

# Organizations Under the Lens of Metamodeling : Towards Unfolding the Logics of Change

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# Introduction

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- ▶ Organization:
  - ▶ Structuring and arranging a set of related or connected concepts
- ▶ Metamodeling:
  - ▶ Constructing and relating a collection of concepts within a certain problem domain
    - ▶ Examples of metamodels in software, process, and requirements engineering : UML, SysML, SPEM, i\*
- ▶ What is the difference between organization and metamodeling?!

# My Current Research Question?

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- ▶ **What is the problem?**

- ▶ Conceptualization of change at the level of metamodels is an open research issue

Rational:

Generally in the design space in which everything is planned ahead change is considered as an exceptional concept

- ▶ **Why is it a problem?**

- ▶ What about the flexibility of designs?

# My Current Research Goals

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- ▶ **Research Question:**

  - How to conceptualize the notion of change at the level of metamodels?

- ▶ **Research Goal1:**

  - To investigate injecting the concept of change in the current metamodels

- ▶ **Research Goal2:**

  - To propose a new metamodel which conceptualizes the notion of change

- ▶ **Limiting research scope:**

  - ▶ Focusing on the context of organizations

  - ▶ **Research Question:** How to conceptualize the notion of change in organizational and business processes metamodels?

# My Current Research Method

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- ▶ **Am I the first researcher to address these questions??!!**
- ▶ Investigation of conceptual frameworks in:

- ▶ **Organization Theory**, and

- ▶ **Systems Theory**

, which directly address the concept of change in their analysis frameworks, such as:

- ▶ **Systems Dynamics**

- ▶ **Ecosystems**

# System Dynamics

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- ▶ **Dynamics:**

- ▶ The branch of any science in which forces and changes are considered.

- ▶ **System Dynamics:**

- ▶ An approach to understanding the behavior of the system over the time in complex systems

- ▶ Main concepts related to change and behavior over time :

- ▶ Stocks : accumulations in the system ( e.g. bank balance)
- ▶ Flows (e.g. inflow: deposit interests, outflow: withdrawal)
- ▶ Valves : actions controlling the rate of inflows and outflows to stock
- ▶ Information feedbacks : information which affects the valves

- ▶ It supports simulation and prediction of the behavior of system over time

# My first research step

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- ▶ **A preliminary step in accordance with:**

- ▶ **RG1:** To inject the concept of change in the current business process metamodels

- ▶ **Research Objective:**

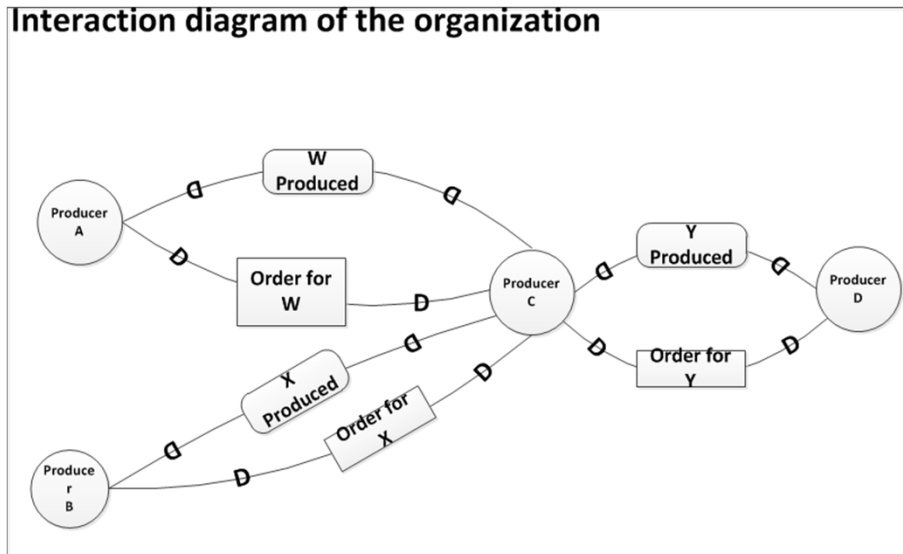
Integrating

- ▶ i\* models (strategic-rational, strategic-dependency relationships)
- ▶ stock and flow models (stock and flow diagrams), and
- ▶ process models (activity diagrams)

- ▶ **Research Outcomes (so far):**

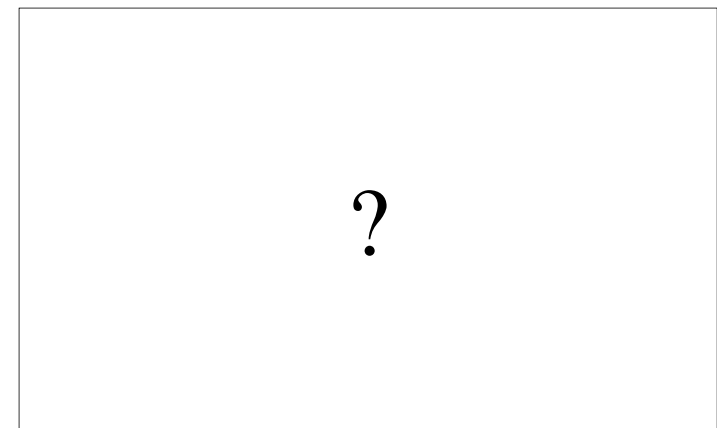
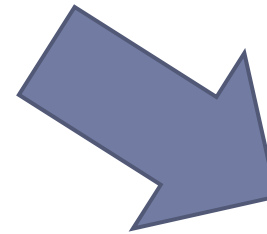
- ▶ A methodology for relating the dynamics of processes to their statics
- ▶ A methodology for managing reconfiguration of statics of processes based on their dynamics

# Problem Formulation



**As-Is Organization Architecture (T1)**

Reconfiguring the as-is architecture based on dynamic properties

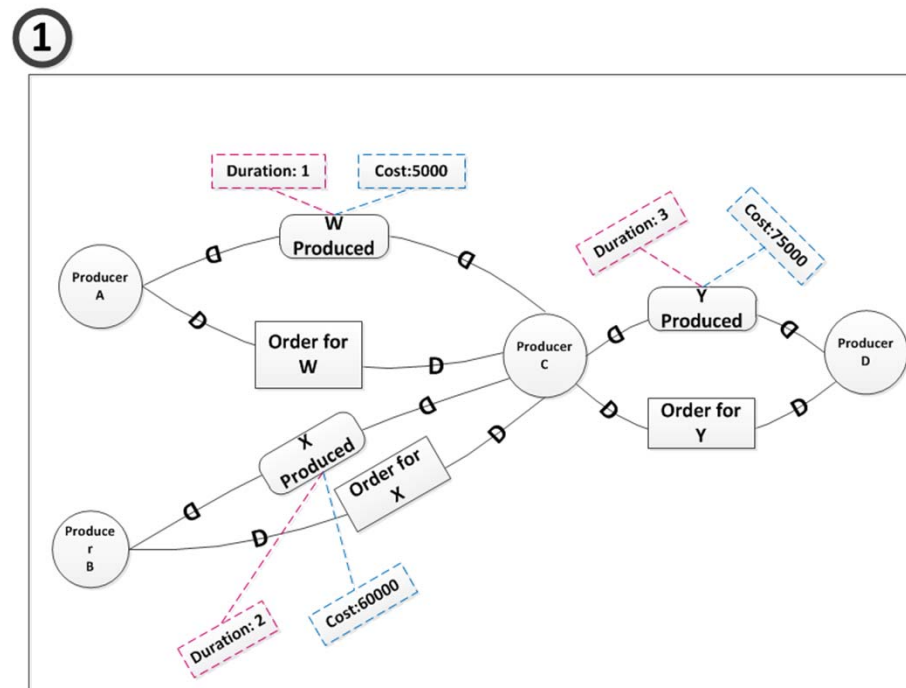


**To-Be Organization Architecture (T2)**



# Proposed Methodology – Step 1

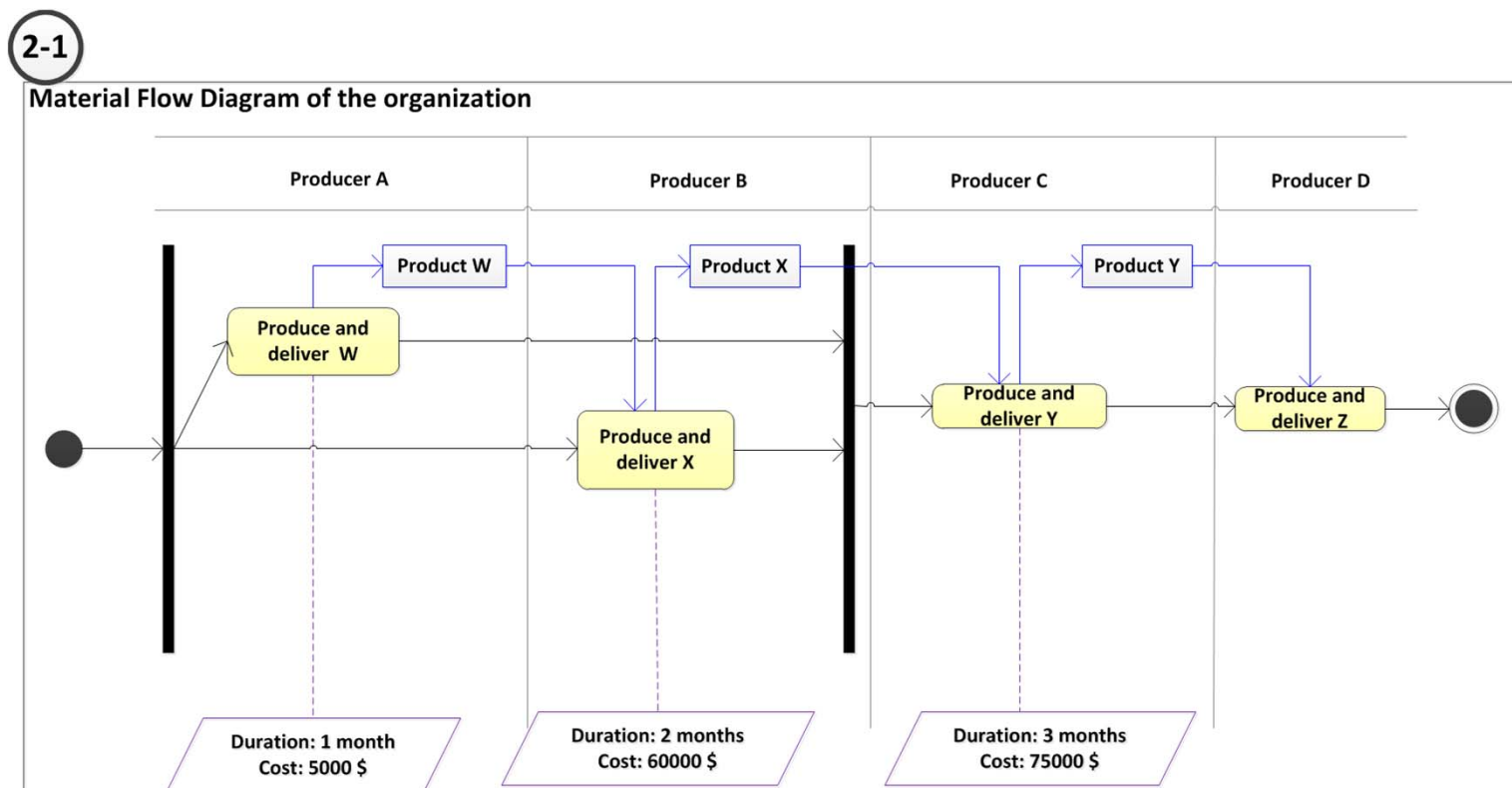
- ▶ Identification of properties of interest which should be achieved and maintained over time and corresponding them to SD relationships
  - ▶ In the case study: cash level ( a function of costs and time)
  - ▶ **Desired behavior: Reaching cash level from 0 to 2100K\$ in two years**



# Proposed Methodology – Step2 (1)

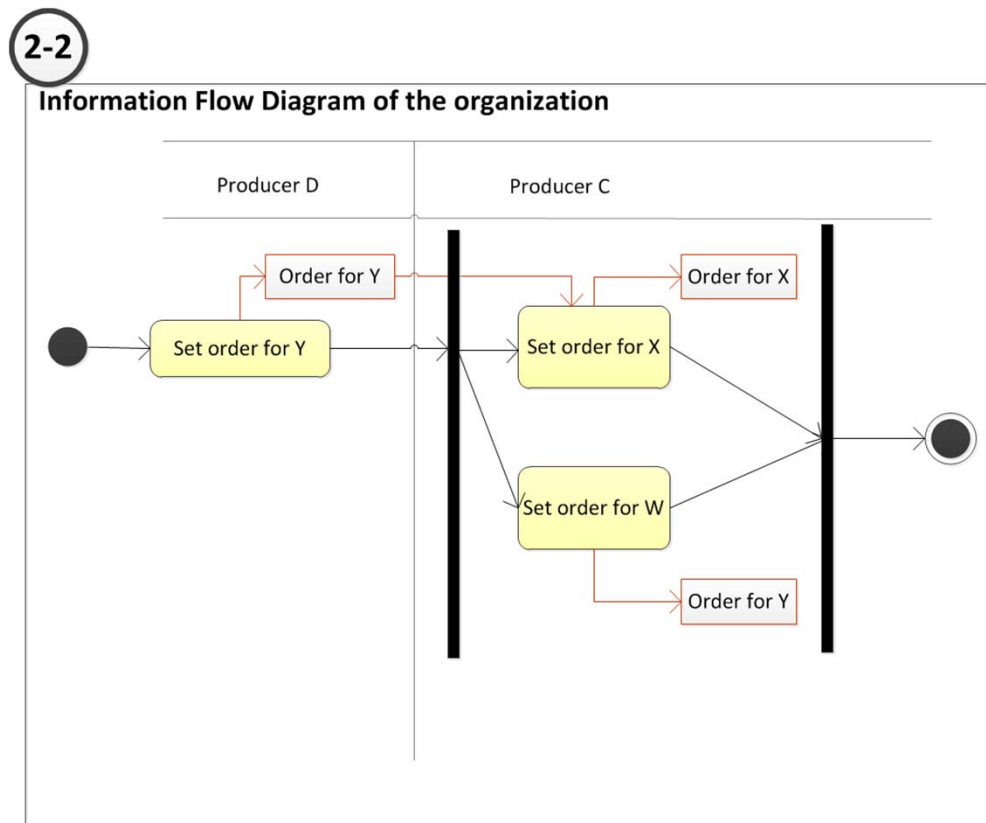
- ▶ Development of the relevant process models and identification of:

1. Material flows



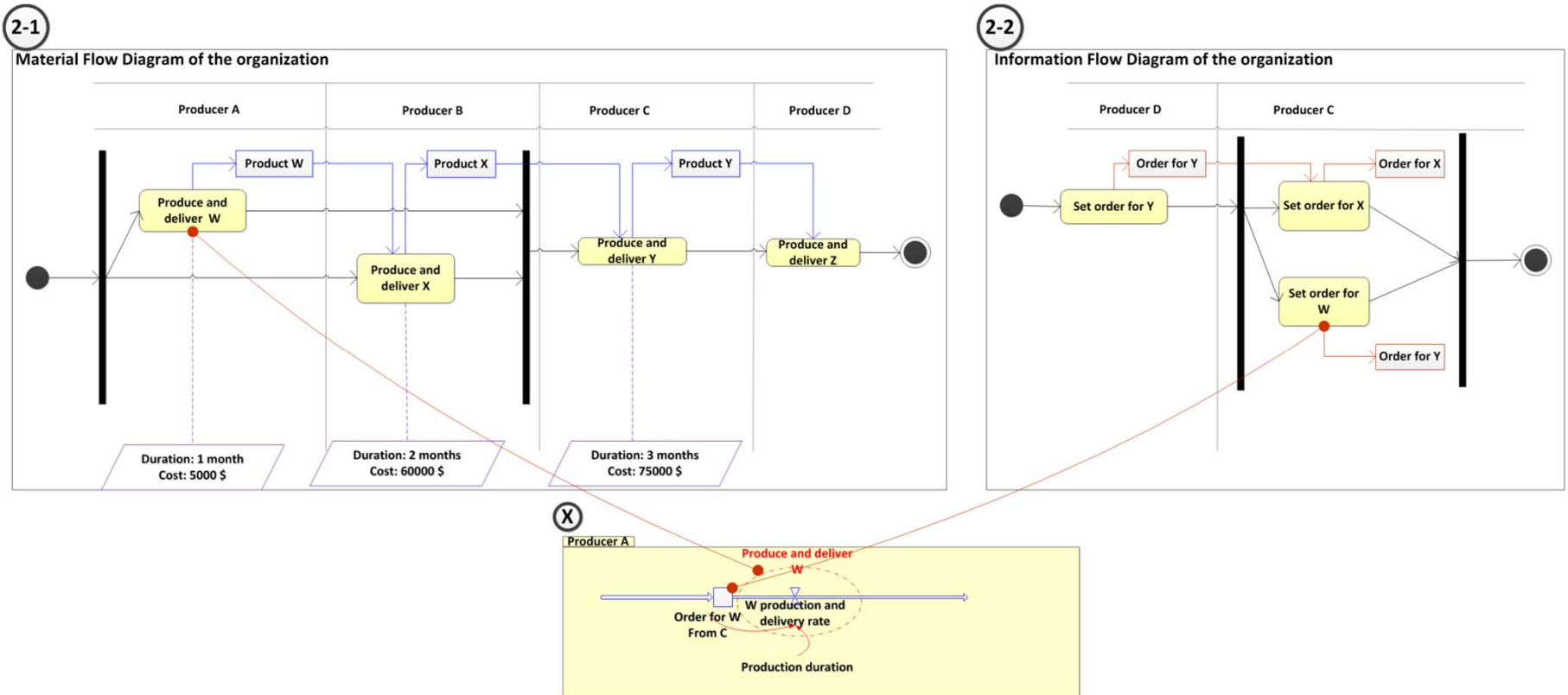
# Proposed Methodology – Step2 (2)

## 2. Information flows:

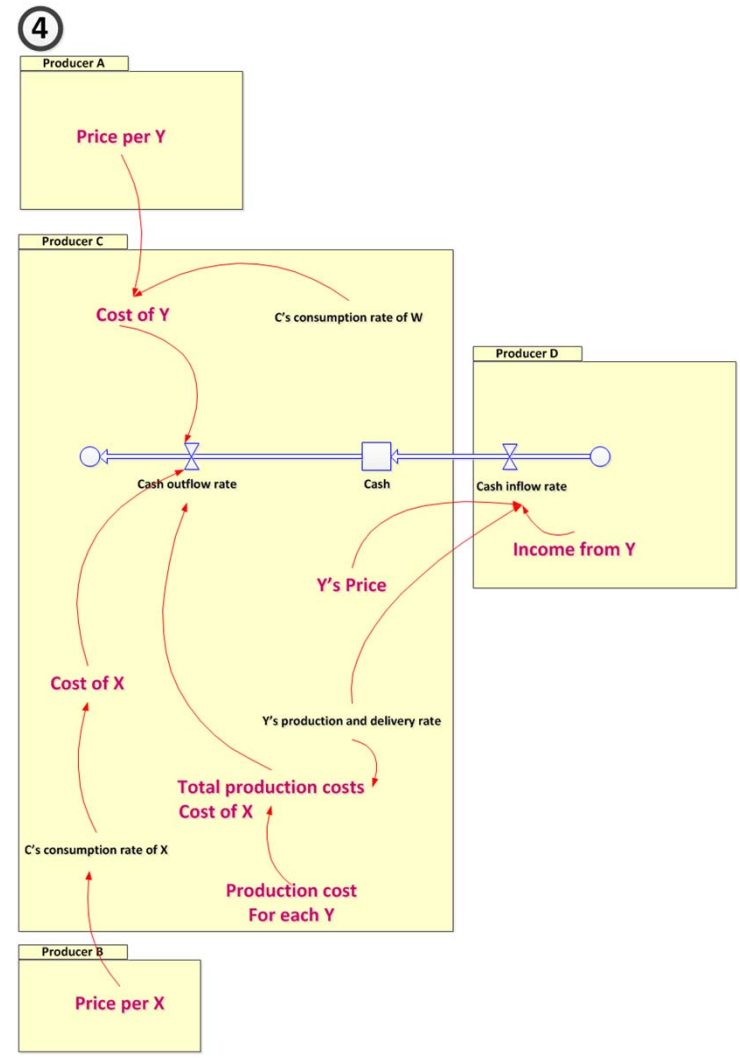
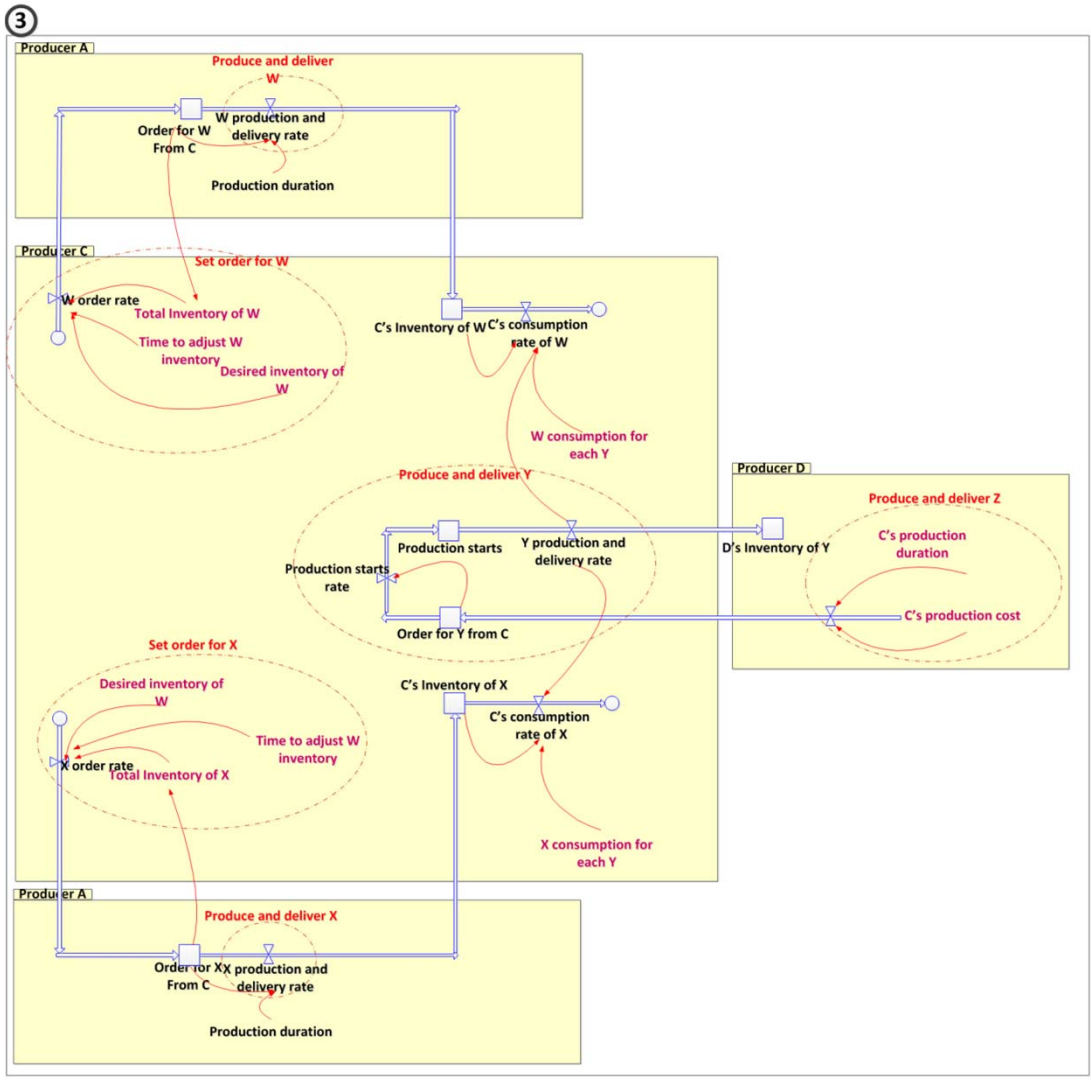


# Proposed Methodology – Step 3 (1)

- ▶ Development of stock and flow diagrams based on process models



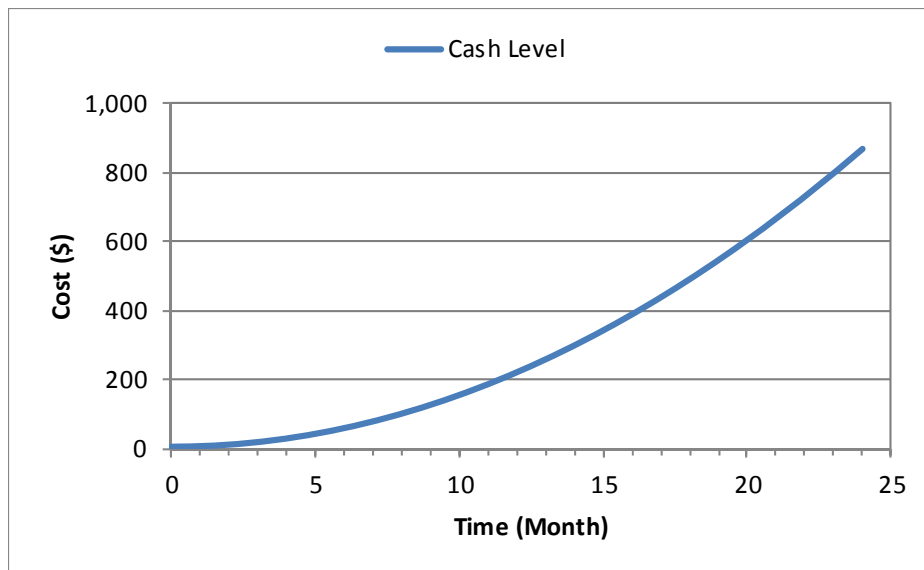
# Proposed Methodology – Step 3 (2)



# Proposed Methodology – Step 4

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- ▶ Simulating the behavior of the organization's architecture
  - ▶ In the case study: Over a two-year period



What is the current behavior of the as-is architecture over a two-year period?

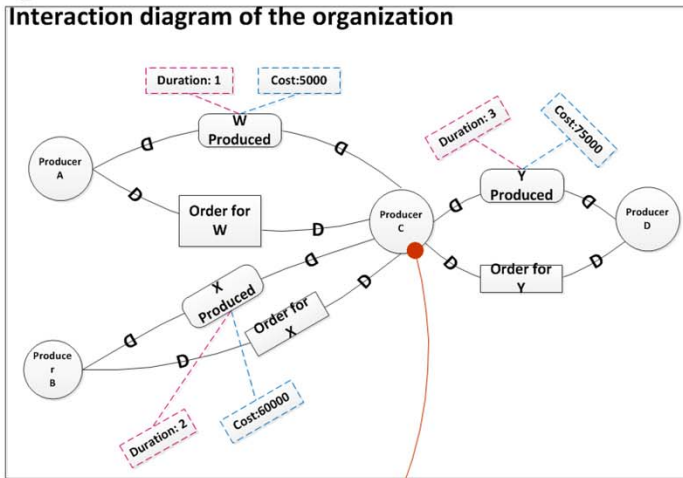
**Cash level reaches to 850K\$**

What is the desired behavior over a two-year period?

**Reaching the cash level to 2100K\$**

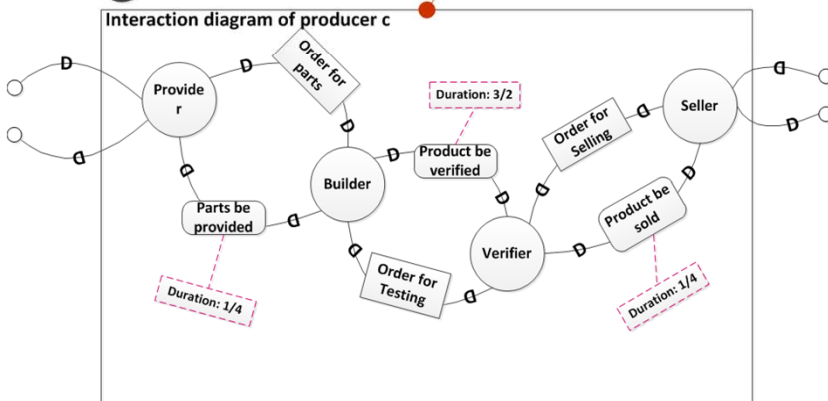
# Proposed Methodology – Step 5

(A)

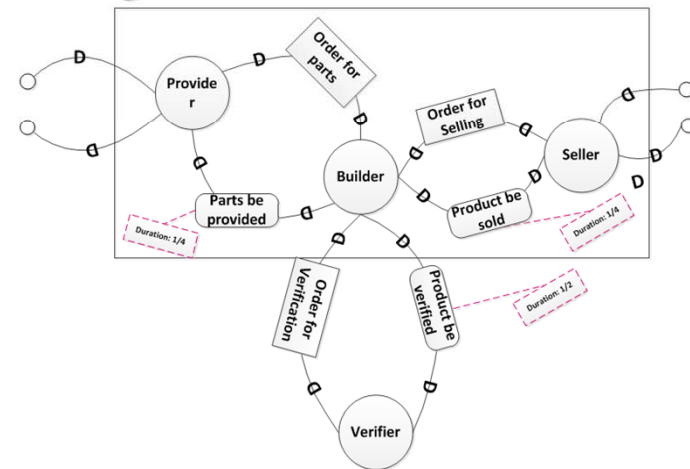


- a) Reducing level of abstraction of strategic-dependency diagram
- b) Developing alternative reconfiguration solutions
- c) Repeating step 2 to 4

(B)

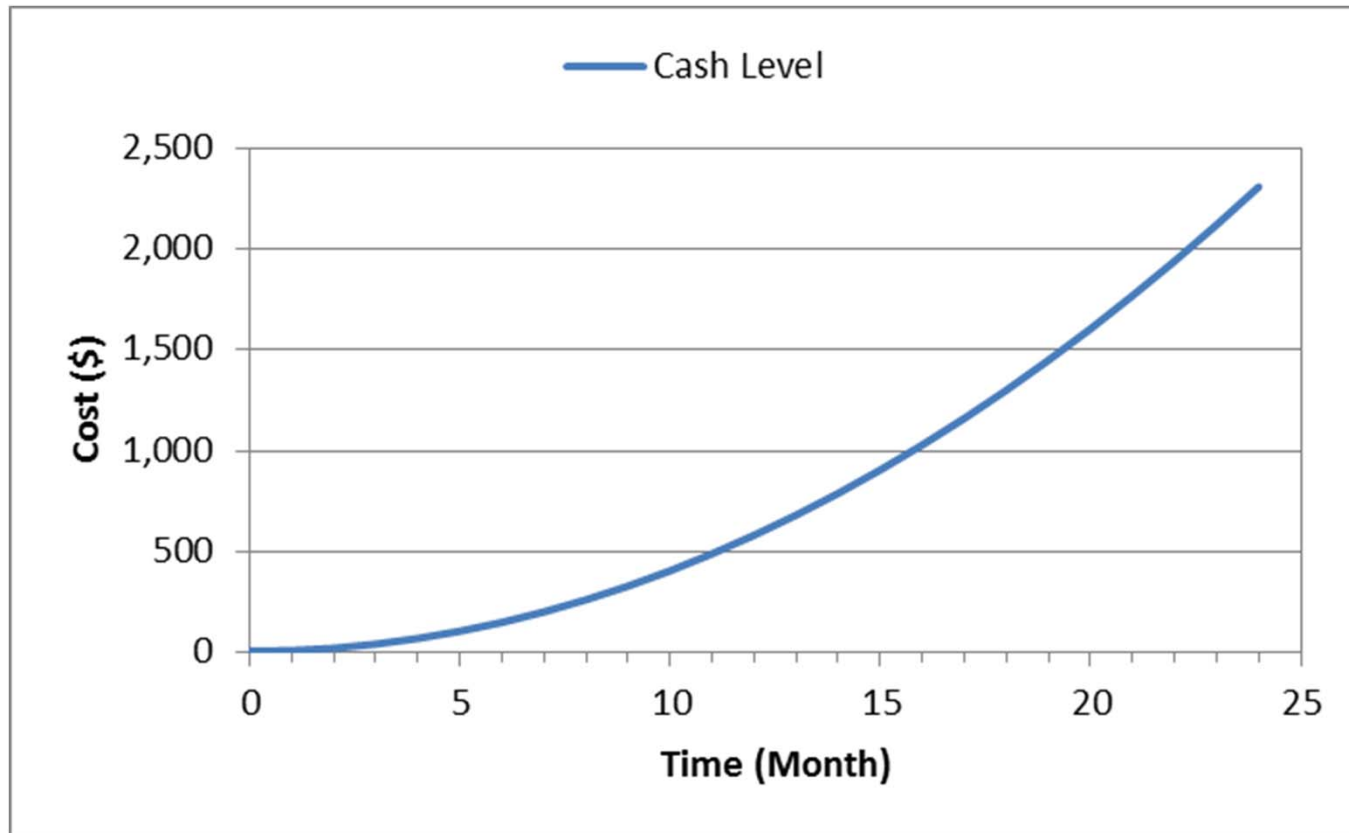


(C)



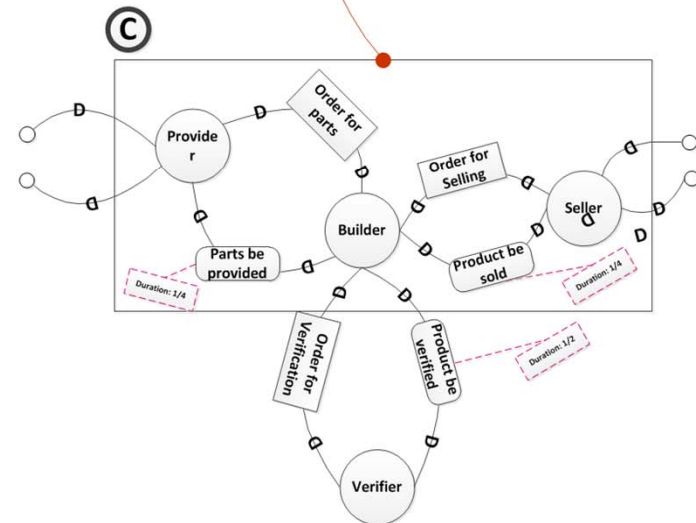
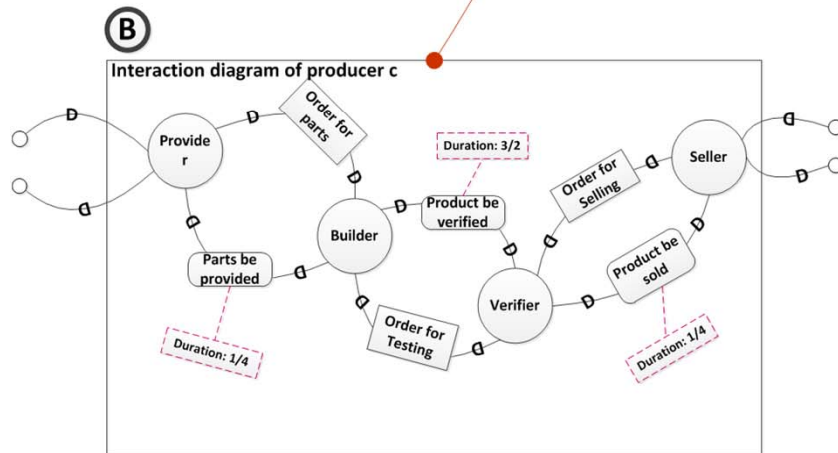
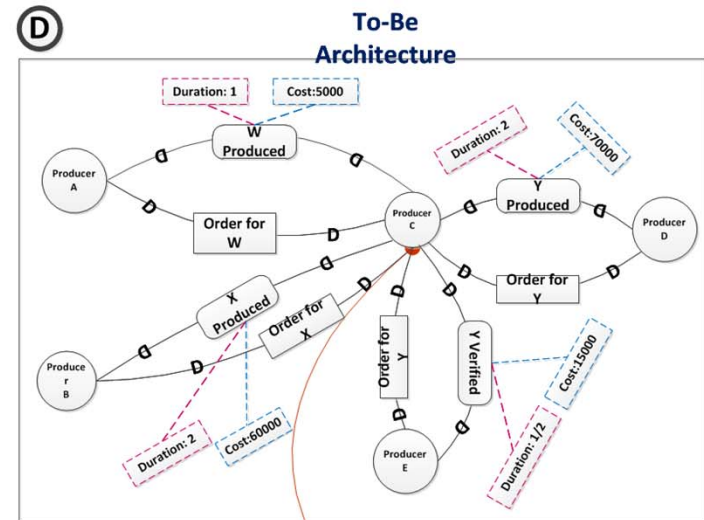
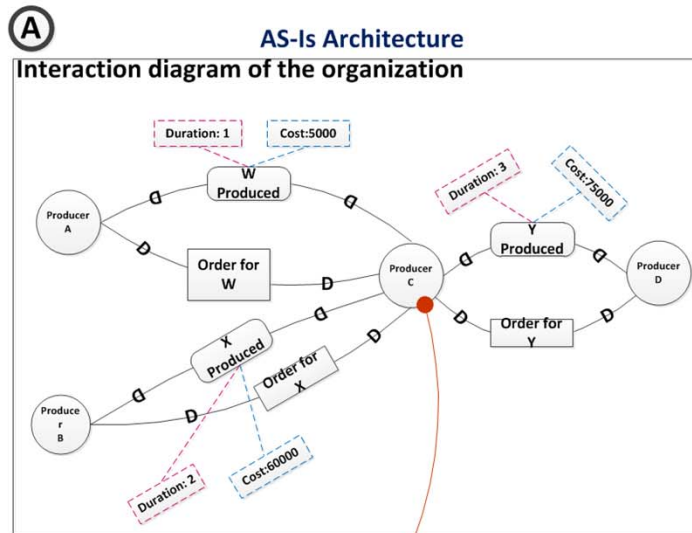
## The behavior of the system with the chosen solution

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# Final Step: Reconfiguring the as-is architecture



# Summary

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## ▶ What have I done?

- ✓ Developed a small case study

- ✓ Proposed the first draft of a methodology for relating statics of the design space to its dynamics (relating  $i^*$  and process models to stock and flow models)

- ✓ Proposed the first draft of a methodology for moving to the new version of a design based on its dynamics

## ▶ What have not I done?

# Summary

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- ▶ The potential contributions to the bigger context:

[i\* models is a conceptual problem structuring method: other static design models can be mapped on it]

- ▶ Contribution to the evaluation of static designs models (responsibility assignment and re-assignment between entities) based on the dynamics of the design
- ▶ Contribution to the evolution of static design models

# What I learnt

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- ▶ I had no view of the path I want to travel throughout my research before this project.
  - ▶ **Now I have the straw-man version of a straw-man version. I am happy!**
- ▶ Have I moved towards the research goals I have set?
  - ▶ **To a very small extent. A good try!**
- ▶ Do I want to change my research goals?
  - ▶ **Definitely not! I will strongly continue!**

