

Multi-Level Delegation for Flexible Business Process Modeling

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Outline

1. Findings and requirements on BP flexibility
2. The framework **C_xRB²PM²**
Context-aware Role Based BP Modeling & Management
3. **C_xDM** : Context-aware multi-level Delegation Model
 - 3.1. Requirements on delegation
 - 3.2. The delegation model **C_xDM**
4. Conclusion and future work

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1. Requirements of flexibility

2. The framework $C_xRB^2PM^2$

Context-aware Role Based BP Modeling & Management

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3.1. Requirements on delegation

3.2. The delegation model C_xDM

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Requirements of BP flexibility

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Why is flexibility required ?

- Environment is **distributed, changing, competitive**
- Customers demand **rapidity** and **quality** of products and services
- Users require **autonomy**
- Economic **growth**
- **ICT expansion** (Information and Communication Technology)

How is Flexibility reached ?

- **Decentralized** and **expanding** firms
- **Decentralized decision making**
- **Adaptation** of BPs to the **actual** and **current context**

Which mechanisms provide flexibility ?

- **Context-awareness** reasoning
- **Reuse** of process chunks
- **Delegation** of responsibility and work

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Motivation

- “BP is a set of one or more linked procedures or activities that collectively realize a business objective or policy goal, normally within the context of an organizational structure defining functional roles and relationships”. [WfMC,95]
- Techniques for modelling BP:
 - Input-process-output, Conversation-based, System dynamics, Constraint-based representations, ...

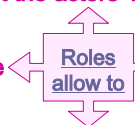


□ **Techniques based on role modelling** → more expressive

For what reasons ?

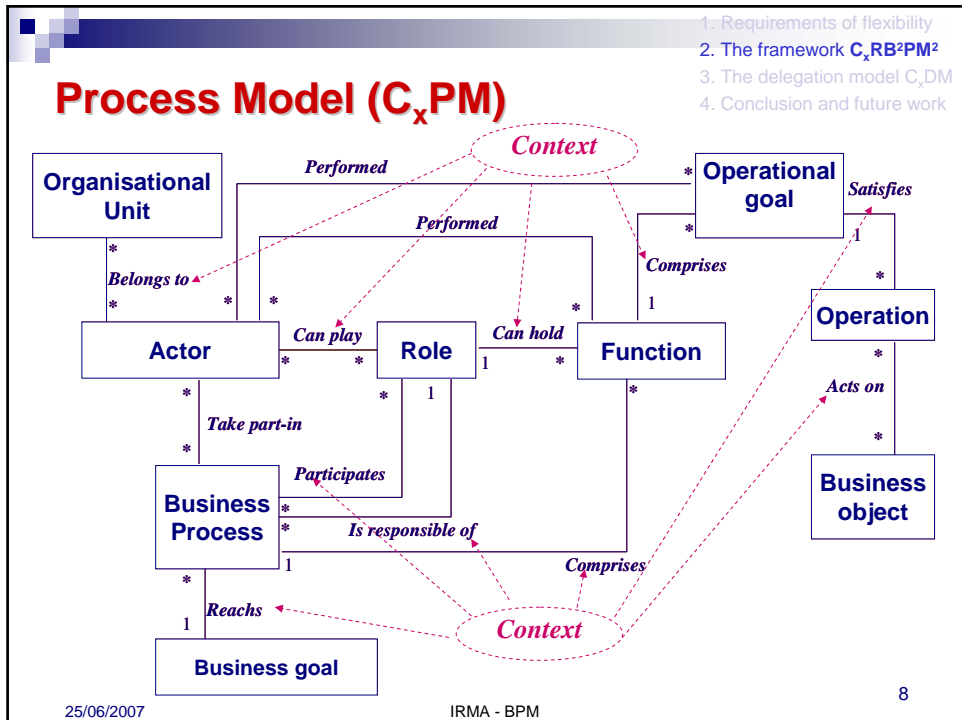
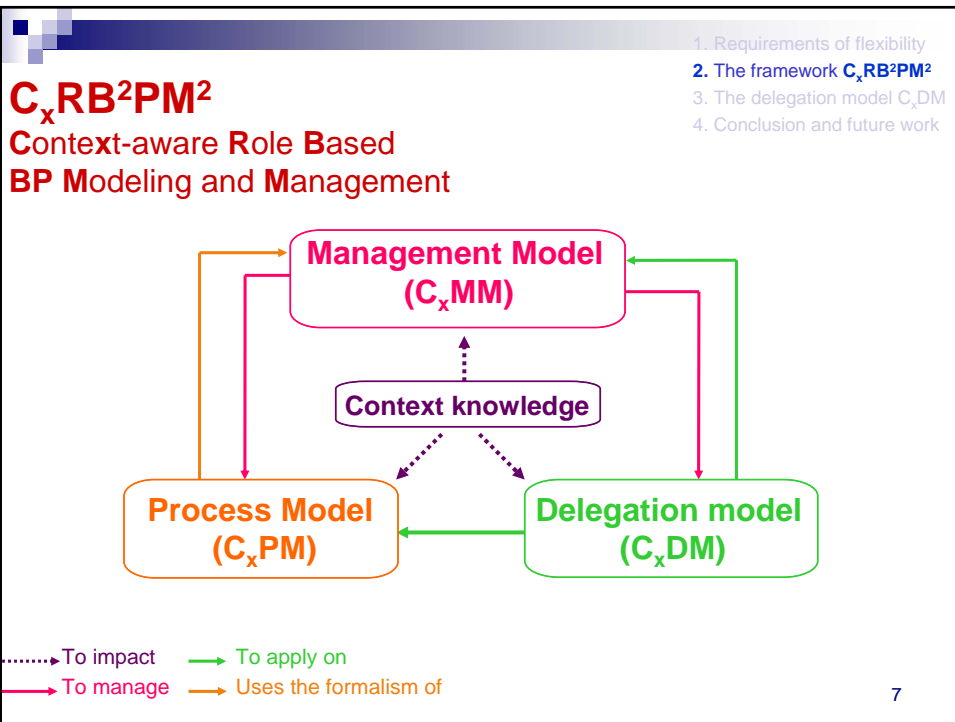
Highlight the actors' responsibilities

Reflect the organisational structure



Support of SOD principle

Better understand the way of assigning responsibilities to actors



“Context”

Lenat, 1998 characterises the context in the domain of artificial intelligence by a space that includes a number of dimensions or parameters (e.g. “time”, “location”).

“any information that can be used to characterize the situation of entities that are considered **relevant to the interaction between a user and an application**, including the user and the application themselves” [Dey et al. 2001]

Maus, 2001 introduces parameters for a workflow context space.

A **role-based** definition: “context is an operational term, something is context because of the way it is **used in interpretation**, not due to its inherent properties” [Winograd 2001]

A BP context : “The minimum of variables containing **all relevant information that impact the design and execution** of a BP” [Roseman, & Recher, 2006]

→ Any information reflecting changing circumstances during the execution of a BP can be considered as contextual information. We define the context as: “**the collection of assumptions that is required to activate accurate assignments in the BP model at the process instance level**”.⁹

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Discussion on $C_xRB^2PM^2$

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User has {
Requirements
Points of view and preferences
A decision-making capability

Exhaustive policies specifying :
- How they should behave and proceed
- To which role actors are assigned

reduce autonomy
and efficiency of the user

→ Users have to contribute in the definition and the management of BPs based on their experience and competency (Saidani et Nurcan, 2007c)

→ Rather than fully developing policies → providing the ability of delegation

Need for an effective delegation model

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Requirements of delegation

- Decentralization of the control and the decision-making
- Collaborative work
- Separation of duties (SoD)
- Unforeseen circumstances
- Lack of resources

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Related work on delegation

- User-to-machine (Gasser and McDermott, 1990)
- Machine-to-machine (Henry and Gladny, 1997)
- Process-to-process (Nagaratnam and Lea, 1998)

Context of use :

- Distributed software process management (Becker et al., 2001)
- Security (Barka and Sandhu, 2000)

Delegation is often defined as a substitution mechanism of all or a subset of actor's roles to one or more other actors, or the ability of a user to delegate to another user some permissions related his/her role or tasks.

Facets of delegation

- ✦ **What** is the delegated responsibility ?
- ✦ **Who** delegates the responsibility ?
- ✦ To **Whom** the responsibility is delegated ?

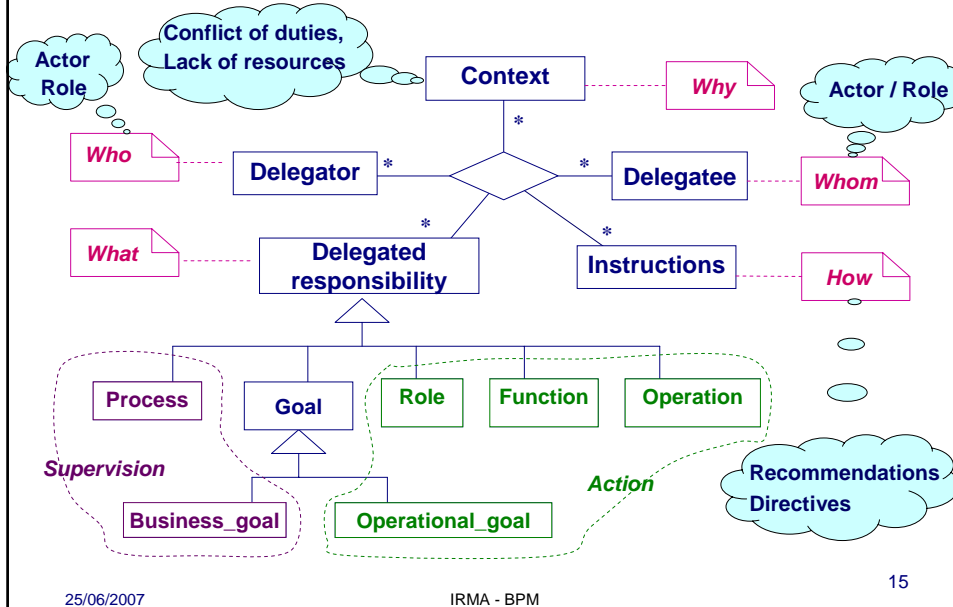
Our contribution : **WHY** and **HOW**

Why delegation take place ?

How the delegation is done ?

Meta-model for C_xDM

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Formal representation of C_xDM

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Can-delegate (*Delegator, Delegatee, Delegation-unit, Context, Instructions*)

- ▶ Actor-to-Actor
 - ▶ Actor-to-Role
 - ▶ Role-to-Role
- The delegatee should be able to perform responsibilities / Work associated with the delegation-unit

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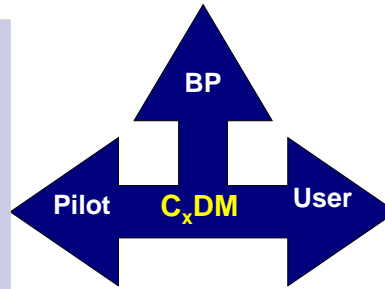
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Contribution of C_xDM

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Flexibility and adequacy
Easiness to align BPs / IS and BPs / Strategies

- The development of BP policies is simplified
- Significant BP rules are specified on a coarse-grained level
- Fine-grained rules are delegated to users
- Decision-making decentralization
- Context knowledge helps to make decisions



- Users are autonomous and decide on –some- operational aspects of their work
- Users define how tasks should be achieved and by whom

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Conclusion

- Importance of delegation in the flexibility and effectiveness of business processes,
- The framework $C_xRB^2PM^2$ (Context-aware Role Based BP Modeling & Management)
 - A Process Model : C_xPM (Context-aware Process Model)
 - A Delegation Model : C_xDM (Context-aware multi-level Delegation Model)
 - A Management Model : C_xMM (Context-aware Management Model)
- C_xDM (Context-aware multi-level Delegation)
 - Requirements of delegation
 - Facets of delegation
 - Multi-level delegation

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Future work

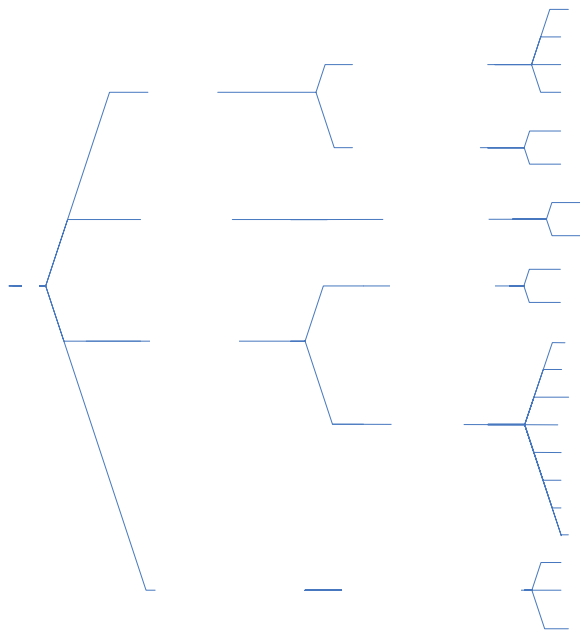
- Delegation in the context of inter-organizational collaborative work
- Delegation management
- Guidelines to help delegator to select the most appropriate delegatee to assume a responsibility in a given context
- Revocation of the delegation
- Transitive delegation
 - The delegatee can delegate some of these responsibilities to other roles/actors

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Thank you for your attention

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Characteristics of a Business Process

- Processes have 'customers'
- 'Customers' may be internal or external
- Processes have well identified outcomes which are received by 'customers'
- Processes have goals (what the business is trying to achieve)
- Processes are manifestations of what 'actors' do to achieve the goals
- Processes cross organisational boundaries; actors interact and collaborate