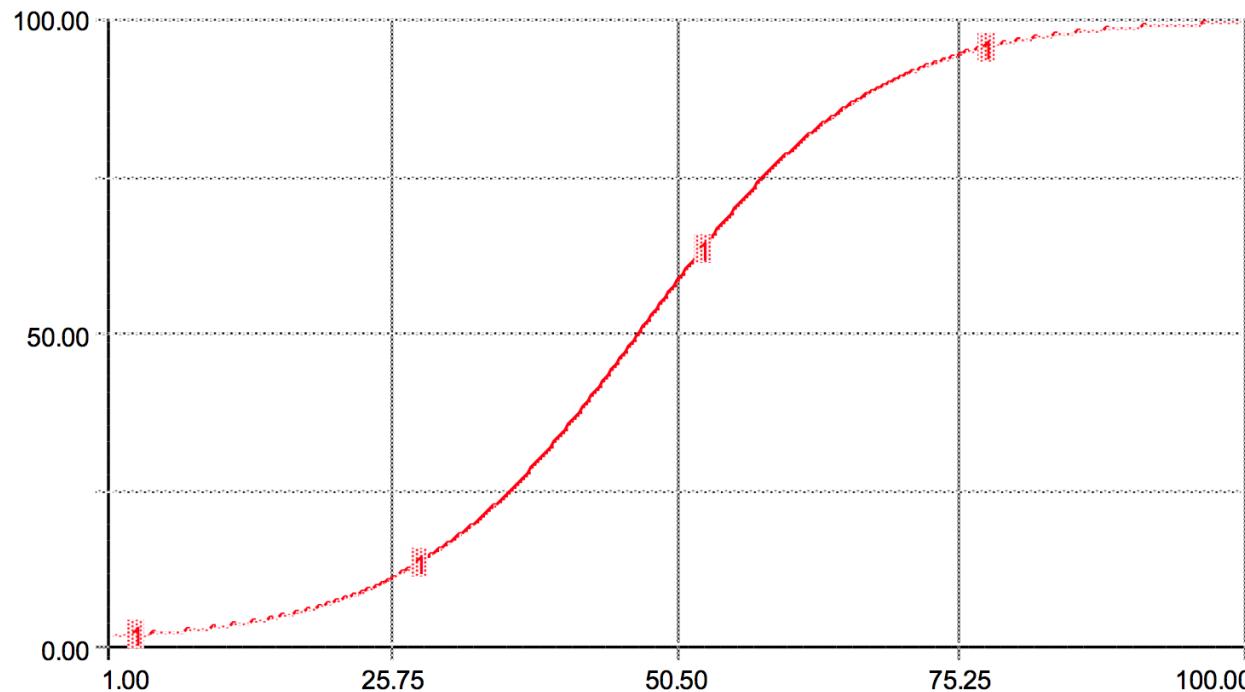
共同的悲劇：範例



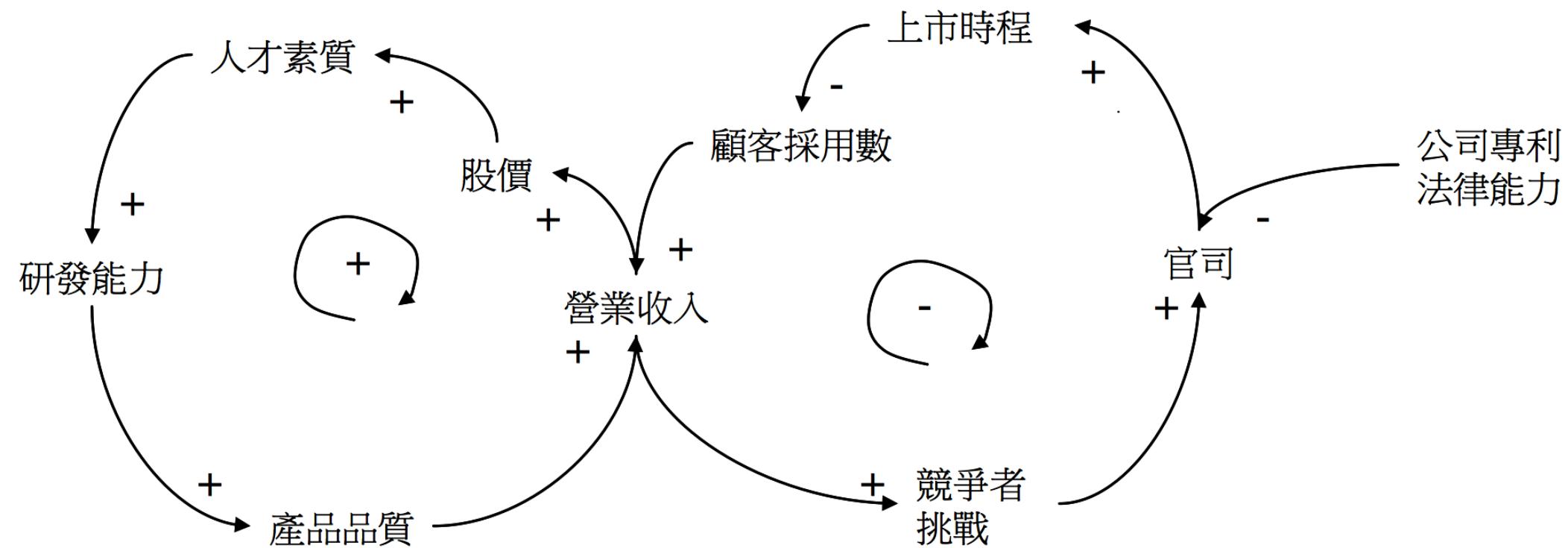
成長上限 (Limits to Growth)



1: Condition

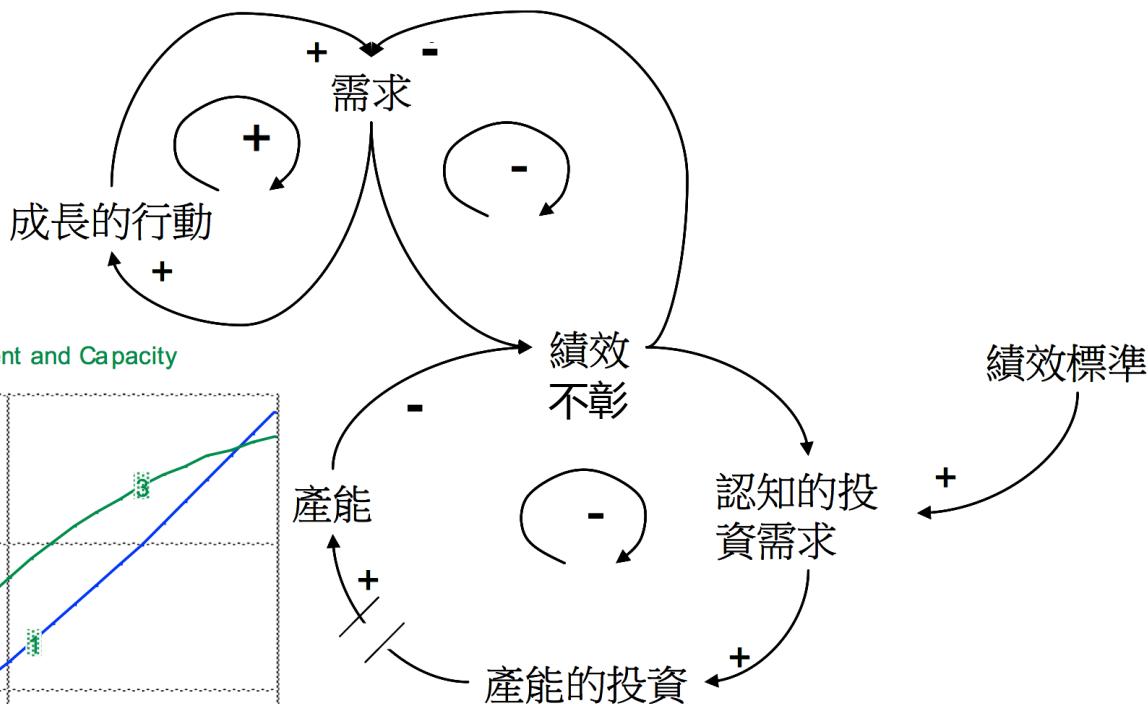
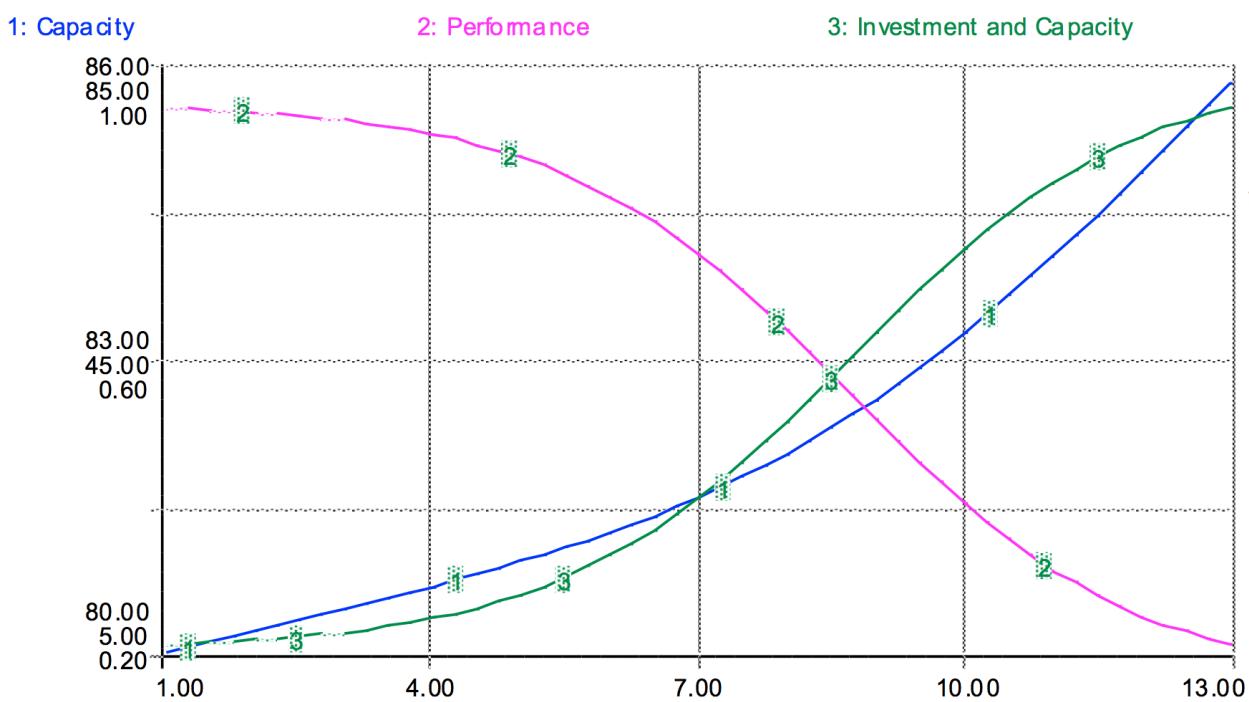


成長上限：範例

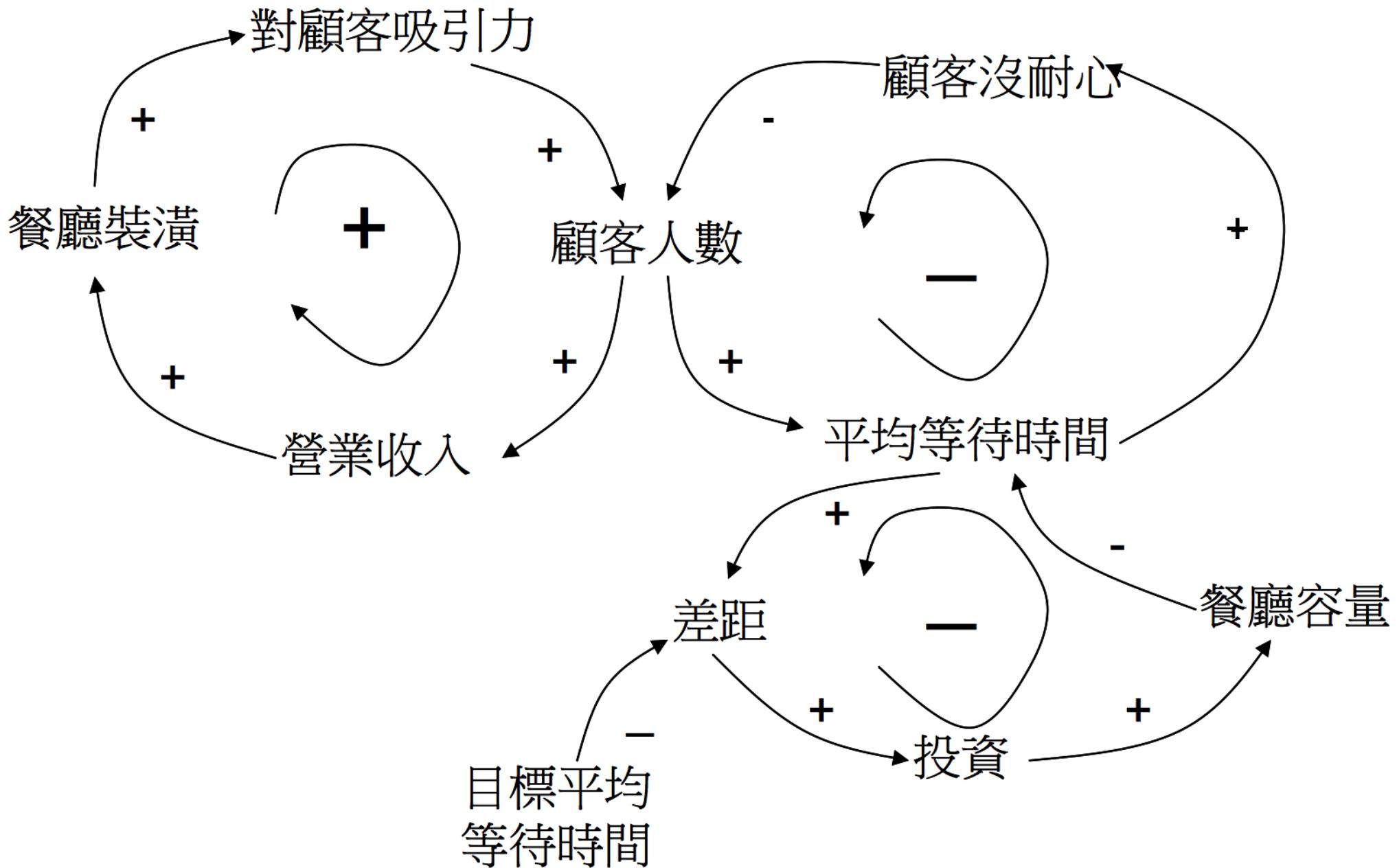


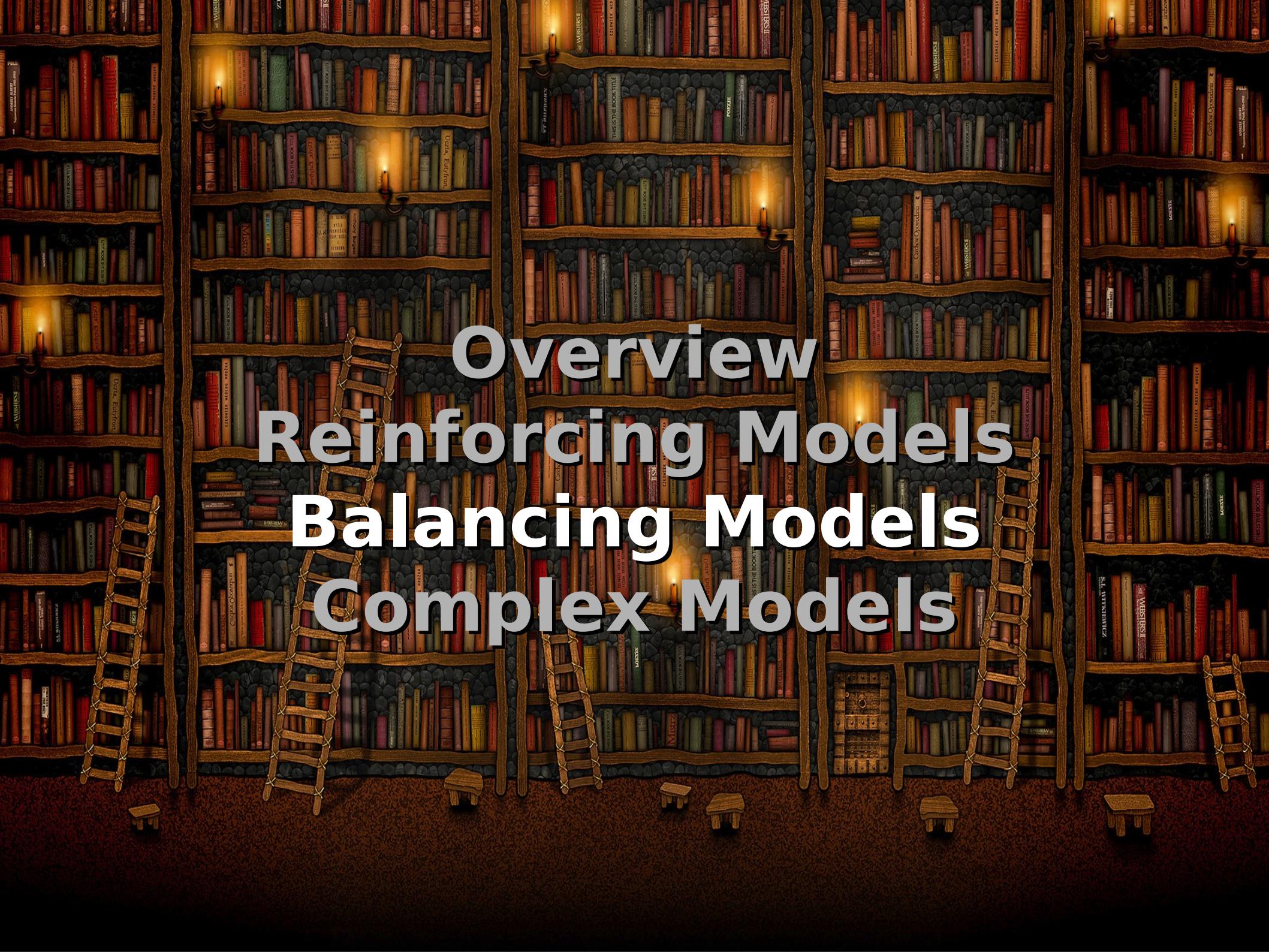
成長與投資不足：耐心等結果 (Growth and Underinvestment)

一開始投資確實表現好
但公司擴增，需求增加，
雖有投資，但量不足，所以
表現反而下降



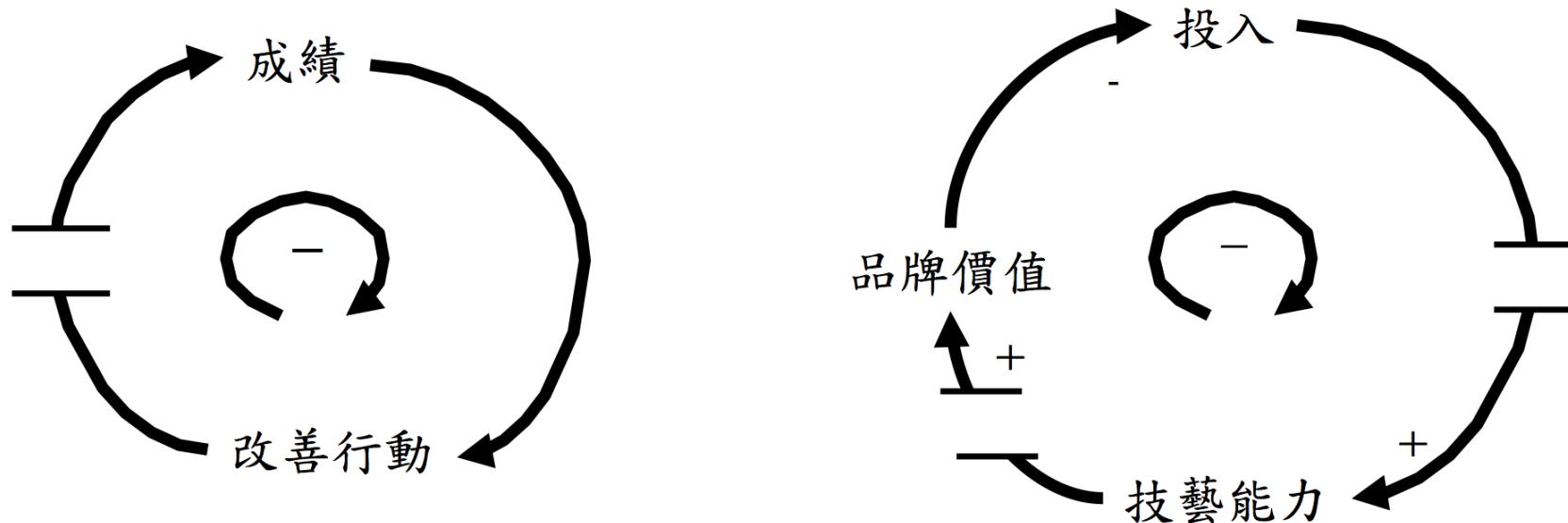
成長與投資不足：範例



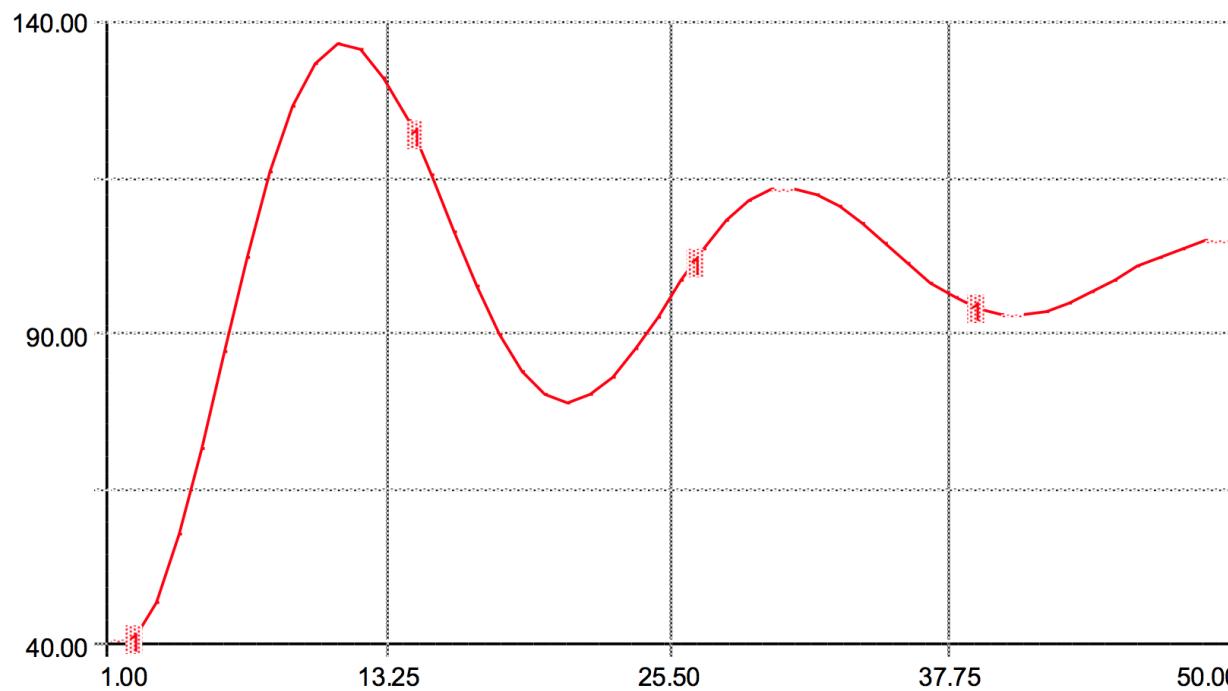


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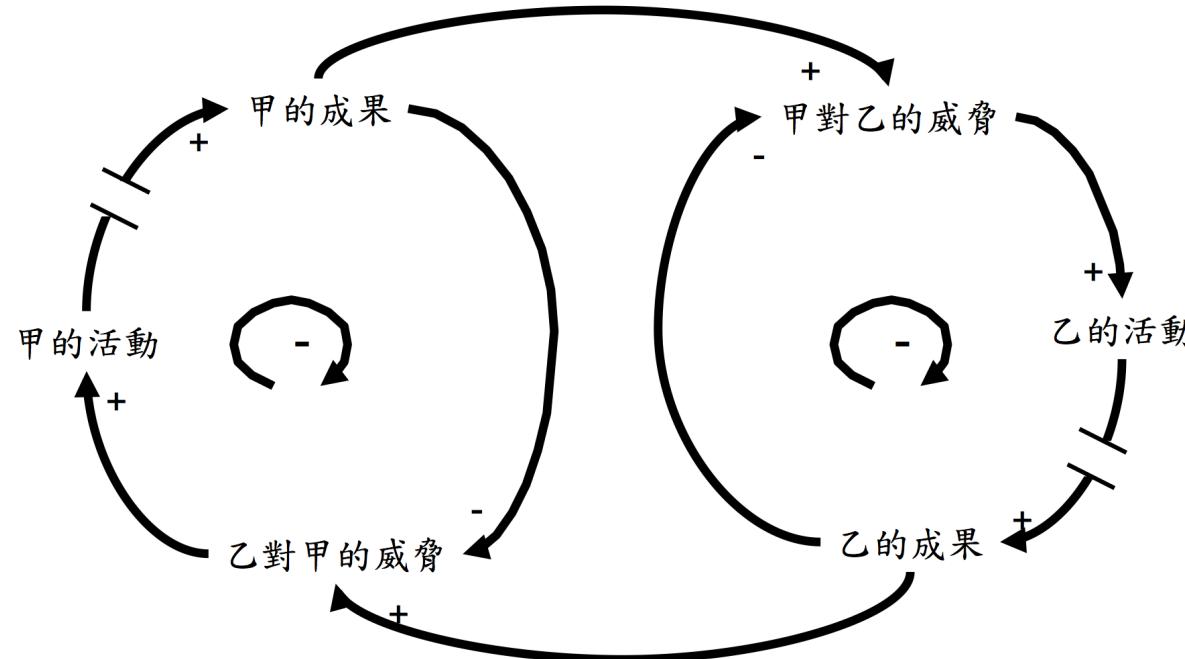
反應遲緩的調節環路



1: Grade

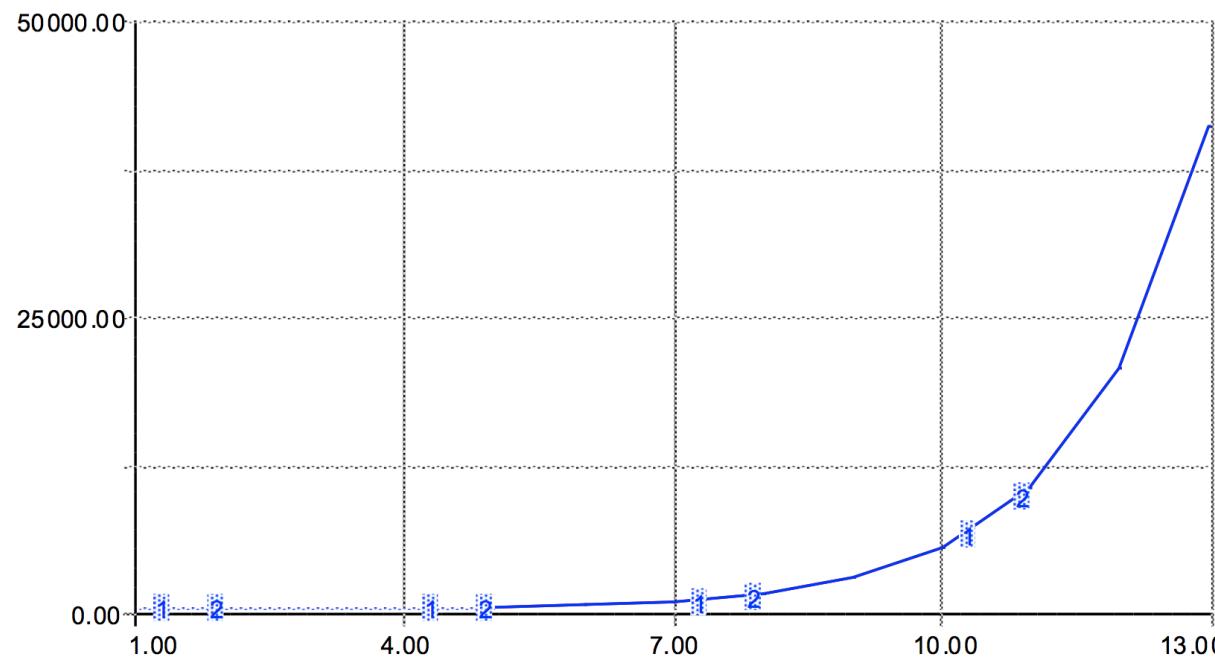


惡性競爭 (Escalation): 軍備競賽

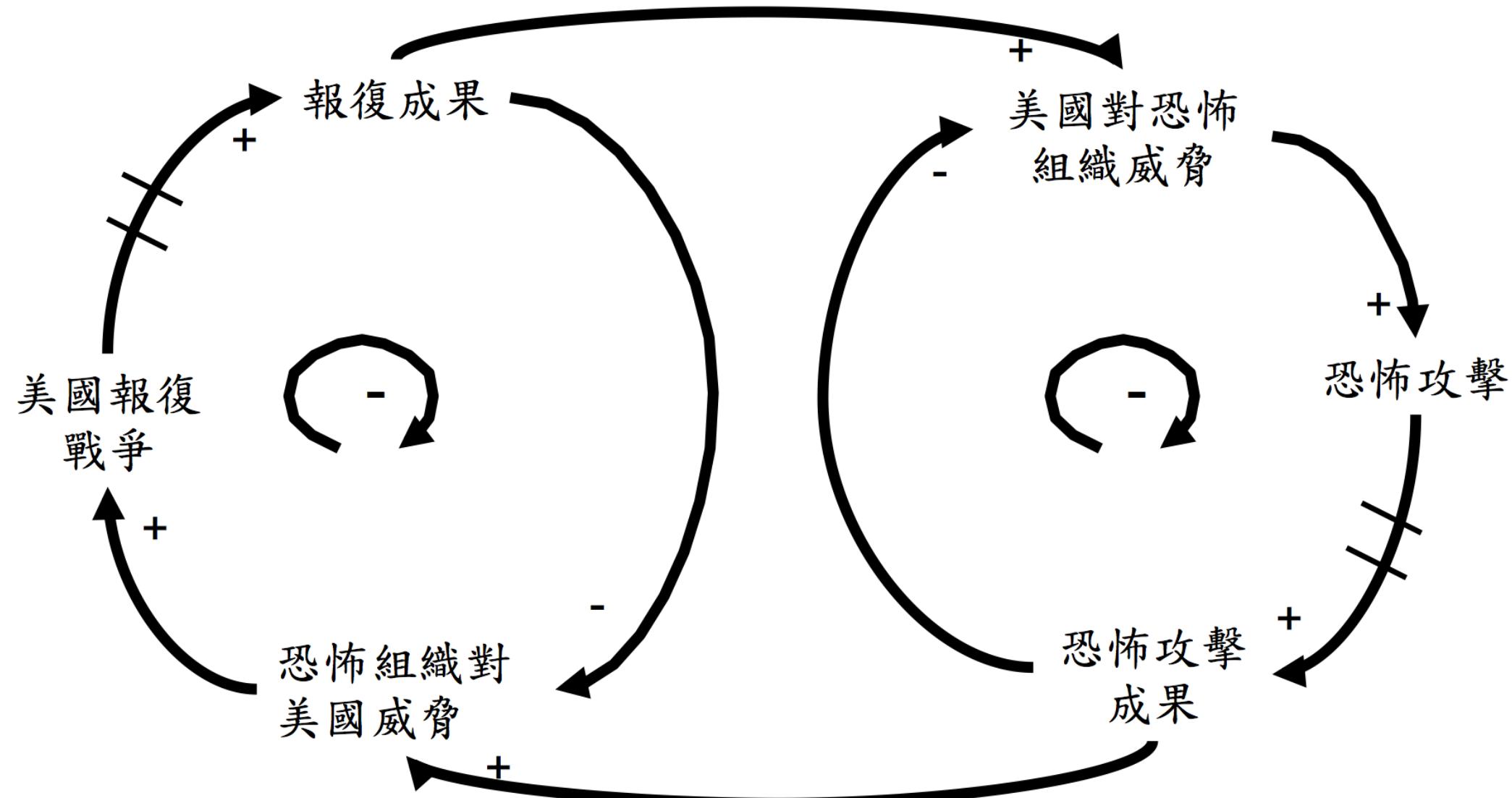


1: Score A

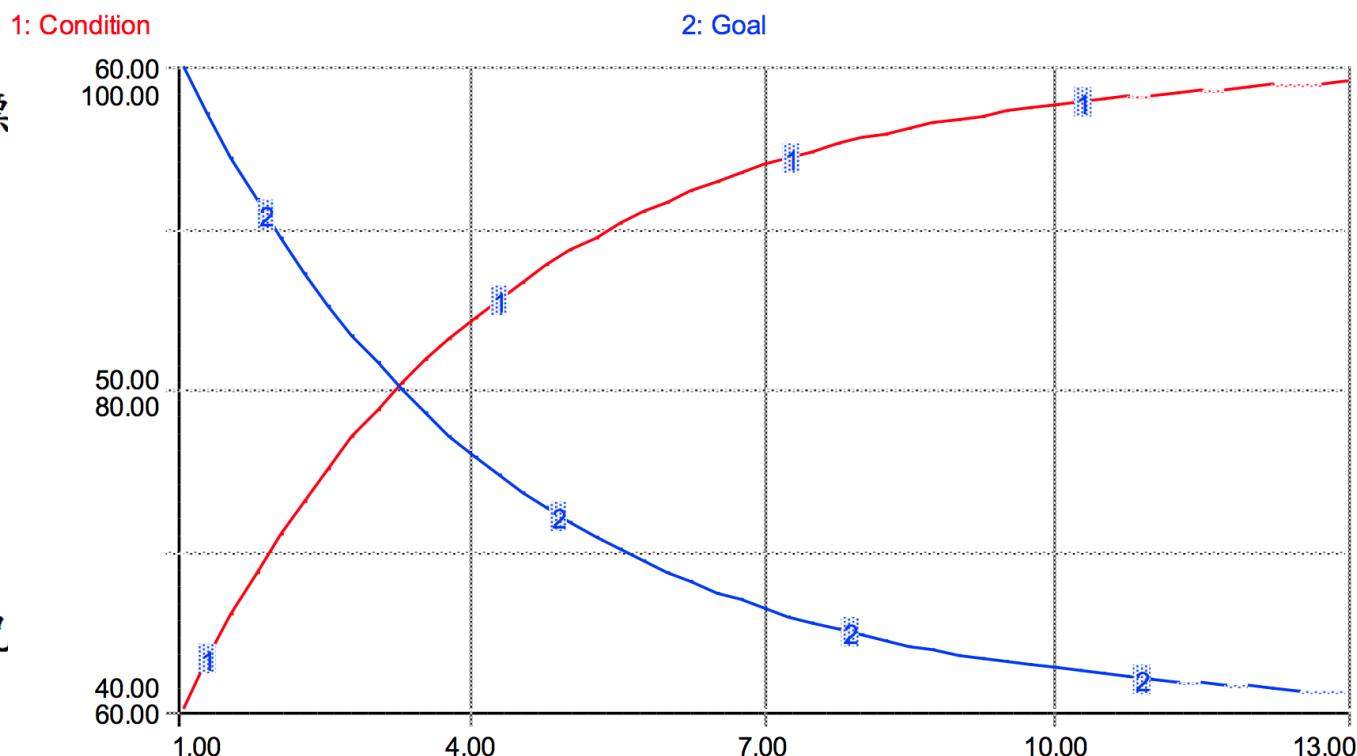
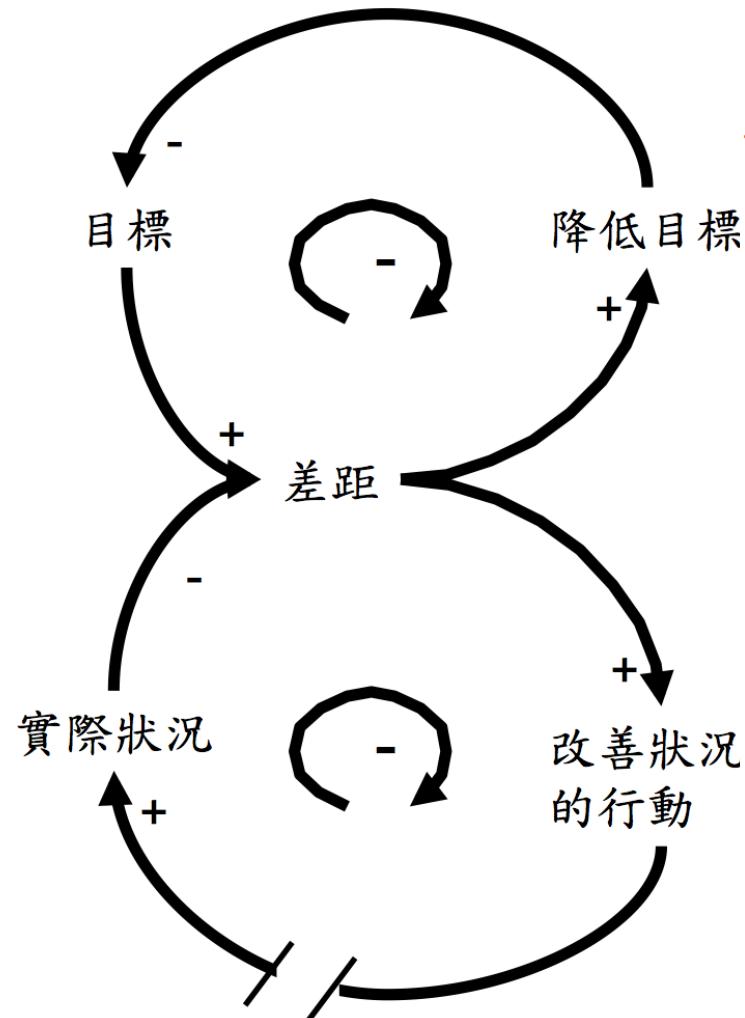
2: Score B



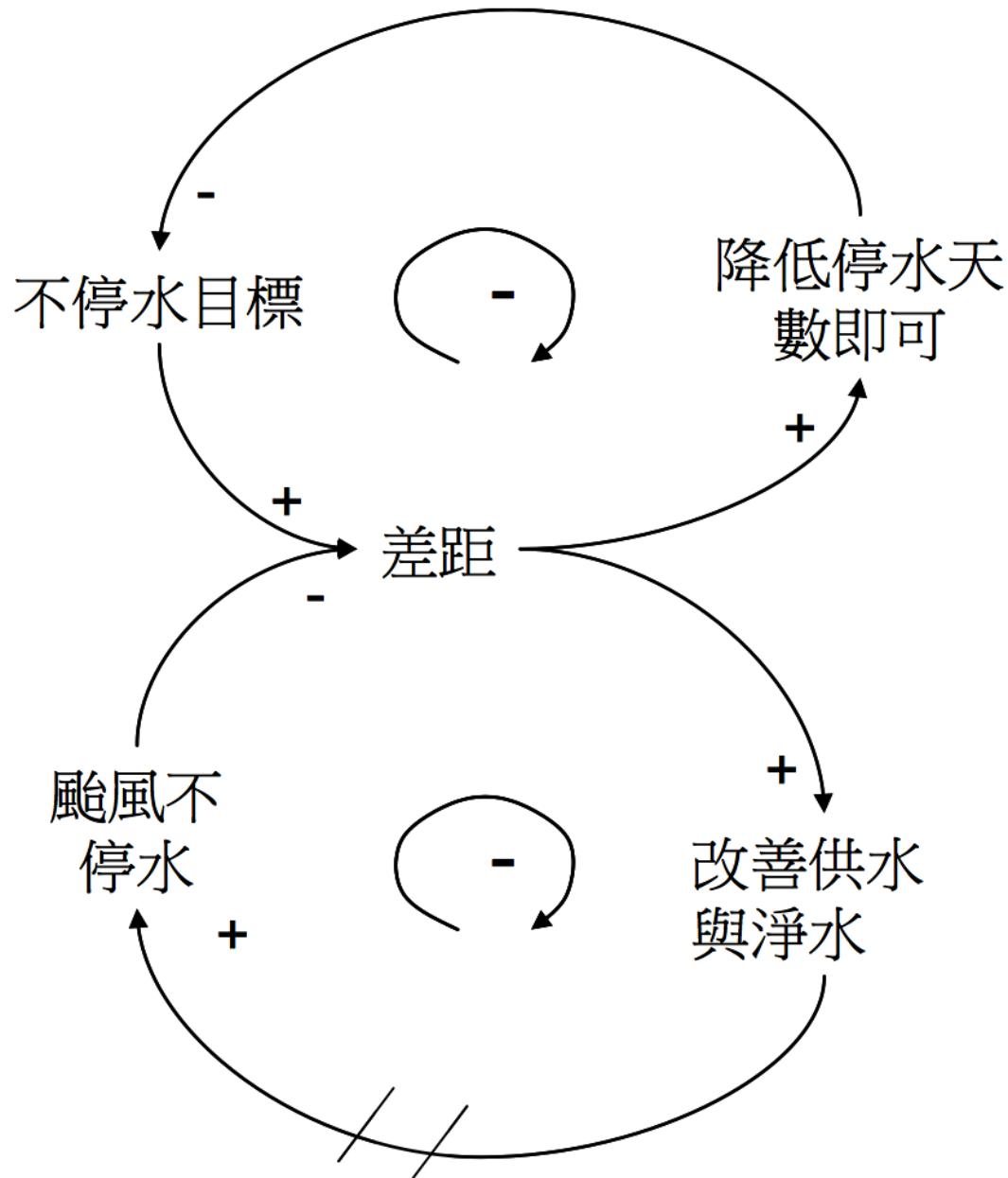
惡性競爭：範例



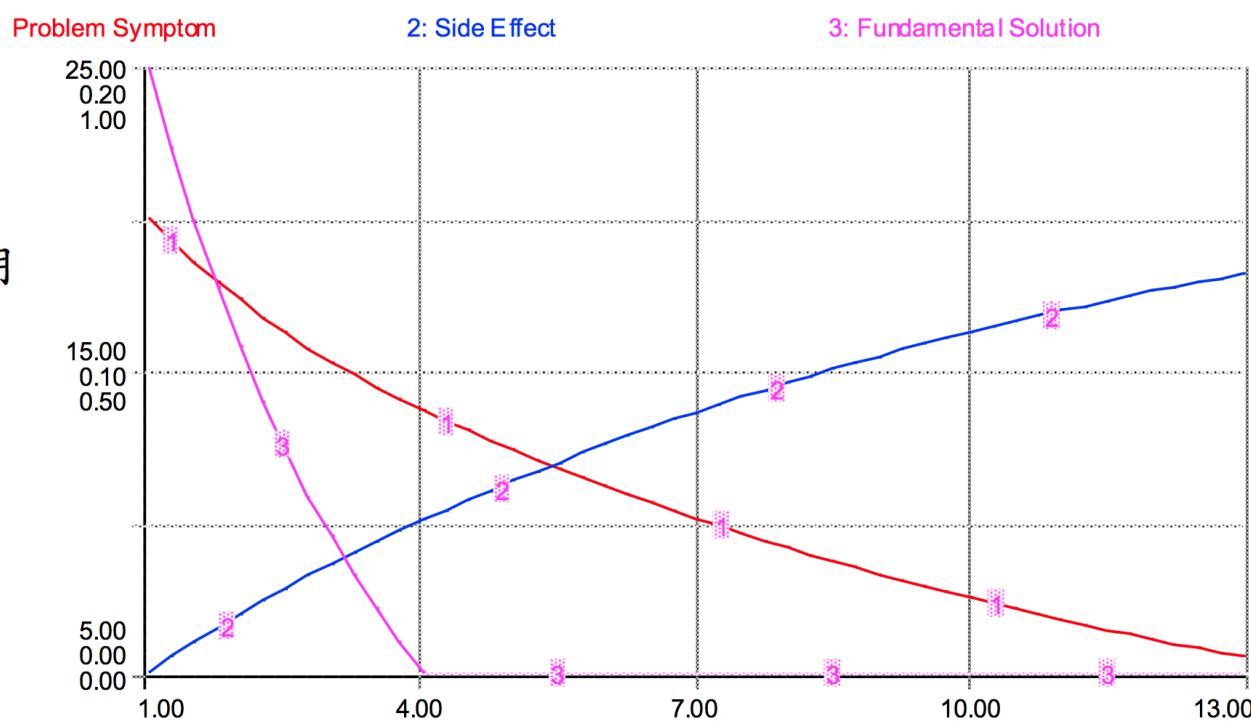
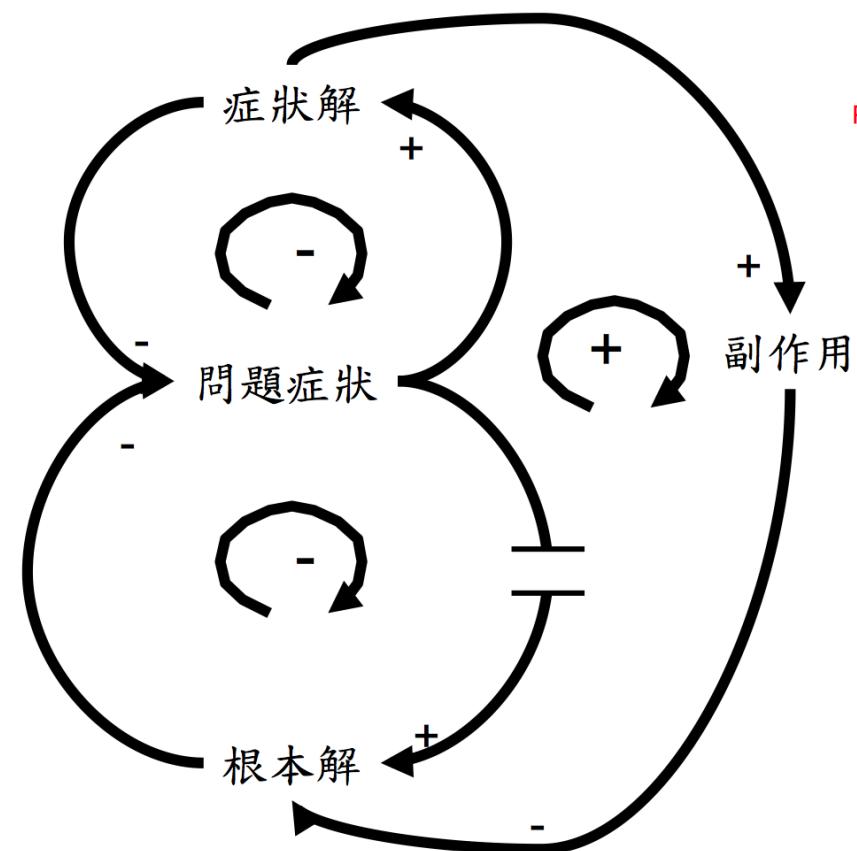
目標侵蝕 (Eroding Goals): 初衷呢？



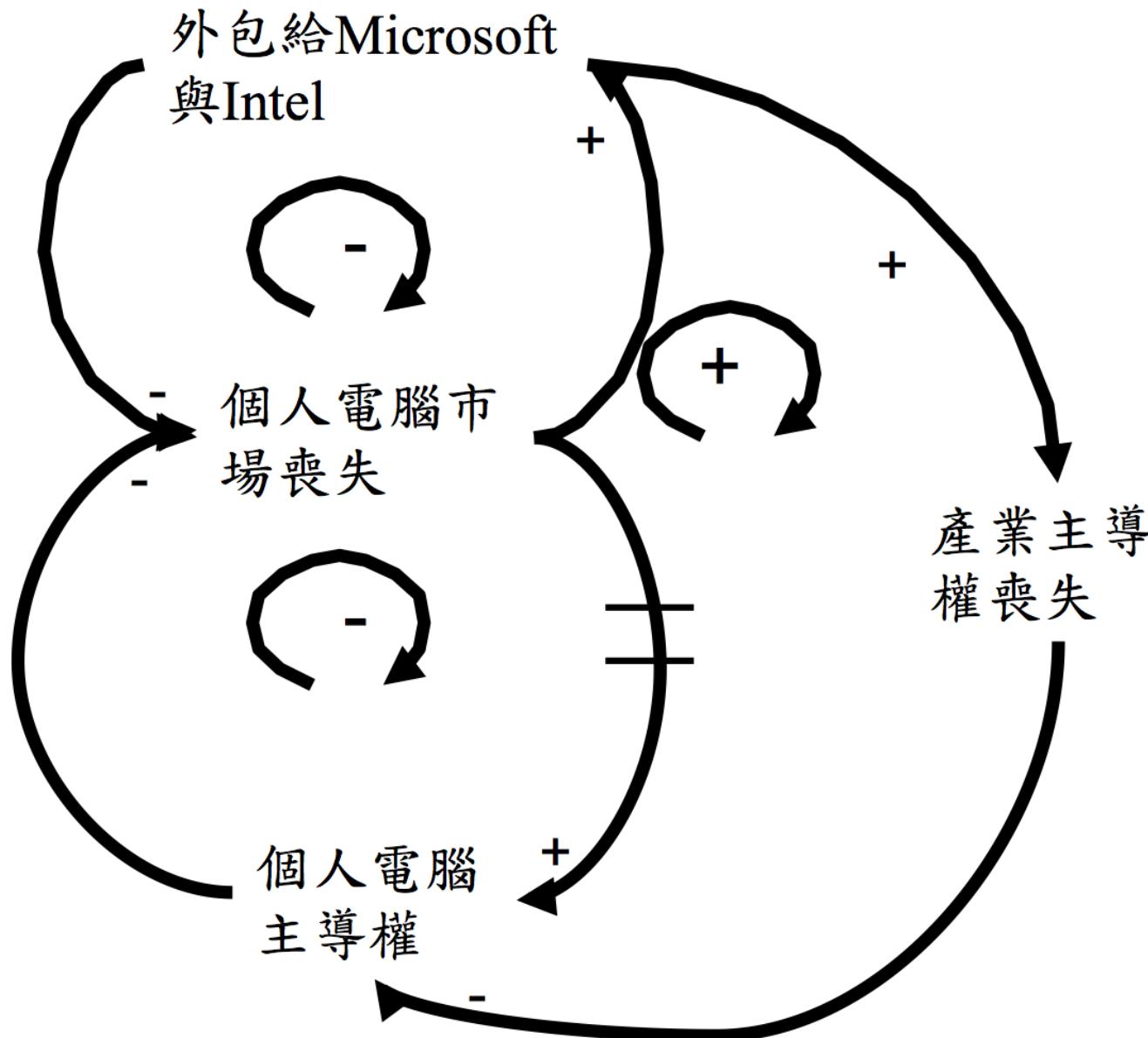
目標侵蝕：範例



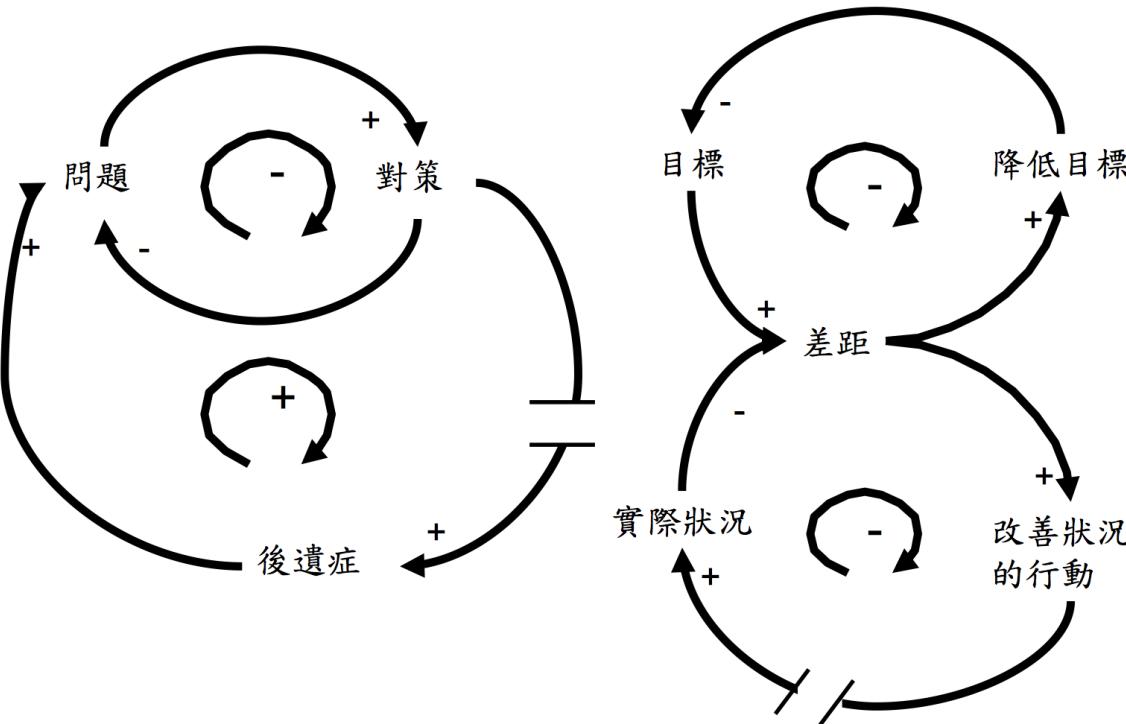
捨本逐末：治根不治本 (Shifting the Burden)



捨本逐末：範例

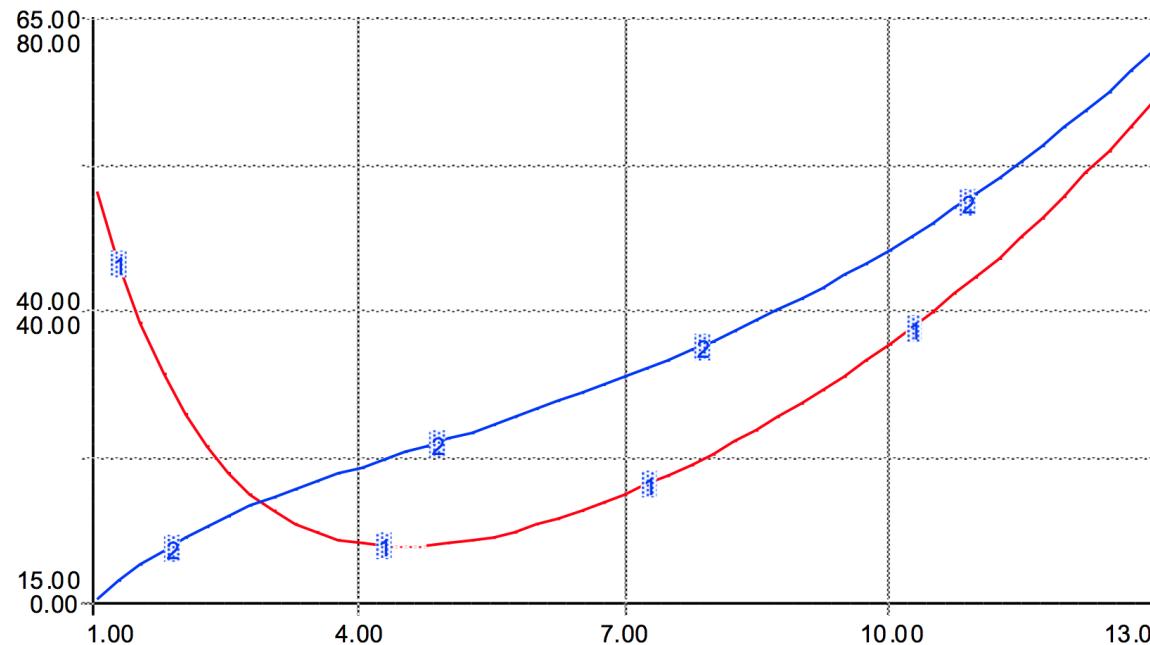


飲鳩止渴 (Fixes and Fail)

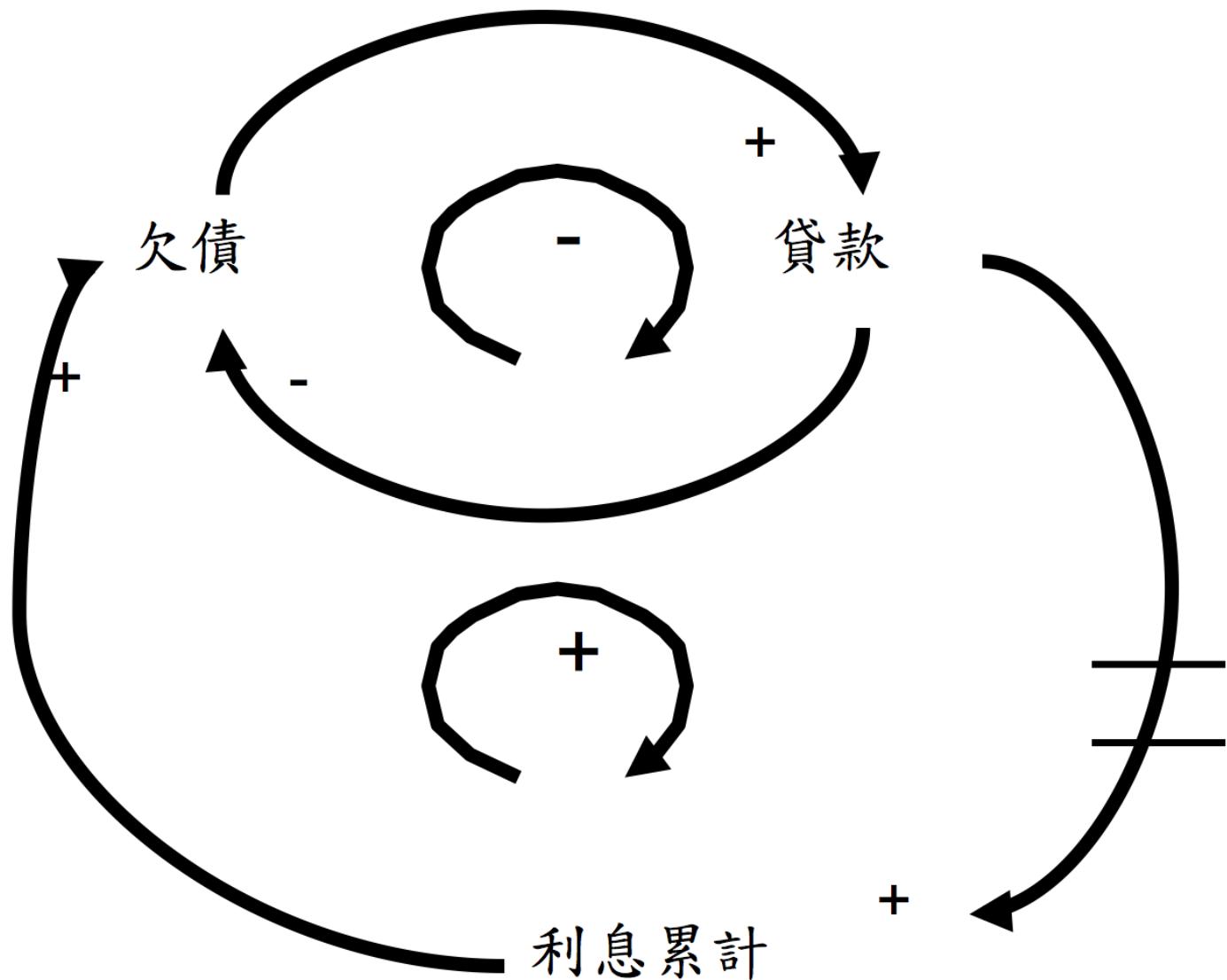


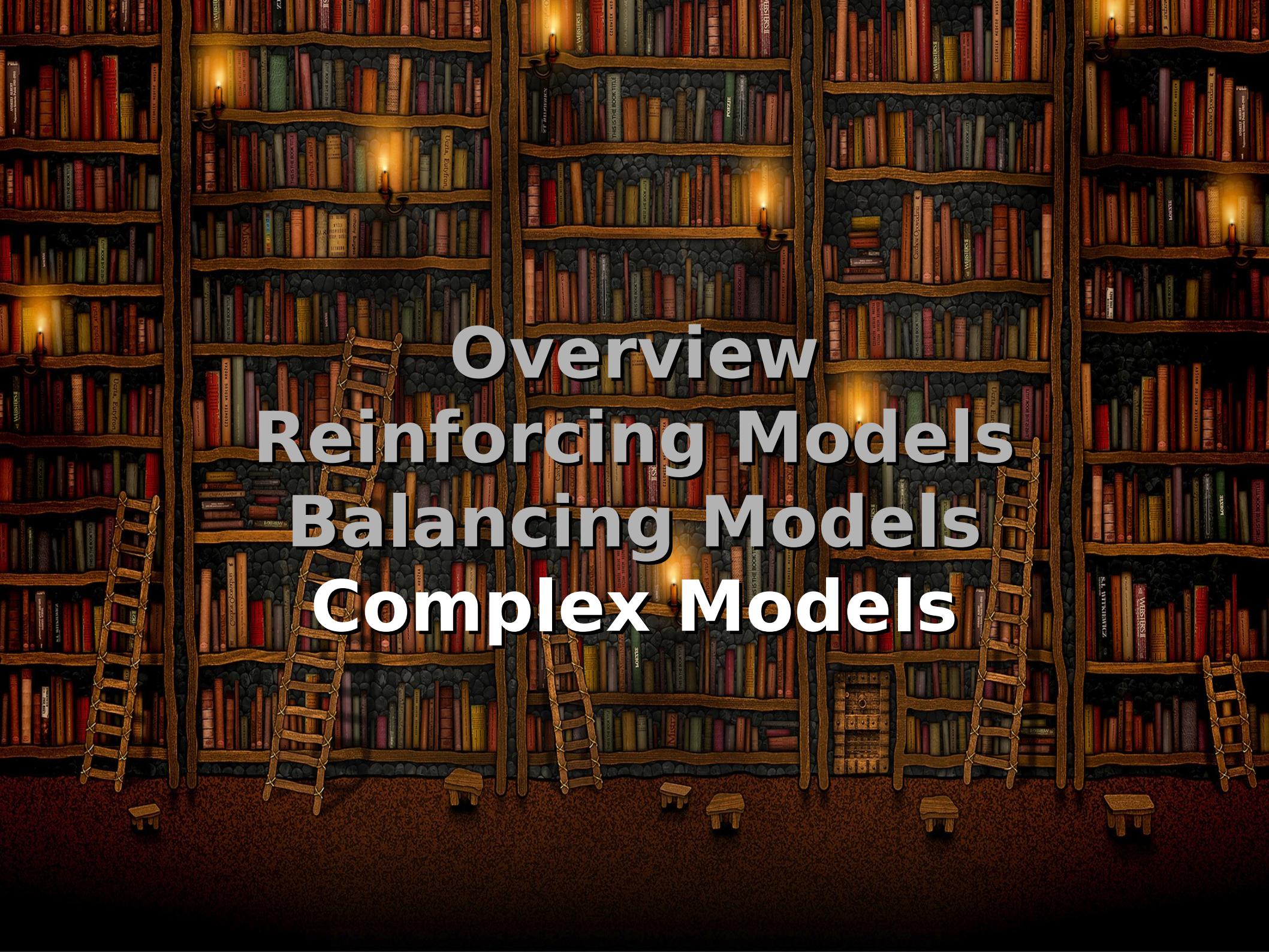
1: Problem

2: Unintended Consequences



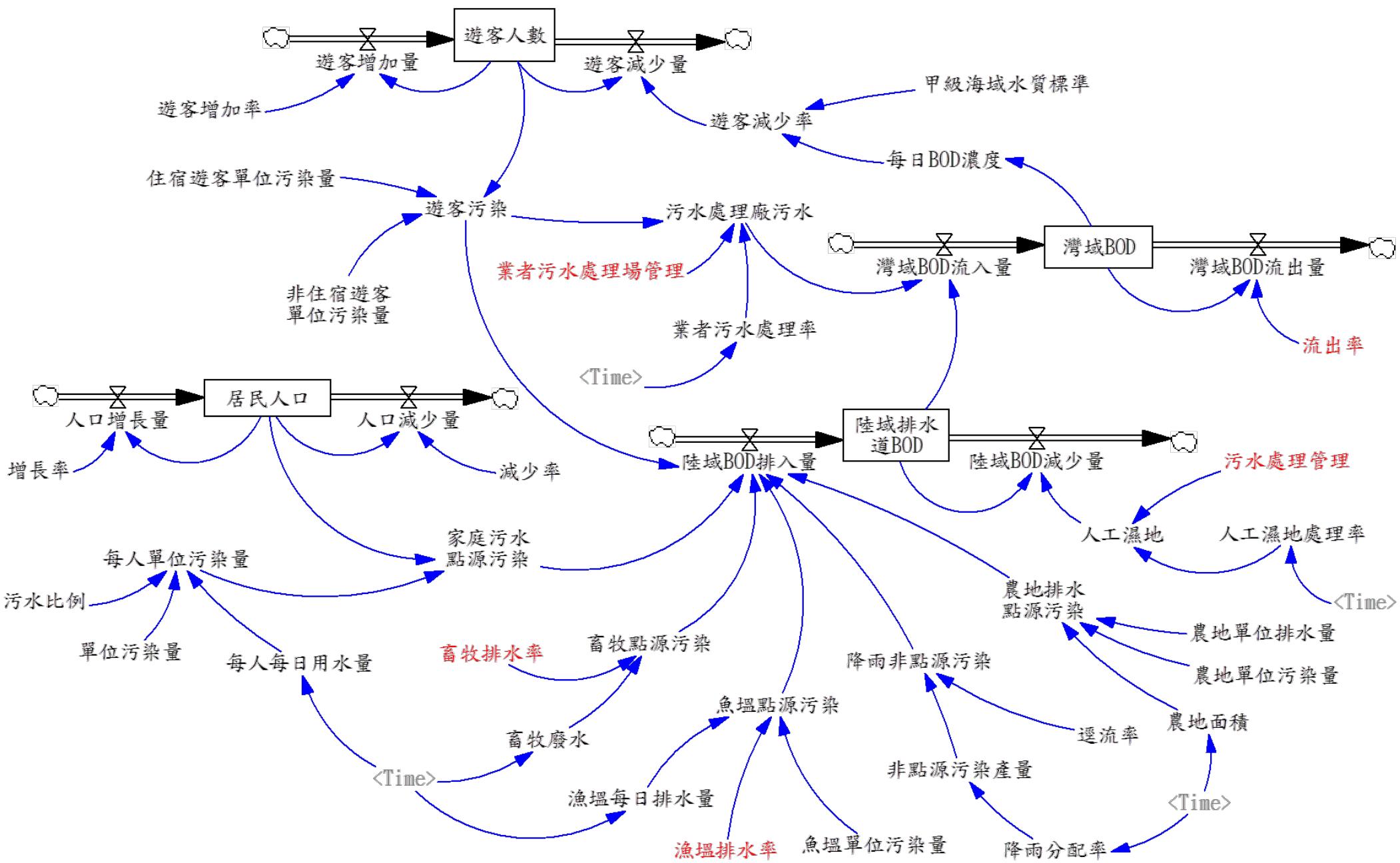
飲鴆止渴：範例



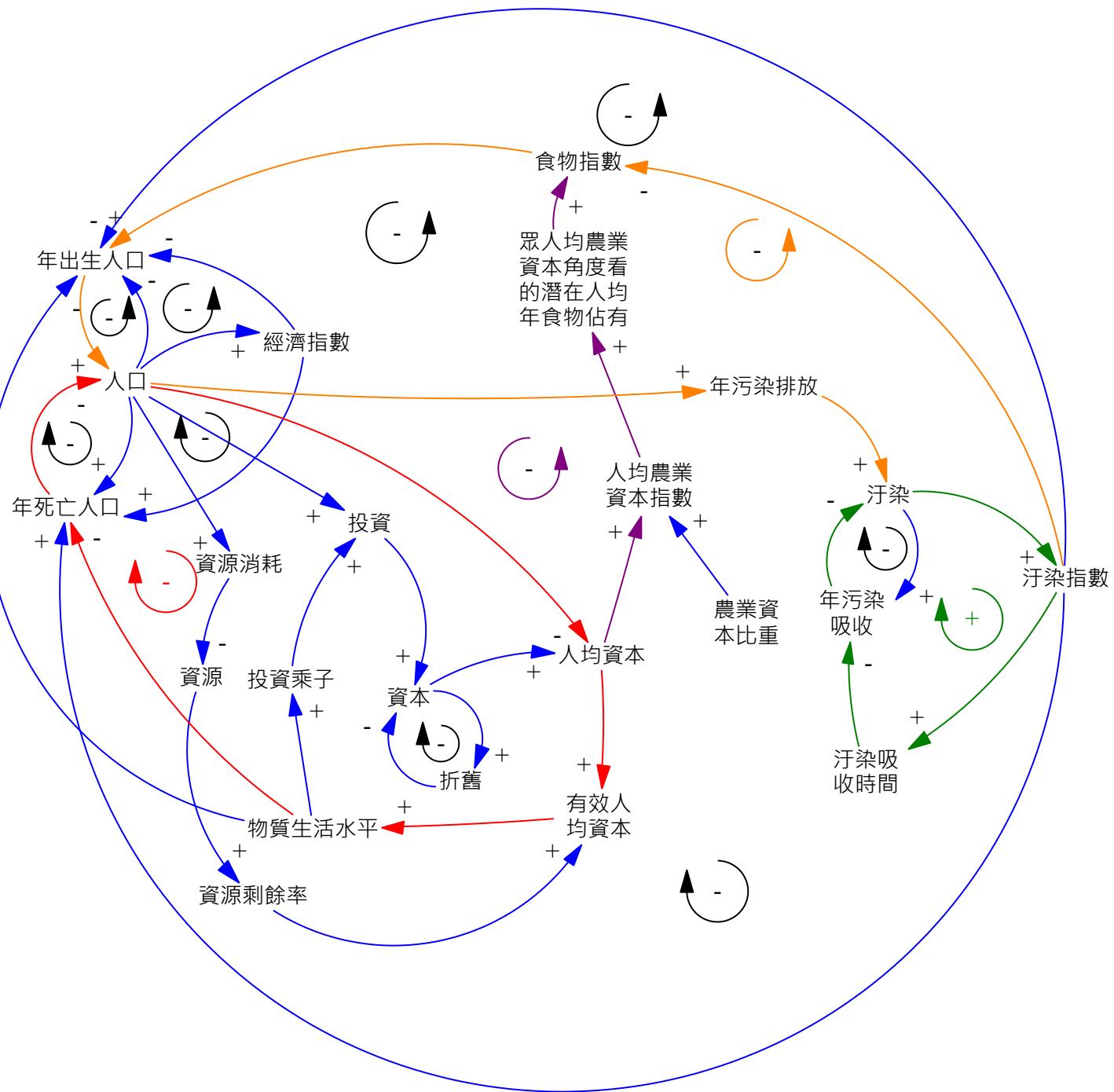


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水質永續經營模型



世界模型



參考書籍

兩本皆有方程式

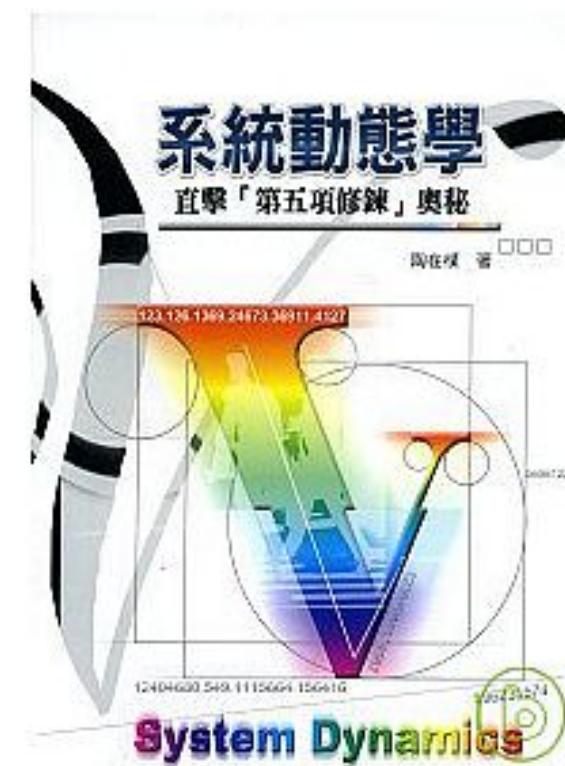
較基礎



*System Dynamics:
Theory & Application*

智勝

較進階



Game Over

