複雜問題的思考

設計思考Design Thinking

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Top Skills in 2020

- Complex Problem Solving

- Systems Skills: System analysis, Judgment and Decision Making

- Procession Skills: Critical Thinking, Active listening

- Cognitive abilities: Creativity, Cognitive flexibility

- Social skills: Training and Teaching others, Coordination with Others, Emotional Intelligence
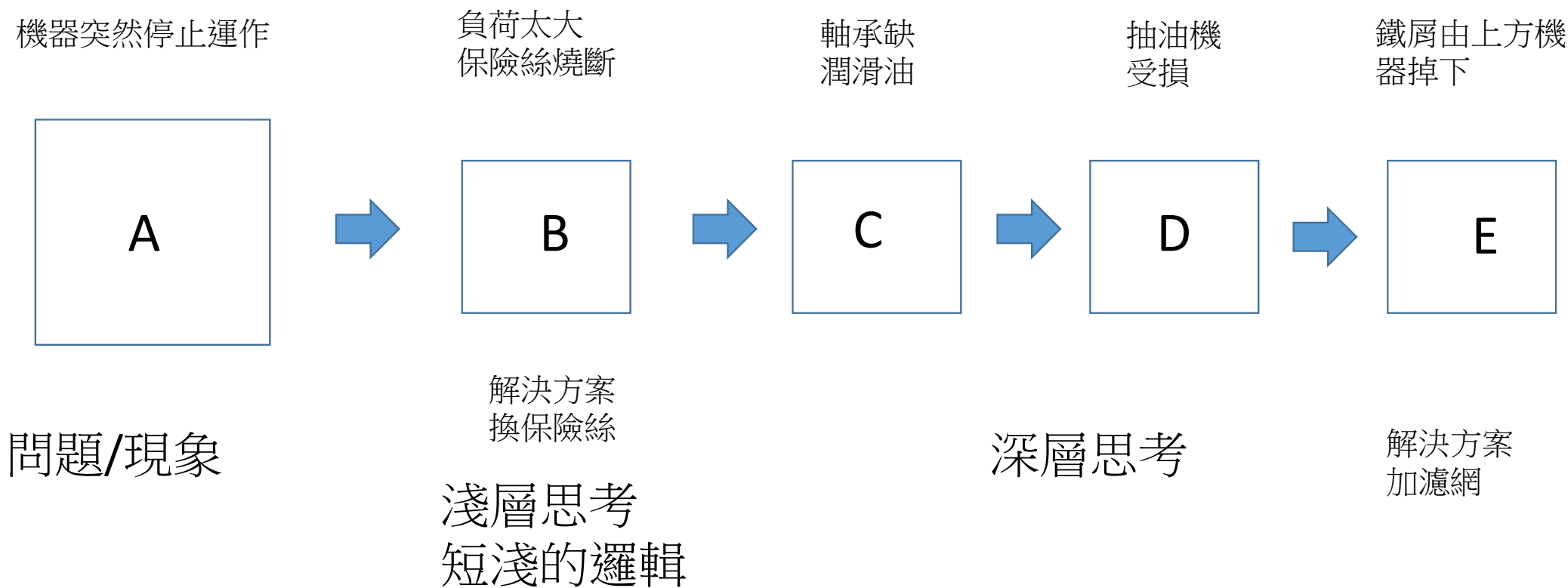
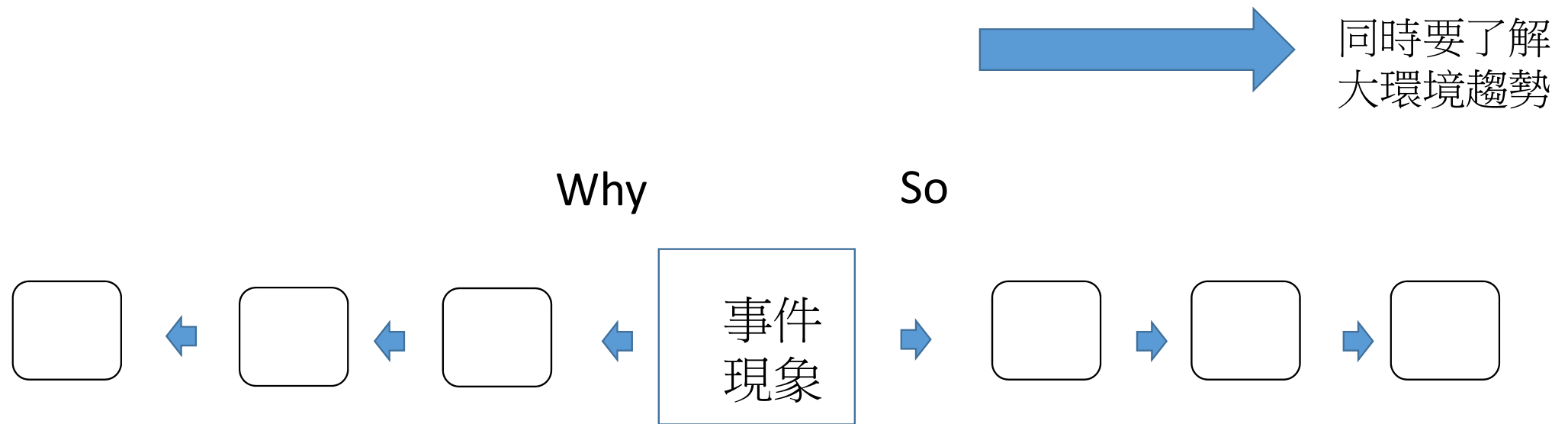- World Economic Forum

出身平凡、缺乏資源、
沒有背景、資質中等

如何成功？

熱情與專注
（機會與獨特性）

一般問題

- 短淺的邏輯鏈條，無法認知較長的因果鏈條。比方說，下象棋的時候只能考慮一到兩步，解數學題的時候只能往後推論一至二級。

- 思考只從最熟悉的地方出發，缺乏切換視角的靈活性。只從自己的角度出發（因為我們最熟悉的就是自己），而無法切換到別人的視角上去換位思考。

- 只關注眼前的、近處的、近期的內容，缺乏長遠規劃、全局掌控的宏觀視角。在日常工作中精打細算，卻無法把握長期趨勢並依此進行規劃。

探索問題的根本原因 (5 Why? 不停追問原因，才能深入

機器突然停止運作

負荷太大
保險絲燒斷

軸承缺
潤滑油

抽油機
受損

鐵屑由上方機
器掉下

A → B → C → D → E

問題/現象

解決方案
換保險絲

深層思考

解決方案
加濾網

淺層思考
短淺的邏輯

5 Why (追求真正原因) and 5 So (長期發展未來)

同時要了解
大環境趨勢

Why　　　　　　　　So

事件
現象

換位思維 (讓你不要只感動自己)

- 一家管理嚴格的公司，員工因而流動率很高。老闆幾經思考，終於決定讓最近招攬的新上任大學生採取自主管理。但結果卻更不好，離職更高。

- Why?

- 因為新員工，自主管理，常茫茫然，不知自己該做什麼。被管理嚴格，並非新進員工關切的事。

- 換位思維 (Empathy)：感受別人心中所想，以此為起點推論

- 方法

1. 喚起過去相同經驗
2. 自己短暫體驗
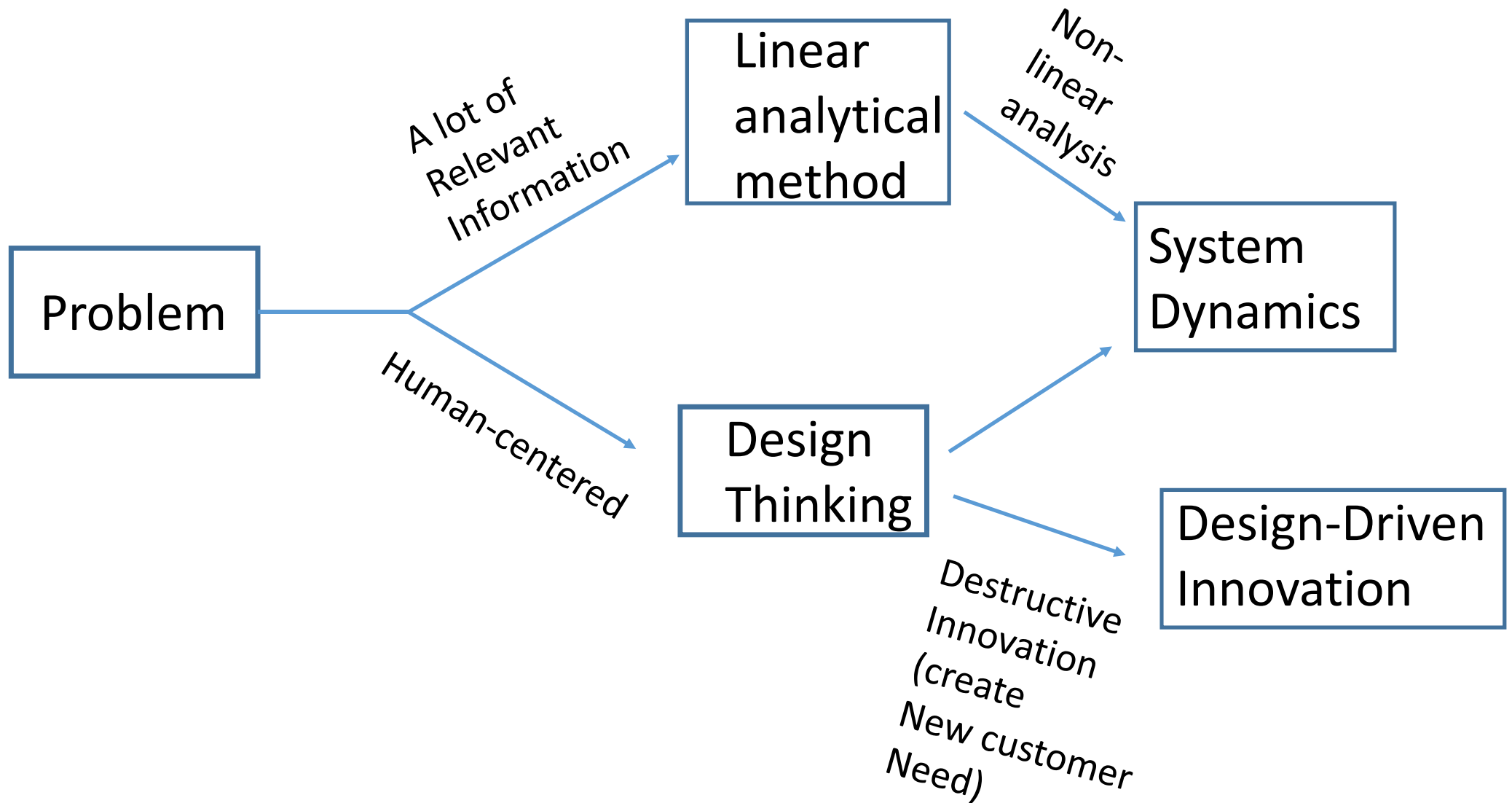3. 由他人經驗模擬
4. 觀察他人喜好
5. 經常想[如果我是他，會如何]

宏觀的思維:考慮大環境之競爭者及共生者

- →森林模型：不是天才的人，如何應對強大的對手？如兔子避開強敵，勿走同樣路線
- →淘金模型：尋找共生者，掏金時賣牛仔褲，因挖礦須耐磨牛仔褲，導致Levi's 崛起

- →大勢思維：掌握未來大趨勢，如中國民族自尊心的崛起， 綜合應用多種常用的思維方式

處理方式

- 1、探索問題的根本原因及長遠發展；
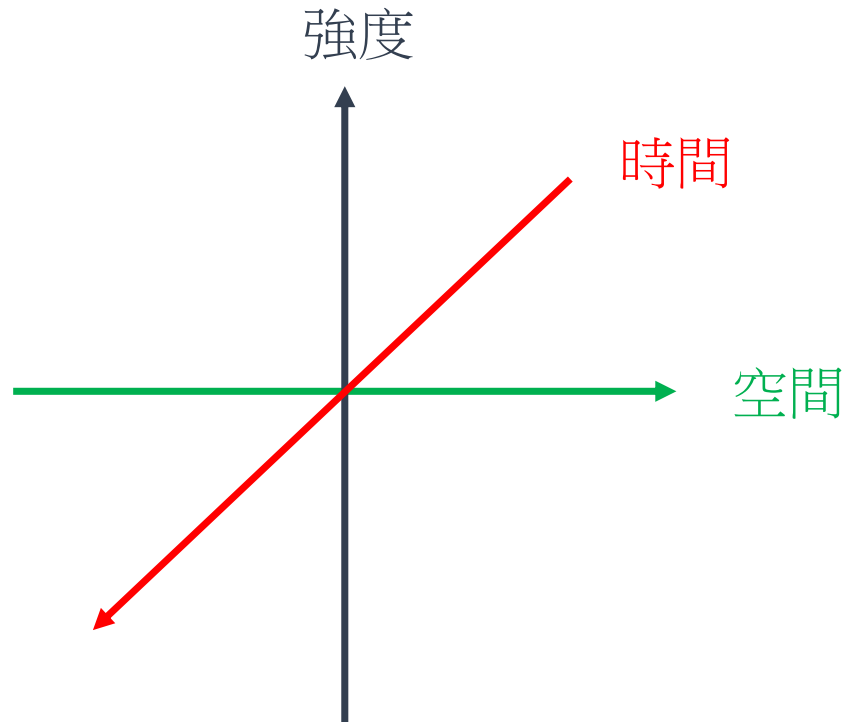- 2、快速切換思考問題的視角；
- 3、站在更高層面，以系統、宏觀的視角認知和解決問題。

```
                                    ┌──────────────┐      Non-
                             A lot of│   Linear     │      linear
                             Relevant│  analytical  │      analysis   ┌──────────┐
                          Information│   method     │─────────────────│  System  │
                    ┌─────────┐  ────┘──────────────┘                 │ Dynamics │
                    │ Problem │──                                      └──────────┘
                    └─────────┘  ──                   ┌──────────┐
                             Human-centered ──────────│  Design  │
                                            ──────────│ Thinking │
                                                      └──────────┘
                                                   Destructive      ┌───────────────┐
                                                   Innovation       │ Design-Driven │
                                                   (create          │  Innovation   │
                                                   New customer     └───────────────┘
                                                   Need)
```

Problem

A lot of Relevant Information → Linear analytical method

Human-centered → Design Thinking

Linear analytical method → Non-linear analysis → System Dynamics

Design Thinking → System Dynamics

Design Thinking → Destructive Innovation (create New customer Need) → Design-Driven Innovation

問題解決實例

從一隻走失的狗開始 (Complex Problem)

- 報警？
- 懸賞？
- 社群媒體 (FB, Post) (特徵，晶片，相片)？

- 系統化思考

收集資訊

強度

時間

空間

Zoom in/Zoom out

- Zoom in: go into details
- Zoom out: go to imaginatory the 101 th Floor and has a broad view
- Go back to ground floor with many wild ideas and check the details
- Continue the process
- Creativity needs to have a whole picture, not fragments

- [系統化產生創意]的第一個方式是在兩個不相關事件建立聯結(connection)
- [擴散法]及[反思法]
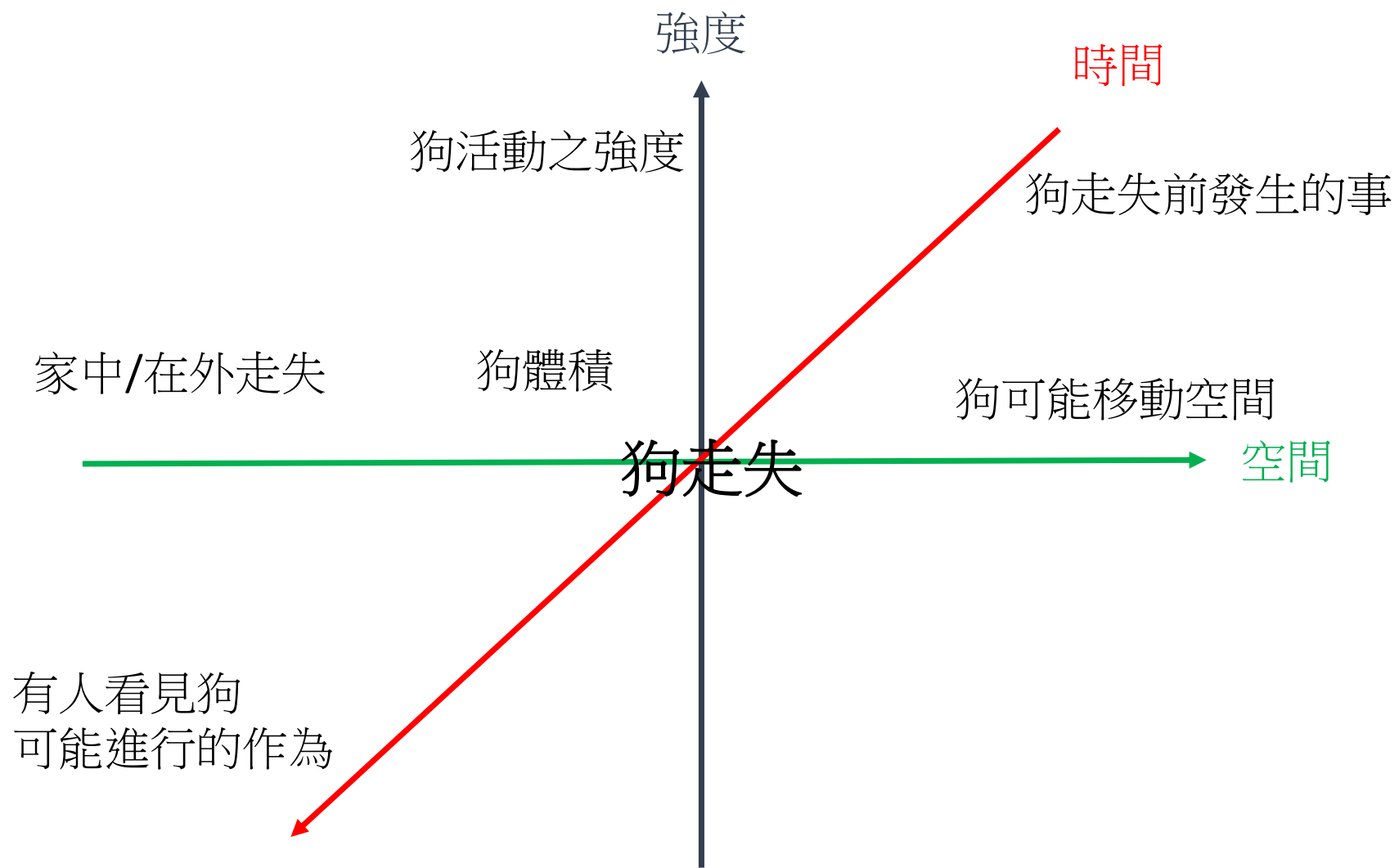
What? Why? How? Do

- 家中佣人於昨日因吵架離職　　(a) 傭人惡意帶走
- 今天清潔工曾來打掃　　　　　(b) 清潔工打掃時溜走
- 狗這幾個月活動正常
- 狗對人很友善，很易抱走

狗消失 —— 在某處 —— 在傭人

在某處 —— 在他人

狗消失 —— 流浪
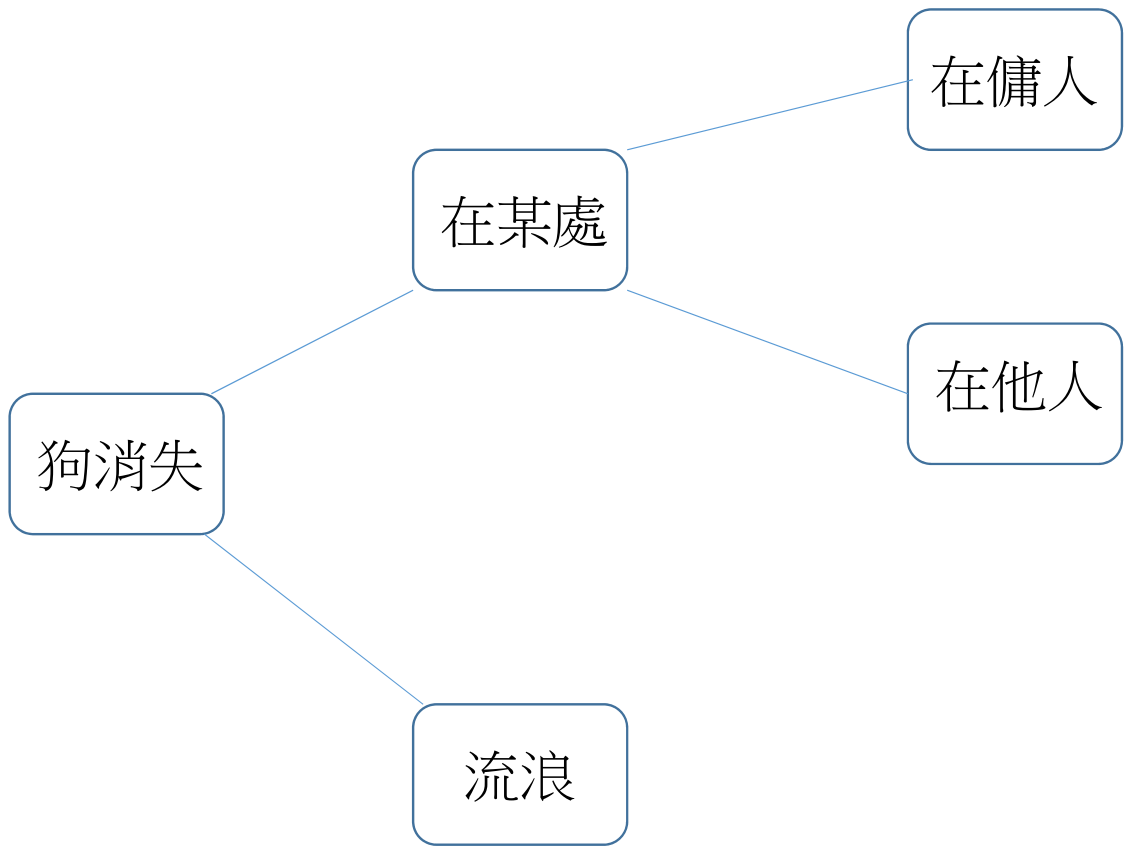
流浪地點

- 走失狗在外可能地點
(a) 便利商店
(b) 一般散步的路
(c) 公園
(d) 與其他流浪犬在一起

社區其他人遇到流浪家犬可能反應

- 若有人看到狗，他可能進行之事：
(a) 送到收容所
(b) 帶回家中，公告於社群媒體
(c) 送到獸醫院，公告於社群媒體
(d) 觀察，公告於社群媒體

```
狗消失 ─┬─ 在某處 ─┬─ 在傭人
        │           │
        │           └─ 在他人 ─┬─ 收容所 ── 政府公告
        │                       │
        │                       ├─ 他人家
        │                       │
        │                       └─ 獸醫院
        │
        └─ 流浪 ─┬─ 散步的路
                  │
                  ├─ 便利商店
                  │
                  ├─ 公園
                  │
                  └─ 與其他犬

他人家 ── 社群媒體
獸醫院 ── 社群媒體
便利商店 ── 社群媒體
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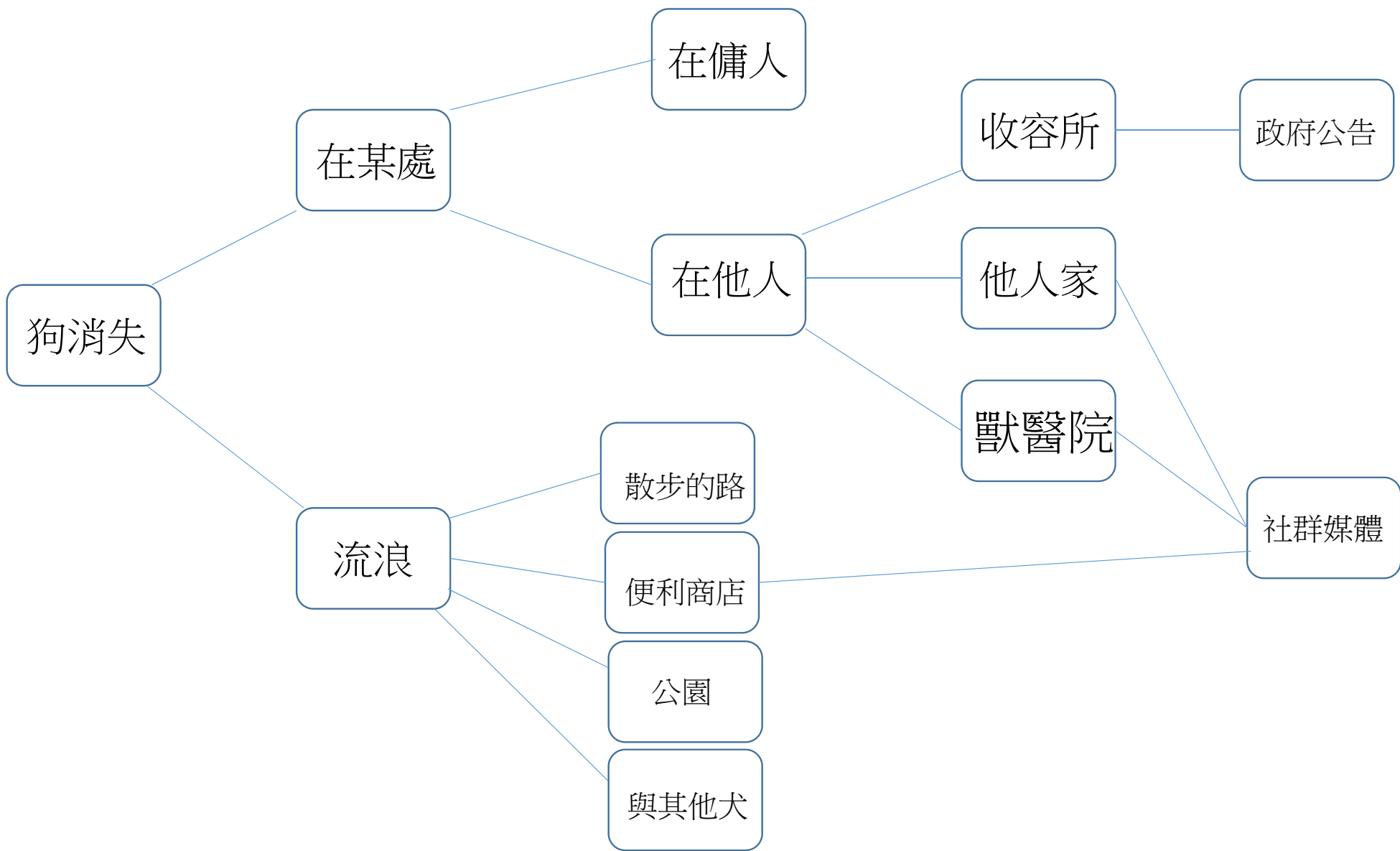
How? 行動方案 Do (按加權總分排定優先行動順序)

	成功機率	速度	成本	加權總分	行動順序
權值	0.6	0.3	0.1		
探問鄰居街坊	50	100	80	68	3
聯絡離職傭人	90	100	100	94	1
聯絡清潔工	50	100	100	70	2
查看政府公告	10	10	100	19	9
張貼網路告示	20	20	80	26	6
張貼街頭告示	30	40	20	32	4
查看網路訊息	20	30	100	31	5
附近社區尋找	30	20	5	24.5	7
狗自行回家	30	0	30	21	8

張貼街頭告示 (地點")

- Google 狗走失行走方向，動物保護組織，狗走失尋回實例
- 小狗最可能朝著風吹來方式行進(動物保護組織Houston SPCA)
- 小狗可能喜歡有冷氣有食物地點：便利商店，手機商店，餐廳
- 其他如：街道路樹，變電箱(可能環保顧慮)

創意(?)的其他想法

- 詢問鄰長養很多條狗的人士 (They know the connection to animal community)
- 帶著小狗之圖像大show給附近流浪狗 (Dogs may understand this is the dog we want?)
- 到教堂或寺廟，行善事 (善有善報？)

視覺化思維：問題分析圖及行動優先表
是解決問題的標準方案

強度

獲利減少程度　　　　過去5年　時間

公司去
年獲利
不佳

營收
減少
　老顧客
　營收減少
　新顧客
　營收減少

成本
提高
　固定成本
　太高
　變動成本
　太高

空間

不同分公司
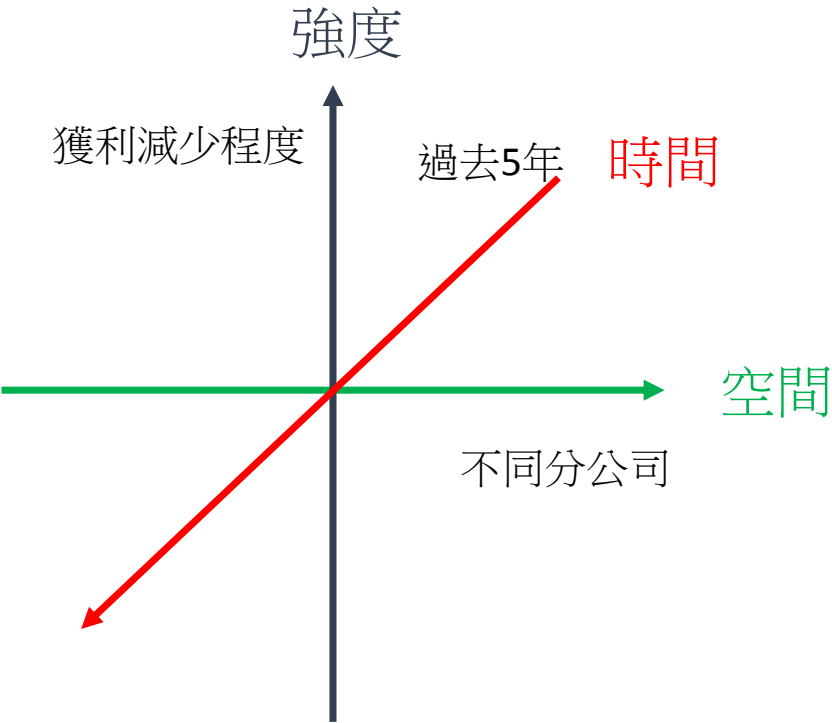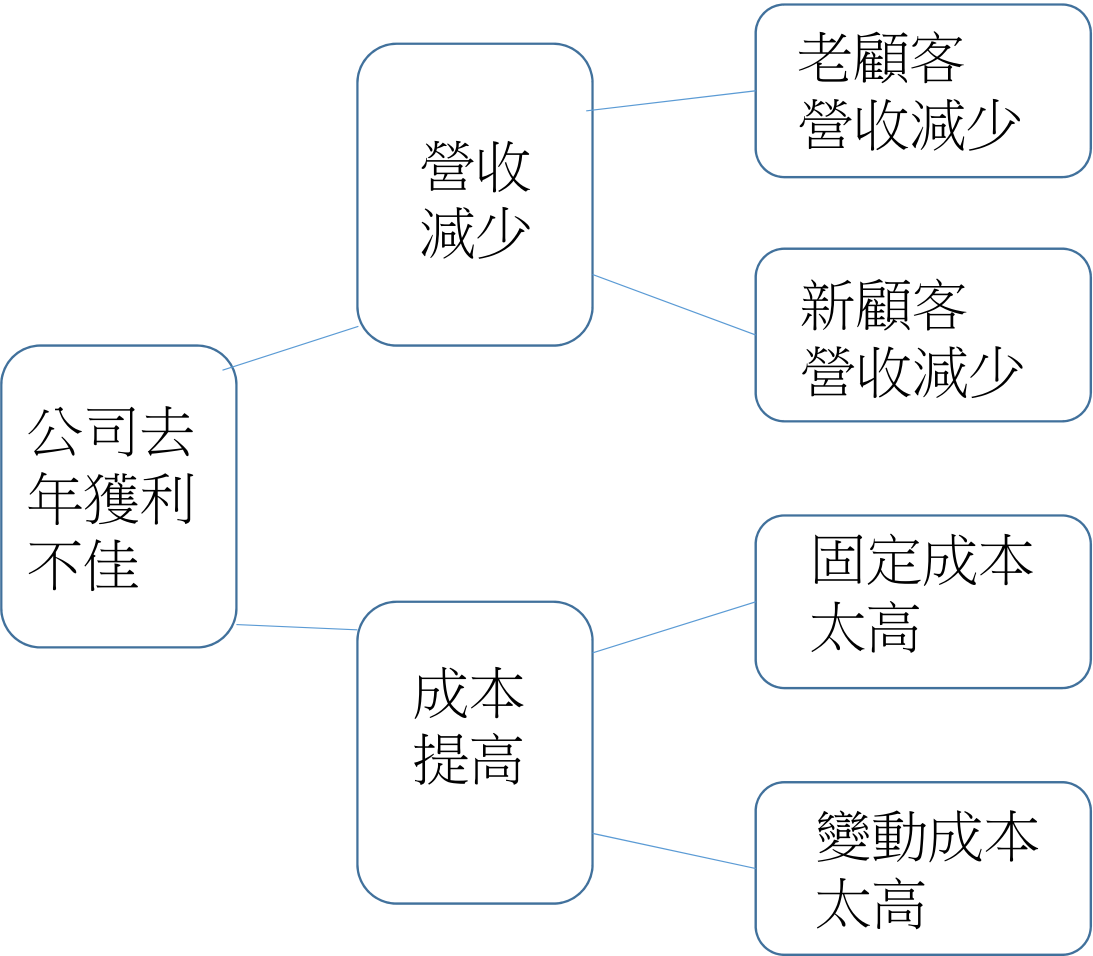
	成功機率	速度	成本	加權總分	行動順序
權值					

解決問題的簡單方案
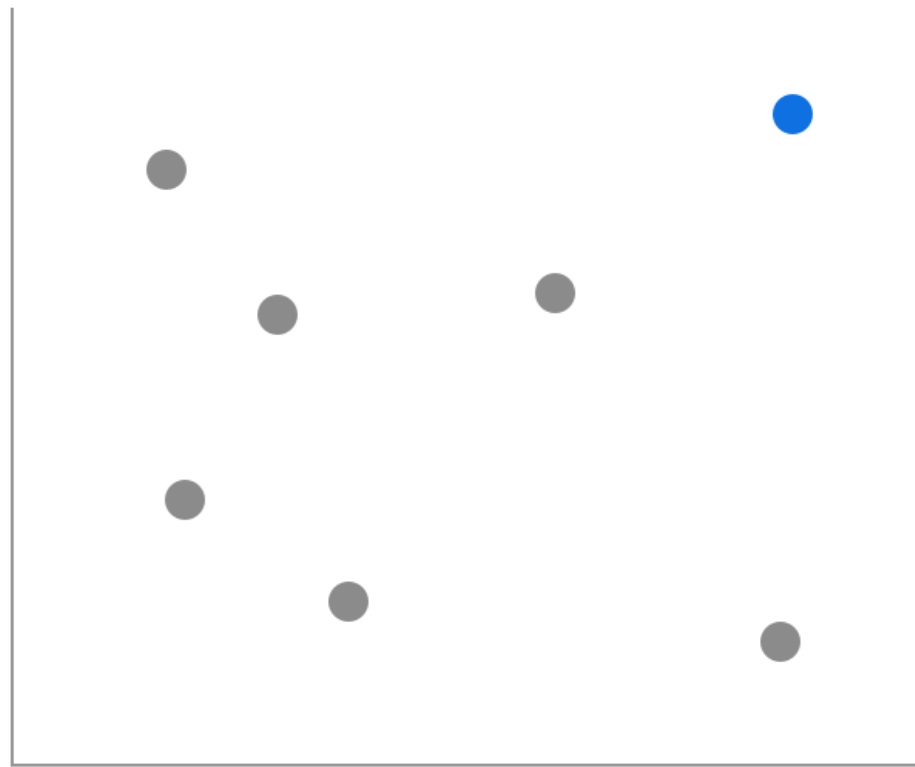
系統動力學

複雜系統中非線性分析

系統動力學 (複雜系統中非線性分析)

- 我們常使用制式架構（如SWOT分析）整理資訊，就以為自己已經認真思考過了，或者順應類別：如「XX產業就一定業績不振」，把事物分類後就以為已經找到邏輯根據。

- 在觀察事件本質，我們會發現，有些問題是不能用分解法 (線性) 來得到解答。要掌握全體之本質：模式+因果

- 啤酒遊戲(Beer Game) MIT的Sloan管理學院所發展出來的一種模擬供應鍊的策略遊戲。假設啤酒供應鍊有四種廠商參與處理工作。有一家生產工廠(Factory)、有一家大盤商(Wholesaler)、一家零售商(Retailer)、消費者。以整組總成本最低獲勝

- •在啤酒遊戲中，消費者需求變動的幅度很小，然而通過整個系統的放大作用將產生很大的危機。即首先是大量缺貨，整個系統訂單都不斷增加，庫存逐漸枯竭，欠貨也不斷增加，好不容易達到訂貨單大批交貨，不料新收到訂貨數量卻開始驟降，這也就是供應鏈中著名的「長鞭效應(Bullwhip Effect)」。

系統動力學 system dynamic (複雜系統中非線性分析)

STEP1: 建構模式—用一張圖來表現構成要素與關係

STEP2: 解讀物力論—掌握模式隨著時間流逝會產生什麼變化

STEP3: 尋找改變模式的策略—找到槓桿點或轉折點

STEP4: 採取行動，從實踐中得到回饋

本質

結構(模式) X 因果(物力論)
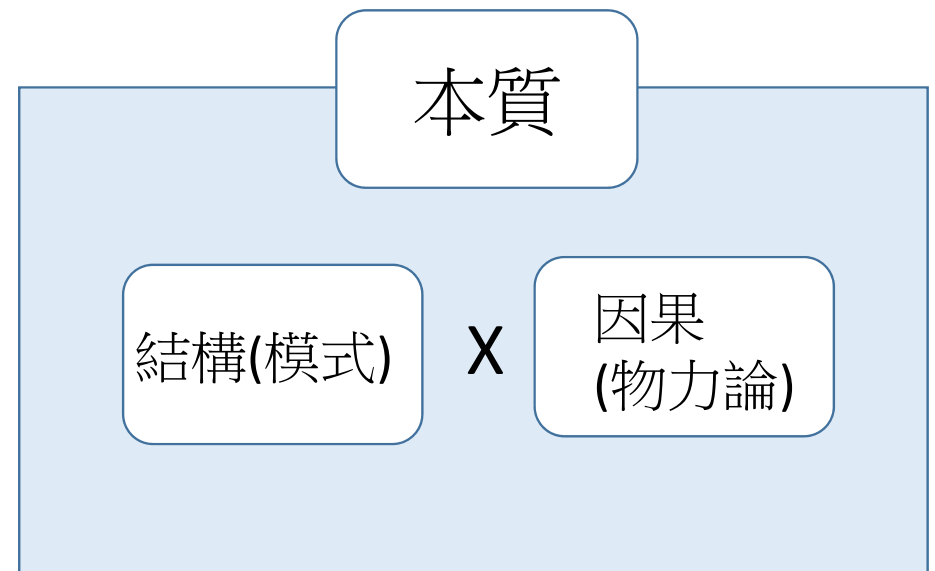
例一: A 和B 利用增加廣告增加營業額

- 營業額初期隨廣告費上升而上升，但B公司跟進

- 若無新客戶
- 營業額最後無法隨廣告費上升而上升

- 策略是轉移至新產品

A公司
營業額

B公司
廣告費 ↑

B公司
營業額

A公司
廣告費 ↑
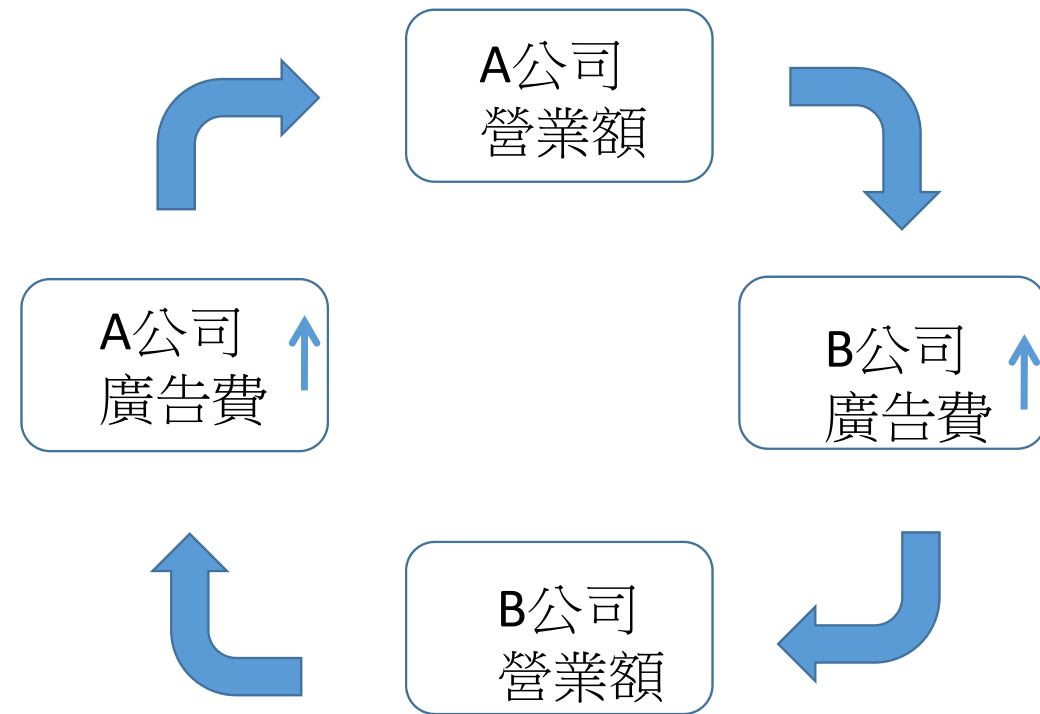
「三洋維士比」南部崛起

周潤發代言加持、威脅保力達江山

類似成份功效
如何產生差異?

形象品牌

因為十多年前吳念真的廣告一推出，才讓差一點失去龍頭寶座的保力達，再度奪回市場冠軍。保力達B以台灣傳統產業為主題，用影像保留珍貴的製程工法，成功將「勞工血汗」昇華為「職人精神」。

例二: 開發新產品札幌啤酒

- 札幌啤酒曾推出第一項以豌豆釀製之啤酒，營業額大增

- 但其他更具實力之麒麟或朝日推出類似產品，札幌啤酒營業額又大幅下降

- 策略：控制札幌啤酒自己豌豆釀製之啤酒最初成功速度，打穩品牌之聯結，未來較不易被取代

- 在尋找改變模式的策略時，有一點很重要的就是我們要找到「槓桿點」，也就是能真正改變整個現況的楔子。

- **採取行動，從實踐中獲得回饋**

- 這是最重要的一個動作，當我們前面的步驟都做到後，我們就要開始實踐，並不斷從得到的回饋再重複前面的步驟，如此不斷修正，走上正軌，解決問題。

參考書目

- 複雜問題的策略思考&分析 Arnaud Chevallier著 張簡守展 譯 大雁文化 2018 年10 月 ISBN 978-986-95532-5-4
- 本質思考 平井孝志著 吳怡文譯 天下文化 2016年9月 ISBN 978-986-479-082-1 書評https://keeplearning.blog/ https://keeplearning.blog/2017/03/05/%E3%80%8C%E6%9C%AC%E8%B3 %AA%E6%80%9D%E8%80%83%E3%80%8D-%E8%AE%80%E5%BE%8C%E6%84%9F/
- 深度思維：讓邏輯思維更強大，打造更厲害的自己 作者： 葉修出版社：日出出版 出版日期：2019/02/26 ISBN：9789869727822
- 解決問題最簡單的方法：在故事中學會麥肯錫**5**大思考工具原文作者：**Kensuke Watanabe** 譯者： 蔡昭儀出版社：時報出版ISBN：9789571368986

Customer data

↓ **Empathy**

Generate idea

↓
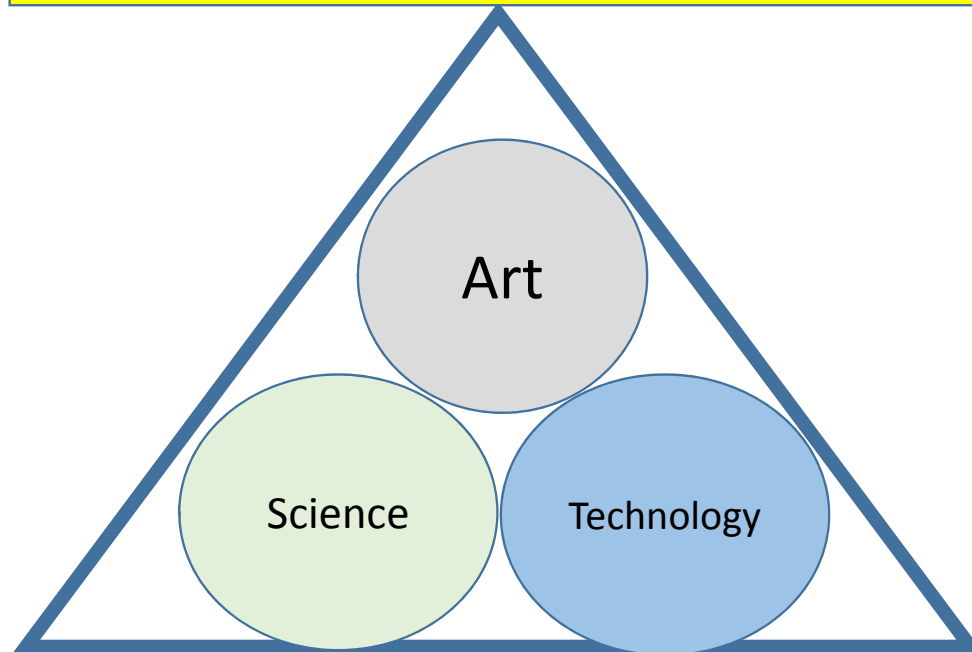
Design Thinking
By Jeanne Liedtka
Professor of business administration
at the Darden School
the University of Virginia

Pilot concept ← Revised idea

↓ ↑

Scale up ← Small experiment → Concept disapprove
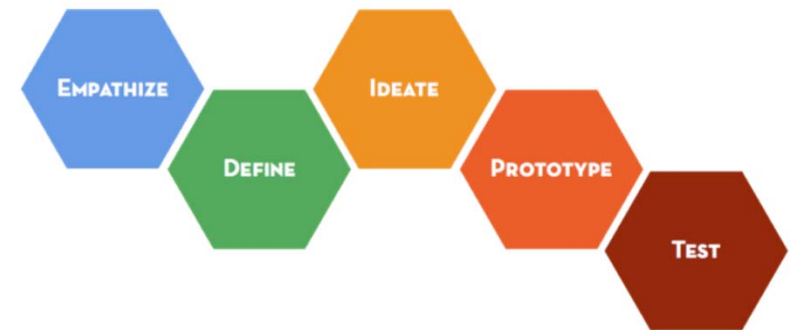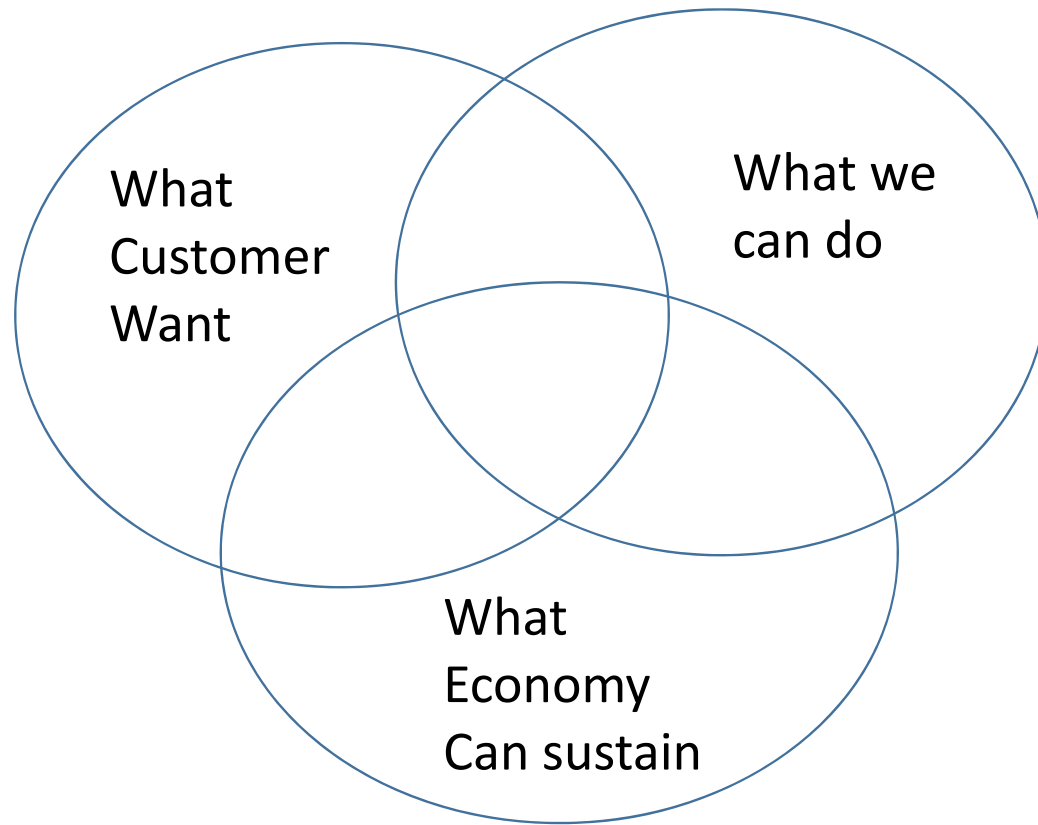
Success **Incremental Success** Fail
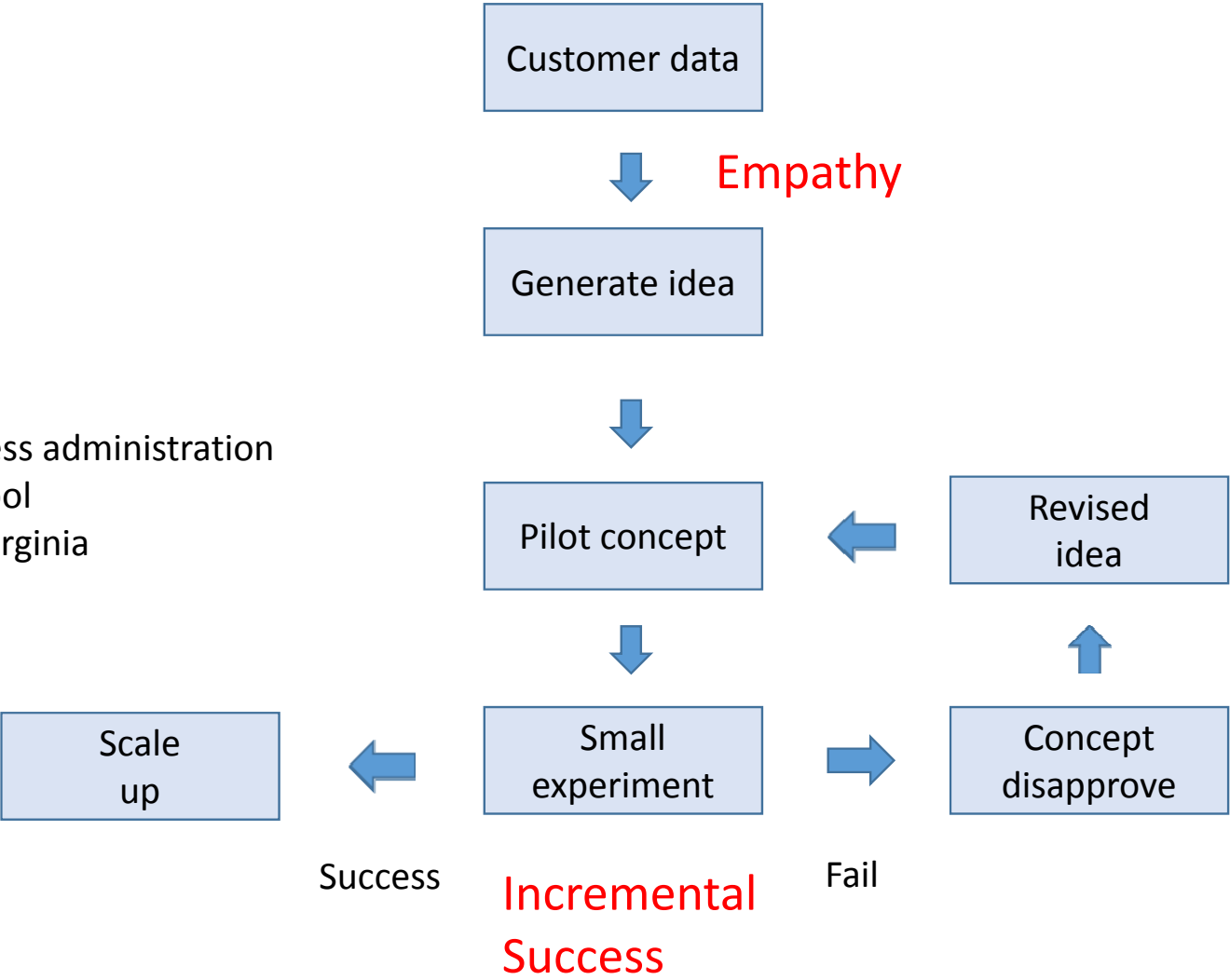
What is Design thinking

- Human centered
- Option focused
- Possibility-driven
- Iterative

Jeanne Liedtka
University of Virginia's Darden School

Four Principles of Design Thinking

- Plattner, Meinel and Leifer laid out four principles for the successful implementation of design thinking as a process for innovation in business or society.

- The human rule, which states that all design activity is ultimately social in nature, and any social innovation will bring us back to the 'human-centric point of view'.

- The ambiguity rule, in which design thinkers must preserve ambiguity by experimenting at the limits of their knowledge and ability, enabling the freedom to see things differently.

- The re-design rule, where all design is re-design; this comes as a result of changing technology and social circumstances but previously solved, unchanged human needs.

- The tangibility rule; the concept that making ideas tangible always facilitates communication and allows designers to treat prototypes as 'communication media'.

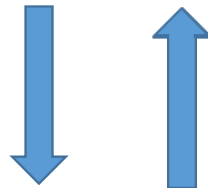# Case Report. the social problem Improving the nutrition of the elderly

- Problem: The Danes, like citizens in most developed countries, recognize that the aging of their population presents many challenges. One of these is serving the more than 125,000 senior citizens who rely on government-sponsored meals. Danish municipalities deliver subsidized meals to people who suffer from a reduced ability to function due to illness, age, or other conditions. Many of the seniors have nutritional challenges and a poor quality of life because they simply do not eat enough. In fact, it is estimated that 60 percent of Denmark's seniors in assisted living facilities and residential care units have poor nutrition, and 20 percent are actually malnourished.

Workers

Frustrated
Nobody asked them how they want to do things differently

Someone was listening and trying to help

Ethnography

Elders

Observe current customers
And those who discontinued service

Understanding
(Define the problem)

- For kitchen workers: One of the workers' major frustrations was that they were not empowered to do what they loved. They had chosen to work with food because they enjoyed creating things out of food, but they were forced to prepare the same meals from the same menu month after month.

- For elders: deciding what kind of food they put in their mouths

- For elders: disliked eating alone because it reminded them that their families were no longer around.

First workshop: Co-Creation in Social Services. The first workshop brought together municipality officials, volunteers, experts in elderly issues, kitchen workers, and employees of residential care centers. review the ethnographic research and develop insights that would later facilitate the creation of innovative ideas

Hatch & Bloom had invited a well-known chef to observe the kitchen, he argued that they are not lacking of skill, but have different focus: the kitchen employees concentrated on maximizing economy rather than food styling or seasoning or other details that professional chefs would focus on.

Second workshop: During the second workshop, facilitators and participants used a mind-mapping approach, first grouping the key findings and observations gathered during the What is? process into categories—for instance, the delivery of the food or the composition of the menu. They then moved into What if?

The third workshop, which was much more hands-on, moved into the What to do phase, prototyping and beginning to test the co-created solutions. For example, Hatch & Bloom worked with participants on three different versions of the menu and asked them which they liked and how they felt about various aspects, such as which colors they favored and whether they preferred photos or illustrations.

Pilot Experiment

- Hatch & Bloom took the results from the workshops and moved into What works?, testing prototypes with different combinations and ways of presenting food with the customers they had been observing since the beginning of the project. Again, they tested the prototypes not only with current customers but also with people who had stopped using the service and with those nearing retirement age.

- The learning from this initial set of experiments resulted in a second project with some quick design changes that allowed for meals in which the components were packaged separately. Which may be modified by the elder depending on their wishes.

what is design thinking?

EMPATHIZE   DEFINE   IDEATE   PROTOTYPE   TEST

a process
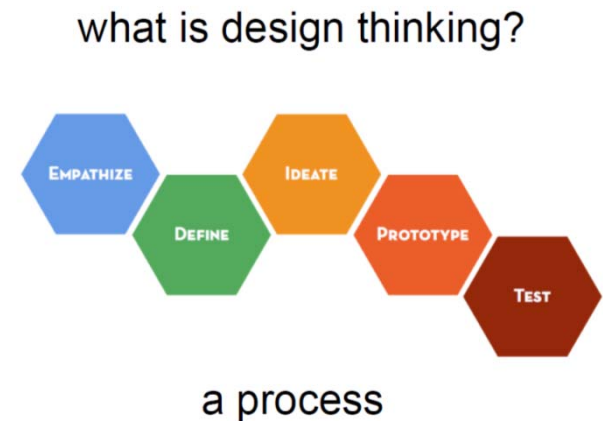
Solution: From Hospitable Food Service to The Good Kitchen

1. <u>The chef inspired the kitchen employees to introduce seasonal</u> ingredients and offered ideas for improving presentation.

2. <u>Kitchen employees also received new uniforms</u> that were much more "chef-like." This was a symbol of their dignity and status,

3. <u>The new menu looked like a real restaurant menu.</u> Instead of a list of dishes, it presented categories such as entrees, desserts, and so on. Items were also explained in greater detail.

4. <u>The Good Kitchen employees also made changes to the menu based on what they heard from seniors.</u> For example, they learned that a lot of their clients were still very social, so they added a two-course guest menu. They also introduced individual snacks,

The Good Kitchen Becomes Part of the Family

- Employees in the kitchen had not been accustomed to communicating with the people they served (this gets back to the "Who are the waiters?" question). The drivers who delivered the meals, who were all kitchen employees, would enter the seniors' homes and leave without reflecting on what they saw.

Results

- The Good Kitchen was complete, the results spoke for themselves. Reorganizing the menu and improving the descriptions of the meals drove a 500 percent increase in certain meal orders in the first week alone. Within three months, the number of customers had increased substantially. One of the most important elements of the transformation has been the shift in employees' perceptions of themselves and their work. Kitchen workers are now much more satisfied and motivated. As a result, customers are happier with their food. "If you have professional pride, you'll also cook good food,"

Denmark elder malnutrition

1. Journey mapping to trap the elder meal service (this is more like we solve the problem with space, intensity, time course)

2. Empathy of the elder and the kitchen people

3. The key:

(a) Let them have the choice and even make the new menu,

(b) self-esteem, Personal pride: kitchen worker are satisfied.

(c) Co-creation program make the people feel the participation, easy success for all process: including government, kitchen worker, elder expert

(d) small pilot experiment

Co-creation Design Thinking

- Co-creation between designer and customer (for example, Startups) depends on the establishing empathy through understanding the genetic and environment (Precision Design)

- What is the biological basis of empathy?

- How to establish the "empathy" between designer and customer?

- *Understand* and *Create* the "need" of customer.

- Co-Creation may establish the "Value" of customer.

Jeremy Alexis from Illinois Institute of Technology Business model innovation

- Collaboration is becoming more and more critical for a design team. One of the biggest failure modes in hypothesis generation is a lack of diverse input when you're creating your hypotheses. So if it's just you and your team, who are all have the same education, all have the same point of view, all live in the same neighborhood. If, if you're the ones who are generating these hypotheses, even if you try to be creative, there're still going to be in somewhat of a limited set. So when you start to collaborate with a, a larger group, a larger part of the organization, you start to have ideas that you never would have had before.

Design thinking
Is NOT one size for all question

- The first question to ask is, is this problem human centered? Design thinking is appropriate if a deep understanding of the actual people or users involved is essential.

- Linear analytic methods may be better if there are few human beings involved in the problem or the solution.

# Design thinking or linear analytical method

- A second question to ask is how clearly do you understand the problem itself.

- If we need to explore and perhaps build agreement even around the definition of the problem. Design thinking, is an appropriate method?

- On the other hand if we understand the problem clearly and are sure that we're solving the right one. Linear methods may work better.

- What's the level of uncertainty, is another important question to ask yourself. If there are many unknowns, both large and small, and past data is unlikely to help us, design thinking is appropriate.

- If, on the other hand, the day that you've got on the past is a pretty good predictor of the future analysis works.

Design thinking or linear analytical method

- Finally, I'd encourage you to think about what data is already available to you.

- If there's very little relevant existing data, then design thinking is appropriate. If, on the other hand, there are several clear sources of analogous data, linear analytic methods may work better.

- So once you're sure you have the right kind of problems and opportunities for design thinking to address. You're ready to roll up your sleeves and get started.

Other comments on Design Thinking

- Empathy is the intellectual identification of the thoughts, feelings, or state of another person while sentiment is a general thought, feeling, or sense. Therefore, we only need to increase intellectual identification.

- Design-driven innovation is not like design thinking in US, that is customer-empathy. Design-driven innovation more like destructive design or create the (need/demand) of the customer. (The question is: whether design thinking can create novel answer?)

- Disruptive novel idea is required for solving complex problems
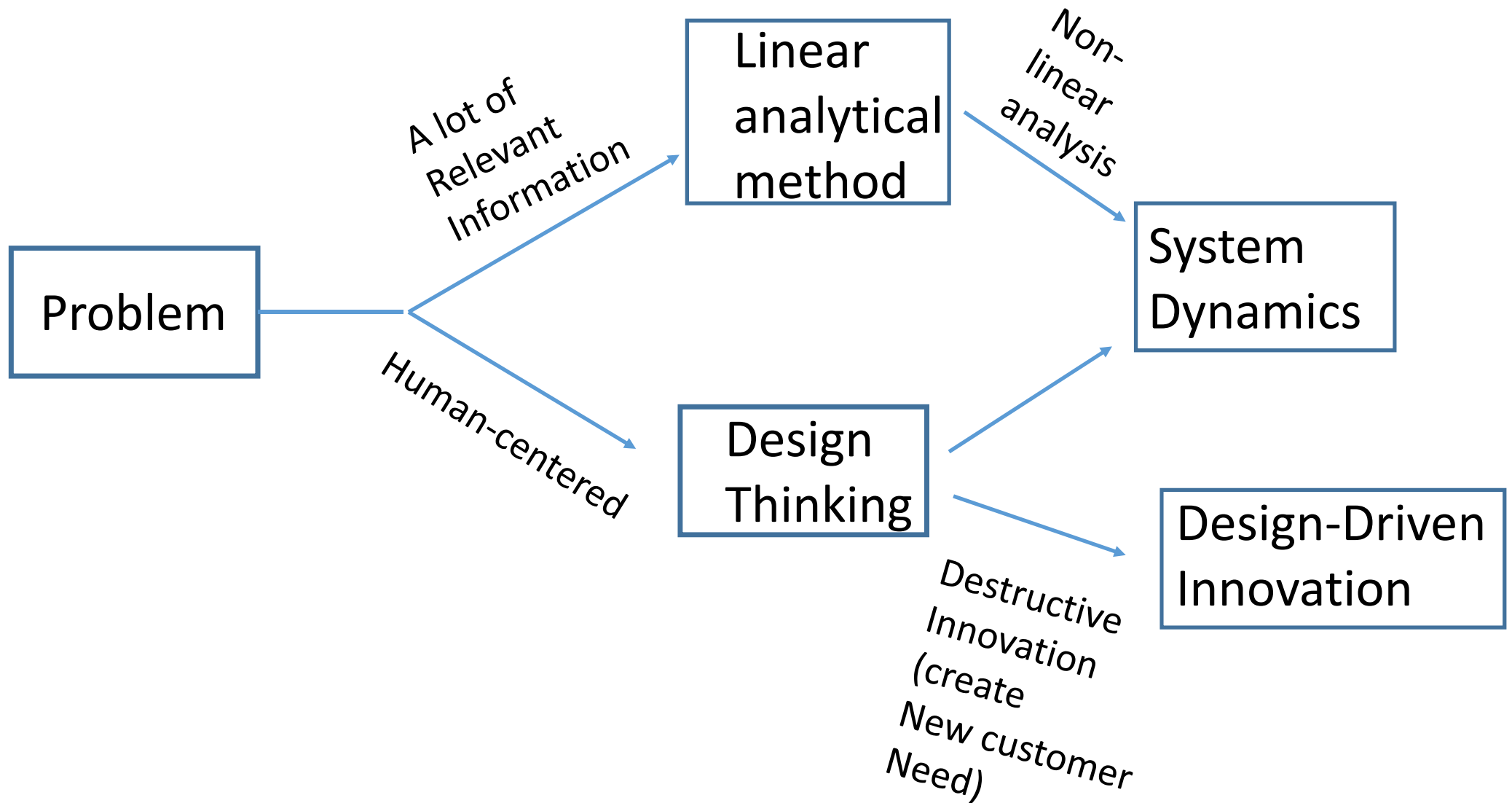
References

- Solving Problems with Design Thinking Jeanne Liedtka, ANDREW KING and KEVIN Bennett 2013 Columbia University Press

如何運用收集資料及創意
思考重新設計人生

問題

- 有人喜歡收集石頭，考大學唸了地質系，畢業後相關工作都無太大興趣，整日茫然。

- 興趣

- 大學畢業後，很多不是從事相關職業，你可以隨時重啟你的生活

- 有人畢業於一流大學法律系，畢業後進入律師事務所，風光，收入高。但卻深夜常在陽台流淚，他一點也不高興。

- 世俗成功

- 成功不一定會快樂，要過自己設計的生活

5 steps for designing your life

- Be curious: starting points for every new things
- Try stuff: Experimentation is a key step for organization change, and it should be designing your life too.
- Reframe the problems: the revised problem can then be approached in a novel way.
- Know it's a process: Focus more on the process than on the outcome, you will get the progress in the process.
- Ask for help: Design and invention are collaborative activity. More inputs from other people will make redesign your life more productive.

Analysis:建立一致性
比較及找出自己理念相同之處

- 工作觀
- 為什麼要工作
- 工作的意義是什麼
- 工作和個人，社會關聯
- 什麼叫好工作
- 金錢和工作的關聯
- 成長，成就和工作關聯

- 生命觀
- 人活在世上是為了什麼
- 個人與他人關聯是什麼
- 家庭，國家對我的意義
- 什麼是善？什麼是惡？
- 世上是否有神或其他崇高事物，對你人生的影響
- 喜悅，正義，不公不義，悲哀，對你生命的影響

Analysis: 什麼是你的興趣？熱情？

- 興趣常因接觸的狹隘，而不易發現。
- 興趣常因受到稱讚或有成就而誤認。

- 建立數據
- 建立好時光日誌，記錄那些活動讓自己專注或有精力：

(1) 專注：完全投注於活動，感到狂喜或欣快，全然祥和，心中澄明，時間靜止或轉眼即逝

(2) 精力：作自己興趣的事會精力充沛

mind mapping

- start with the topic you wish to map and write its name in the center of your page
- from this point draw a line and write down the first thing that comes to mind
- do this 4-7 times from the center point
- from each of these topics draw a line and write down the first thing that comes to mind
- do this 3-5 times from each topic
- from each of these…continue as instructed above.
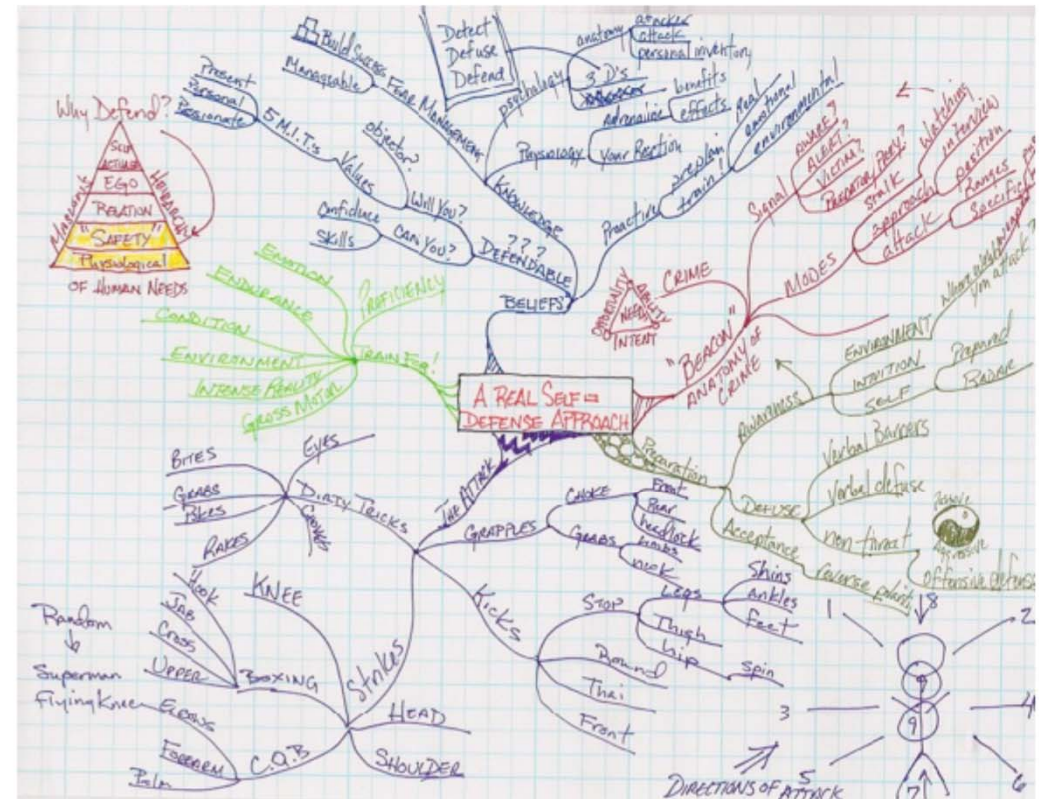
我可能想要什麼？發想廣大的世界

在局限生活經驗中利用發想找出你的興趣。一個方法是心智圖
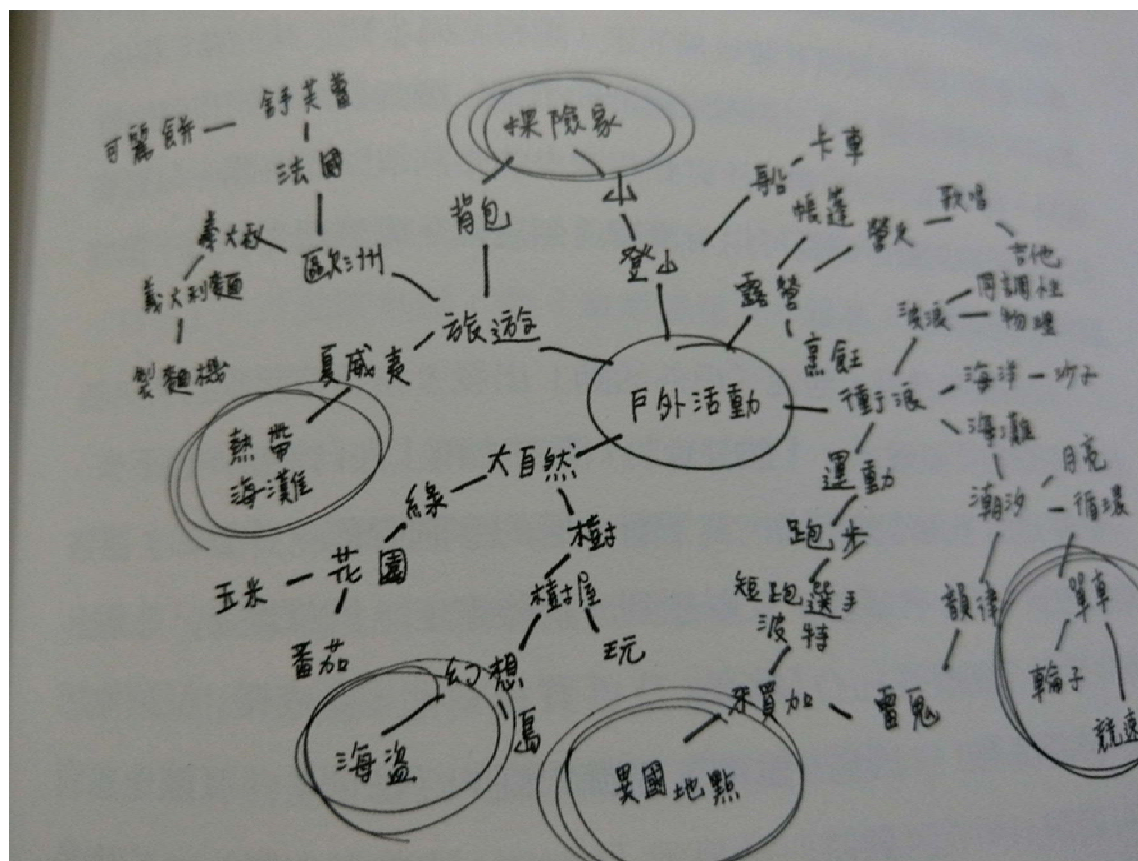
重新擬定問題

- 無效的想法或問題：生命的設計是要得到幸福，作出正確的選擇才會幸福

- 重擬問題：選擇沒有正不正確，重點是用好方法選擇

參考書目

- 做自己的生命設計師：史丹佛最夯的生涯規畫課，用「設計思考」重擬問題，打造全新生命藍圖 Designing Your Life: How to Build a Well-lived, Joyful Life原文作者： Bill Burnett, Dave Evans

生命是好玩的，
一直打造前方道路的設計方案

不是每次設計都要帶來生活大改道偶而也給自己生活一些小動亂

Please imagine and
Write a story of yourself at year 2050

What is your action plan?