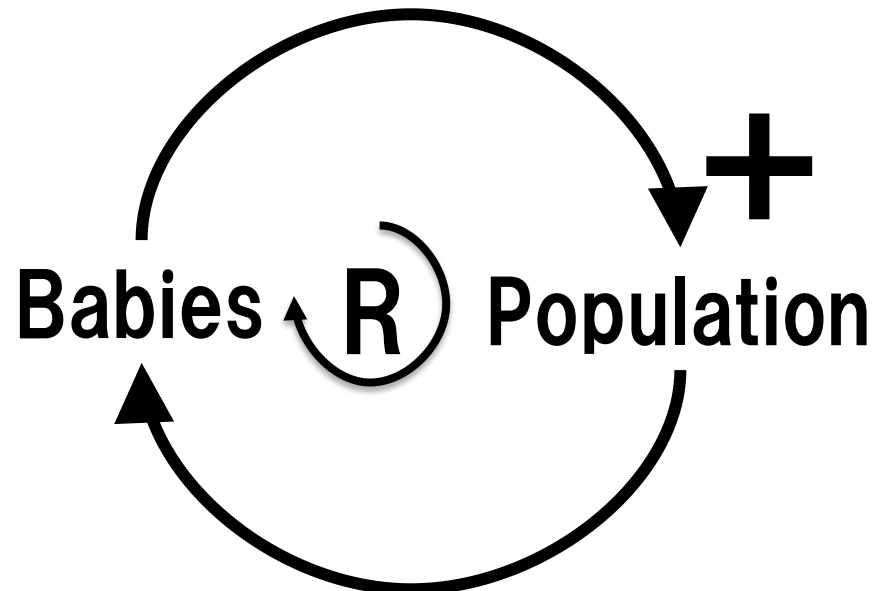


# Systems Approach we talk about today

- **Value Graph (upper half)**
  - purpose and alternative viewpoint
  - higher purposes and alternative ideas
- **Causal Loop Diagram**
  - cause-and-effect viewpoint
  - causes and effects
- **Customer Value Chain Analysis (CVCA)**
  - value chain viewpoint
  - stakeholders and their values
- **Function and Physical Architecture**
  - function and physical viewpoints
  - functions and physical structures

# Causal Loop Diagram

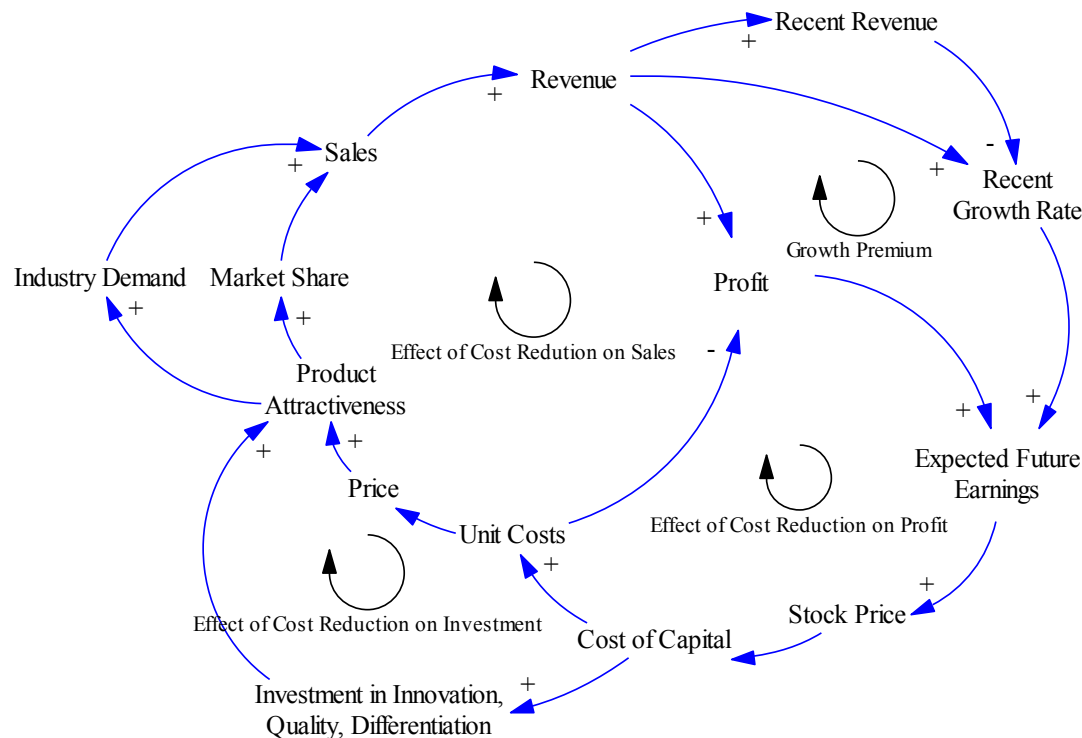
- **Causal Loop Diagram**
  - **cause-and-effect** viewpoint
  - **causes** and **effects**



# Causal Loop Diagram

- A causal loop diagram consists of variables connected by arrows denoting the causal influences among the variables.

(Sterman, J. D. *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Vol. 19 Irwin/McGraw-Hill New York, 2000.)



# Causal Loop Diagram

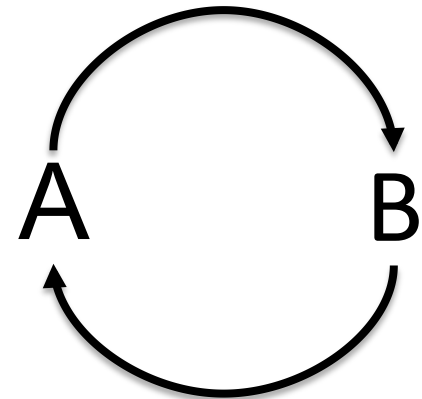
## 2 Causal Links

- Positive Causal Link
- Negative Causal Link



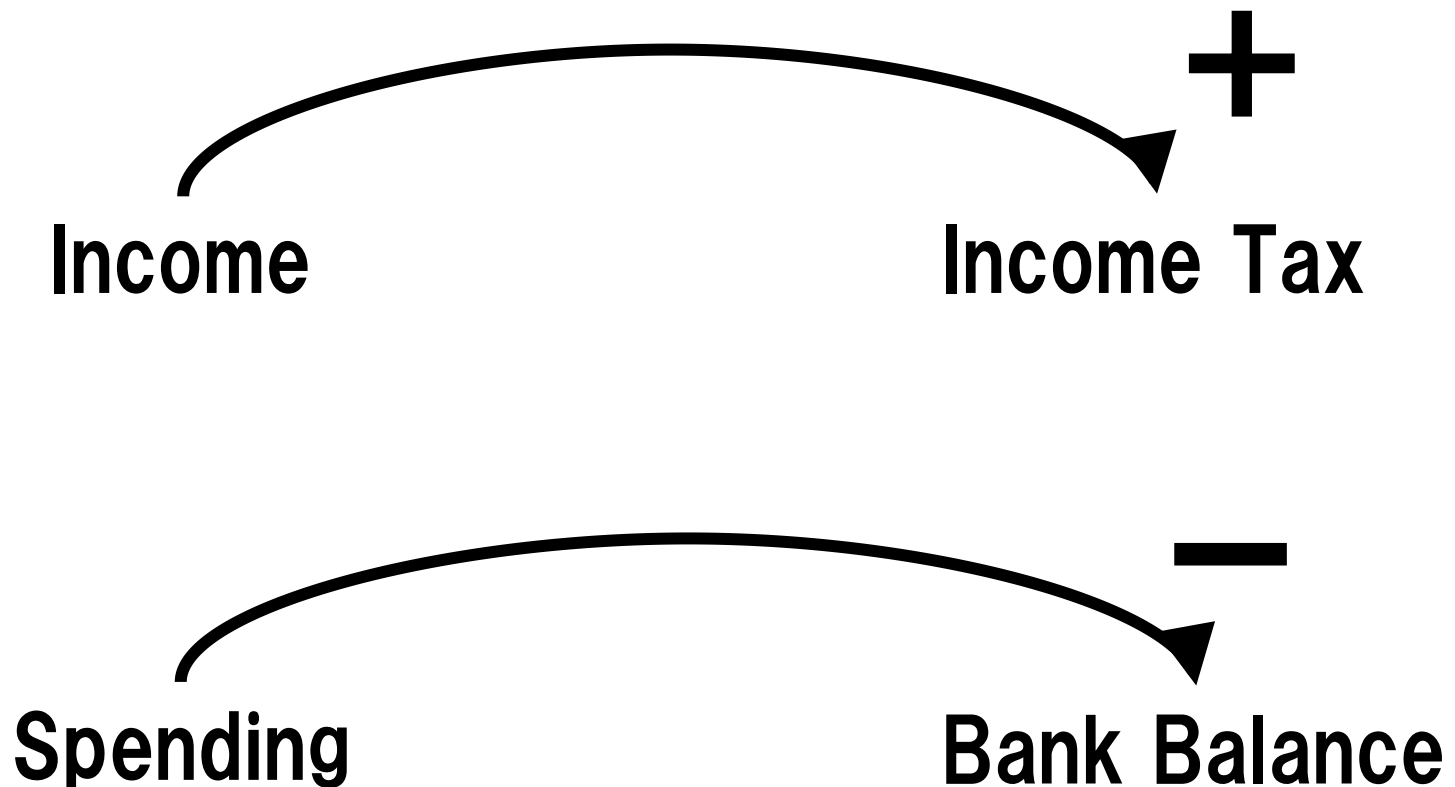
## 2 Causal Loops

- Reinforcing Causal Loop
- Balancing Causal Loop



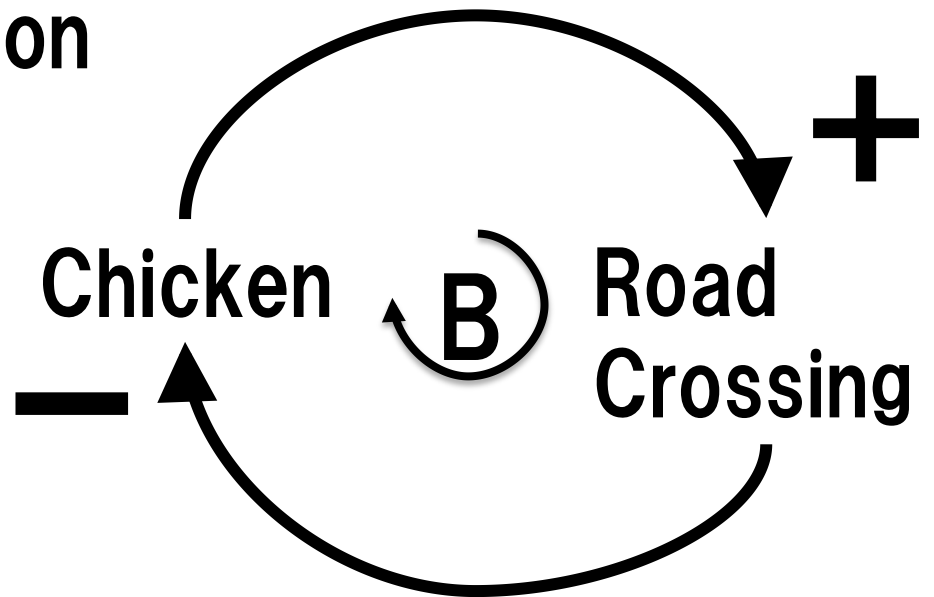
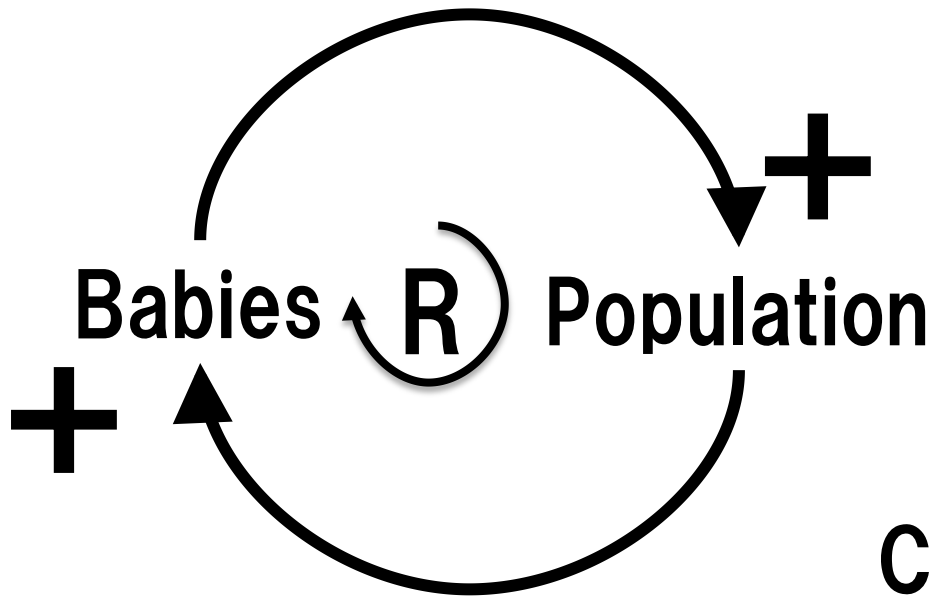
# Causal Links

- Identify the type of links.



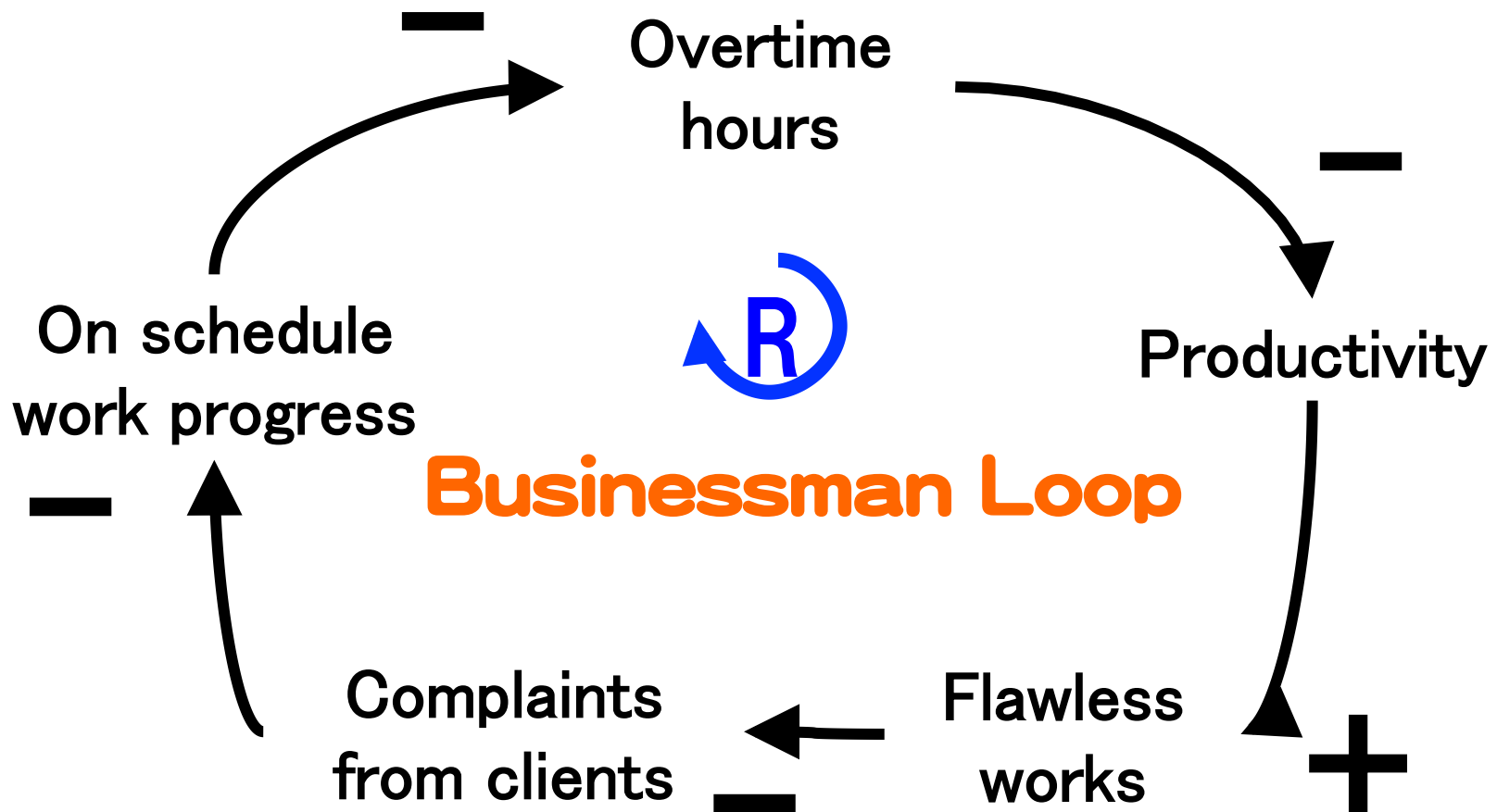
# Causal Loops

- Identify the type of loops.

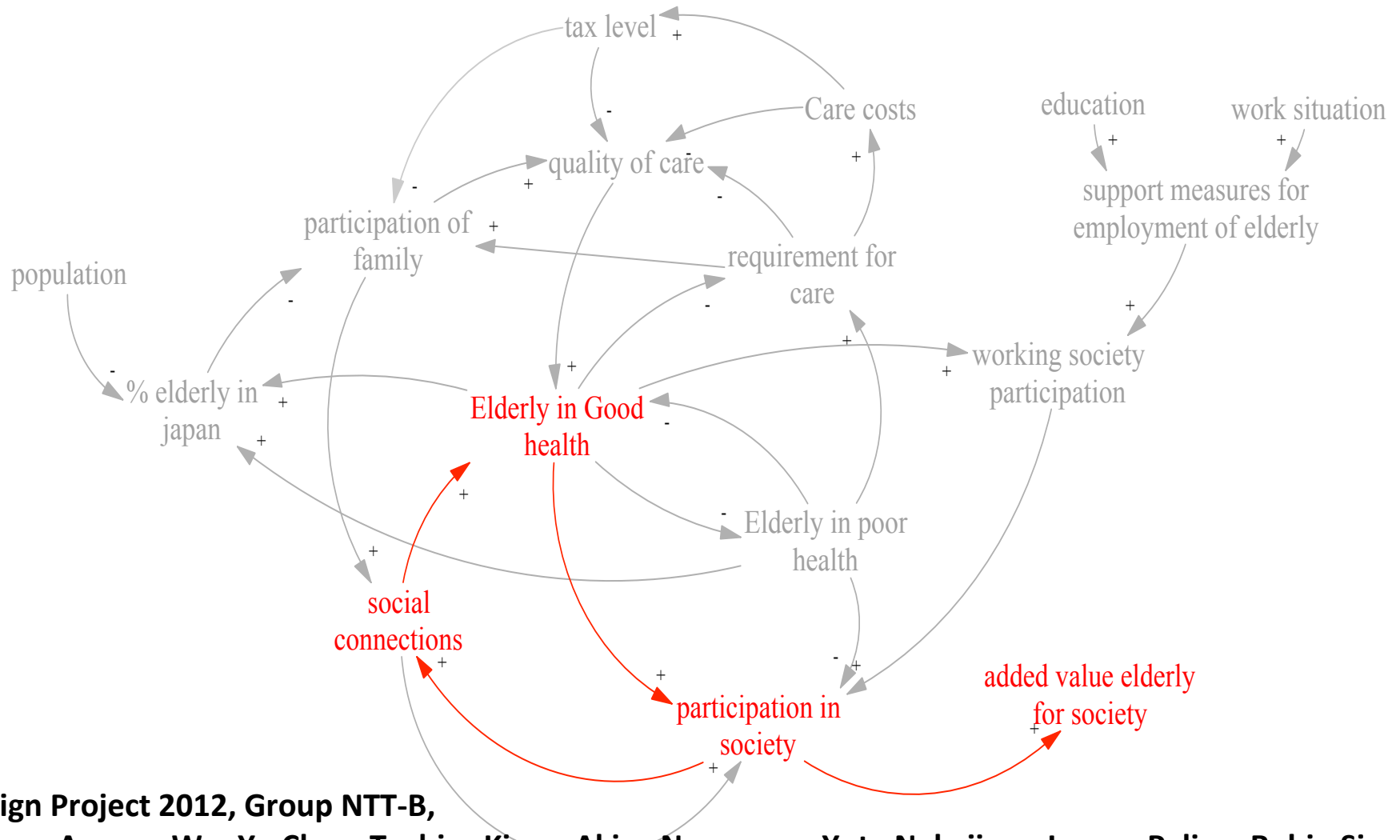


# Causal Loop Names

- Name your important loops.



# CLD in a Design Project: Example

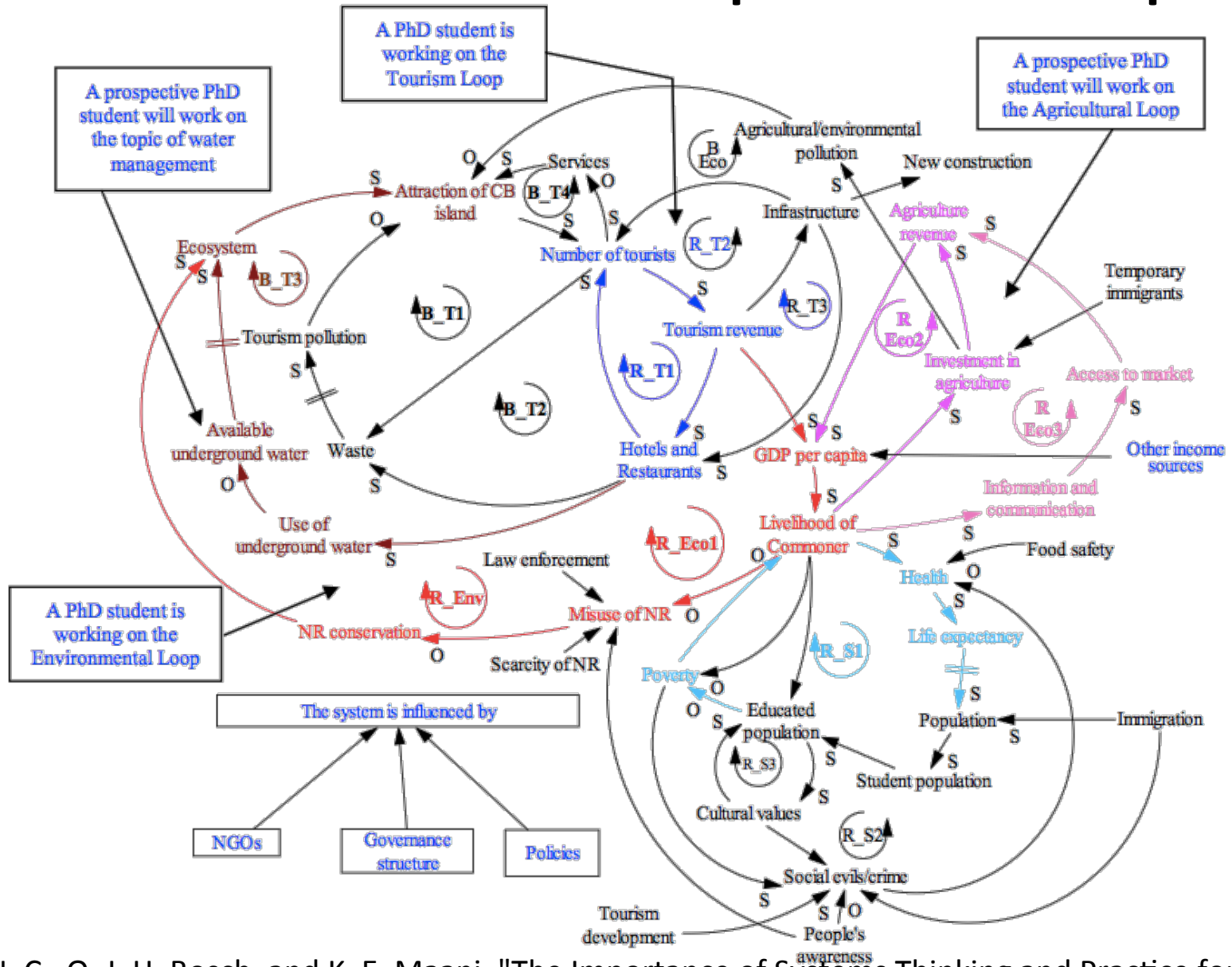


Design Project 2012, Group NTT-B,  
 Damon Azuma, WanYu Chen, Toshiro Kiura, Akico Nagasawa, Yuta Nakajima, Jeroen Paling, Robin Sippe  
 Final Report, p16, Figure 7 Causal loop aging problem

“NTT asked us to find a way to increase their market and also show their societal connection as a former public company.”



# CLD in Academic Papers: Example



# CLD **Analysis** in a design process: Practice

- Try to create causal loop diagram with multiple loops.
- Be careful with causal links.

## Agenda

# Depopulation of Japan.

# CLD **Design** in a design process: Practice

- Analyze and find a point of intervention.
  - find leverage point
- Design *a solution's cause and effect*.
- Think about the implementation.

## Agenda

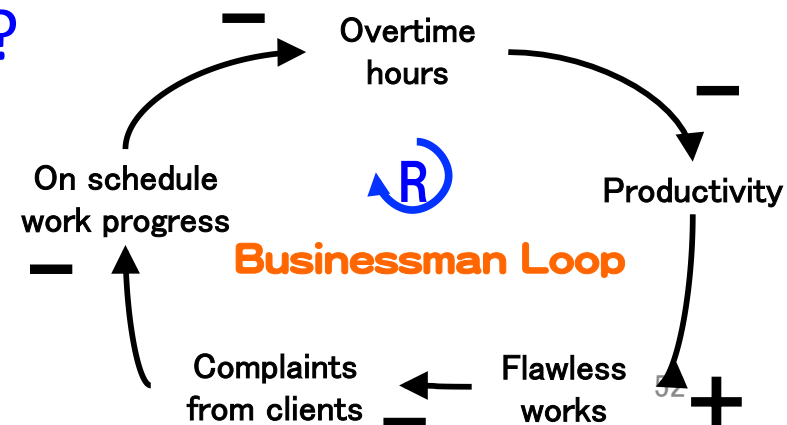
# Counter measure for Depopulation of Japan.

## Exercise

# Causal Loop Diagram Exercise 1

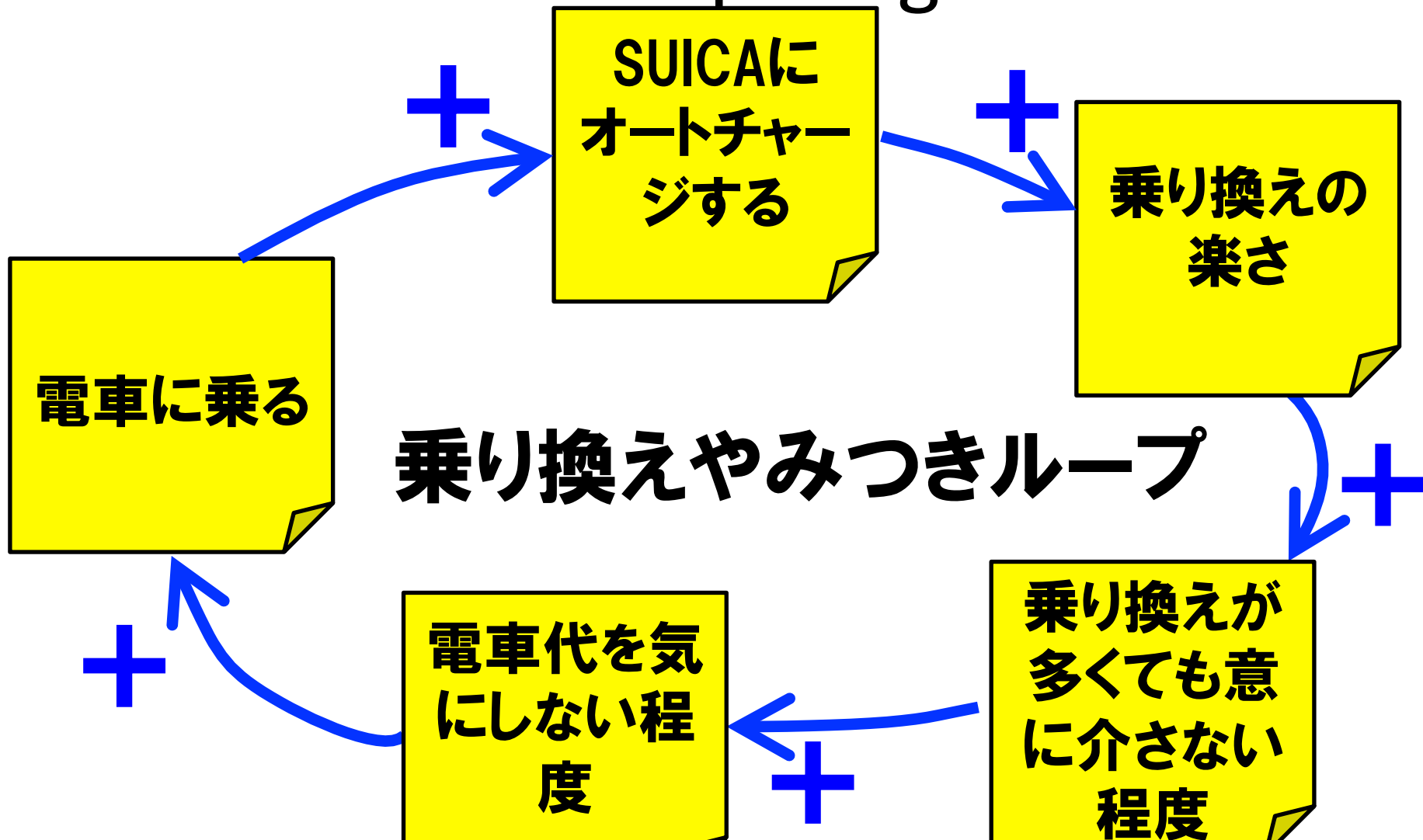
- **Discuss and create Causal Loop Diagram** from one of your concepts or ideas. (\*If you don't have one than you can do “wearable life log device”.)
- Try to create **more than two** Causal Loop Diagrams.
  - ❑ Is there something that “keep happening” or “situation does not change for long time”?
  - ❑ What are causes and effects of those events?
  - ❑ Are these causes and effects loop?

Identify causes and effects and their relationships within the scope and the topic?



# Exercise

## Causal Loop Diagram



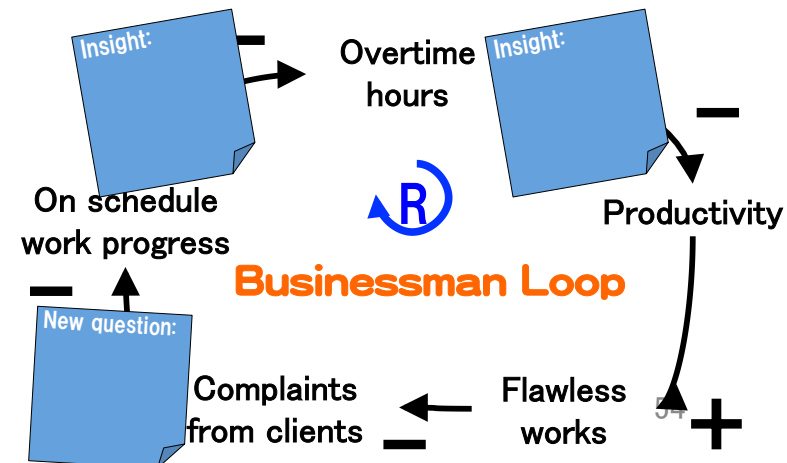
原因と結果が連鎖している様子を明らかにして可視化する

## Exercise

# Causal Loop Diagram Exercise 2

- Discuss about your Causal Loop Diagram session. Both process and output.
  - Jot down **interesting finding** and **new questions found** during the discussion. They may be important insights.
- Where is the leverage point?
  - How might we get more people go through this loop?
  - How might we create new loop?

Look for insights to create new causal loops as a part of the solution.



# Wrap-up

- In many cases, it is NOT easy to find **causal links** in a real world issue.
  - Ex) Apple's domination of smart phone domain.
- It often requires diligent fieldwork, careful investigation, creative insight, flexible logical thinking, and more to find **causal loops**.
  - Ex) Depopulation in Japan.
- Systemic thinking and innovative ideation is often a key for **designing causal loop** for your solution.