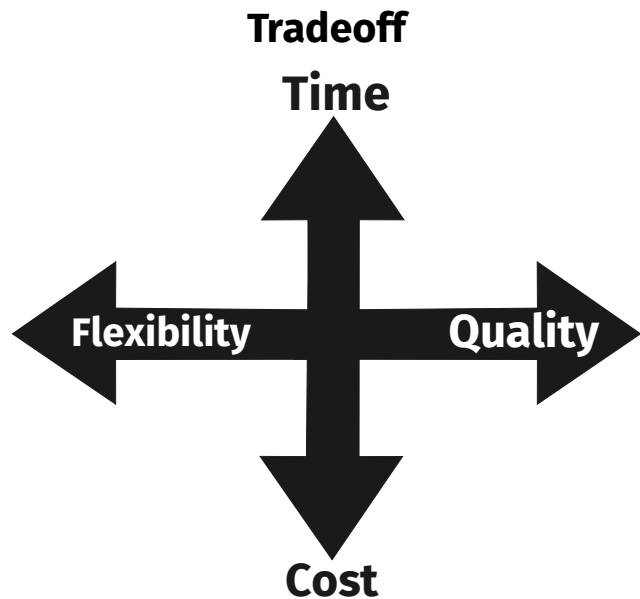


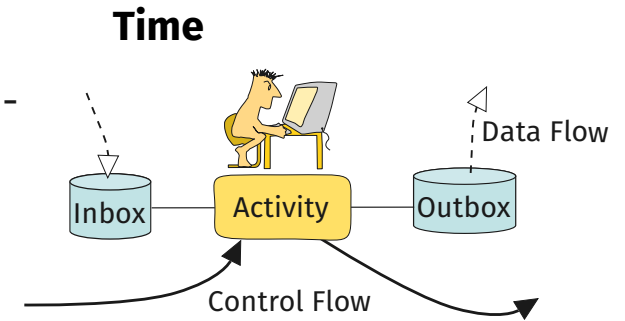
**Business Process Modeling, Management and Mining**  
**Business Process Improvement**

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Hard to optimize all qualities

- Execution Time - the duration of the actual task execution
- Waiting Time - delay due to resource unavailability or contention
- Setup Time - preparations may be amortized over multiple executions
- Communication Time - to gather all information necessary for the execution (message exchanges, input/output from files/databases)



## External Quality

### Customer Satisfaction:

- Product (Process Outcome) meets expectations/specifications
- Customer receives correct informations in a timely manner
- Contracts are not violated
- Data privacy is guaranteed

## Internal Quality

### Working Conditions:

- Find the Best Person for each Task
- Fair Workload Allocation
- Motivation
- Experience, Learning effects
- Ensure Correct Decisions are made

## Costs

- Fixed vs. Variable (over time, per use)
- Human vs. IT Systems
- Internal (we pay) vs. External (customer pays)
- Operations vs. Management vs. Support
- Finite resource depletion vs. Renewable resource consumption

## Flexibility

Ability to react to changes

- Flexible resources can execute different tasks, (quickly) learn how to execute new tasks
- Flexible processes handle various cases and variable workloads
- Flexible management can reallocate resources, adapt rules and policies
- Flexible organizations can restructure themselves to respond to market conditions or business partners demands

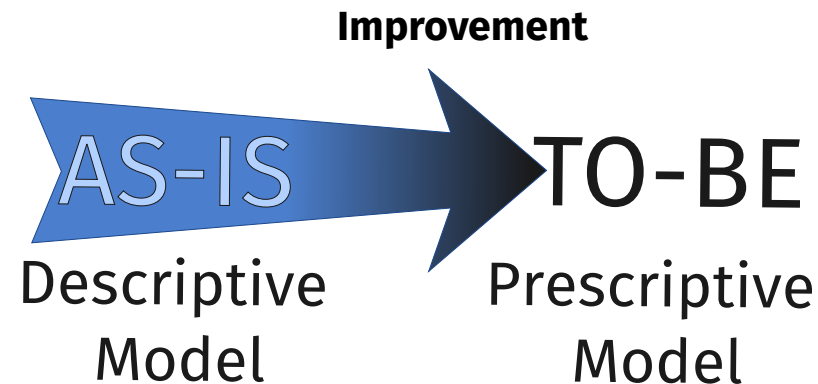
## Focused Improvement

### Scope:

- Individual Activities
- Sub Processes
- Entire Processes

### Statistics:

- Average
- Variance
- Threshold Violations



## How to redesign?

- **Evolutionary**  
salvage AS-IS, lower risk, smaller changes
- **Revolutionary**  
ignore AS-IS, high-risk high-reward

## Starting point?

- Clean slate
- AS-IS (existing processes)
- Reference process models

## Task Elimination

### Remove unnecessary activities:

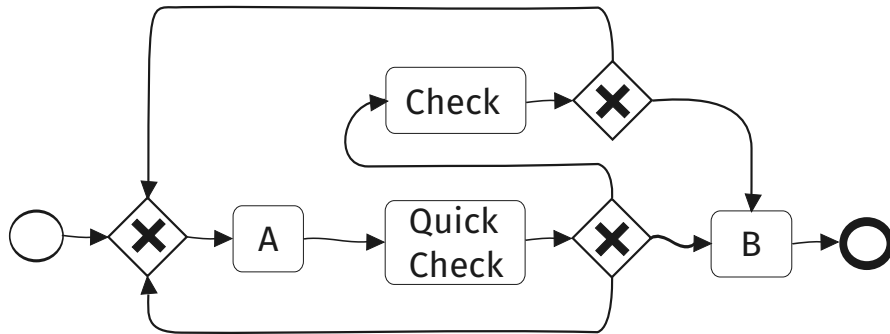
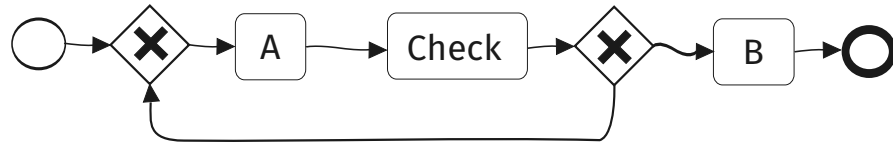
- redundant activities (lean)
- inefficient activities (cost > benefit)
- useless activities (value = 0)

**Better:** Cost, Time - **Worse:** Quality

## Task Elimination Example

Trade the cost of checking against the risk of not checking

Skip some check point activities: cheaper but also could lower product quality



## Resequencing

Order tasks using their costs/benefits ratio

Anticipate decisions that may lead to quick dismissals

Postpone expensive tasks

**Better:** Time, Cost - **Worse:** Flexibility

## Triage

Use an early up-front decision to pick the appropriate process path and avoid unnecessary work

Example: emergency room admission, quick settlement for cheap claims, VIP treatment for returning customers

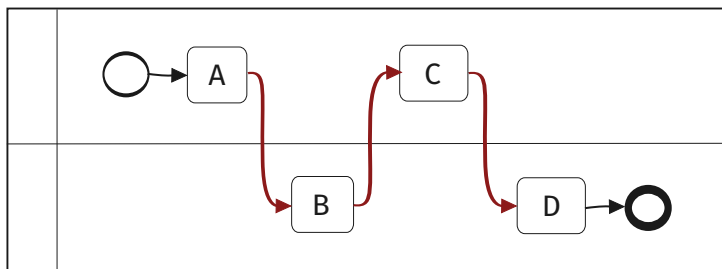
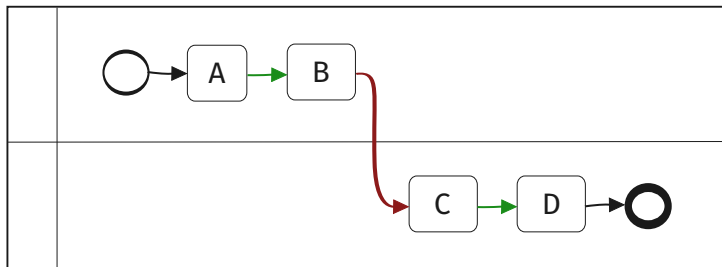
**Better:** Time - **Worse:** Flexibility

## Handover reduction

Keep the same person working on the same case as long as possible

Example: personalized service by dedicated customer account manager

**Better:** Time, Quality - **Worse:** Flexibility



## Task Composition

Combine multiple small tasks into complex large ones (simpler processes, more complex tasks)

Reduce setup time and fragmentation

Ensure uniform quality

Employ generalists that enjoy doing rich and eventful jobs

**Better:** Time - **Worse:** Flexibility

## Task Decomposition

Decompose large tasks into workable units

Less work per task, more handovers

Employ specialists, let the experts focus on critical tasks

**Better:** Quality, Cost, Flexibility - **Worse:** Time

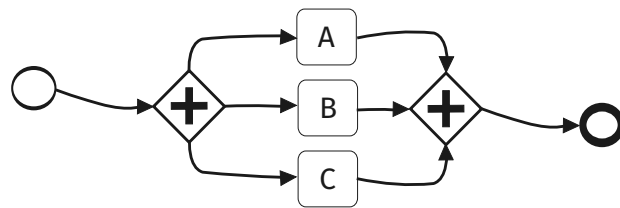
Potential for Parallelization and Self-Service

## Task Parallelization

### Parallelize Independent Tasks

(assuming enough concurrent execution resources are available)

**Better:** Time - **Worse:** Cost



$$T = \max(\{t_A, t_B, t_C\})$$



$$T = t_A + t_B + t_C$$

## Optimize Communication

Reduce the number of messages to be exchanged (simplify business protocols)

Automate message handling

Never employ a human being to copy data between two systems by hand

Prefer asynchronous non-blocking interactions

**Better:** Time, Cost - **Worse:** Flexibility



				days
Automation	Human	Face to Face Phone Call	Letter Fax SMS email	seconds
	Machine	Web Service APIs HTTP	MQ, JMS	
		Sync	Async	ms
		Interaction		

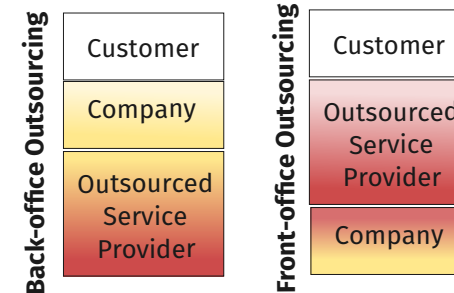
## Outsourcing

Let inefficient and non-critical parts of the process be executed elsewhere by a different organization

Requires: provider selection, contract bidding and negotiations, trust establishment, systems interoperability and integration, quality monitoring

**Better:** Cost - **Worse:** Flexibility

### What to outsource?



internal (private) business functions (e.g., payroll, billing, accounting, legal, IT)  
customer-facing (public) processes (e.g., marketing, sales, support)

## Information Access

Provide direct, unfiltered, timely access to the right and necessary information

What information is needed to carry out a task or to make a decision?

Who owns and controls information, databases, websites (authoritative sources)?

**Better:** Time, Cost - **Worse:** Quality

## The Complete Kit

Work should not begin until all necessary pieces are available (front-loading)

Requires to give feedback upstream about incomplete/defective input

Prevents failures due to missing/incorrect information

Wasted preparation effort if the work fails later

## What to outsource?

Clearly defined, repeatable tasks

Labor intensive tasks done without needing the core competencies or intellectual property of the company

Seldomly executed processes that will need large capital investments

Processes that operate on information allowed to cross national borders

## What NOT to outsource?

Core processes that add the most value to the company's products or services

Critical operational processes that need to be closely monitored and controlled

Highly visible processes that impact the company's image

Tasks for which liability cannot be shifted to the external service provider

## Where to outsource?

- Offshoring
- Nearshoring
- Onshoring
- Inshoring
- Multishoring

Increasing the distance may reduce labor costs but increase communication, synchronization, travel overhead



## Self Service

### Push work back to the customer

Examples: data entry, quality assurance, support

More challenging but as important: make sure customers can revise/cancel/suspend their work by themselves

**Better:** Cost - **Worse:** Quality

## Crowdsourcing

### Leverage open community participation

Open Call for "volunteers" which collaborate/compete to carry out a specific task for a small financial reward or social recognition

Examples: content production and curation, distributed human intelligence tasks, fund raising

**Better:** Cost - **Worse:** Quality, Time

## Process Standardization

### Same treatment for all cases of all customers

Use a larger, homogeneous resource pool

Leverage economies of scale

**Better:** Cost - **Worse:** Quality, Flexibility

## Process Specialization

### Differentiate processes based on case types, geography, season, customer profile

Opportunity to include customized activities

Use a smaller, heterogeneous resource pool

**Better:** Quality, Flexibility - **Worse:** Cost

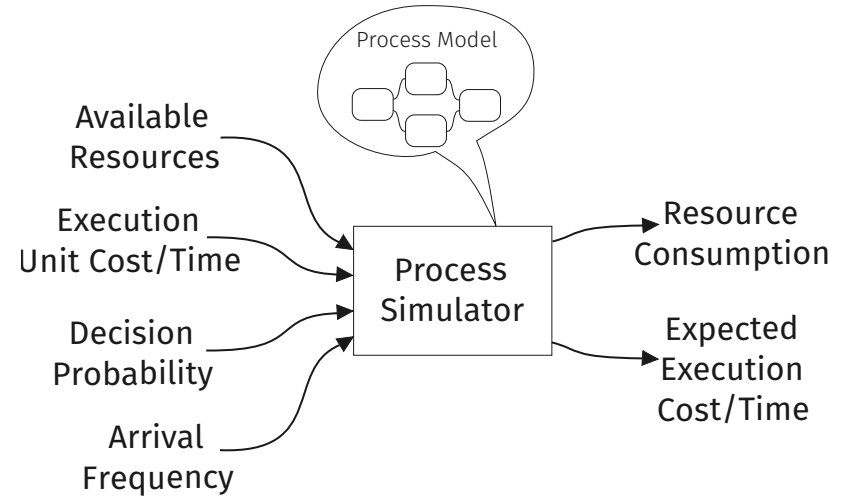
## Improvement Heuristics

1. Task Elimination
2. Resequencing
3. Triage
4. Handover Reduction
5. Task Composition/Decomposition
6. Task Parallelization
7. Optimize Communications
8. Outsourcing/Insourcing
9. Self Service/Crowdsourcing
10. Standardization/Specialization

## Improvement Fail Factors

- Spend too much time analyzing the AS-IS state
- Target non-critical paths
- Ignore concerns/suggestions from involved people
- Proceed without management support
- Consider parts of the process/organization off-limits
- Introduce automation for technology's sake
- Pick the wrong benchmarks

## Process Simulation



## References

- Marlon Dumas, Marcello La Rosa, Jan Mendling, Hajo Reijers, [Fundamentals of Business Process Management](#), Chapters 7-8, Springer, 2013, ISBN 978-3-642-33142-8
- Thomas N. Duening, Rick L. Click, [Essentials of Business Process Outsourcing](#), Wiley, May 2005, ISBN 978-0-471-70987-9