MTAT.03.231 Business Process Management

Lecture 9
Business Process Redesign

Part 2: Heuristic Process Redesign

Marlon Dumas
Professor of Information Systems @ University of Tartu
Co-Founder of Apromore
Process Redesign

- Process discovery
  - Process identification
  - Process architecture
  - Process monitoring
  - Process analysis
  - Insights on weaknesses and their impact
  - To-be process model
  - Executable process model

- As-is process model

- Conformance and performance insights

- Define Vision
  - Develop Strategy
  - Implement Strategy
  - Manage Personnel
  - Manage Assets

- Management Processes
  - Core Processes
  - Support Processes

- Procure Materials
  - Procure Products
  - Market Products
  - Deliver Products
  - Manage Customer Service

- Manage Risk
  - Manage Information

- Procure
  - Materials
  - Products

- Market
  - Products

- Deliver
  - Products

- Manage
  - Customer Service
Process redesign approaches

**Transformation Redesign**

- Puts into question the fundamental assumptions and principles of the existing process structure
- Aims to achieve **breakthrough innovation**
- Example: Business Process Reengineering (BPR)

**Transactional Redesign**

- Doesn’t put into question the current process structure
- Seeks to identify problems and resolve them incrementally, one step at a time
- Example: Heuristic redesign (next week)
Heuristic process redesign

• A method to identify changes to an “as is” process based on a collection of heuristics that strike tradeoffs between:
  • Cost
  • Time
  • Quality
  • Flexibility
Performance measures: the Devil’s Quadrangle

- Cost
- Time
- Quality
- Flexibility
Flexibility

- Ability to react to changes in:
  - Workload
  - Customer demands and expectations
  - Resource and business partner availability and performance

- Example: Following natural disasters (e.g. storms), the number of home insurance claims increases by tenfold

- To address this surge, flexibility is required at:
  - Resource level: Staff redeployment, faster performance
  - Process level: Performing tasks differently to speed up the front-end
  - Management: Relaxing business rules and controls where possible
Redesign heuristics

- **Task-level**
  - Task elimination
  - Task composition/decomposition
  - Triage

- **Flow-level**
  - Re-sequencing
  - Parallelism enhancement

- **Process-level**
  - Specialization & standardization
  - Resource optimization
  - Communication optimization
  - Automation
Task-level redesign heuristics

1. Task elimination
2. Task composition/decomposition
3. Triage
H1. Task elimination

Eliminate non-value-adding steps wherever these can be isolated

• Forward, send, receive, ...

Consider reducing manual control steps (checks & approvals) by:

• Skipping them where feasible
• Replacing them with statistical controls
• Skipping them selectively
H1. Task elimination

Consider trade-off between the cost of the check and the cost of not doing it

Examples:

• **Procure-to-pay process**: some types of employees are empowered to trigger isolated purchases below $500 without supervisor approval

• **Order-to-cash process**: invoices from trusted suppliers under $1000 are not checked on a one-by-one basis

• **University admission process**: authenticity check is very expensive, yet it leads to only 1% of applications being rejected
H2. Task composition/decomposition

• Consider composing two tasks to eliminate transportation and reduce “context switches”, OR

• Consider splitting a task into two and assign to separate, specialized resources
H2. Task composition and decomposition

Composition example:

• **Procure-to-pay process**: Merging two checks: “Check necessity of purchase” and “Check budget”

Decomposition example:

• **Make-to-order process**: Separate a single thick “prepare quote” task into “prepare bill of materials”, “prepare production plan” and “estimate costs and delivery time”

**Composition: (T+, C+/-, F+)  
Decomposition: (T-, C+, F-)**
H3. Triage

• Specialize a task: divide a *general* task into two or more *alternative* tasks

• Generalize tasks: integrate two or more alternative tasks into one general task
H3. Triage

Specialization example:
• **Procure-to-pay process**: Separate approvals of *small* purchases, *medium* purchases and *large* purchases

Generalization example:
• **Make-to-order process**: Integrate quote preparation for two product lines into one single task
Flow-level redesign heuristics

4. Re-sequencing
5. Parallelism enhancement
H4. Re-sequencing

Re-order tasks according to their cost/effect ratio to minimize over-processing

- Postpone expensive tasks that may end up not being necessary until the end
- Put *knock-out* checks first in order to identify problems early
H4. Re-sequencing

Examples:

• Make-to-order process: If “Prepare production plan” is time-consuming, postpone it until after the quote price has been tentatively accepted by the customer.

• Procure-to-pay process: If “Check necessity of purchase” leads to 20% of knock-outs and “Check budget” leads to 2%, perform “Check necessity of purchase” first.

• University admission process: Authenticity check (very slow) leads to 1% of applications being rejected while committee’s check leads to 80% of applications being rejected. Put committee’s check first.
H5. Parallelism enhancement

Parallelize tasks where possible in order to reduce cycle time
H5. Parallelism enhancement

Examples:

• **Procure-to-pay process:** Parallelize “Approve budget” and “Approve necessity of purchase”

• **Make-to-order process:** After “Prepare bill of materials”, perform “Prepare production plan” and “Estimate costs” in parallel
Process-level redesign heuristics

6. Process specialization & standardization
7. Resource optimization
8. Communication optimization
9. Automation
H6. Process specialization/standardization

Process specialization

• One process is split into multiple ones: by customer class, by geographic location, by time period (winter, summer), etc.

• Resources are split accordingly

Process standardization

• Two processes are integrated

• Resources are pooled together
H6. Process specialization & standardization

Specialization example:

• **Procure-to-pay process**: One process for Direct procurement (e.g. raw materials) and one for Indirect procurement (MRO - Maintenance, Repair and Operations)

• **Claims handling process**: One claims handling process for the summer season (stormy season - peak) and one for the winter season (off-peak)

Standardization example:

• **Claims handling process**: Integrate claims handling for motor insurance across different brands of a group

Specialization: (C+/-, Q+/-, F-)
Standardization: (C+, Q+/-, F+)
H7. Resource optimization

➢ Use resources of a given type as if they were in one room
  • Avoid one group of people overloaded and another (similar) group idle

➢ Let people do work that they are good at
  • However, avoid inflexibility as a result of specialization

➢ When allocating work to resources, consider the flexibility in the near future
  • Allocate work to specialized resources first

➢ Avoid setups as much as possible
  • Chain multiple instances of the same task [sequential]
  • Batch multiple instances of the same task [parallel]
H7. Resource optimization

➢ Resource integration example:
  • Claims handling process: Share resources across different types of claims (e.g. motor and personal insurance)

➢ Batching example:
  • Claims handling process: Batch all claims for a given geographic area and assign them to the same resources
  • University admission process: Batch all applications and handle them to the assessment committee
H8. Communication optimization

➢ Automate handling, recording and organization of messages
➢ Monitor customer interactions, record exceptions
➢ Optimize
   1. Number of interactions with customers and business partners
   2. Type of interaction (synchronous vs. asynchronous)
   3. Timing of interactions

(T+,Q+,C+-,F-)
H8. Communication optimization

➢ Optimize number of interactions
  • Gather sufficient information to get to the next milestone (reduce external interactions)

➢ Optimize type of interaction
  • *Synchronous* interactions effective to resolve minor defects
  • *Asynchronous* to notify, inform, resolve major defects, request additional information to reach next milestone
H8. Communication optimization

- Optimize timing of interactions:
  - *Front-loaded process*: bulk of information exchange and processing happens upfront
    - Complete-kit concept
  - *Back-loaded process*: bulk of information exchange and processing happens downstream
    - Example: Ford procurement process in the late 80s (see Lecture 8)
H8. Communication optimization

Complete-Kit Concept: “Work should not begin until all pieces necessary to complete the job are available”

Boaz Ronen

Principles for complete-kit process design:

• Provide complete and easy-to-follow instructions for those who will initiate the process.
• If a process cannot start, the client should be notified of all defects that could be reasonably identified at the onset of the process
• Consider the tradeoff between “incomplete-kit” process initiation vs. roundtrip to revise and resubmit a request
H9. Automation

➢ Use data sharing (Intranets, packaged enterprise systems) to:
  • Increase availability of information to improve visibility and decision-making (subject to security/privacy requirements)
  • Avoid duplicate data entry and transportation

➢ Use network technology to:
  • Replace physical flow (e.g. paper documents) with information flow
  • Enable self-service via e.g. online forms and Web data services
H9. Automation

➢ Use tracking technology to identify and locate materials and resources
  • Identification: Bar code, RFID
  • Location: GPS, indoor positioning

➢ Use business rules technology to automate information processing tasks (including decisions)

➢ Automate end-to-end processes with a dedicated BPM system or automation module in an ERP/CRP system
# Technologies for BP Execution

## Coordination Tech
- BPM System
- Automation platform
- RPA

## Decision Tech
- BRMS
- ML/Analytics
- Chatbots

## Data Tech
- DB engines
- Big Data platforms

## Connectivity Tech
- Online self-service portals
- EDI, Web services, Web APIs

## Cyberphysical Tech
- Digital-physical linking:
  - Bar/QR codes
  - RFID
  - Location tracking
  - GPS
    - Indoor positioning
  - Display, Tactile, AR/VR
  - Sensing and acting:
    - IoT
    - Auton. Robots
Applying redesign heuristics

Example: Equipment rental process
Applying redesign heuristics

Example: Equipment rental process

Heuristic 1: Task elimination

• Eliminate “Request for approval” for small equipment
Applying the redesign heuristics

Example: Equipment rental process

Heuristic 1: Task elimination

• Eliminate request for approvals for small equipment

• Replace approval in all cases, with empowerment and statistical controls
Applying the redesign heuristics

Example: Equipment rental process

Heuristic 2: Task composition

• Merge equipment selection, availability check and rental request creation
Applying the redesign heuristics

Example: Equipment rental process

Heuristic 6: Process specialisation and standardisation

• Separate the process for small versus large equipment and streamline the process for small equipment
Applying redesign heuristics

Example: Equipment rental process

Heuristic 8: Communication optimisation

- Inform the site engineer when the equipment is dispatched
Applying the redesign heuristics

Example: Equipment rental process

Heuristic 8: Communication optimisation

• Inform the site engineer when the equipment is dispatched
• Add interaction to handle extensions
Applying the redesign heuristics

Example: Equipment rental process

**Heuristic 9: Process automation**

- Use self-service for the equipment search and availability checking
Applying the redesign heuristics

Example: Equipment rental process

Heuristic 9: Process automation

• Use self-service for the equipment search and availability checking

• Use process automation to coordinate handovers
Redesign heuristics for Equipment rental process

Heuristic 1
- I1. Eliminate request for approvals for small equipment
- I2. Replace approval with empowerment & stat. controls

Heuristic 2
- I3. Compose equipment selection, availability check and rental request creation

Heuristic 6
- I4. Separate process for small vs. large equipment, streamline “small” process
Redesign heuristics for Equipment rental process

Heuristic 8
- 15. Inform site engineer when equipment dispatched
- 16. Ask site engineer if extension required

Heuristic 9
- 17. Use self-service for equipment search and availability checking
- 18. Use process automation to coordinate handovers