Business Process Management and Tool Support: ADONIS®

Modeling, Optimization, Execution and Monitoring of Business Processes

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Overview

• Part I: Introduction
  - Company Profile
  - BPMS: Business Process Management Systems

• Part II: Business Process Modeling
  - Basics
  - Example from IT Service Management Area

• Part III: Business Process Optimization
  - Structural and dynamic
  - Example from Health Care Area

• Part IV: Business Process Execution
  - From Business Process Modeling to Process Execution
  - Example from Insurance Area

• Part V: Business Process Monitoring
  - Business Monitoring Framework
  - Example from Direct Sales Area

• Part VI: Summary & Outlook
Part I

Introduction
BOC Company Profile and Business Fields

- Founded 1995, as a spin off from the BPMS group at the University of Vienna
- A mix of developers and consultants (Business and IT people)
- With currently 120 employees

Business fields:

- **Software Development**
  - Development of ADONIS®, ADOscore®, ADOit®, ADOlog®, PROfit® etc.
  - Development of integration modules (interfaces to Workflow Management Systems, ERP systems, Groupware, web-based systems etc.)

- **Services and Consulting**
  - Consulting and implementation of organizational change projects.
  - Consulting and projects in the area of process based application development.
  - Customizing of BOC products to customer specific needs.
  - Training in methods and tools (end user, train-the-trainer etc.).
  - Technical support.
Product Portfolio: IT-based Management Solutions

"Software Products for IT Support for Central Management Approaches"

<table>
<thead>
<tr>
<th>Strategy Management</th>
<th>Process Management</th>
<th>IT Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSC Method</td>
<td>BPMS Method</td>
<td>SCOR Method</td>
</tr>
<tr>
<td>IT Service and Architecture Management</td>
<td>ITIL® Method</td>
<td></td>
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</tbody>
</table>
BPM: Core Elements of (Service) Organizations

Products

Business processes

Organizational units

Information technology

Product X
Product component Y

Products and Business processes are interdependent.

Business processes are implemented by Information technology.

Information technology affects the design.
The BPMS Paradigm

Which **products** do we offer?

How do we design our **business-processes**?

How do we **operate** our business processes?

How do we **control** our (daily) business?

How do we **evaluate** our business?

**Products** are realised by **Business processes**

**Business processes** are operated by **IT** and **Employees**

**Evaluated Business Processes**

**Executed Business Processes**

**Companies**

**Strategic Decision Process**

**Re-Engineering Process**

**Resource Allocation Process**

**Workflow Process**

**Performance Evaluation Process**
The BPMS Subprocesses

- Strategic Decision Process
- Re-Engineering Process
- Resource Allocation Process
- Workflow Process
- Performance Evaluation Process

Business Process Modeling

Business Process Execution

Business Process Optimization

Business Process Monitoring
BPMS and Tool Support

- Management IS
- Executive IS
- ...
Concrete methods are specified by the composition of the core activities (Techniques, modelling formalisms, etc.)

A tool has to have the ability to be adaptable to changing methods.
ADONIS: Overview of Components
Method Development in ADONIS: Levels

Basic functionality extensions...

Configuration of the components

Analysis

Modeling

Meta modeling

Simulation

Model evaluation/usage

Evaluation

Methodology

Document generation

...with the use of AdoScript and add-on programming

New application scenarios/New tools

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Part II
Business Process Modeling
Abstraction Levels in Process Modeling/Mapping

Process Map

Addressees:
Chief Executive, Management etc.

Business Process

Addressees:
Process Responsible, Process Manager, Business Process Expert etc.

Workflow („Macro Flow“)

Addressees:
IT Specialist, System Architect, Application Developer etc.

Micro Flow

Addressees:
Application Developer, Programmer etc.
Views on Business Processes - Interdependencies

- **What?**
  - Functional View
    - Activity
    - Sub process
  - Content View
    - Product
    - Artefact
  - Quantitative View
    - Times & Costs
    - Probabilities & Stat. Distributions

- **When?**
  - Dynamic View
    - Control Flow
    - Information Flow
  - Time-oriented View
    - When & what?
    - How much?

- **Who?**
  - Organizat. View
    - Actor
    - Resource
  - Version
  - Variant
  - Time-oriented View
    - When & what?
BPMS Method
LOVEM Method
SCOR Method
ISO 9000:2000 Method
UML Method
EPC Method
Example – IT Service Management

Live Example “ITIL Processes”
Part III
Business Process Optimization
Approaches of Business Process Optimization

**Structural Optimization:** Modeling, Checks, Navigation, Documentation, Queries etc.

**Dynamic Optimization:** Path Analysis, Capacity Analysis, Workload Analysis, Scenario Management etc.
Structural Optimization

Media Breaks

Role Changes

Cycles

eetc.
Structural Optimization

Product

Pro Life

Covering

Payment type

Survival

Death

BUZ

BUZP

BUZR

Method

Frequency

Bank transfer

Withdrawal

Process
Structural Optimization

As-Is Processes

E-Business Processes

Business Model
Dynamic Optimization – Typical Parameter

Quantitative Parameter

Times
- Resting Time
- Execution Time
- Waiting Time
- Transport Time
- Cycle Time
- ...

Costs
- Activity Costs
- Actor Costs
- Process Costs
- Resource Costs
- Transaction Costs
- ...

Capacities
- Process Quantity
- Workforce Requirement
- Charge Rates
- Workload
- ...

Other Parameters
- Process Calendar
- Actor Calendar
- Resource Calendar
- Probabilities
- ...

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Dynamic Optimization – Path Analysis

- Simulation of processes without considering the working environment
  - Expected value of times and costs, cycle time
  - Critical paths / dead paths
  - Determination of the potential workforce requirement

\[
\sum_0 \\
\sum_1 = \sum_0 + \sum_{1.1} \\
\sum_2 = \sum_0 + 0
\]
Dynamic Optimization – Capacity Analysis

- Simulation with assignment of activities to performers

- Exact determination of workforce requirement (capacity planning)
- Consideration of personnel costs

The algorithm assigns a performer

\[ \sum_{0} + \sum_{1} = \sum_{0} + \sum_{1.1} \]

\[ \sum_{2} = \sum_{0} + 0 \]
Dynamic Optimization – Workload Analysis

• Simulation considering the timeline (queueing model)
  - Activity and process costs
  - Capacity planning and workforce management based on process and performer calendars
  - Initialization phases
  - Simulates on timeline (in comparison to path and capacity analysis)
  - Dynamically calculated waiting times
Example - Call Center

Protocols from ACD Machine
- Online times
- Attendance times
- Call rates

Metrics of customer satisfaction
- agents
Definition of measurements

Execution of workload analysis:
- waiting times
- workloads
- costs
- ...

BP models

WE models

Create the following models:

Consider operational data within models for evaluations "close to reality"
Example – Health Care

Live Example “Patient Admission”
Part IV
Business Process Execution
From Business Process Modeling to Process Execution

Business Modelling Process

IT Modelling Process

IT Process Integration Communication and Interaction Rules Data Format Translation

Target System Level

Execution Process
3 examples of process technologies:
• Workflow Technology
• ERP Technology
• E-Business Technology
Workflow Technology: Evolution of Application Development

<table>
<thead>
<tr>
<th>Past</th>
<th>Present</th>
<th>Present/Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application = Program</td>
<td>Application = Functionality + Storage</td>
<td>Application = Control + Functionality + Storage</td>
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</table>

Workflow Technology
- Modeling
- Internal Representation
- Execution
Workflow Modeling: Basic Modeling Concepts

Build-Time Component

Graphical Editor

Internal Representation

WMS-Objects

File Representation

Run-Time Component

WMS-DB
From Business Graph to Execution Graph

<table>
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<tr>
<th>Business Graph</th>
<th>Workflow Graph</th>
<th>Execution Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>(business process modeling language)</td>
<td>(e.g. extended business process modeling language)</td>
<td>(set of different modeling languages)</td>
</tr>
<tr>
<td><img src="image1" alt="Diagram of Business Graph" /></td>
<td><img src="image2" alt="Diagram of Workflow Graph" /></td>
<td><img src="image3" alt="Diagram of Execution Graph" /></td>
</tr>
</tbody>
</table>

- **Business Graph**: The starting point, representing business processes using a modeling language.
- **Workflow Graph**: An extended business process model, possibly using an extended modeling language.
- **Execution Graph**: A set of different modeling languages used for process definition, with references to legacy systems, UML models, and ERP systems.

Legend:
- Arrows indicate flow and direction.
- Shapes represent different entities or stages in the process.
- Dashed lines may indicate feedback or iterative processes.
Workflow-based Enterprise Application Integration

**Business Graph**
(e.g. within ADONIS®)

**Execution Graph**
(executed by WMS's Runtime)

- Groupware
- Legacy System (1)
- Legacy System (2)
- SAP

Modeled by Business Specialist
Completed by IT Specialist
Workflow Technology: Interest

Interest & Market Evolution

Applications are inherently workflow-based

"Diffusion" in other domains (Groupware, Standard Software, Web Technologies ...)

Year

Explicit representation of the business and the IT view

Use of the SAP R/3® reference processes

**Business view:**
Workflow-oriented

„What is everything that has to be done?“

**IT View:**
Event oriented

„What does R/3 do and how does it do it?“

**Simulation:**
- Volume analysis
- Capacity analysis

**Process costs calculation**

**Analysis:**
- Costs
- Times
- ...

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Implementing Business Processes with ERP Technology – 2/4

Explicit representation of business and IT views

- Use of the SAP R/3® reference processes

Themes:
- Representation of business processes
- Representation of IT processes
- Mapping
- Requirements definition
- Documentation of IT functions
- Integration of external documents
- Direct call of SAP R/3® transactions
- Customizing of the documentation

Definition of business requirements
If R/3 Functionality is not sufficient:

**SAP-Standard**

- Add On Programming (ABAP)

**Creation of new process objects:**
- Enhancement of existing processes
- Definition and documentation of requirements
Realization of E-Business Applications – 1/2

- **Strategy**
  - Business models

- **Design**
  - Products
  - Business processes
  - Clerks/Roles
  - Application architecture

- **Realization**
  - Product data
  - Executable processes
  - Rights Competences
  - Application modelling

- **Execution**
  - Productive execution environment

- **Evaluation**

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Realization of E-Business Applications – 2/2

Live Example
“B2B Insurance Platform”
Part V
Business Process Monitoring
Workflow-based Business Monitoring

Strategic Level

- Strategic Decision Process
  - Commitment to Strategic Goals and General Conditions
  - Prod. Proc. Org. IT
  - Balanced Scorecard Tools
  - Management IS
  - Executive IS
  - ...

Business Level

- Re-Engineering Process
  - Model-based Design of Core Elements
  - Prod. Proc. Org. IT
  - Business Process Management Tools
  - Metamodeling Tools
  - Simulation Tools
  - Analysis Tools
  - ...

Implementation Level

- Resource Allocation Process
  - Implementation of Core Elements
  - Prod. Proc. Org. IT
  - Metamodeling Tools
  - Customizing Tools
  - CASE Tools
  - Workflow Tools
  - Code Generators
  - Integrated Development Environments
  - ...

Execution Level

- Workflow Process
  - Execution of Business Processes
  - Prod. Proc. Org. IT
  - Existing Applications
  - Standard Software
  - Workflow Technology
  - Groupware Technology
  - Object Technology
  - ...

Analysis and Evaluation of Core Elements

Operational Data

Levels in Workflow-based Business Monitoring

Strategic Level
(Process Scorecard)

Tactical Level
(Process Types)

Operational Level
(Process Instances)

Runtime Environment
(Execution Data)

1:n Aggregation

1:n Aggregation

1:1 Mapping

Instances of Process Type 1

Instances of Process Type 2

Instances of Process Type n

Aggregation of Instances of Process Type 1

Aggregation of Instances of Process Type 2

Aggregation of Instances of Process Type n

Data Source 1

Data Source 2

Data Source 3

Data Source n

Junginger et al. (2004):
Workflow Handbook 2004
Workflow-based Monitoring: Operational Level
Scenario: The business process models serve as "business guideline" into operational data

Excel Sheets

Snapshot Database (with operational data)

or optional
Workflow-based Monitoring: Strategic Level

- Generation of Management- und Controlling-Cockpits from model and operational data.
Workflow-based Monitoring: Direct Sales Example

**Strategic Monitoring**

- Minimize complaints (strategic goal)
- Complaints per order (performance indicator)
- Number of orders (KPI)
- Complaints (KPI)

**Tactical Monitoring**

- Order flow (business process)
- Cycle time (KPI)
- Number of orders (KPI)
- Complaints (KPI)

**Operational Monitoring**

- Order flow (workflow process)
- Cycle time (KPI)
- Adaptor to legacy application
- Number of orders (KPI)
- Complaints (KPI)

Workflow-based Monitoring: Example of Cockpit – 1/2
Workflow-based Monitoring: Example of Cockpit – 2/2
Part V
Summary & Outlook
Business Processes are Knowledge

A business process is...

... not only a logical sequence of activities, which is executed by roles at a certain point of time at a certain place...

... but ...

...the know how platform of a corporation...

...and is realized by value chains, which serve for achieving the strategic company goals.

(Karagiannis 2000)
Some Predictions…

- Creation of corporation-wide, model-based Know-How-Pools.

- Business processes are the "cement" for Enterprise Application Integration (EAI).

- Models get a central part of IT applications.

- Combination of modeling paradigms (e.g. descriptive-, decision support-, predictive models etc.).

- Online Monitoring and Benchmarking according to enterprise models (business processes, scorecards etc.).
Thank you very much for your attention!

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