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Systemic Design Thinking for Creativity

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Modelling the Systemic Context in Business Process Management applications

Systems Modeling + BPMN

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Abstract

Business Process Management (BPM), in general, is the discipline, both art and science, of overseeing how works are performed in an organization to ensure the consistency of outcomes and explore improvement opportunities.

BPM combines knowledge from the information technology field and management sciences and applies it to business processes that operate within an organization to increase productivity and save costs.

Context is a multi-dimensional concept that can be summarized as the environment or conditions in which something is placed. It constitutes of background, surroundings, circumstances, or settings which determine or clarify the meaning or perception of an entity or event.

For BPM, we define context as the interrelated conditions in which a business process takes place. These conditions may refer to the organizational background, settings, stakeholder groups, the legal or institutional framework, or any other classification of the process's environment.

BPM affects the whole organization and concerns all people at every administration level. Consequently, BPM bears a holistic character, and the organizational context becomes a critical factor that someone needs to consider for successful BPM projects.

A key concept in BPM is the "process", which is defined as a transformation of inputs to outputs and can be decomposed into events, decisions and activities. As expected, occasionally, various methods have been used to model processes. From 2013 onwards, the modelling methodology known as Business Process Model and Notation (BPMN) is the global de-facto standard for modelling processes. It is used in every phase of the BPM lifecycle.

Less standardized is the modelling of the context. The Unified Modeling Language (UML) is a general-purpose modelling language that can be used for context modelling. Besides that, many proprietary languages or methodologies have been used to model the context when describing problems or situations.

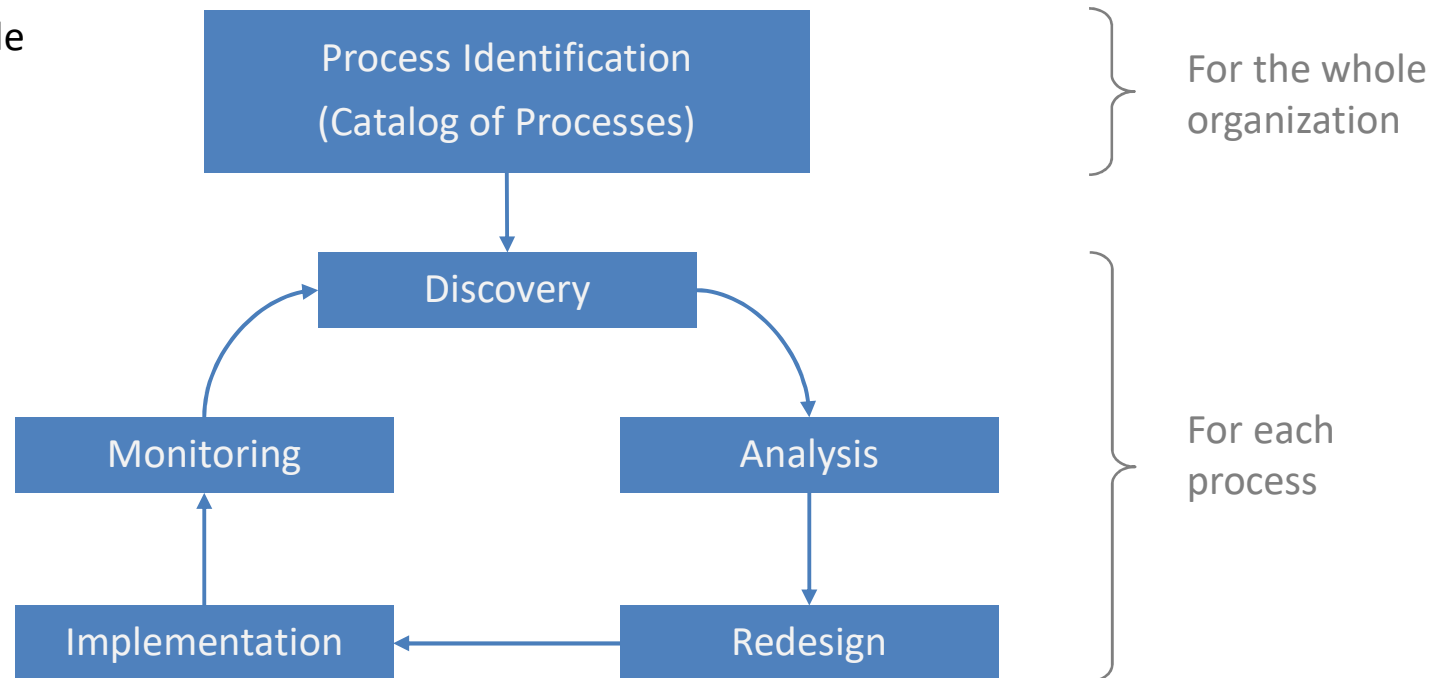
Given the importance of the context in clarifying any problem or situation, and the value of Systems Thinking in understanding the world, we propose a methodology to model the systemic context of a process. It is based on the Design and Control Systemic Methodology (DCSYM), which can model the hierarchical structure of a system and the relations among system elements. Thus, DCSYM provides a systemic representation of the process context. BPMN is still used to model the process while the process elements are placed within the systemic context entities. In summary, DCSYM is used to accommodate the BPMN model of the process.

Business Process Management (BPM)

Overseeing how works are performed in an organization
⇒ ensure the consistency of outcomes
⇒ explore improvement opportunities

- art
- science

BPM Lifecycle

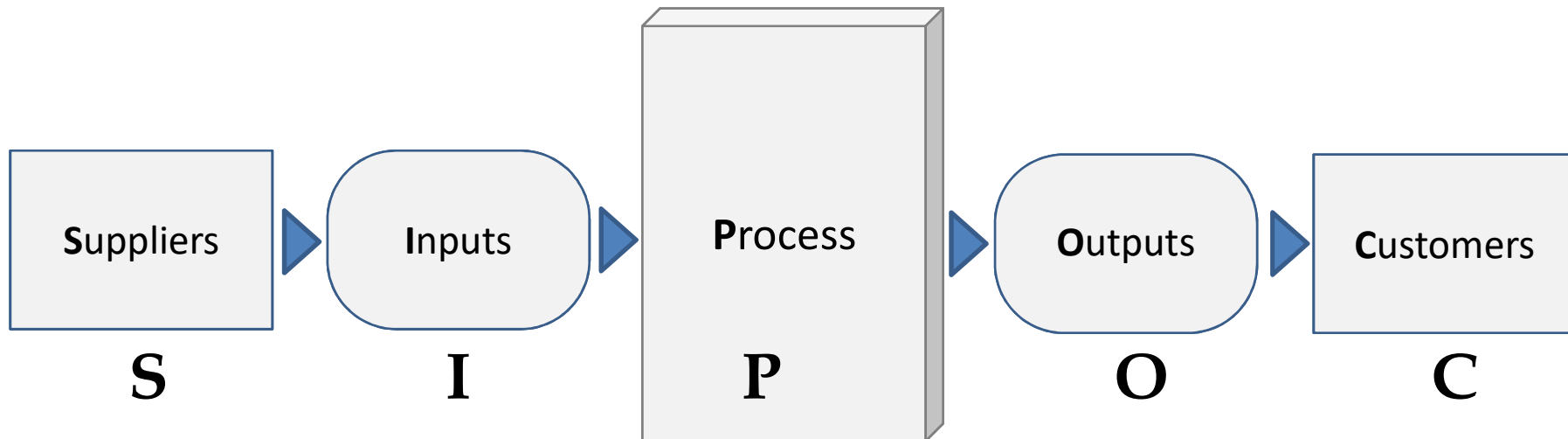


Dumas, La Rosa, Mendling, & Reijers (2018)

Process

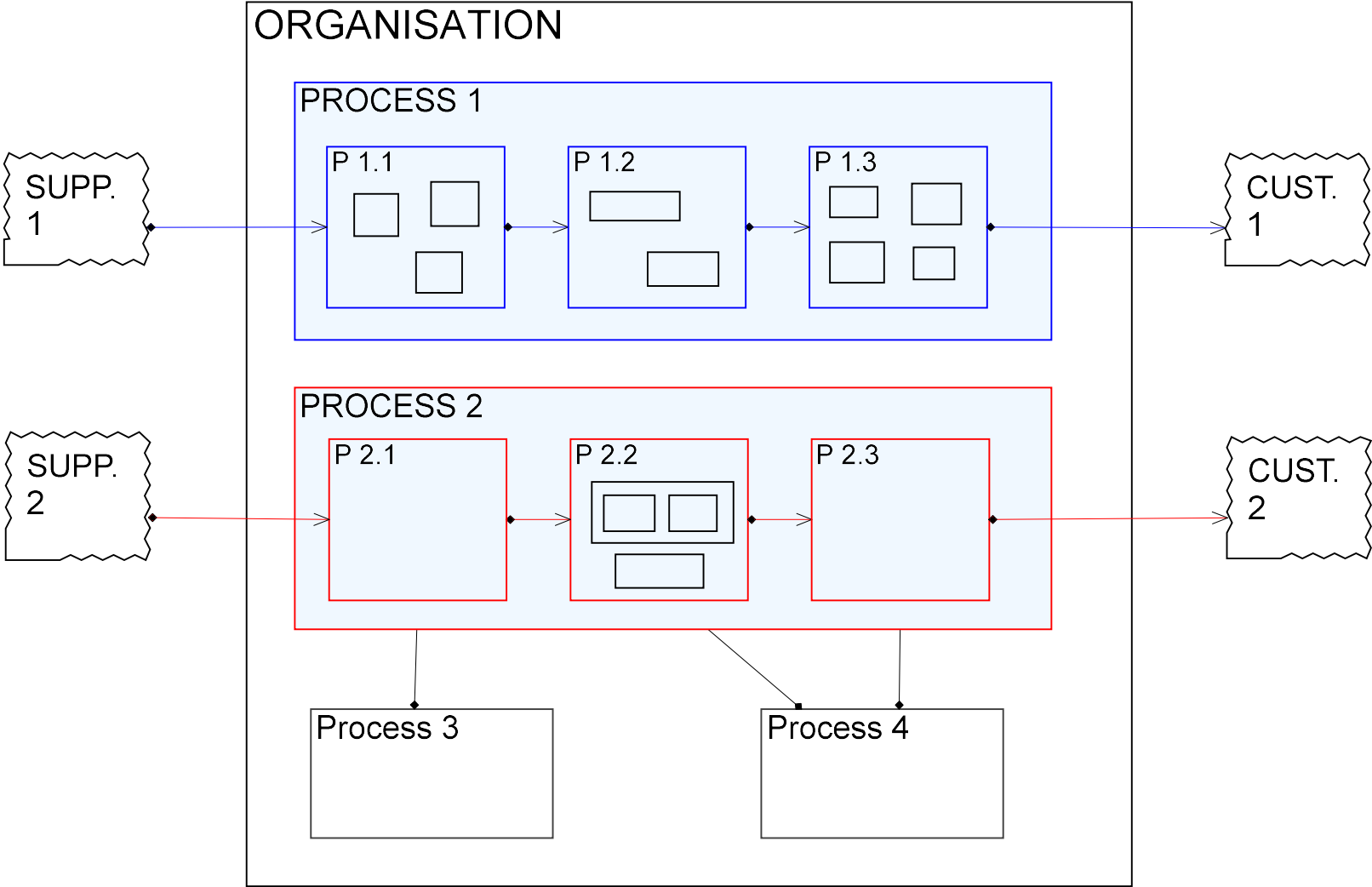
A Transformation of Inputs to Outputs

From end to end



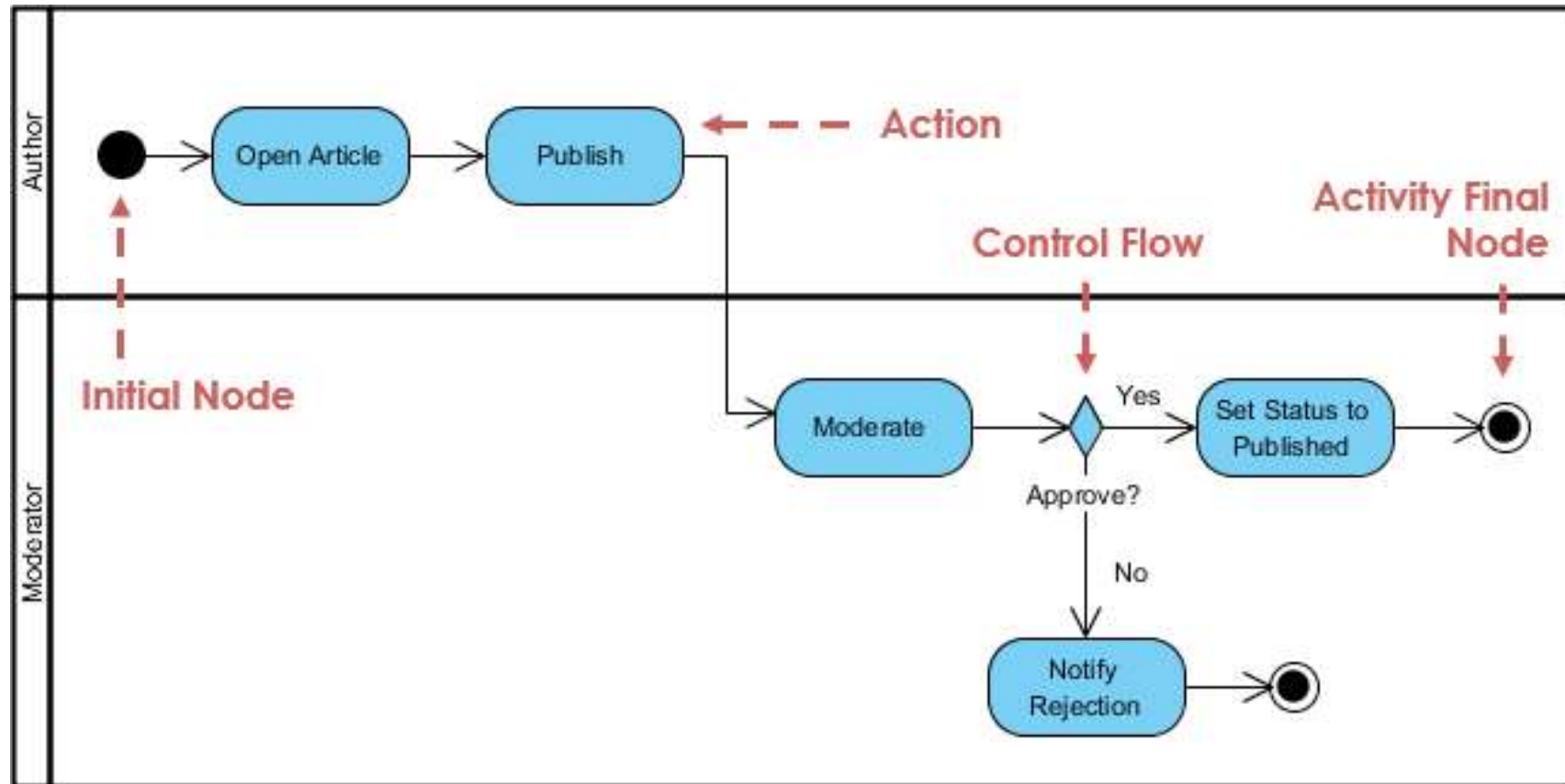
SIPOC model

The organization as a system of processes



Modeling Processes with UML

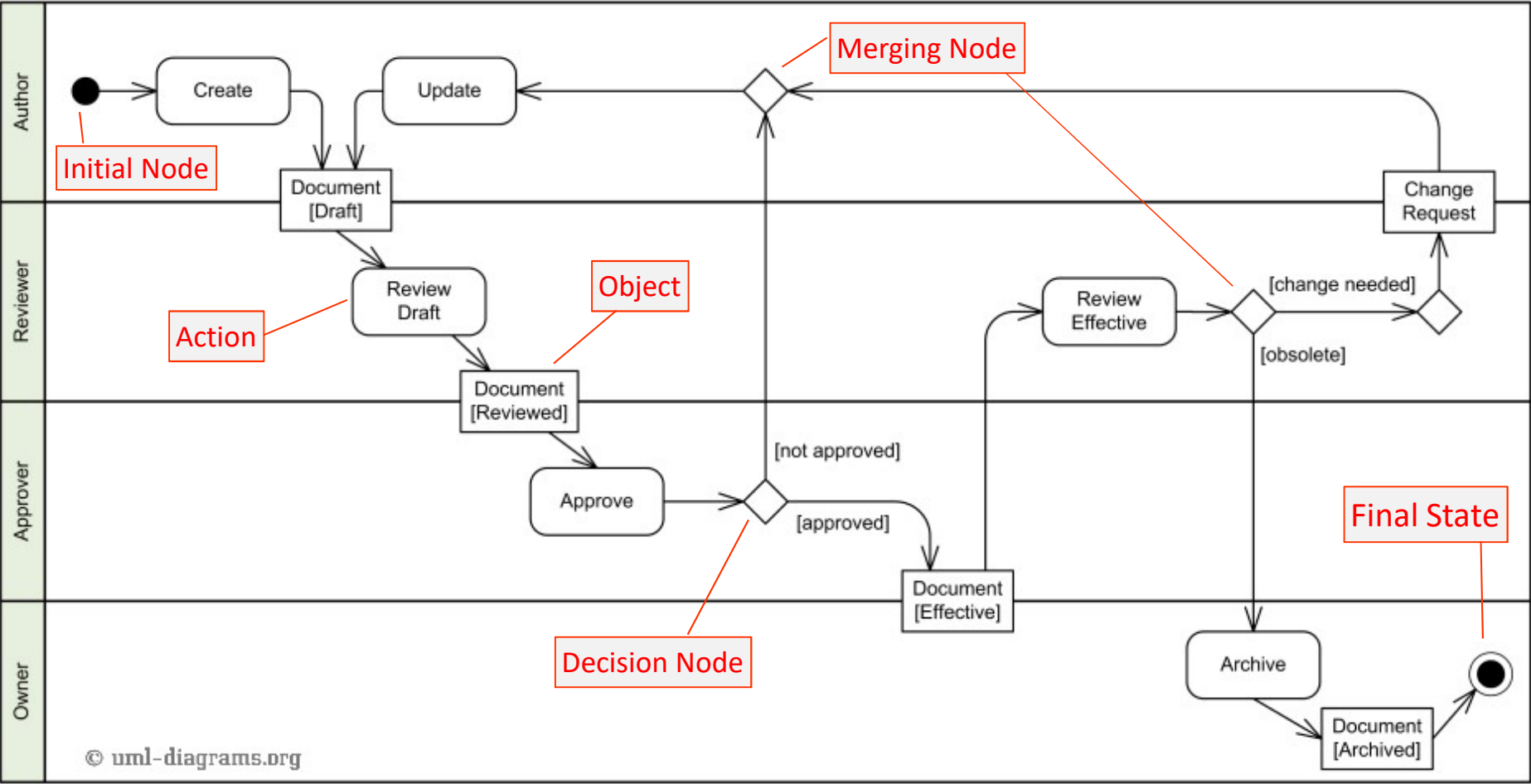
Activity Diagram



SOURCE: www.visual-paradigm.com/guide/uml-unified-modeling-language/uml-practical-guide

Modeling Processes with UML

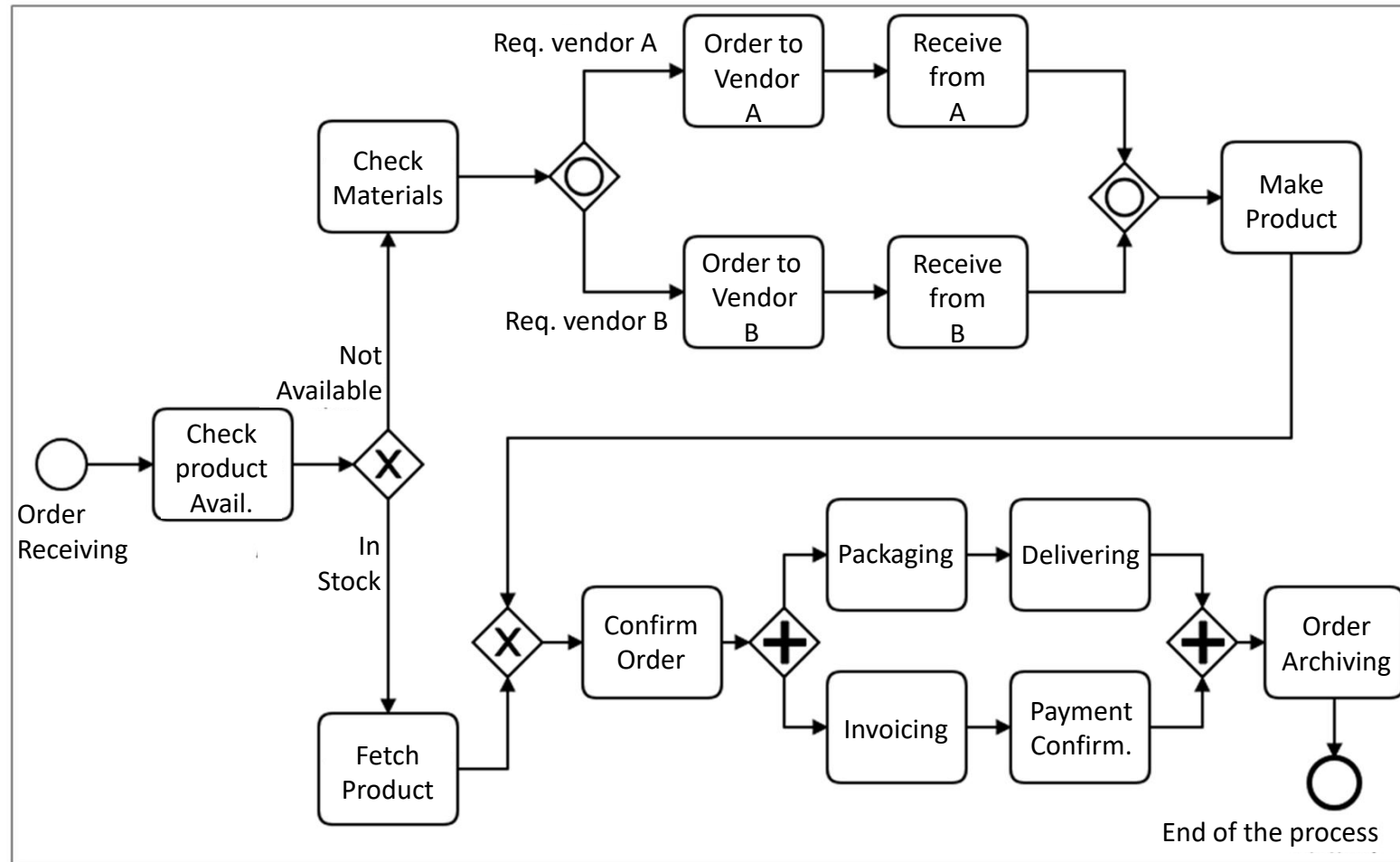
Activity Diagram



SOURCE: www.uml-diagrams.org/document-management-uml-activity-diagram-example.html

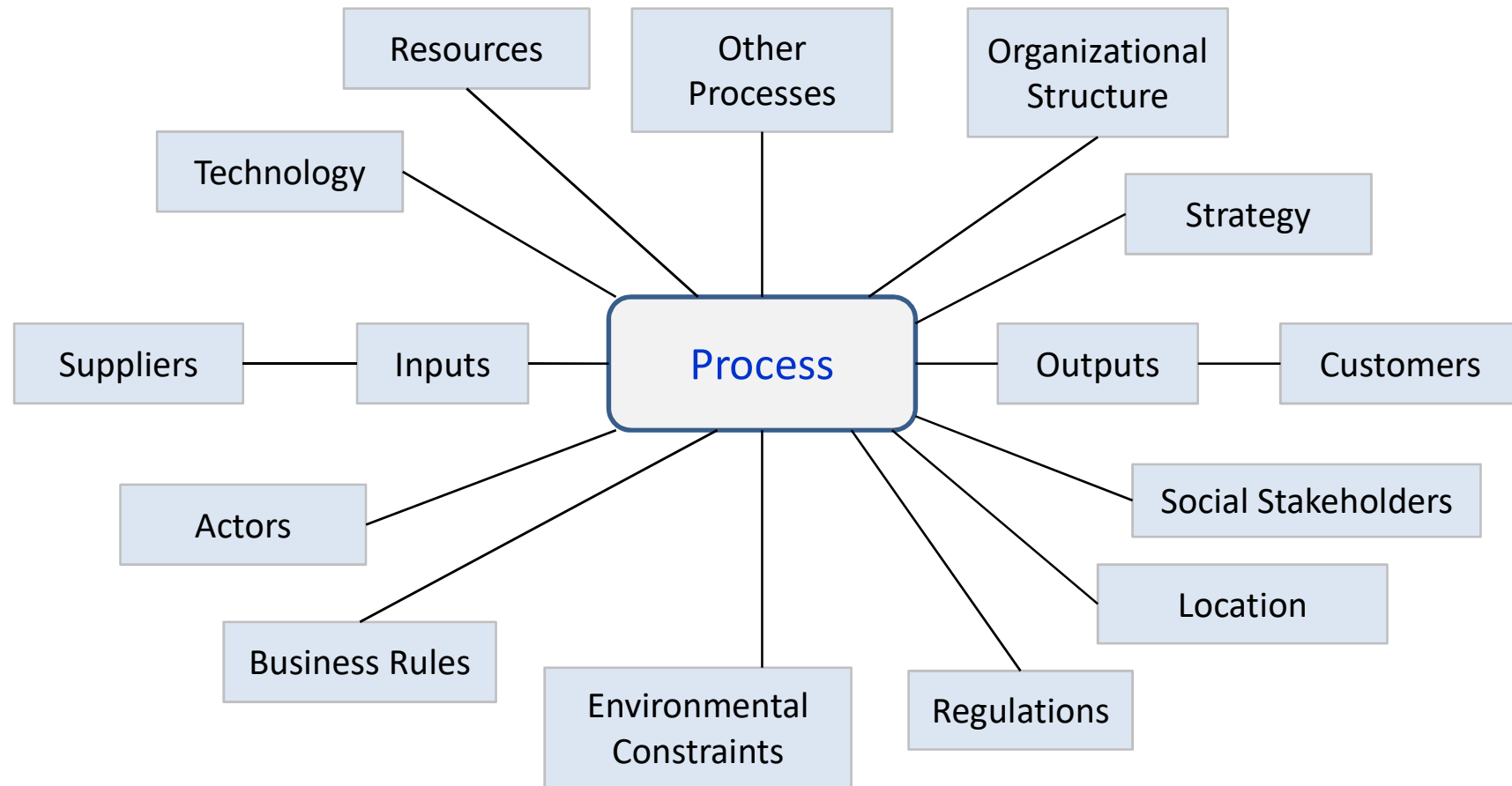
Modeling Processes with BPMN

Business Process Model and Notation (BPMN)



De facto standard for Business Process Modeling
 BPMN 2.0 (2011) , BPMN 2.0.2 (2014)
 ISO standard (**ISO/IEC 19510:2013**) since 2013

Context in Business Process Management



Context: the interrelated conditions in which a business process takes place

Business Process Context Classification

4 Types of Context

- Immediate context (elements directly related to the process)
- Internal context (internal environment of the organization)
- External context (beyond the organization)
- Environmental context (beyond the business network)

Rosemann, Recker, Flender, and Ansell (2006)

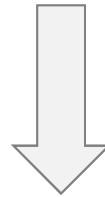
4 context dimensions (Situational factors classification)

- Contextual factors related to BPM goals
- Contextual factors related to processes
- Contextual factors related to the organization
- Contextual factors related to the environment

Vom Brocke, Zelt, Schmiedel (2016)

Context and BPMN

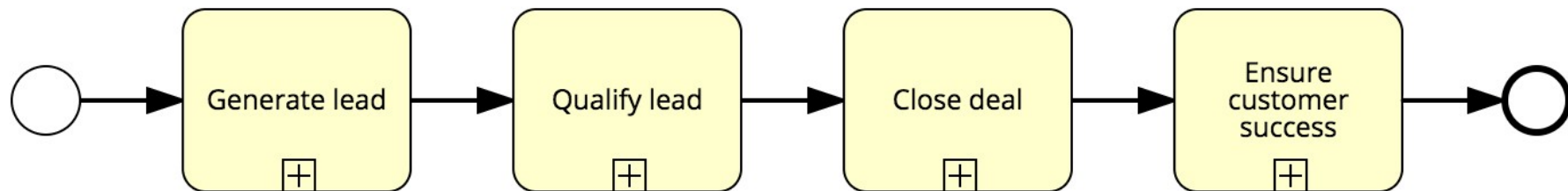
- Need to have context-awareness in business process design
- BPMN lacks supporting context representation
- Business process modeling is more than BPMN



Need to add a context background to a BPMN process model

Modeling Process Context Elements with Archimate #1

A simple process



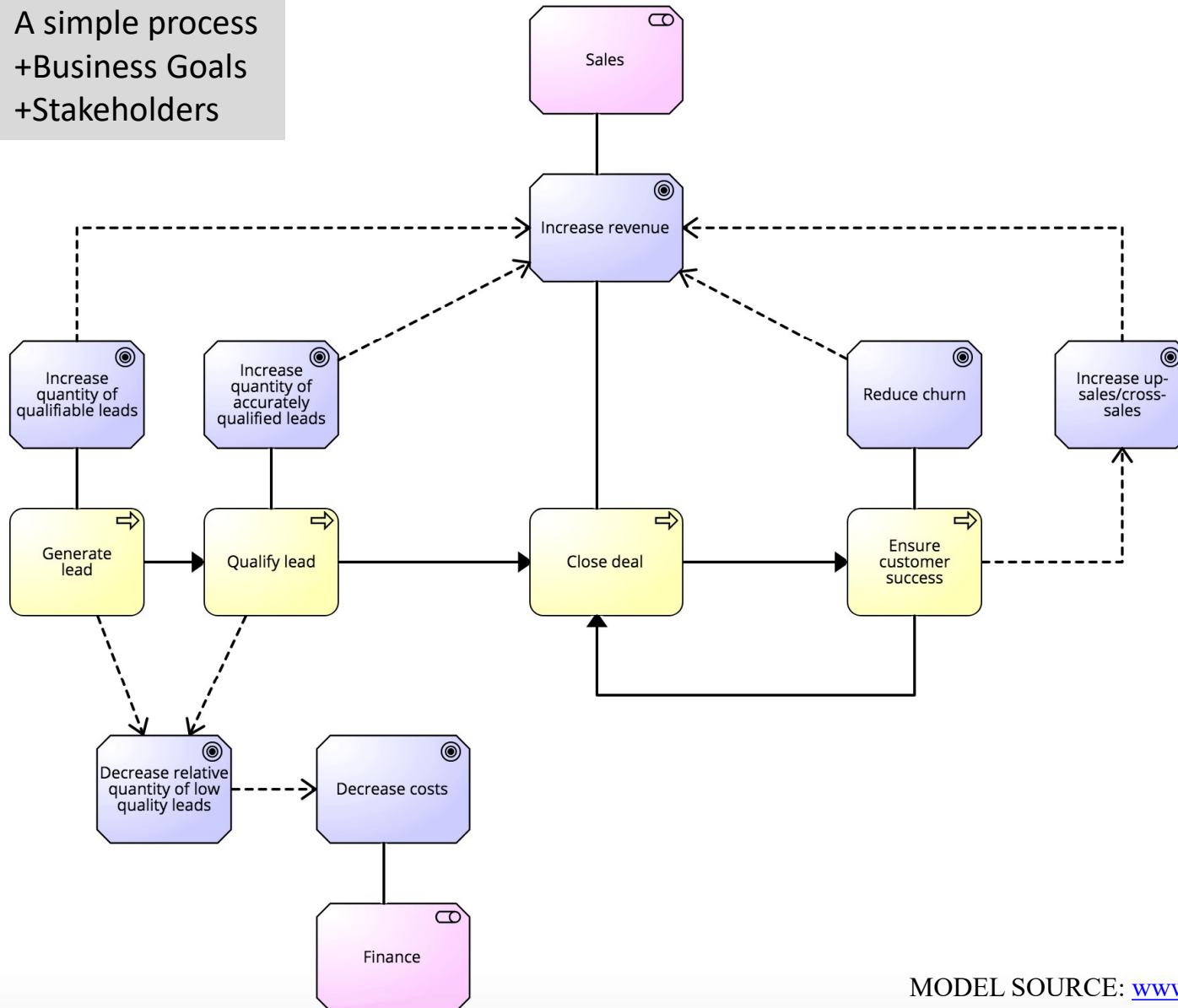
MODEL SOURCE: www.signavio.com

ArchiMate

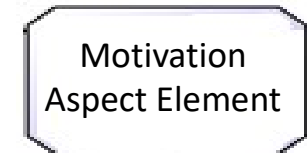
- A modelling technique (“language”) for modeling aspects of the enterprise architecture.
- A technical standard, created by the "Open Group" and supported by various tool vendors and consulting firms.

Modeling Process Context Elements with Archimate #2

A simple process
+Business Goals
+Stakeholders



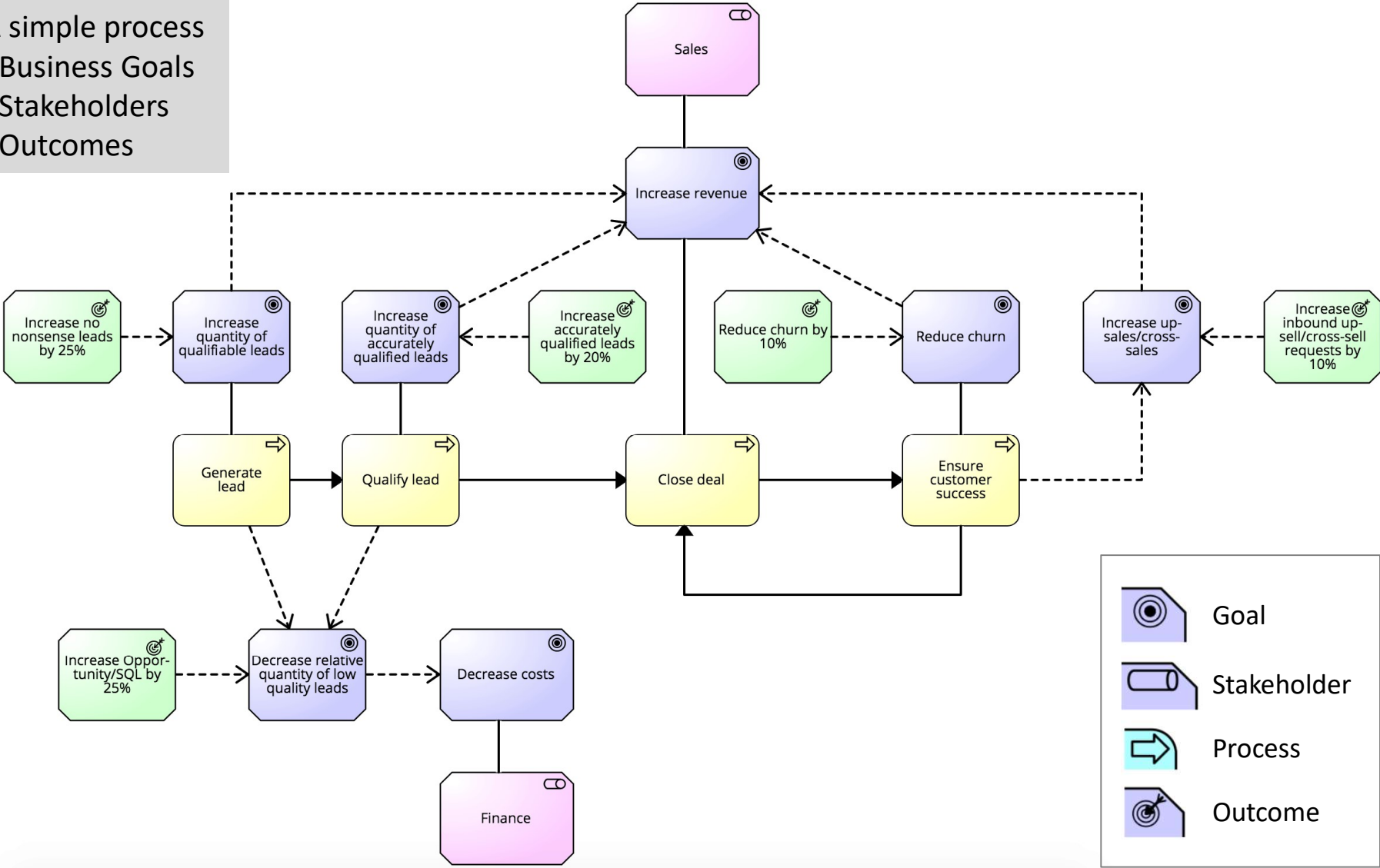
Archimate Notation



-  Goal
-  Stakeholder
-  Process
-  Outcome

Modeling Process Context Elements with Archimate #3

A simple process
+Business Goals
+Stakeholders
+Outcomes



MODEL SOURCE: www.signavio.com

Ten principles of good BPM – The systemic nature of BPM

* Systemic aspects

* 1. Principle of context-awareness

BPM should fit to the organizational context - It should not follow a cookbook approach

2. Principle of continuity

BPM should be a permanent practice - It should not be a one-off project

3. Principle of enablement

BPM should develop capabilities It should not be limited to firefighting

* 4. Principle of holism

BPM should be inclusive in scope - It should not have an isolated focus

* 5. Principle of institutionalization

BPM should be embedded in the organizational structure - It should not be an ad-hoc responsibility

* 6. Principle of involvement

BPM should integrate all stakeholder groups - It should not neglect employee participation

* 7. Principle of joint understanding

BPM should create shared meaning - It should not be the language of experts

* 8. Principle of purpose

BPM should contribute to strategic value creation - It should not be done for the sake of doing it

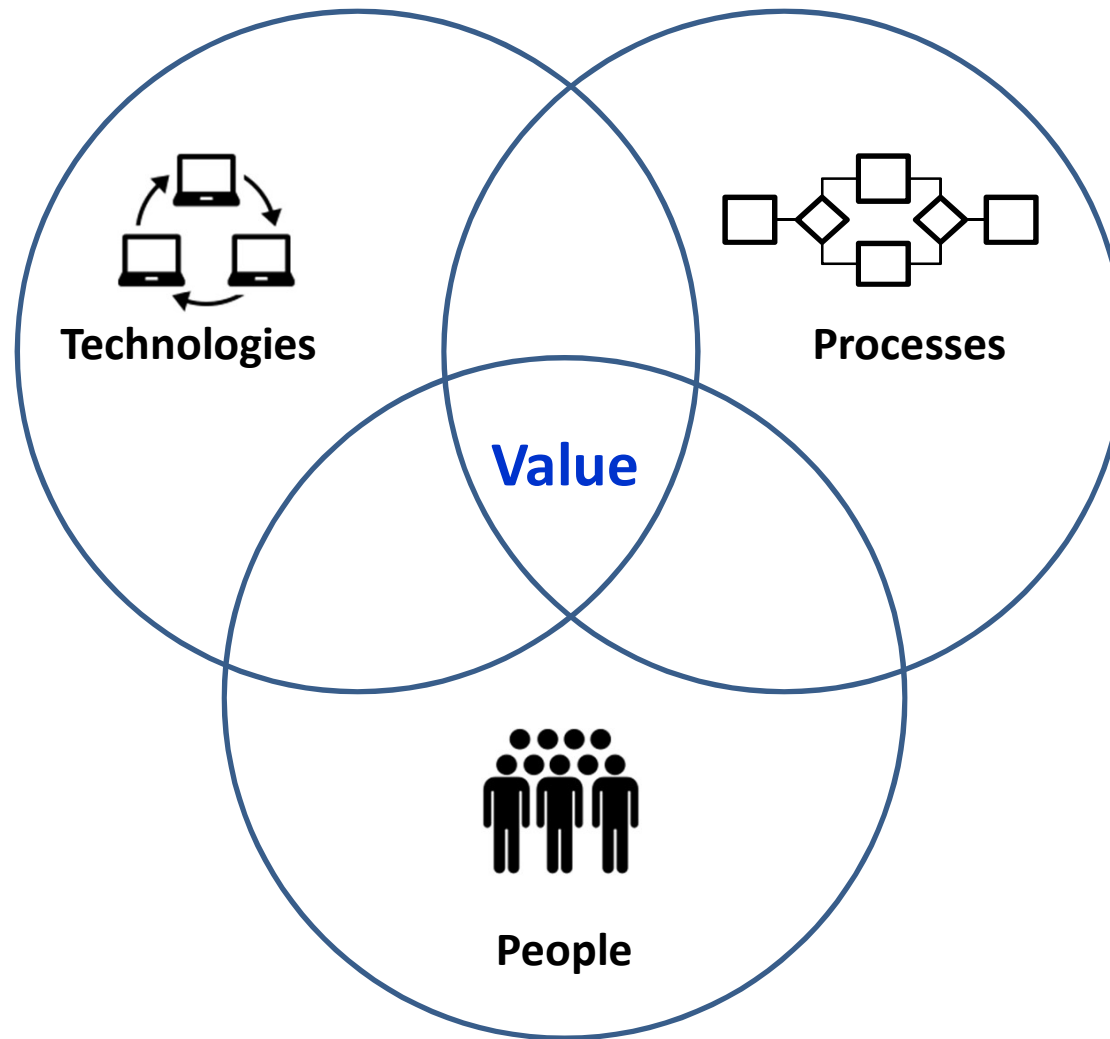
* 9. Principle of simplicity

BPM should be economical - It should not be over-engineered

10. Principle of technology appropriation

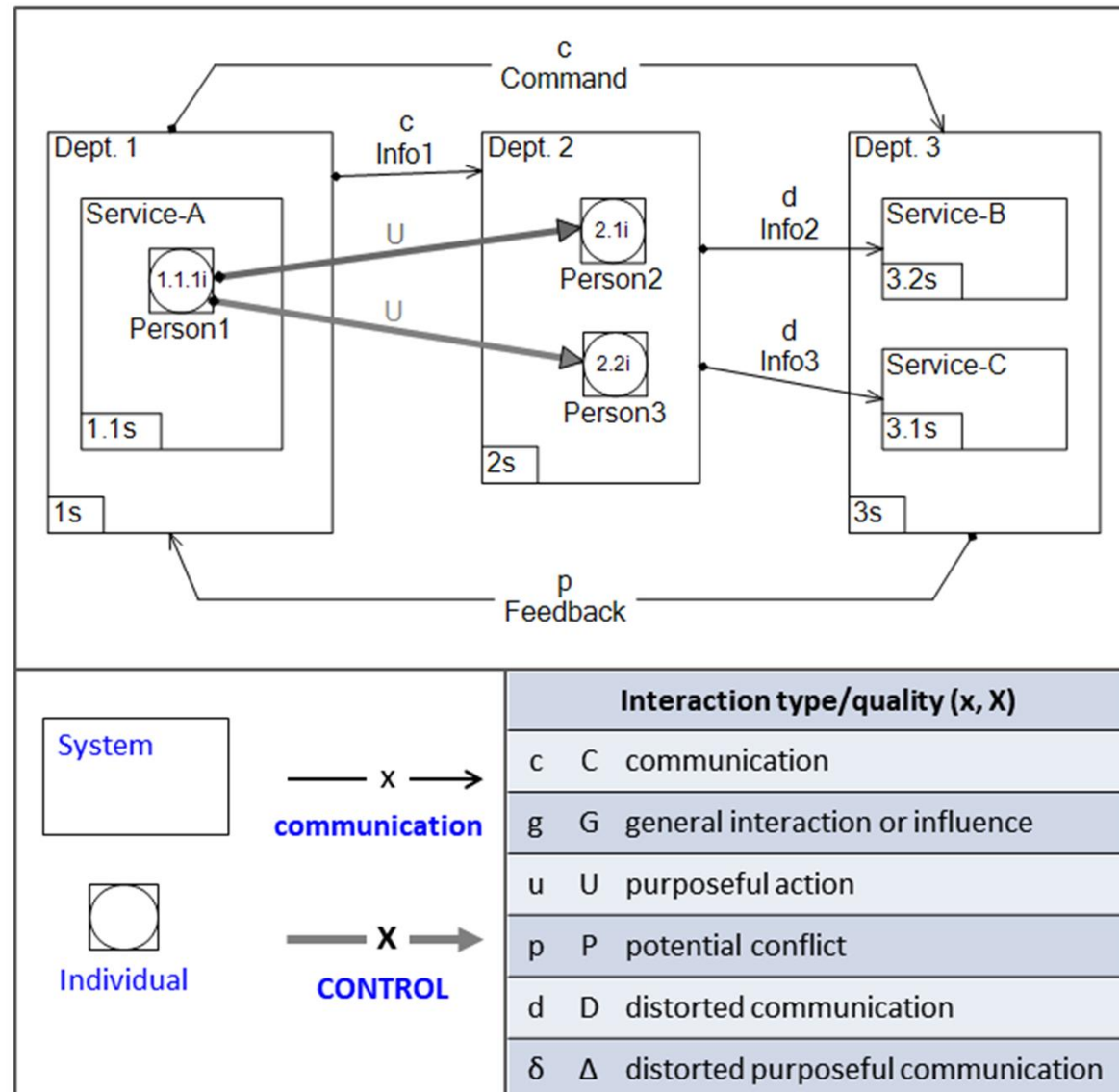
BPM should make opportune use of technology - It should not consider technology management as an after-thought

Need for Systemic Approach



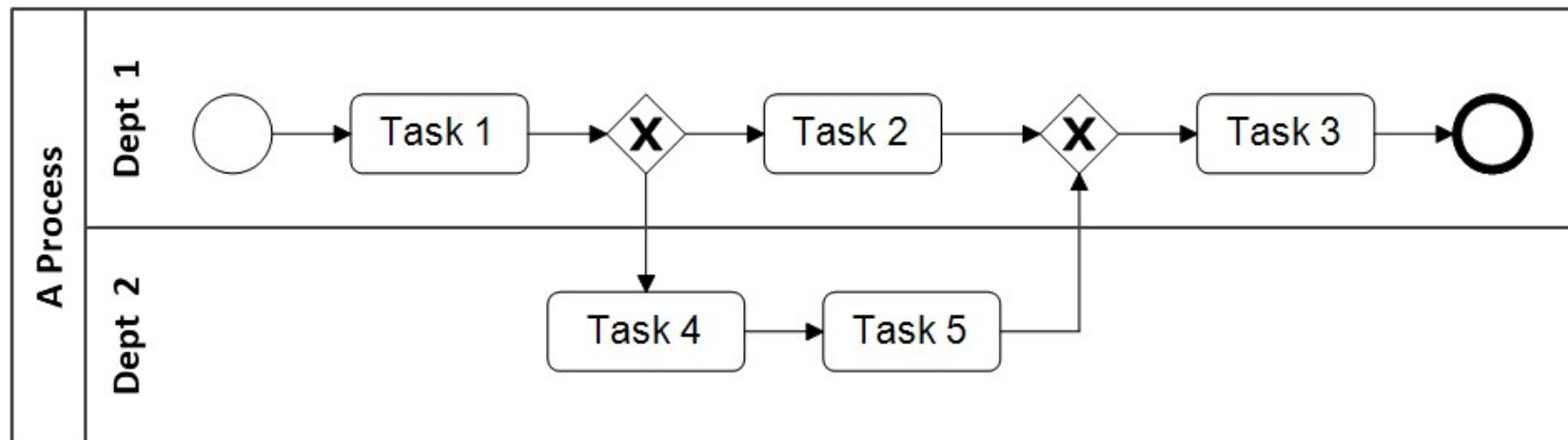
Systemic Modeling

Design & Control Systemic Methodology (DCSYM)



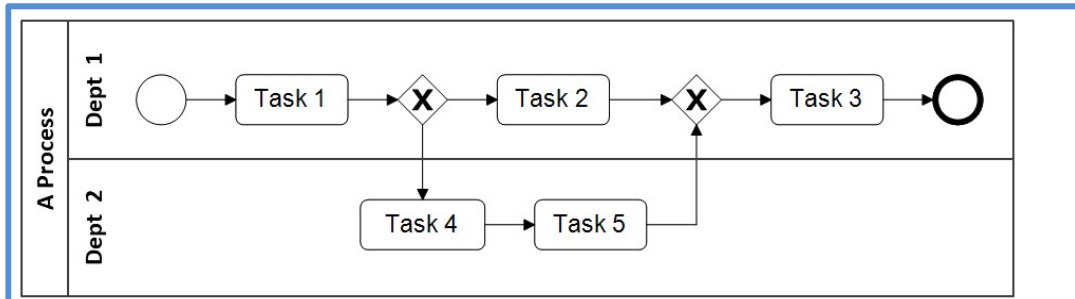
A simple process

Dept 1 and Dept 2 can be seen as context elements (resources)

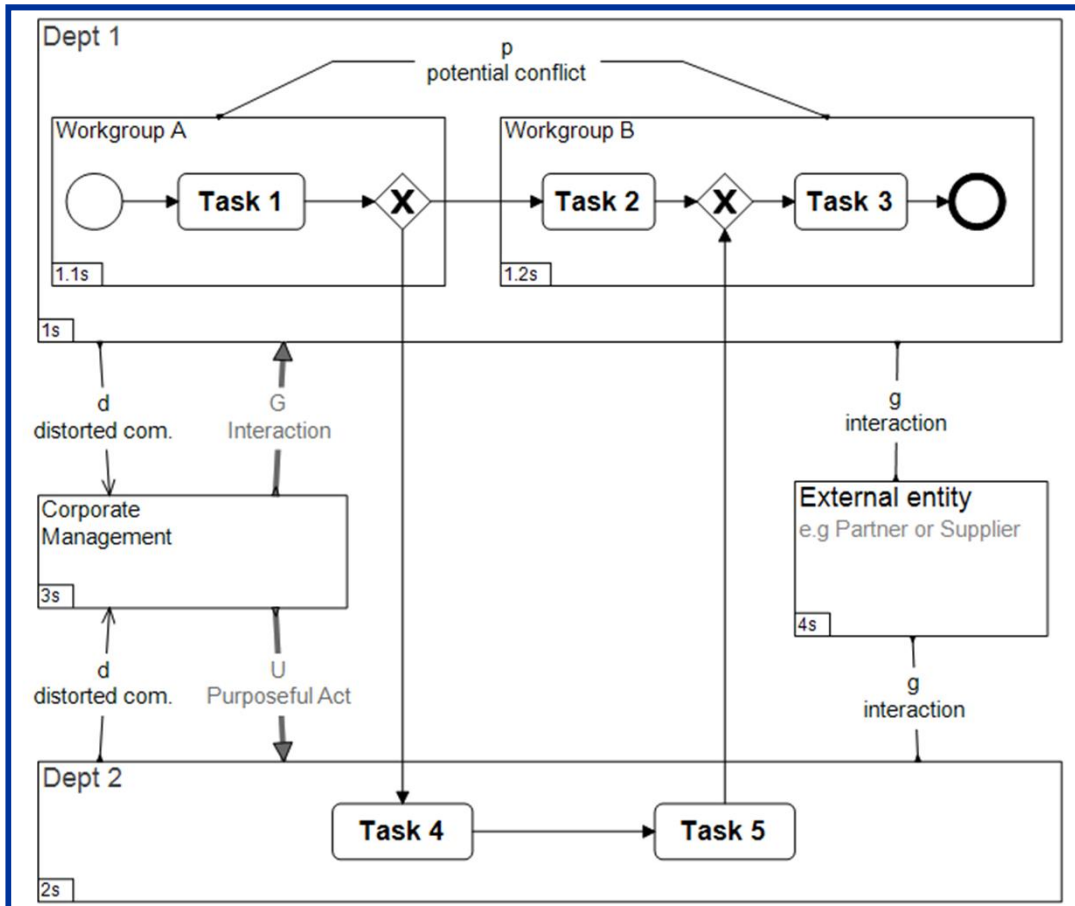


BPMN with DCSYM to model the context

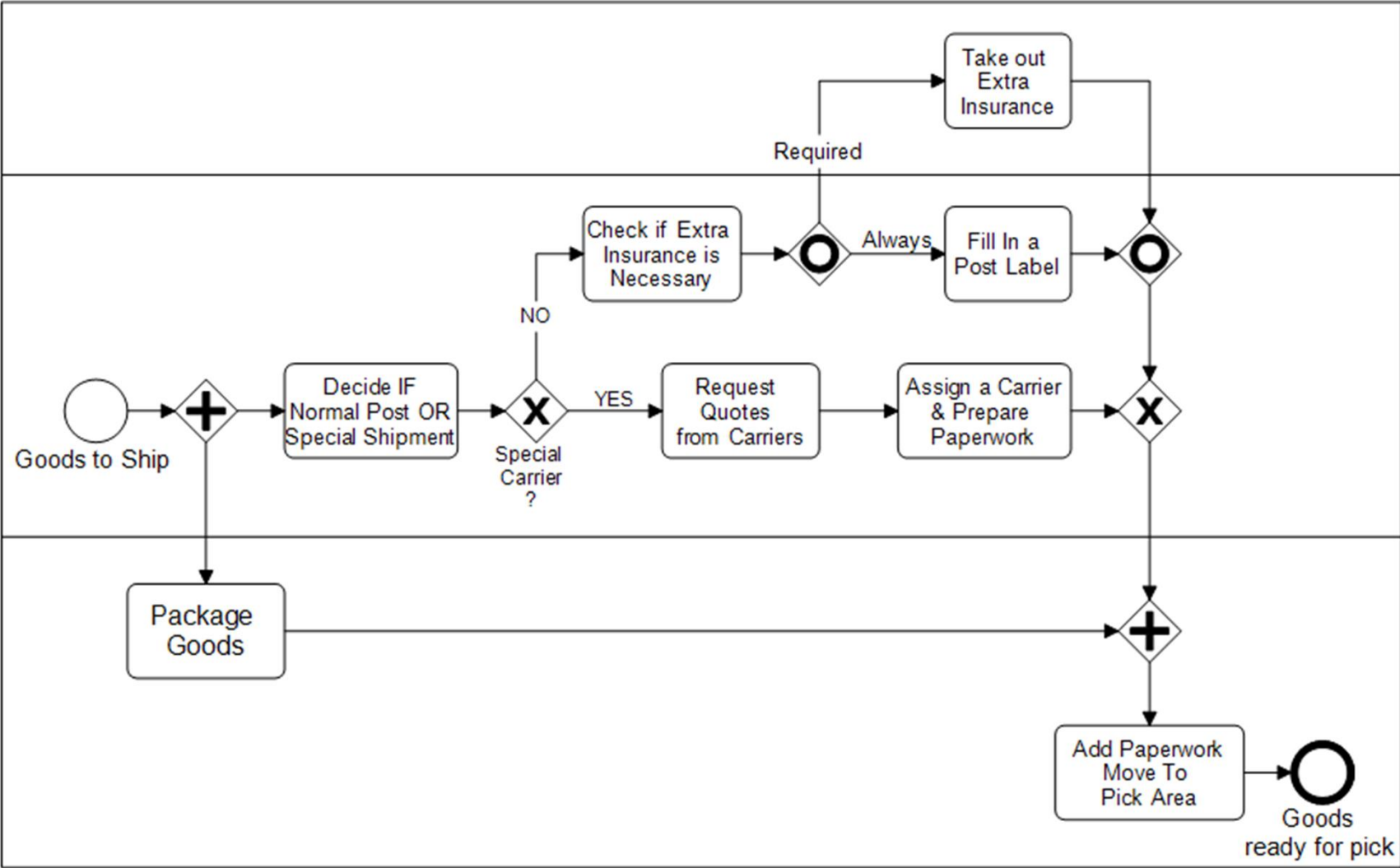
The Simple Process in BPMN



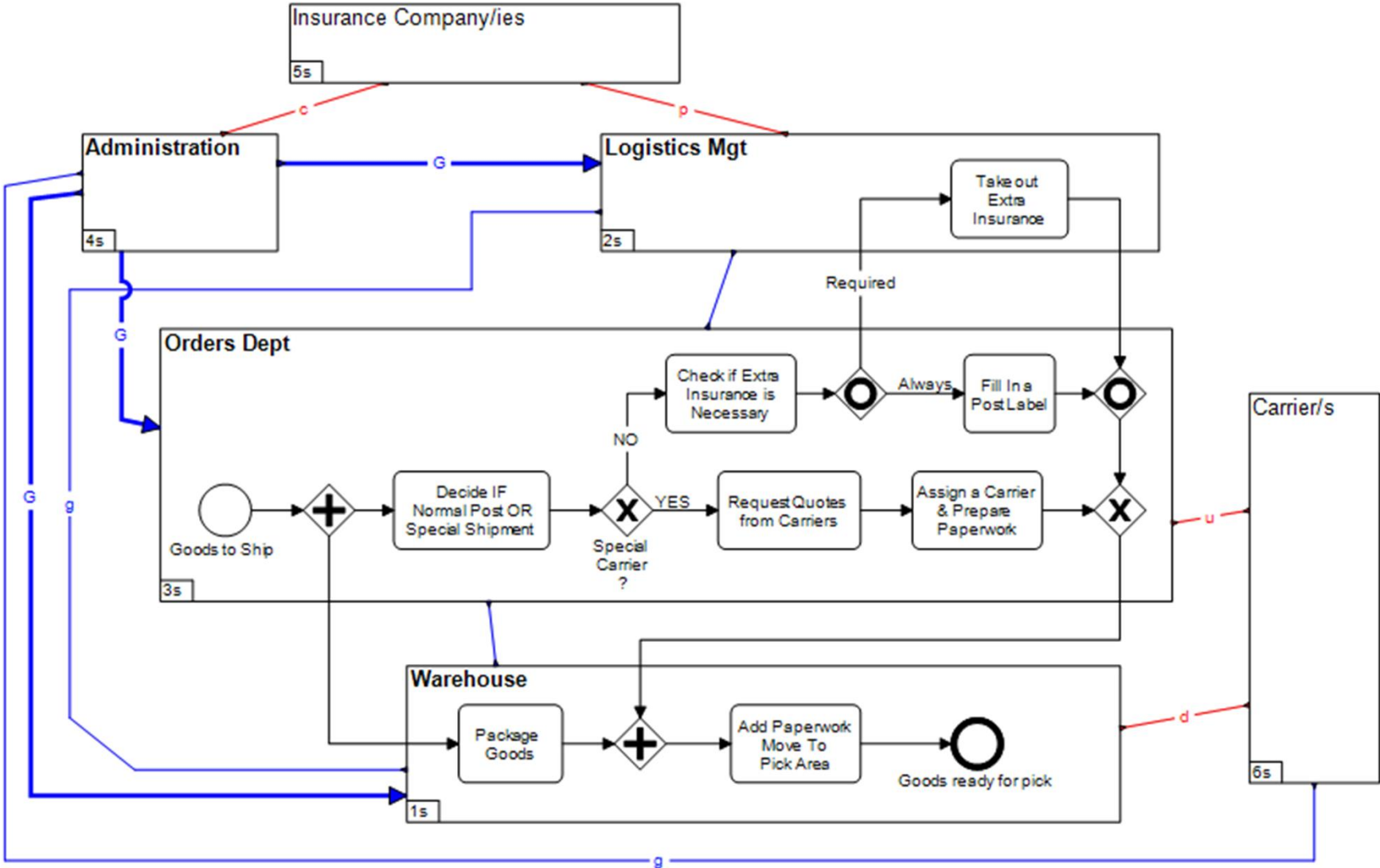
The Simple Process in Context. Context is modeled in DCSYM. More context information is provided. The context is in a systems perspective (systems, subsystems, relations among them).



Example 2 (shipment process) in BPMN



Example 2 (shipment process) – BPMN in context with DCSYM



Benefits of placing the process in the systemic context

The systemic context reveals:

- The big picture of the process
- How the process fits into the organization
- The relation to the strategic goals of the organization
- The relation to the IT Systems of the organization

Implications in:

- Process design
- Process execution (performance)
- Process improvement
- Business-IT alignment
- Preventing malfunctions
- Analyzing incidents

Discussion

- ✓ Bridging systems approach and BPMN.
- ✓ A systemic aspect of business process management.
- ✓ Approach proper for simple, non-executable, private (internal) processes (process orchestration), without lanes.
- ✓ Complex drawings but this is an issue even in BPMN.
- ✓ Reduced BPMN precision
but drawings enrichment with System-Subsystems concept and the relations among them.

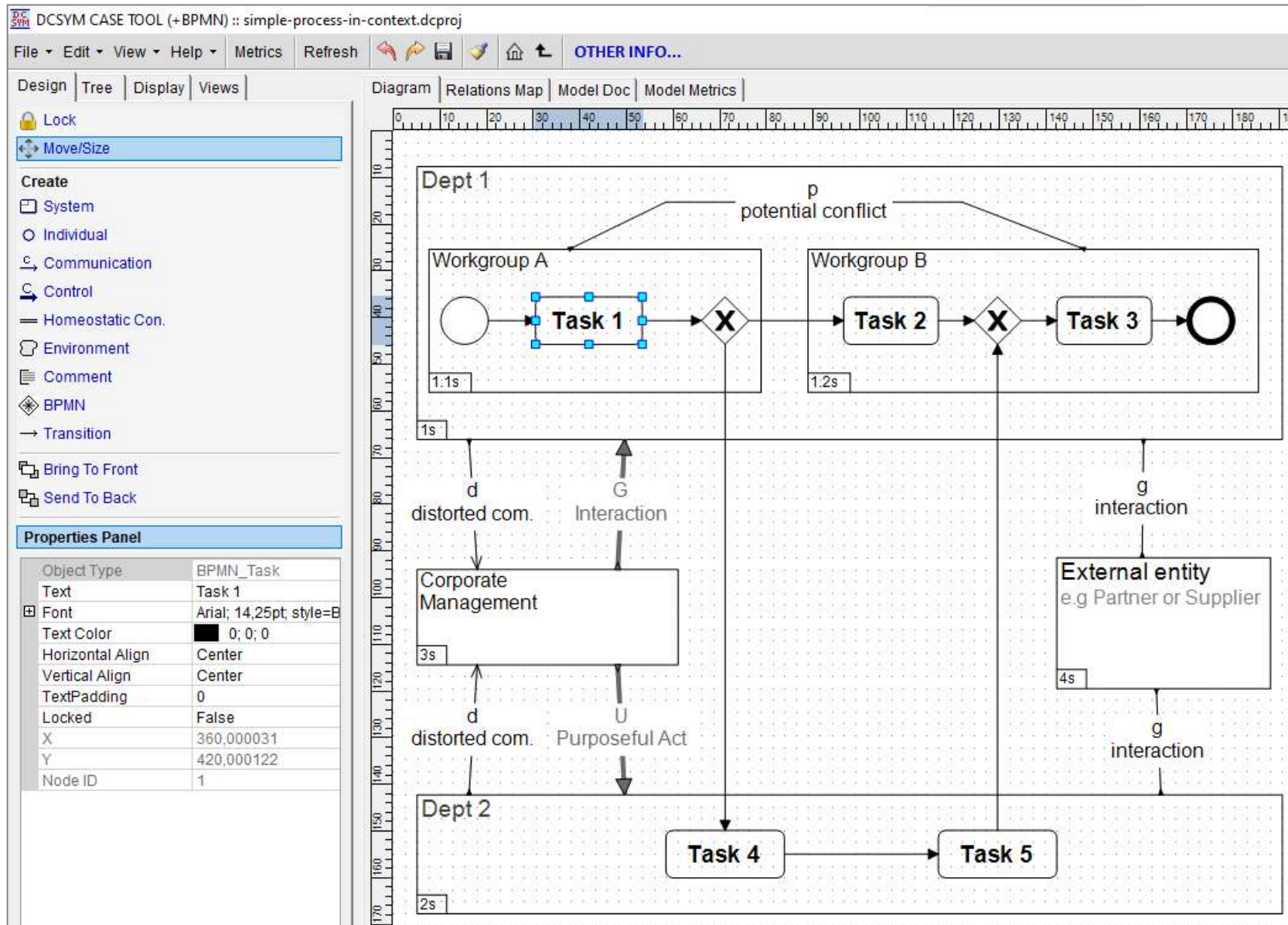
Software to combine BPMN with DCSYM

DCSYM CASE TOOL (+BPMN)

www.systemsandcomplexity.com/dcsym-case-tool/download-dcsym-case-tool-bpmn

DOI: 10.5281/zenodo.6757515

DCSYM CASE TOOL (+BPMN) screenshots



DCSYM CASE TOOL (+BPMN) screenshots

DCSYM CASE TOOL (+BPMN) :: Shipment-Process-BPMN.dcpj

File - Edit - View - Help - Metrics Refresh

Design Tree Display Views

Diagram Relations Map Model Doc Model Metrics

Lock Move/Size

Create System Individual Communication Control Homeostatic Con. Environment Comment BPMN Transition Bring To Front Send To Back

Properties Panel

Object Type	DIAGRAM SURFACE
Model Name (opional)	main
Smoothing Mode	HighQuality
Show Grid	True
Grid Color	140; 140; 150
Grid Style	Points
Grid Size X	30
Grid Size Y	30
Align To Grid	True
Lines Crossing Style	Arcs
Crossing Arc Radius	20

```
graph TD
    subgraph Orders_Dept [Orders Dept]
        Start(( )) --> G1{+}
        G1 --> D1[Decide IF Normal Post OR Special Shipment]
        D1 --> G2{X}
        G2 -- NO --> G1
        G2 -- YES --> T1[Request Quotes from Carriers]
        T1 --> T2[Assign a Carrier & Prepare Paperwork]
        T2 --> G3{X}
    end
    subgraph Warehouse [Warehouse]
        T2 --> G4{+}
        G4 --> T3[Add Paperwork Move To Pick Area]
        T3 --> End(( ))
    end
    subgraph Logistics_Mgt [Logistics Mgt]
        G3 --> T4[Take out Extra Insurance]
        T4 --> G5{O}
        G5 --> T5[Fill In a Post Label]
        T5 --> G6{O}
        G6 --> G4
    end
    G1 --> T6[Package Goods]
    T6 --> G4
```

Logistics Mgt

Orders Dept

Warehouse

Goods to Ship

Decide IF Normal Post OR Special Shipment

Special Carrier ?

Request Quotes from Carriers

Assign a Carrier & Prepare Paperwork

Check if Extra Insurance is Necessary

Required

Always

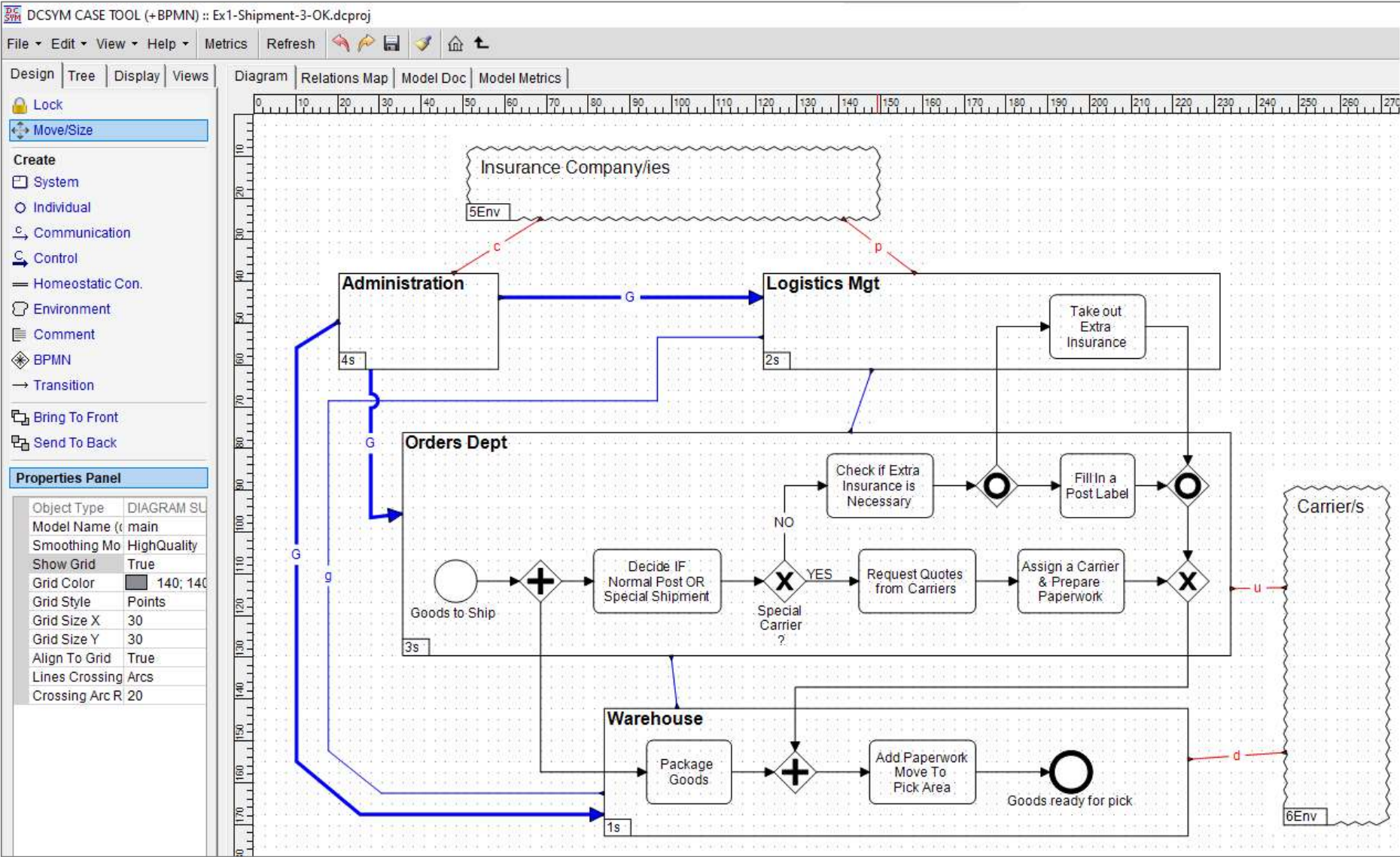
Fill In a Post Label

Take out Extra Insurance

Add Paperwork Move To Pick Area

Goods ready for pick

DCSYM CASE TOOL (+BPMN) screenshots



www.systemsandcomplexity.com/dcsym-case-tool/download-dcsym-case-tool-bpmn

Systems and Complexity

A Systemic World

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Interesting Links

Contact

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Important notice:

DCSYM CASE TOOL is a Windows™ application. It only runs on Windows operating system.
DCSYM CASE TOOL BPMN latest version: [5.3.1.0]

Download DCSYM CASE TOOL BPMN setup

To install or update **DCSYM CASE TOOL BPMN** in your computer:

(in case of updating make sure that the DCSYM CASE TOOL application is closed)

See also:

[DCSYM](#)

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Dumas, M., La Rosa, M., Mendling, J., & Reijers, H. A. (2018). Introduction to business process management. In *Fundamentals of business process management* (pp. 1-33). Springer, Berlin, Heidelberg.

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