Business Processes and Business Logic
**Knowledge Processes**

- All business activities are part of in a process. The question is whether the process is prescribed or adhoc.

- Knowledge Processes can be regarded as adhoc business processes
  - knowledge processes may consist of several tasks
  - the order of the tasks may be determined at run-time
  - even the tasks themselves may be determined at run-time

- In the extreme case a knowledge process only consists of one task (we sometimes use the term knowledge-intensive task (KIT) for knowledge work that is not decomposed into activities or phases in advance)
Separating Processes Logic and Business Logic

- Davenport's distinguishes between process and practice
  - Process – the design for how work is to be done
    - Process Logic
  - Practice – an understanding of how individual workers respond to the real world of work and accomplish their assigned tasks
    - Business Logic

- Following this distinction Process Logic and Business Logic should be modeled and managed separately
  - Process Logic – step-by-step flow of work
  - Business Logic – applying knowledge to derive a result

Separate the KNOW from the FLOW
Separate the WHAT from the HOW
Business Processes containing Knowledge Work

- A process can contain knowledge work
- The prescribed process part can be planned and modeled in advance.
- Business logic can be added to activities
  - experts
  - documents
  - guidelines
  - business rules
  - ...
  (in particular to a knowledge-intensive task KITs)
Combining Structured Processes and Knowledge Work

■ There often is a mixture of prescribed model parts and adhoc parts.

■ Example: Sometimes it makes sense
  ♦ to model the process flow of routine cases, e.g. for efficiency and automation
  ♦ treat special cases and exceptions as knowledge work done individually or collaboratively by the knowledge workers
Approach: Dealing with Knowledge Work in Business Processes

This is a procedure model for knowledge work in business processes. It separates Process Logic from Business Logic.

1. Process Elicitation
2. Identification of Knowledge-intensive Tasks
3. Modelling
   - Process Flow
   - Business Logic for KITs
4. Continuous Improvement of
   - Business Process Model
   - Business Logic
Operational Business Decisions – A special Kind of Knowledge Work

- In the following we specialize the approach for a specific kind of knowledge work: **Operational Business Decisions**

- A decision is characterized by a *question*

- Examples for decision questions:
  - Should the insurance claim be accepted, rejected or examined for fraud?
  - Which resource should be assigned to this task?
  - Which service should be used to ship this package?

- An operational business decision considers cases arising in day-to-day business and *answers the question* for each case by choosing among potential outcomes.

- Each operational business decision involves business logic (know how) to answer the question.  
  (Ross 2011, p. 149)
Decision

- A decision is a determination requiring know-how - the resolving of a question by reasoning.
- An outcome is an answer to such a question
- A decision task is a business task or action in which some decision is made

(Ross 2011, p. 150)
Decision Tasks in Business Processes

- Decision Tasks occur in business process
- They are knowledge-intensive tasks for operational business decisions
- Decision tasks can provide data for gateways

Decision: Is the application eligible?

Check Eligibility

Applicant eligible?

- yes: Offer appropriate insurance
- no: reject application

Decision: Which product is appropriate for the applicant in this specific case?
Basic Elements of Operational Business Decisions

- A *case* is some particular matter or situation arising in day-to-day business activity and requiring consideration.
- A *potential outcome* is some result, conclusion, or answer that might be deemed appropriate for a case. An operational decision has at least two potential outcomes.
- The *outcome* is the result, conclusion, or answer deemed appropriate for a *given* case.
- The *decision logic* is the business logic (the set of all decision rules) for cases in scope of a given decision.

(Ross 2011, p. 152f)
Examples for Elements of Business Decisions

- Process: Handling auto insurance applications
- Case: John Smith applies for auto insurance
- Decision Task: Check Eligibility of applicant
- Potential outcome: Depending on the decision, potential outcomes might be
  - some form of yes/no (e.g. eligible/non-eligible)
  - some quantities (e.g. dollar amounts)
  - some categories (e.g. silver, gold, or platinum customer)
  - some real-world instances (e.g. employee to serve a real-world customer, software product to be purchased)
  - some course of action (e.g. on-site visit, teleconference, email)
- Outcome: John Smith is deemed eligible for auto insurance

(Ross 2011, p. 152f)
Decision-Aware Business Processes
Decision-aware Business Processes

- A decision-aware business process as one that is designed to distinguish between
  - tasks that perform work (i.e., process tasks) and
  - tasks that come to conclusions based on business logic (decision tasks)

- This separation enables the details behind a decision task (i.e., business logic) to be represented in a different kind of model, specific to business logic.

- Separating business decisions from business process tasks
  - simplifies the business process model,
  - allows to manage business logic in a declarative form,
  - offers more creativity in organizing the business logic
  - delivers the business logic in a form that transcends technology options

(von Halle & Goldberg 2010, p. 66)
Managing Decision-aware Business Processes

The general approach for dealing with knowledge work in business processes can be specialized to a procedure model for decision-aware business processes:

1. Process Elicitation
2. Decision Analysis: Identify key questions
3. Modelling
   - Process Flow
   - Decision Logic
4. Continuous Improvement
   - Business Process Management
   - Business Decision Management
Decision Analysis: Capturing Decision Logic

- Decision Analysis identifies and analyses key questions arising in day-to-day business activity and captures the decision logic used to answer the question.

- The result of decision analysis is decision logic
  - Decision Logic is Business Logic for decision making
  - Decision logic is a set of decision rules for cases in scope of a given decision
  - A decision rule is a business rule that links a case to some appropriate outcome

- Decision logic should be externalized from decision tasks
  - Decision tasks are procedural
  - Decision logic should be declarative
Declarative Representation of Decision Logic

- Decision logic should be represented declaratively

- A declarative representation of Decision Logic
  - specifies the conditions on which a decision is made
  - does not specify how the conditions are tested, in particular it does not specify the order in which conditions are tested

- Examples of declarative representations of decision logic
  - decision tables
  - business rules
  - Decision Model (von Halle & Goldberg 2010)
  - Q-Charts (Ross 2011)
Distinguishing a Procedural Task from a Declarative Decision

- A procedural solution specifies how, in a step-by-step manner, something is to be done.
  - So a business process model is a procedural solution because it prescribes a set of tasks that are carried out in a particular sequence.
  - The business process model is the “How” of a unit of work.

- A declarative solution only specifies what needs to be done, with no details as to how, in a step-by-step manner, it is to be carried out, because sequence is irrelevant to arriving at the correct result.
  - A Decision Model is a declarative solution because it is a set of unordered business logic, not a set of ordered tasks.
  - A Decision Model is the “What” of a special kind of unit of work.

(von Halle & Goldberg 2010, p. 67)
Procedural versus Declarative

A procedural solution specifies how, in a step by step manner, something is to be done.

Business process is a procedural solution of tasks to be performed in precise sequential order. The “How” of a unit of work.

A declarative solution is what needs to be done, with no details as to the methods to be used (no sequential information).

A declarative solution occurs when sequence is irrelevant to the result. The “What” of a unit of work.

(von Halle & Goldberg 2010, p. 67)
Example 1: Declarative vs. Procedural Solutions

Option 1

Option 2

Option 3

Process Model

Rule Family Table

Decision Model Diagram

(von Halle & Goldberg 2010, p. 69)
Advantages of Separating Business Processes and Business Logic in Option 3

- The Rule Family implies no particular sequence among the conditions to be tested.
- The Rule Family indicates via the “?” that there are other possible combinations of conditions to consider.
- The Rule Family can contain as many rows as are needed to reach the correct conclusion. It can contain additional columns if other conditions are needed to determine a person’s credit rating.
- The Rule Family table also contains business logic for the logic not modeled in the business process models of Option 1 and Option 2, e.g. the possible values of person’s debt ("high", "low") and employment history ("good", "bad")

(von Halle & Goldberg 2010, p. 68f)
# Distinctions between Business Process and Business Decision

<table>
<thead>
<tr>
<th>Business Process</th>
<th>Business Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Procedural in nature</td>
<td>• Declarative in nature</td>
</tr>
<tr>
<td>• Consists of tasks connected by sequence</td>
<td>• Consists of Rule Families connected by inferential relationships (all independent of sequence)</td>
</tr>
<tr>
<td>• Is all about how (step-by-step sequence to carry out work)</td>
<td>• Is all about what is to be concluded (the logic leading from conditions to conclusion)</td>
</tr>
<tr>
<td>• Improvements in business process aim for increased work efficiency</td>
<td>• Improvements in a business decision aim for smarter business logic</td>
</tr>
<tr>
<td>• Represented best in a procedural business process model</td>
<td>• Represented best in a declarative Decision Model</td>
</tr>
</tbody>
</table>

*(von Halle & Goldberg 2010, p.70)*
Improvements by separating business logic from Business Process Model

- Allows a much simpler business process model
- Easily highlights all possible combinations of conditions
- Supports the principle of separation of concerns
  - Permits changes in the Decision Model without changing the business process model
  - Permits changes in the business process model without changing the Decision Model

(von Halle & Goldberg 2010, p. 69)
Disadvantages to Burying Decisions (Business Logic) in Business Processes

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Forces unnecessary sequence and constraints on business logic</td>
</tr>
<tr>
<td>2</td>
<td>Makes changes to business process and business logic difficult</td>
</tr>
<tr>
<td>3</td>
<td>Adds meaningless complexity to business logic and business process</td>
</tr>
<tr>
<td>4</td>
<td>Fails to deliver a visual representation of all business logic</td>
</tr>
<tr>
<td>5</td>
<td>Makes governance of business process and business logic difficult to manage</td>
</tr>
<tr>
<td>6</td>
<td>Results in business logic and business processes that are not reusable</td>
</tr>
<tr>
<td>7</td>
<td>Compromises SOA</td>
</tr>
</tbody>
</table>

- If a business process is too complicated, a reason might be that business rules are embedded in the flow.

- "If you separate the business rules, you can develop remarkably stable business processes" (Roger Burlton)  
  (von Halle & Goldberg 2010, p. 70)
Example 2: Business Logic not contained in a Process Model

(von Halle & Goldberg 2010, p. 71)
A Business Process Model does not Reveals All Business Logic

- If the separation of business processes and business logic is not made consciously, some business logic might be in the process model while others is missing.
- It must then be modeled separately, e.g. in the task descriptions or externally (if it is represented at all).
- Reusability if hampered: Some of the business logic may be used in several of the tasks (maybe even several processes).
- The Decision Model resurrects all of the business logic in one visual artifact.

(von Halle & Goldberg 2010, p. 72)
Managing Business Logic separately

This solution has two tasks with their Decision Models.

The Decision Model can be viewed, managed, and executed as one whole set of business logic, as a black box evaluating conditions and reaching a conclusion.

Business Logic can be reused
- the whole decision model
- Individual rule families

(von Halle & Goldberg 2010, p. 71f)
Business process model without regard for business decisions

Business Logic is partly represented in tasks, while others is represented in textual annotations

(von Halle & Goldberg 2010, p. 74)
The detailed business logic is captured in Decision Models

(von Halle & Goldberg 2010, p. 75)
Business Process Model, Decision Model and Rules Families

(von Halle & Goldberg 2010, p. 76)
Decision Requiring Sequence

- There are business circumstances that require separate business decisions and Decision Models.
  - Different business decision may be governed by different groups, hence having separate Decision Models facilitates separate governing bodies for the business logic.
  - There may be different decisions depending on a previous decision (Example: After a make-or-buy decision either the supplier has to be selected or the effort for the development is derived).

- The business process model is simplified and collapsed by
  - separating the decision into separate decisions for which sequencing is required
  - removing business decisions from the business process model when sequence is not required (and modeling them in decision models)

(von Halle & Goldberg 2010, p. 77)
Achieving Business Excellence by Managing Decision Logic Separately

- von Halle and Goldberg argue that operational excellence alone is insufficient for sustainable competitive advantage.

- Key business process must not only be efficient and consumer-friendly but also smart and agile
  - Business processes become agile when declarative business decisions are separated from procedural business process tasks
  - Business processes become smart when the business decisions are governed appropriately by business leaders

- When the business leadership clearly understands the business logic behind the business decisions, the impact of those decisions can be ascertained, and the business can quickly and easily make adjustments. (von Halle & Goldberg 2010, p. 78)
Business Decision Management

Business Motivation: the objectives that are set by the business decision

Business Logic: the business logic used to achieve the business objectives

Business Metrics: measuring results against the objectives set by the business plan

(von Halle & Goldberg 2010, p. 83)
Business Decision Management

- The practice of managing smart, agile decisions is called Business Decision Management (BDM) or Enterprise Decision Management (EDM).

- Three elements of BDM:
  - **Business Motivation**: the general business plan, and the specific business objective/s
  - **Business Metrics**: measurements and time periods that are set by the business objectives
  - **Business Logic**: logic underlying the business decision that is implemented to achieve the business objective

(von Halle & Goldberg 2010, p. 83)
Decision Model Tools for Enterprise Architects

(von Halle & Goldberg 2010, p. 87)
Literatur
