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Process-Decision Integration:
An overview of different scenarios

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Decision Camp 2017

Faculty of Economics and Business

EFMD EQUIS ACCREDITED

Inconsistency

Cambridge Dictionary

a situation in which two things do not match and are opposed.

Agenda

- Consistency in decision and process modeling
- Process-Decision Continuum
- Consistent process-decision integration: Universe of Discourse
- Potential Inconsistencies
- Guidelines

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How to obtain correct decision/process models

- *Testing?*
- *Verification*
- *Experience?*
- *Validation tools?*
- *Smart modelers?*

Lessons from decision table methodology and experience:

The best way to obtain correct models ...

is to make it impossible/hard to build incorrect models!

=> Consistency by design

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Consistency in decision table modeling

- Obtained by avoiding inconsistency in the table
  - Which is obtained by avoiding redundancy in the table
  - Redundancy is not inconsistent, but often leads to inconsistency (like in databases)
- DMN hit policies solve potential inconsistencies by choosing the rule that hits if more than one rule matches
  - At least then it is clear to the reader/execution engine
  - But it is still possible that more than one rule matches (A, P, F)
  - The result is consistent, but there is always the risk that updates are inconsistent, that the hit policy is misunderstood, that the modeler is confused, that redundancy creeps in, …

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Process-Decision Continuum

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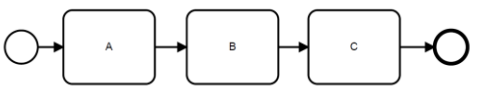
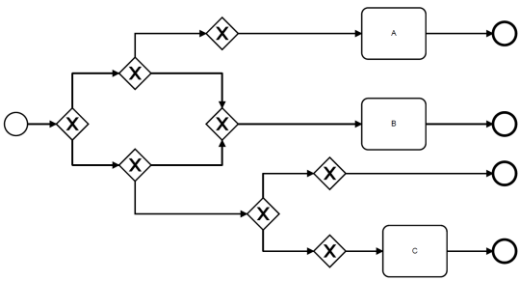
Scenario 1: (no decisions)
Process only occurrence without decisions



Scenario 2: (no-DMN)
Process only occurrence with embedded decisions (no separation of concerns)



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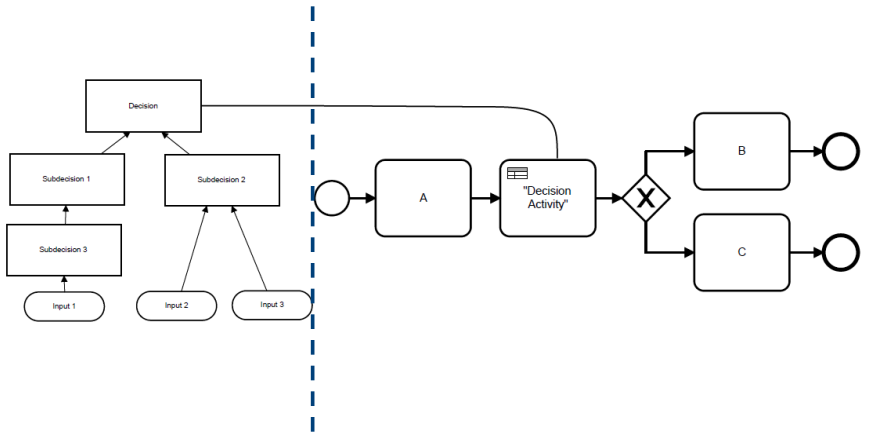
Scenario 3: (street-DMN)
Process-decision occurrence with decisions as a **local** concern



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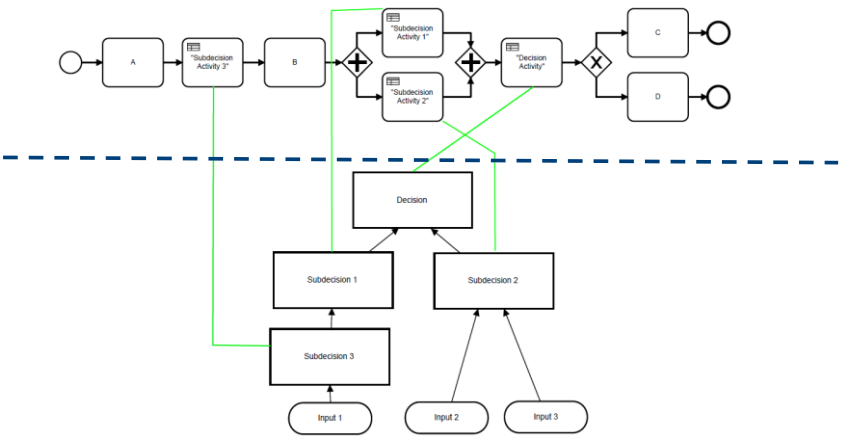
Scenario 4: (real-DMN)
Process-decision occurrence with decisions as a **global** concern



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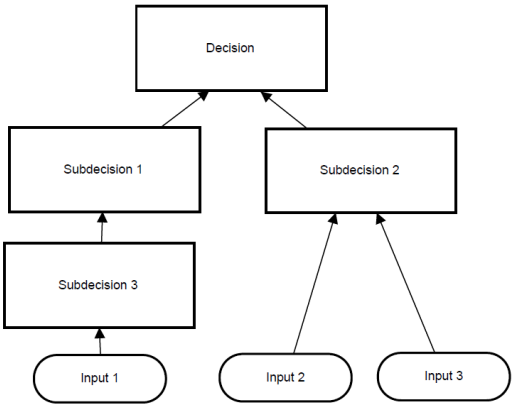
Scenario 5: (all-DMN)
Decision only occurrence without a process



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Consistent process-decision integration: Universe of Discourse

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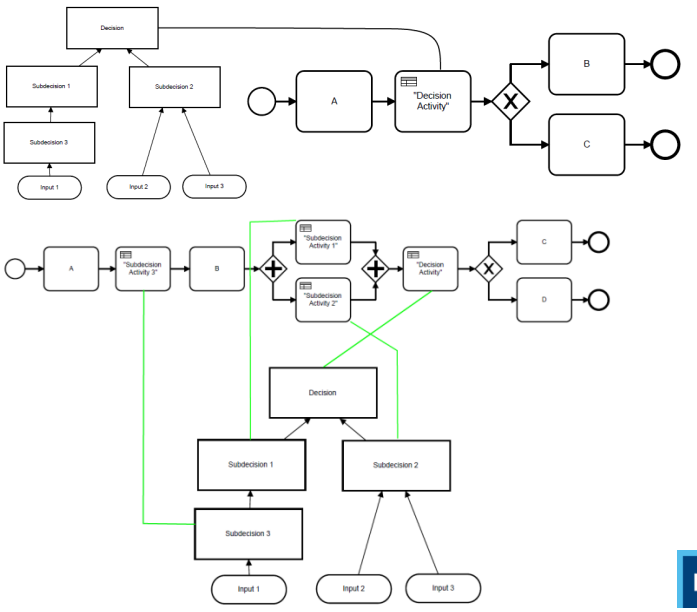
Universe of Discourse: Scenario 3 and Scenario 4



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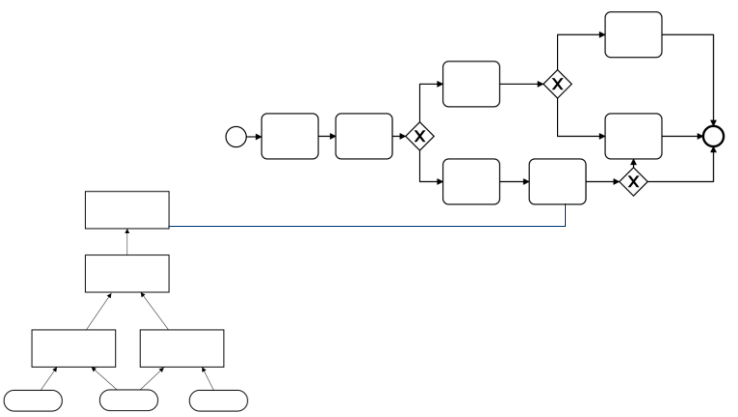
Universe of Discourse: Scenario 3 (local)

- Linking a decision model to a decision activity in the process model



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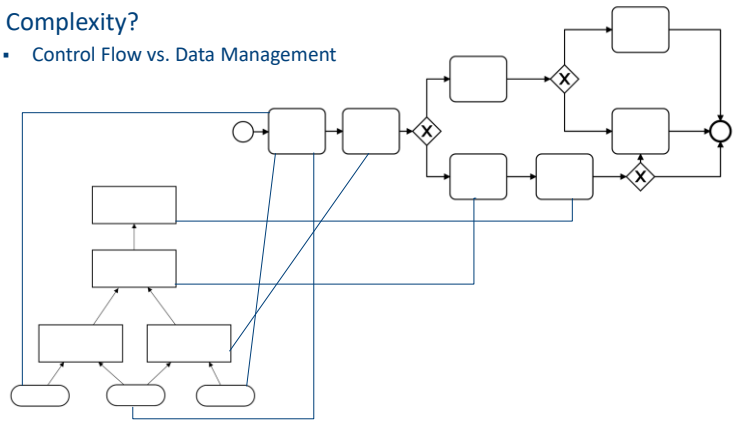
Universe of Discourse: Scenario 4 (global)

- Linking a decision model to multiple decision activities in the process model
- Consistently integrating process and decision models
- Complexity?
  - Control Flow vs. Data Management



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Potential Inconsistencies

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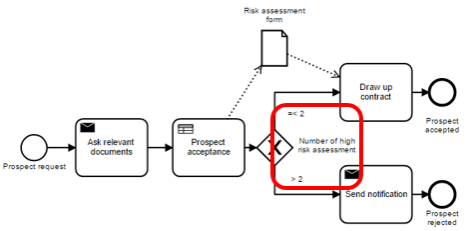
Decision Logic Incompatibility (scenario 2)

- Decision logic is partly embedded in gateways.
- Decision logic is not separated and not fully encapsulated in an independent decision model.
- When changes in the logic occur, the business process itself needs to be adapted.



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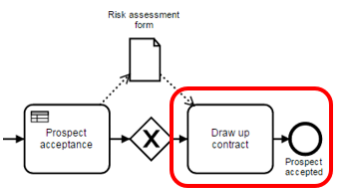
Decision Outcome Inconsistency

- Not all outcomes from the decisions are included in the process model.
- Decisions can (re)direct the flow of the process and in an integrated process-decision model, all outcomes of the decision should be represented in the control flow if said decision redirects the process.
- Modelling all possible decision outcomes in the process is vital for a correct conclusion of the process.



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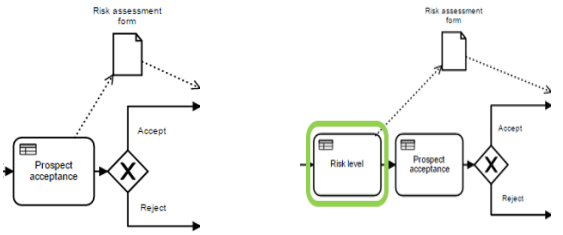
Intermediate Result Inconsistency

- Inconsistencies arise when subdecisions are not modelled in the process, despite the fact that the process uses the outcome of said subdecisions.
- Therefore, certain parts of the flow could be disturbed and render the process model inconsistent.
- Hence, a process model that is consistent with the decision model should ensure that all the subdecisions that contain an intermediate result which is relevant for the process execution, are explicitly invoked in the process as well.



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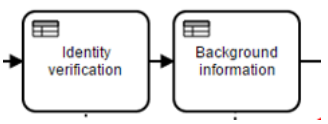
Subdecision Inclusion Inconsistency

- More subdecisions than necessary are included in the process.
- This inconsistency occurs when subdecisions which do not contain relevant intermediate results for the process are modelled within the process itself.
- In this case, the process becomes unclear and overly complex.
- Additionally, by modelling every subdecision in the process, the decision enactment or execution steps become fixed.
- This contradicts the declarative nature of decision modelling and reduces the flexibility provided by the decision model.



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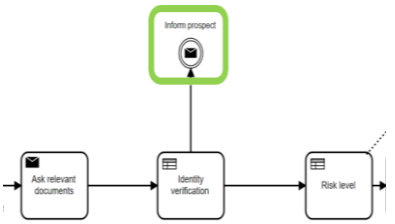
Subdecision Exclusion Inconsistency

- Depending on the outcome of certain subdecisions the control flow of the process may be diverted to include additional activities, to generate exceptions or even to lead to process termination.
- Excluding these subdecisions that have an influence on the control flow of the process, leads to process-decision inconsistency.



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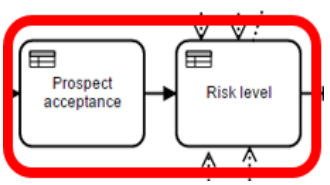
Decision Hierarchy Incompatibility

- This inconsistency occurs when the order of the decision activities in the process model is contradictory to the hierarchy of the decisions in the decision model.
- Consequently, the process cannot function correctly, as decisions are forced to enact without the prerequisite enactment of the necessary subdecisions.
- The hierarchy of decisions in the decision model introduces a partial order on the decision activities in the procedural process.



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Consistency guidelines

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Process-Decision Integration

Overview of Guidelines	
Guideline 1	Include all outcomes from the decision in DMN into BPM
Guideline 2	Avoid embedded decisions in gateways
Guideline 3	Include intermediate decisions in BPM when intermediate results occur.
Guideline 4	Intermediate decisions leading to extra possible paths in model should be included in BPM ("send message" tasks, end events, additional tasks)
Guideline 5	Extract as many intermediate decisions from BPM as possible
Guideline 6	Ensure that input requirements are met per individual intermediate decision.
Guideline 7	Model the necessary decision tasks in the BPM in accordance to their execution in the DM.

Hasic, F., Devadder, L., Dochez, M., Hanot, J., De Smedt, J., Vanthienen, J.: Challenges in Refactoring Processes to Include Decision Modelling, accepted for DeHMiMoP workshop at BPM (2017).

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Further research

- Refactoring existing process models to separate decision logic (in scenario 3: local)
- Refactoring existing process models to separate decision logic (in scenario 4: global)

- Mining simple decision models from case data, given the process model (in scenario 3)
- Mining multilevel decision models from case data, given the process model (in scenario 3)
- Mining integrated process/decision models from event+case data, (in scenario 3)
- Mining integrated process/decision models from event+case data, (in scenario 4)
- ...

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