MTAT.03.231
Business Process Management (BPM)
(for Masters of IT)

Lecture 1: Introduction

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Course Objective

This course aims to introduce the principles and methods of business process management.

Emphasis is placed on to the role of process modelling as an instrument to understand and analyse business operations, and to drive the design of IT systems for process automation.

The course relates to:
- Enterprise System Integration (orchestration)
- Software Economics (business case analysis)
Structure of the course

• 13 lectures covering:
  – Principles of BPM
  – Process Modeling & BPMN
  – Process Analysis & Simulation
  – Process Automation
  – Process Mining

• 13 practice sessions
  – Intro to process modeling (on paper)
  – Process modeling & simulation
  – Process Automation
  – Process Monitoring and Mining (ProM)

• Team Project with MBA Masters students
Grading

- Five assignments worth 20 points in total (to be announced in the practices sessions)
- Project (30 points) – to be released on 10 April
  - Jointly with students from the Masters of ETM
- Exam (50 points)
Readings and Resources

- Readings & resources listed in the course pages:
  - http://courses.cs.ut.ee/2012/bpm
- Additional readings will be distributed during the lectures
- For communication, we will use a Message Board:
  - http://www.quicktopic.com/47/H/wAvdhUZH3hb54
Introduction to Business Process Management
BPM: What is it?

Body of methods to design, analyze, execute and monitor business operations involving humans, software, information and physical artifacts using process models.
So What is a (Business) Process?

Collection of logically-related events, activities and decisions, that involve a number of actors and resources, and that collectively lead to an outcome that is of value to an organization or its customers.

Examples:

• Order-to-Cash
• Procure-to-Pay
• Fault-to-Resolution (Issue-to-Resolution)
• Claim-to-Settlement
• Application-to-Approval
“My washing machine won’t work!”
Processes and Outcomes

• Every process leads to one or several outcomes, positive or negative
• Fault-to-resolution process
  – Fault repaired without technician intervention
  – Fault repaired with minor technician intervention
  – Fault repaired and fully covered by warranty
  – Fault repaired and partly covered by warranty
  – Fault repaired but not covered by warranty
  – Fault not repaired (customer withdrew request)
Why BPM?

“The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.”
Why BPM?

Improving Business Processes = #1 business priority for CIOs internationally, 4 years in a row…

<table>
<thead>
<tr>
<th>Top 10 Business Priorities 2009</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Please select the top five business priorities for your enterprise/business unit in 2009?</td>
<td></td>
</tr>
<tr>
<td>Improving business processes</td>
<td>1</td>
</tr>
<tr>
<td>Cutting enterprise costs</td>
<td>2</td>
</tr>
<tr>
<td>Improving enterprise workforce effectiveness</td>
<td>3</td>
</tr>
<tr>
<td>Attracting and retaining new customers</td>
<td>4</td>
</tr>
<tr>
<td>Increasing the use of information/analytics in decision making</td>
<td>5</td>
</tr>
<tr>
<td>Creating new products or services (innovation)</td>
<td>6</td>
</tr>
<tr>
<td>Managing enterprise change initiatives</td>
<td>7</td>
</tr>
<tr>
<td>Targeting customers and markets more effectively (more effective service delivery)</td>
<td>8</td>
</tr>
<tr>
<td>Expanding current customer relationships (expanding “wallet share”)</td>
<td>9</td>
</tr>
<tr>
<td>Consolidating business operations</td>
<td>10</td>
</tr>
</tbody>
</table>

© Gartner Group, 2009 CIO Survey
Why BPM?

Index Group (1982)
How to engage in BPM?

Two complementary BPM approaches:

1. **Continuous Process Improvement (CPI)**
   - Does not put into question the current process design, but rather seeks to identify issues and resolve them incrementally, one step at a time and one fix at a time.

2. **Business Process Re-Engineering (BPR)**
   - Put into question the fundamental assumptions and principles of the existing process design.
   - Aims to achieve breakthrough, for example by removing costly tasks that do not directly add value.
The Ford Case Study (Hammer 1990)

Ford needed to review its procurement process to:

• Do it **cheaper** (cut costs)
• Do it **faster** (reduce turnaround times)
• Do it **better** (reduce error rates)

Accounts payable in North America alone employed > 500 people and turnaround times for processing POs and invoices was in the order of weeks
The Ford Case Study

• Automation would bring some improvement (20% improvement)
• But Ford decided not to do it… Why?
  a) Because at the time, the technology needed to automate the process was not yet available.
  b) Because nobody at Ford knew how to develop the technology needed to automate the process.
  c) Because there were not enough computers and computer-literate employees at Ford.
  d) None of the above
The correct answer is …
Mazda’s Accounts Payable Department
How the process worked? ("as is")
How the process worked? ("as is")

- Purchasing
- Purchase Order
- Vendor
- Receiving
- Copy of Purchase Order
- Accounts Payable
How the process worked? ("as is")
How the process worked? ("as is")
How the process worked? (“as is”)
How the process worked? ("as is")
Reengineering Process ("to be")
Reengineering Process ("to be")
Reengineering Process ("to be")
Reengineering Process ("to be")
Reengineering Process ("to be")
Reengineering Process (“to be”)
The result…

• 75% reduction in head count
• Material control is simpler and financial information is more accurate
• Purchase requisition is faster
• Less overdue payments

→ Why automate something we don’t need to do? Automate things that need to be done.
How to engage in BPM?

1. Opportunity assessment
2. Process modelling (as-is)
3. Process analysis
4. Process re-design (to-be)
5. Process implementation
6. Process monitoring/controlling
How to engage in BPM?

Phase 1: Opportunity assessment
Define the strategic goals, link them to measurable objectives and quantify the benefits with respect to a given stakeholder

Profit maximizing firms
- Overarching goal is usually to maximize long term shareholder value
- Maximize revenues and minimize costs
- Satisfying customer needs in an efficient way

Non-profit organizations
- A common goal is sustainability and/or growth while satisfying customer needs
- Must use resources efficiently while understanding customer needs
Phase 1: Problems and Metrics

<table>
<thead>
<tr>
<th>Cost</th>
<th>Time</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per execution</td>
<td>Cycle time</td>
<td>Error rates</td>
</tr>
<tr>
<td>Resource utilization</td>
<td>Waiting time</td>
<td>SLA violations</td>
</tr>
<tr>
<td>Waste</td>
<td>Non-value-adding time</td>
<td>Customer feedback</td>
</tr>
</tbody>
</table>
# Case Study at Anonymous Utilities Provider

## Key Performance Process

<table>
<thead>
<tr>
<th>Key Performance</th>
<th>Manage Unplanned Outages</th>
<th>Manage Emergencies &amp; Disasters</th>
<th>Manage Work Programming &amp; Resourcing</th>
<th>Manage Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Satisfaction</td>
<td>0.5</td>
<td>0.55</td>
<td>-</td>
<td>0.2</td>
</tr>
<tr>
<td>Customer Complaint</td>
<td>0.6</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>Customer Feedback</td>
<td>0.4</td>
<td>-</td>
<td>-</td>
<td>0.8</td>
</tr>
<tr>
<td>Connection Less Than Agreed Time</td>
<td>0.3</td>
<td>0.6</td>
<td>0.7</td>
<td>-</td>
</tr>
</tbody>
</table>
Process: Manage Procurement

Process: Manage Emergencies & Disasters

Process: Manage Unplanned Outages

Overall Process Performance

1st Layer Key Result Area
- Financial: 0.5
- People: 0.4
- Customer Excellence: 0.65
- Operational Excellence: 0.5
- Risk Management: 0.8
- Health & Safety: 0.4

2nd Layer Key Performance
- Customer Complaint: 0.6
- Customer Satisfaction: 0.7

3rd & 4th Layer Process Performance Measures
- Customer Rating (%): 0.7
- Customer Loyalty Index: 0.6
- Average Time Spent on Plan: 0.8
- Satisfied Customer Index: 0.4
- Market Share (%): 0.8
Phase 2: Process Identification & “As Is” Modeling

• Identify stakeholders, observe, interview, build insight, get buy-in
Phase 3: Analysis

Qualitative analysis
- Added-Value Analysis
- Issue Register
- Activity Analysis

Quantitative Analysis
- Cycle Time Analysis
- Capacity Analysis
- Queuing analysis
- Process Simulation
## Issue Register

<table>
<thead>
<tr>
<th>Issue No.</th>
<th>Short Description</th>
<th>Issue Explanation</th>
<th>Broad Consequence</th>
<th>Assumptions</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Information regarding units does not match</td>
<td>Units in Relocation system do not match information provided by ...</td>
<td>Wrongly calculated entitlements cause manual calculation...</td>
<td>5% of cases go to the wrong queue, 5 minutes to sort queue and redirect. 5% recalculating on average 10 minutes per calculation.</td>
<td>28,000x0.05x1.5 = 21,000 minutes 350 hours/7.5 47 hrs 9.5 working days</td>
</tr>
<tr>
<td>5</td>
<td>Protected/ Mandatory data entry fields</td>
<td>Not all fields in data entry forms are relevant but mandatory. So &quot;fuzzy&quot; information is entered</td>
<td>Resource intensive, incorrect data. Cases in Clarify need to physically be closed.</td>
<td>5% of cases taking 2 minutes to locate and close. 5% of relocations requiring entry that is not needed taking 30 minutes each.</td>
<td>28,000x0.05x3 = 44,800 minutes 477 hours/7.5 99.5 hrs 20 working days</td>
</tr>
<tr>
<td>11</td>
<td>Information on posting orders</td>
<td>Time consuming to sort through posting orders to identify relocations...</td>
<td>MBR does not get info pack therefore cannot process move. More information could be provided which could be used later in process ...</td>
<td>Only 1/3 rd of postings and CIPC’s are entitled to relocation. 28000 relocations then sorting through 84000 postings. 3 to 4 minutes on average to sort through each.</td>
<td>84,000x3.5 = 294,000 min/60/7.5 = 653 days/250 working days in year. 2.61 FTE</td>
</tr>
</tbody>
</table>
Simulation / What-If Analysis

10 applications per hour
Poisson arrival process (negative exponential)

<table>
<thead>
<tr>
<th>Task</th>
<th>Role</th>
<th>Execution Time (mean, dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive application</td>
<td>system</td>
<td>0</td>
</tr>
<tr>
<td>Check completeness</td>
<td>Clerk</td>
<td>30 mins</td>
</tr>
<tr>
<td>Perform checks</td>
<td>Clerk</td>
<td>2 hours</td>
</tr>
<tr>
<td>Request info</td>
<td>system</td>
<td>1 min</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
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</tbody>
</table>
Simulation output: KPIs
Phase 4: Process Re-Design

- Costs
- Time
- Flexibility
- Quality
Phases 5-6. When technology Kicks in..
Process Execution Engines

• BPMN-based: BizAgi, Savvion, …
• BPEL-based
  – Oracle SOA Suite
  – ActiveBPEL
  – IBM Websphere Process Engine
• Microsoft
  – BizTalk
  – Windows Workflow Foundation
• YAWL
References and acknowledgments

- Some slides are companion slides of Laguna & Marklund’s book “Business Process Modeling Simulation and Design”
- Other resources are listed on the course Web page
- Next week: Introduction to Process Modeling