Chapter 8 - Process Redesign

The Essence of Process Redesign

Product vs Process Innovation

Product Innovation: focused on the development of new products or the addition of new features to existing ones, made keep the old clients and attract new ones.
Ex: Since the iPhone's release in 2007, Apple has been improving on this product throughout the years.
Process Innovation: focuses on redesigning business processes so that customers are drawn to them to acquire the products/services they generate.
Ex: Amazon introduced robots to improve warehouse operations and drones to speed up its delivery process.

- As translated in this graph, it is natural for firms to focus firstly on product innovation but the turn their efforts into process innovation.

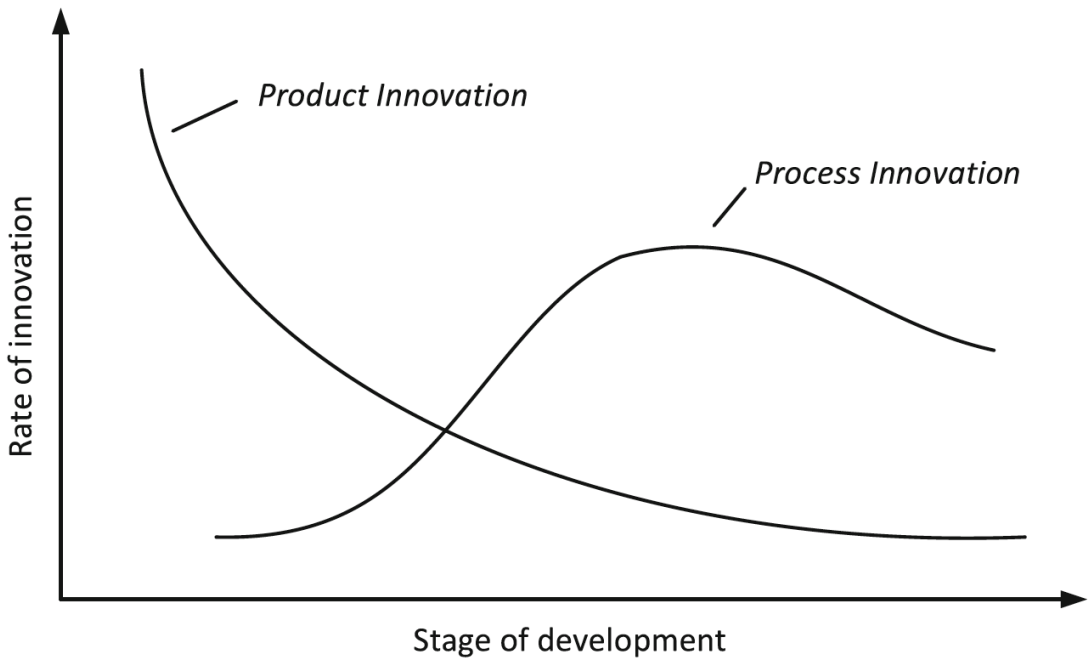


Fig. 8.1 The waves of product and process innovation

Manifestations of Process Redesign

Process Redesign: substantial and intentional change of a business process.

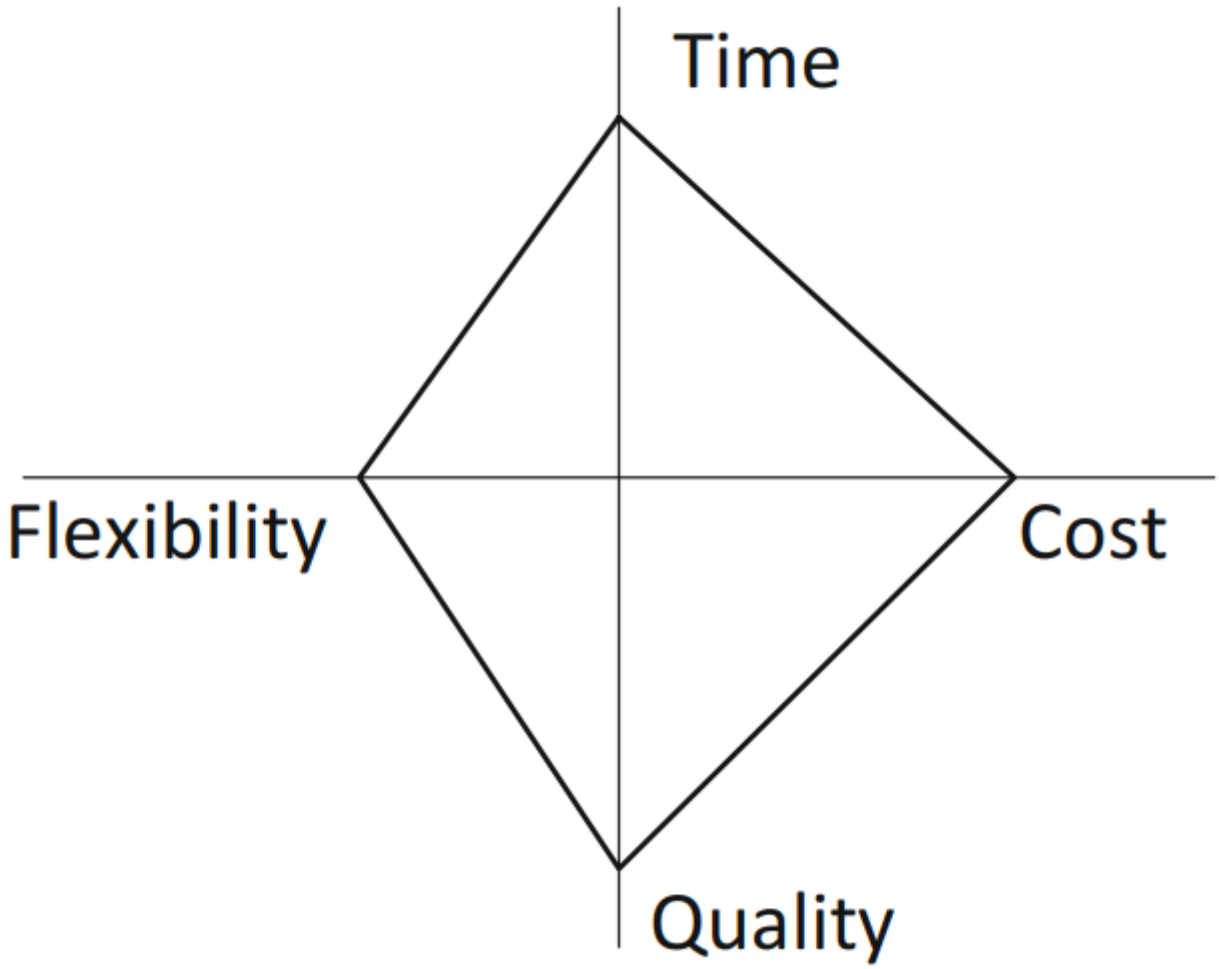
1. **the internal or external customers** of the business process;
2. **the business process operation view**, which relates to how a business process is implemented, specifically the number of activities that are identified in the process and the nature of each;

3. **the business process behavior view**, which relates to the way a business process is executed, specifically the order in which activities are executed and how these are scheduled and assigned for execution;
4. **the organization and the participants in the business process**, captured at two levels: the organization structure (elements: roles, users, groups, departments, etc.), and the organization population (individuals: agents which can have activities assigned for execution and the relationships between them);
5. **the information that the business process uses or creates**;
6. the **technology** the business process uses;
7. the **external environment** the process is situated in;

This leaves out certain activities such as: the way to train people to optimally perform certain activities, the decision which products to phase out, and the acquisition of a competitor.

The Devil's Quadrangle

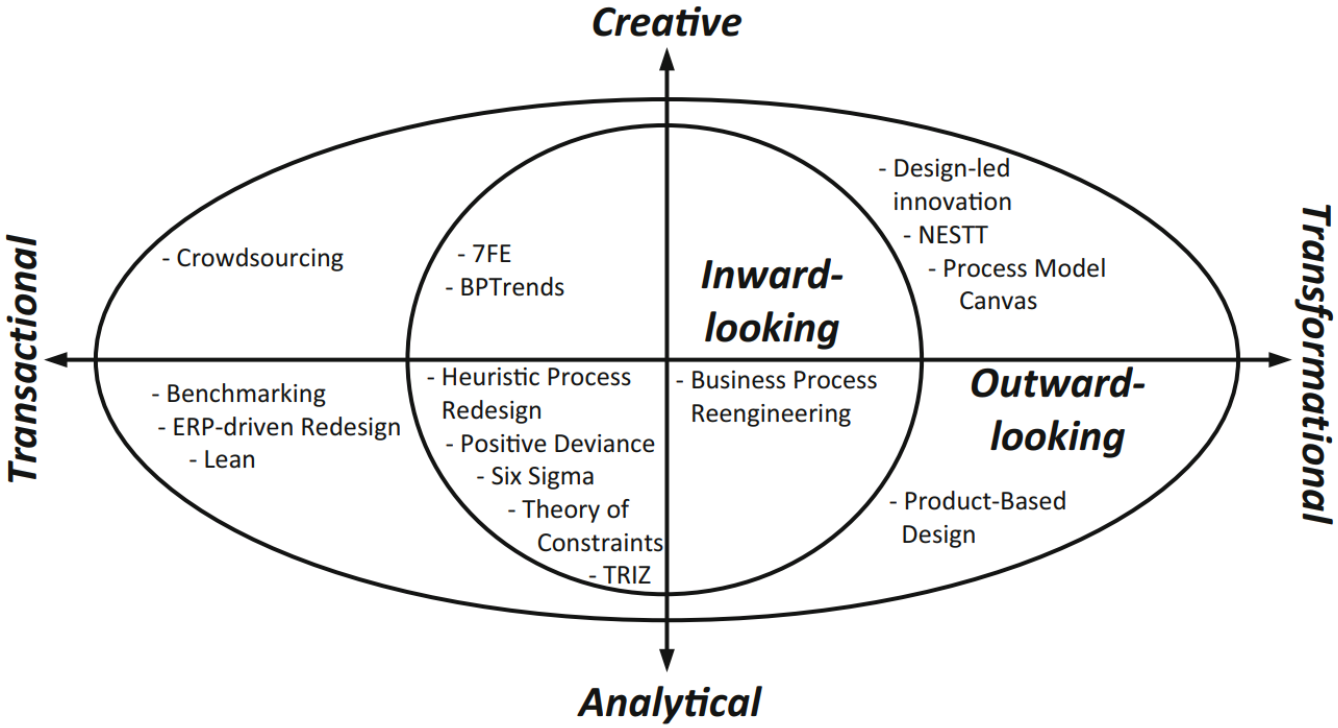
What do we want to achieve exactly when a process is redesigned?



- Improving a process along one dimension will likely weaken its performance along another.
- For example, suppose that a process is extended with a reconciliation activity such that the quality of the delivered service is improved. This extension may actually slow down the delivery time of the

service in question, which would be an undesirable side effect.

The Redesign Orbit



Ambition

- **Transactional Method**: supports identification of problems or bottlenecks and helps to fix these in an incremental way. (evolutionary)
- **Transformational Method**: breaks away from the assumptions and principles behind an existing process. (revolutionary)

Nature

- **Analytical Methods**: mathematical basis and use of quantitative techniques
- **Creative Methods**: embraces human creativity and human ingenuity

Perspective

- **Inward-looking**: concerns itself with the organization's interests
- **Outward-looking**: concerns itself with the perspective of the customer

Transformational Methods

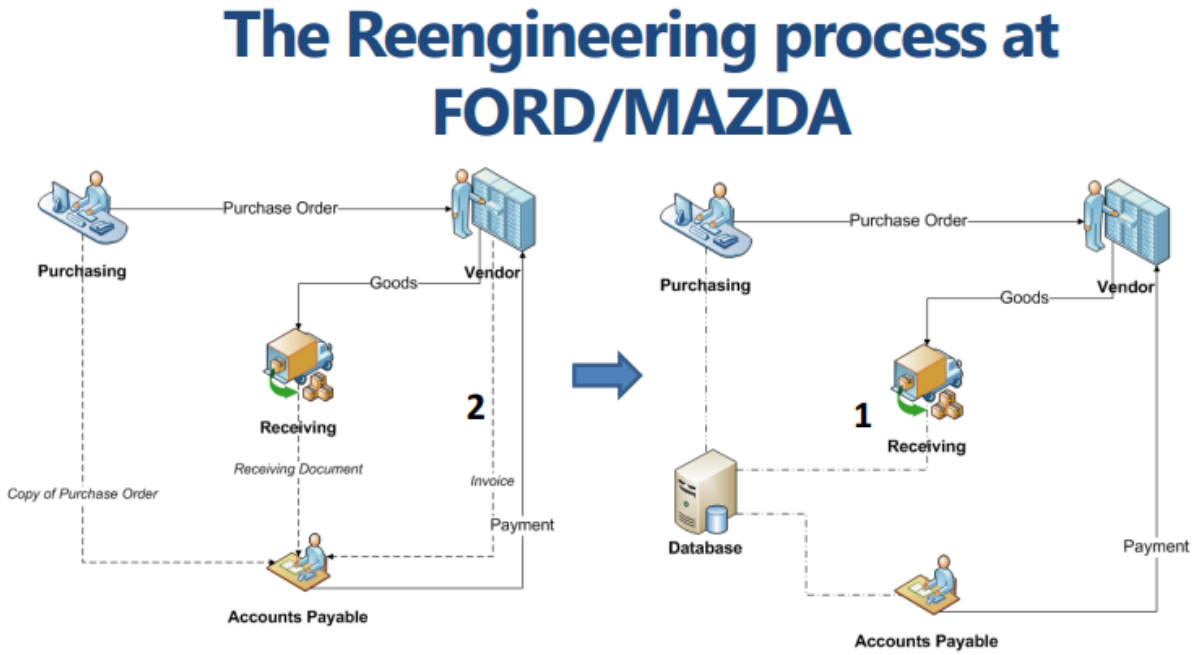
Business Process Reengineering

Properties:

- **Transformative**: the objective is to completely overhaul a process.
- **Analytical**: relies on a set of rigidly defined principles and not on the ideas a group of people comes up with.
- **Mostly Inward-Looking**: operates within the scope and context of the existing process it aims to overhaul.

Principles:

- The information needs to be available to those who need it and want to reuse it, in a shared data store.
- Work that involves processing information needs to be integrated with the real work where this info is produced.
- Those who have interest in the output of a process should not only participate but potentially drive it all the way.



1. The decision to let warehouse personnel immediately check whether a delivery actually matched what was originally purchased is an example of **join the decision to those producing the information**

2. To not collect the same information from the vendor through both an invoice and a notice can be seen as an instantiation of **capturing information once.**

Product-Based Design

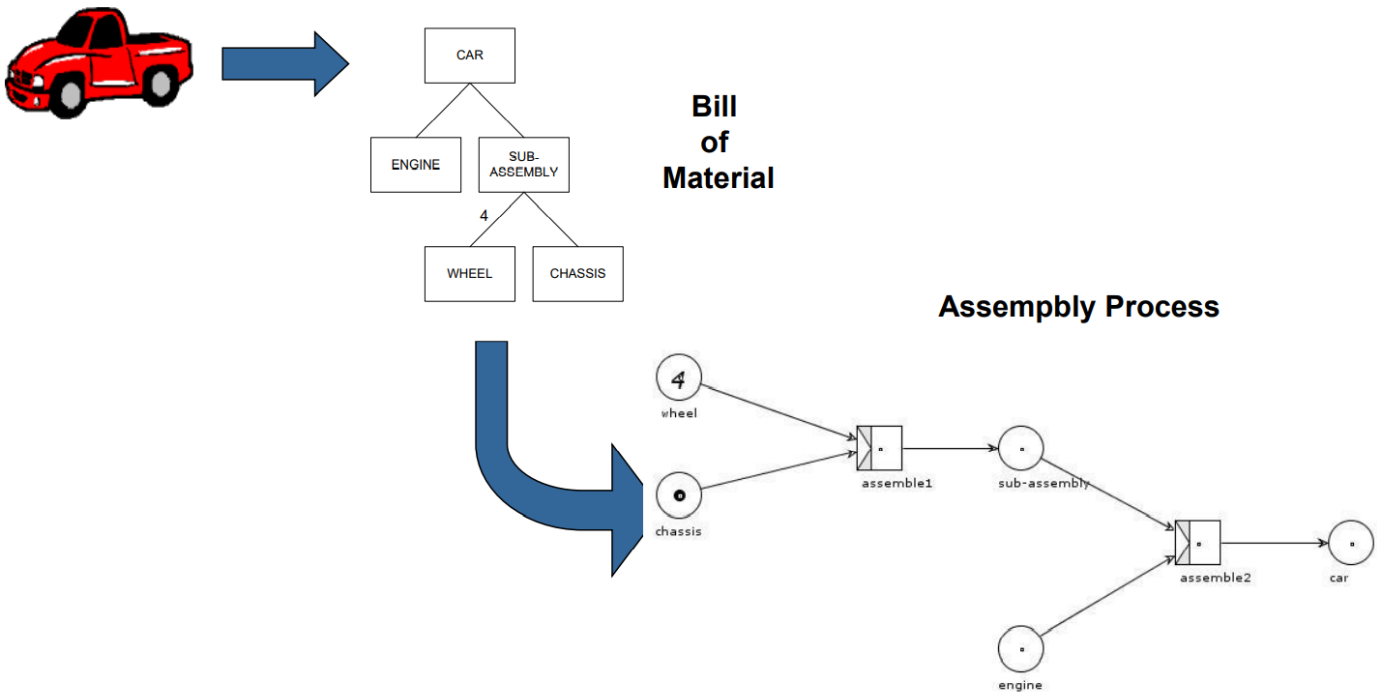
Properties:

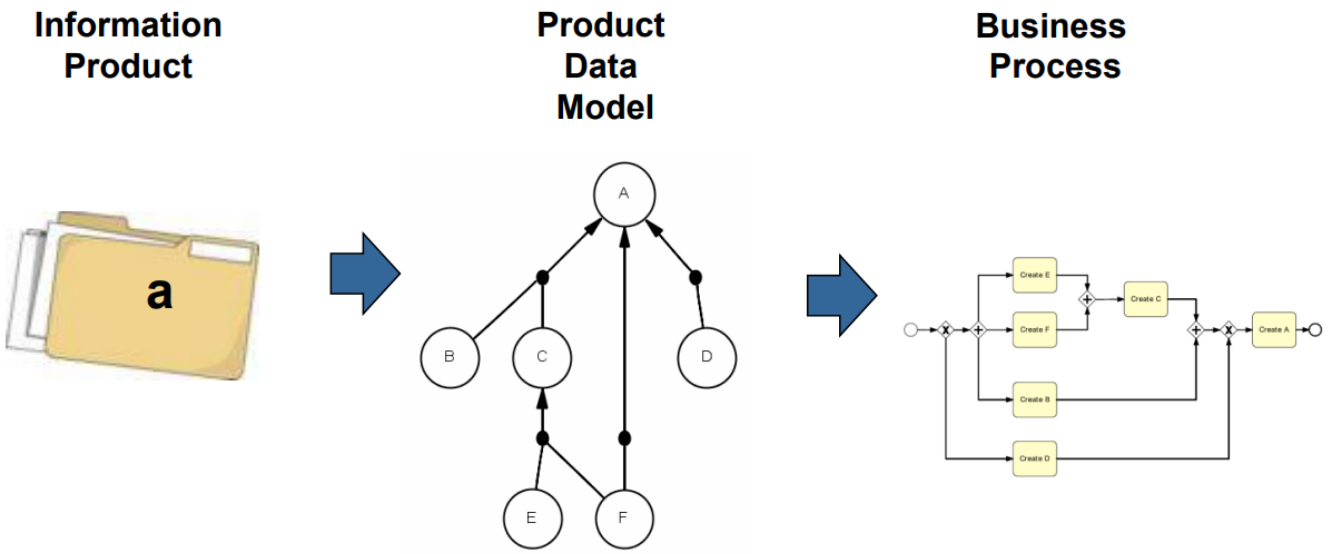
- **Transformative**: the objective is to completely overhaul a process.
- **Analytical**: relies on a formal, almost purely algorithmic way of developing a new business process.
- **Outward-Looking**: because of the artifact that takes **center** stage in this method is the **product** that a business process aims to deliver.

Product Based Design is exemplar:

- **Starts from scratch**
- **For revolutionary redesign, totally different view is taken**
- **Product is central concept rather than process**

Manufacturing Process Model





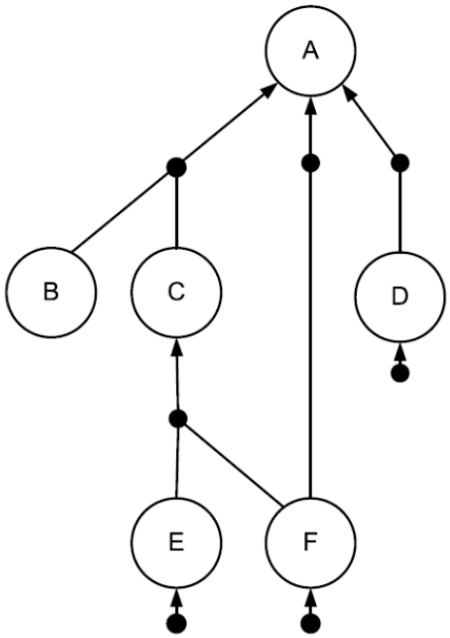
Helicopter Pilot example

- Persons with a bad eye-sight will never qualify as helicopter pilot.
- Persons who were tested no longer than two years ago do not need a new test.
- Physical fitness requires a good quality of eye-sight and very good reflexes.
- Persons with such a good physical fitness and a suitable psychological fitness are suitable to become a helicopter pilot in the Dutch Airforce

Example

The helicopter pilot product data model

- A: suitability to become a helicopter pilot.
- B: psychological fitness.
- C: physical fitness.
- D: latest result of suitability test in the previous two years.
- E: quality of reflexes.
- F: quality of eye-sight.

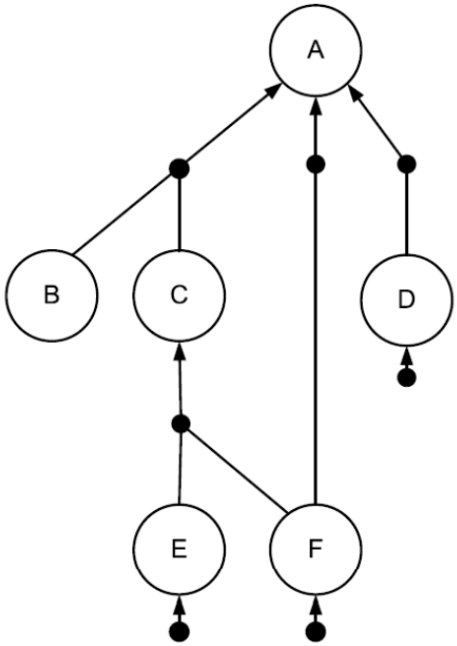


Each incoming arc of a node signifies an *alternative way* of determining a value for the corresponding information element for a specific case.

If outgoing arcs of multiple nodes are joined, this means that values of all of the corresponding information elements are required to determine a value for the information element the arrow leads to.

There are three ways to determine a value for information element *A*. The suitability of a candidate (a) can be determined on the basis of:

1. the combined results of the psychological test (B) and the physical test (C)
2. the result of a previous suitability test (D), or
3. the candidate's eye-sight quality (F)



Notice that, a direct arrow to the end can be either can or cannot be a pilot

Make sure to do the exercise in slide 70

Transactional Methods

Heuristic Process Redesign

Has 3 major stages:

- **Initiate**
  - Validate the process model
  - Based on the collected issues, define redesign goals (quality, time, flexibility, cost)
- **Design**
  - For each goal, identify the possible heuristics as a single transformation
  - Consider the aggregation of possible heuristics that could be applied to improve it
- **Evaluate**
  - Evaluate the final transformation

Process Redesign Heuristics

Basic

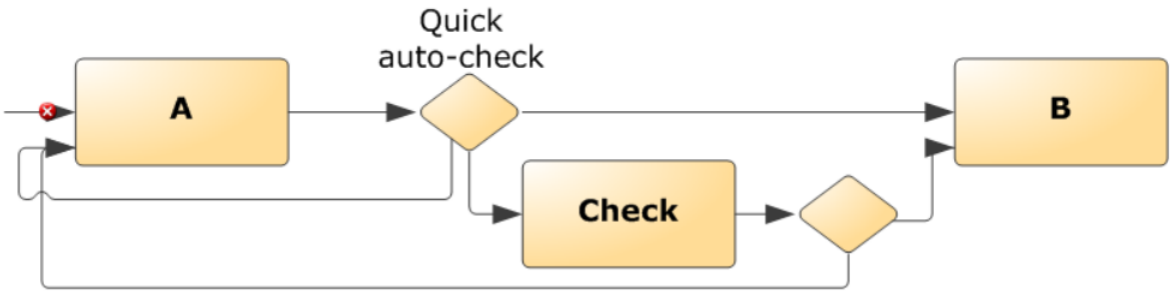
1. TASK Level
   - H1 - Task elimination
   - H2 - Task composition
   - H3 - Triage
2. FLOW Level
   - H4 - Resequencing
   - H5 - More Parallelism
3. PROCESS Level
   - H6 - Process specialization and standardization
   - H7 - Resource optimization
   - H8 - Communication optimization
   - H9 - Automation

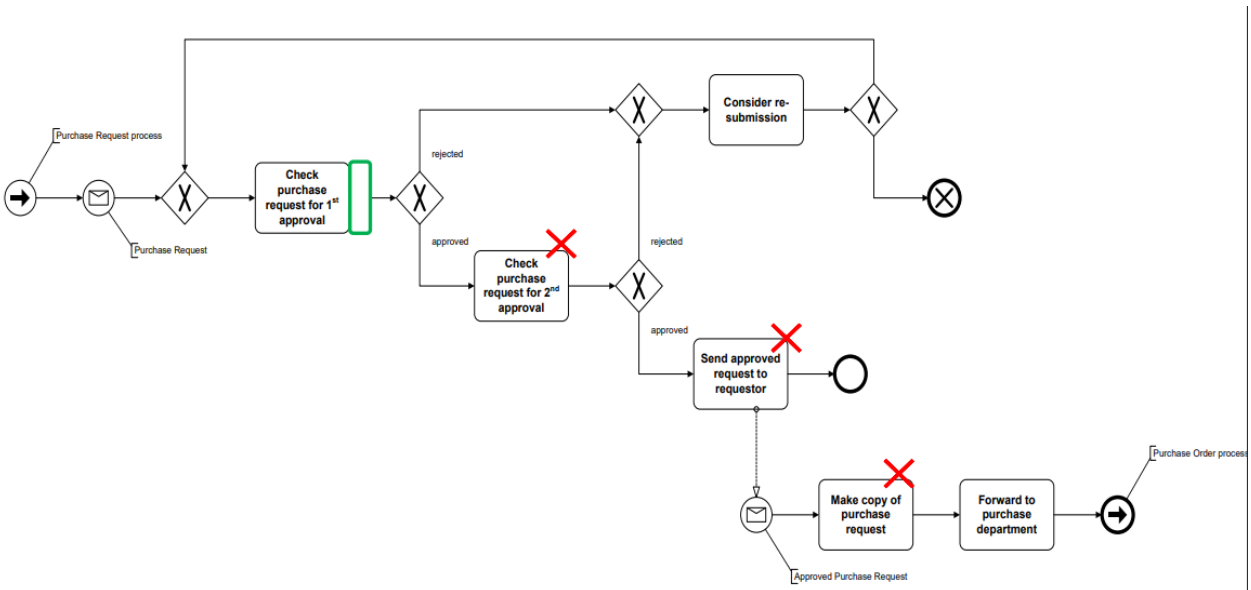
Advanced

4. Customer
5. Operation
6. Behavior
7. Organization
8. Information
9. Technology
10. External Environment

H1 - TASK Level - Task Elimination

- Eliminate non-value-adding steps wherever these can be isolated **(forward, send receive)**
- Reduce manual control steps **(checks and approvals)**:
  - Skip them when feasible
  - Replace with statistical controls
  - Partially/Fully automating them
- Other tasks to consider for elimination: print, copy, archive, store (generally, non-value adding activities -> control and management)
- Task elimination can also be achieved by delegating authority
  - No need for approval if amount less than Y
  - Employees travel expenses reimburse is self validated and controlled by statistical sampling by the company





1-Digitalize the Purchase Request document & Remove tasks:

- "Send approved request to requestor"
- "Make copy of purchase request"

2- Consider removing "Check purchase request for approval 2" and include it in first check.

Based on Marlon Dumas material

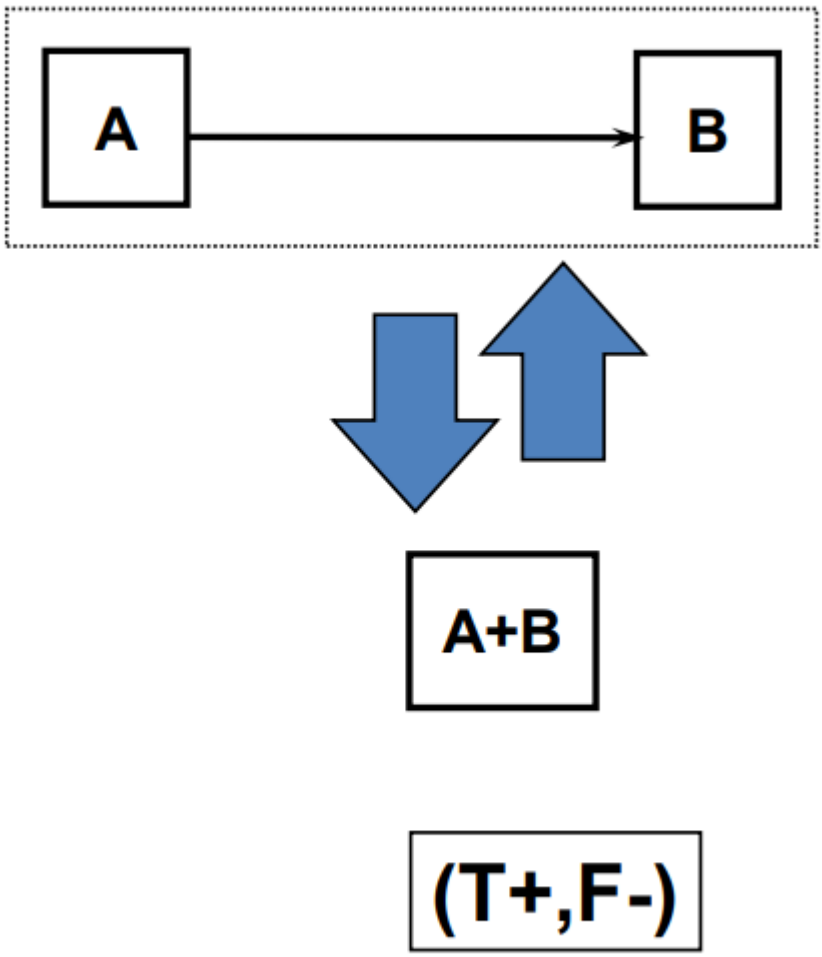
(T+,Q-,C+/-)

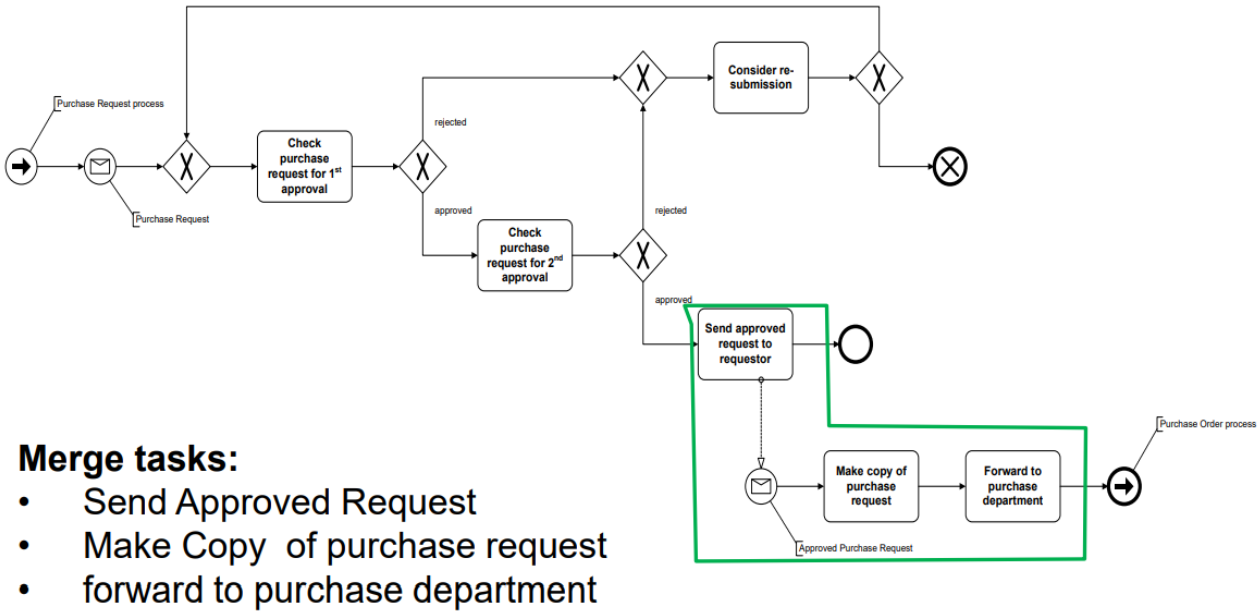
H2 - TASK Level - Task Composition (merge or split)

- Split

- **Pros**: less work to commit, allows for specialization
- **Cons**: setup time, fragmentation, less atomicity

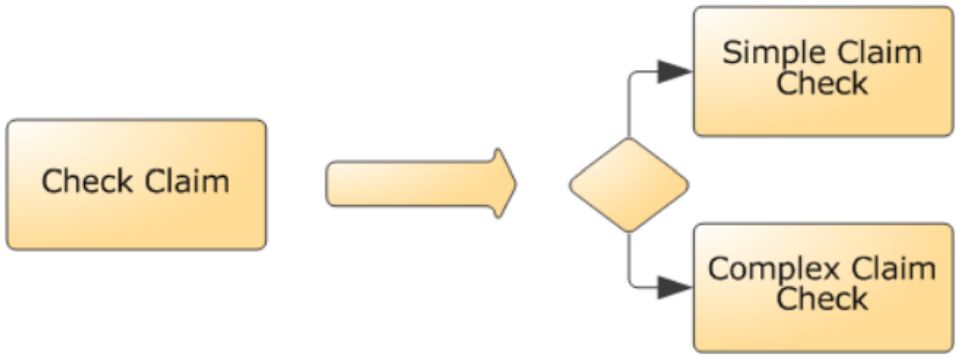
- **Merge**
  - **Pros**: setup reduction, no fragmentation, less transportation time, more atomicity
  - **Cons**: more work to commit, one person needs to be qualified for both the tasks being merged





H3 - TASK Level - Triage

- Divide a general task into two or more alternative tasks or integrate two or more alternative tasks into one general tasks.

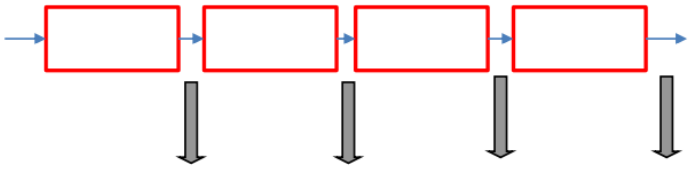


(T+,F-)

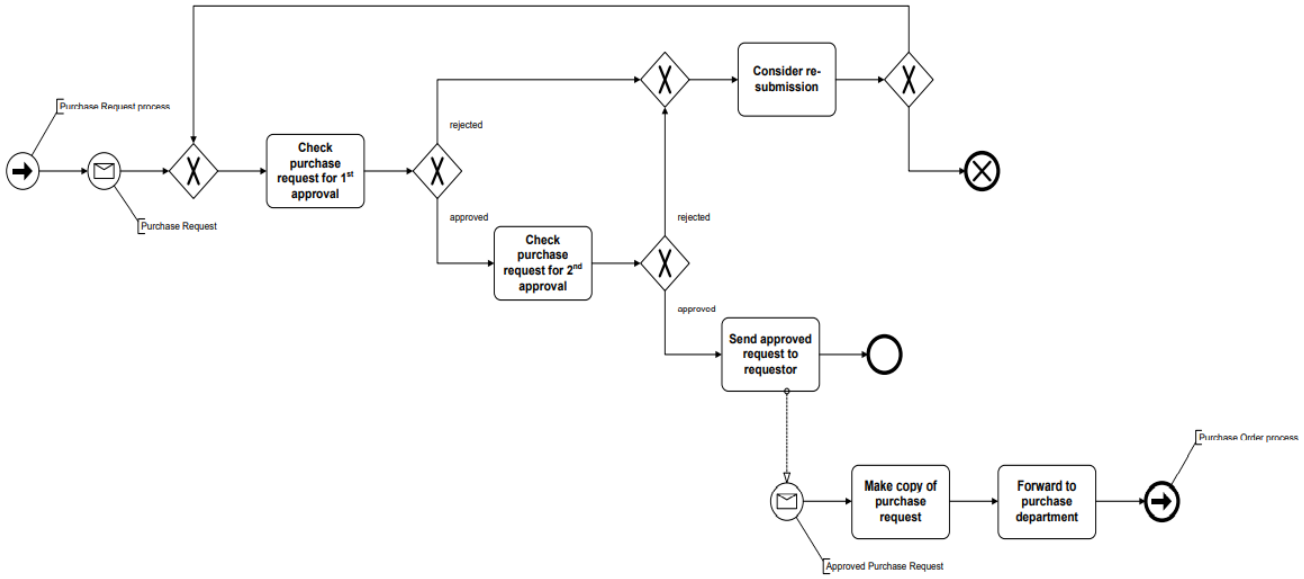
H4 - FLOW Level - Resequencing

- Order tasks based on cost/effect
- Put "knock-out checks" first to identify problems early

- Postpone expensive tasks until the end



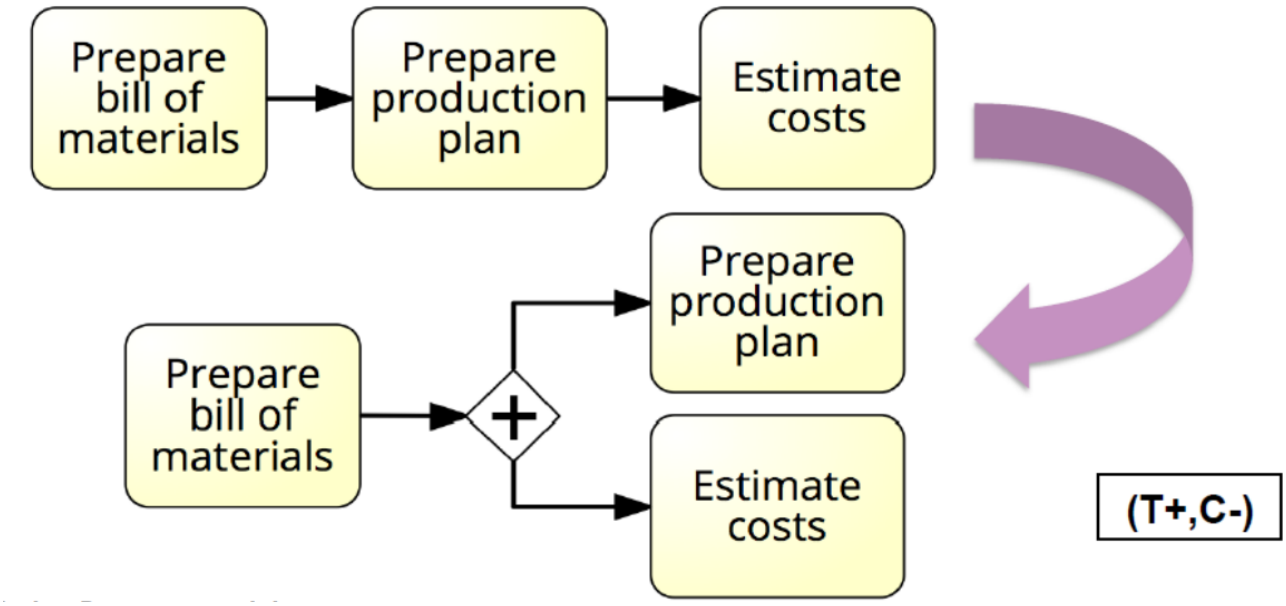
(T+,C+/-)

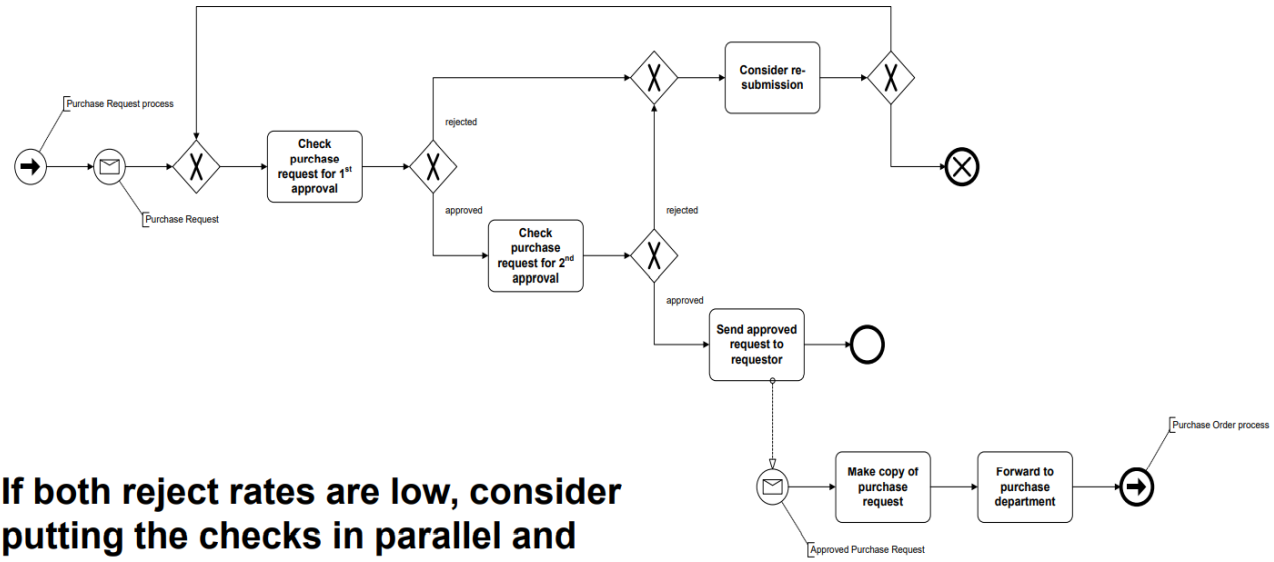


Normally one should place the most selective checks first.
But one must also consider the actual testing effort!

H5 - FLOW Level - Parallelism

- Examples:
  - Procure-to-Pay: Parallelize "budget approval" and "necessity of purchase approval".
  - Make-to-Order: After "prepare bills of materials", perform "prepare production plan" and "estimate costs" in parallel.





If both reject rates are low, consider putting the checks in parallel and then merge both.

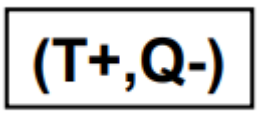
H6 - PROCESS Level - Process specialization and standardization

- **Process Specialization**:
  - Differentiate by customer classes, geographical locations, time periods (winter, summer);
  - Different activities, different resource pools
- **Process Standardization**
  - All cases treated equally (as much as possible)
  - Resources are pooled together

F+/-, C+/-

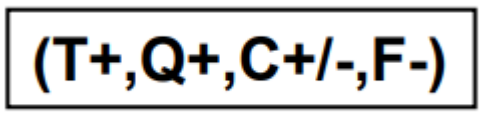
H7 - PROCESS Level - Resource optimization

- **Centralization**: treat geographically dispersed resources as if they were centralized.
  - Avoids one group overloaded with work and another waiting for work
- **Case Assignment**: "Let workers perform as many steps as possible for single cases"
  - Extreme scenario: having "case managers"
- **Flexible Assignment**: "Assign work in such a way that maximal flexibility is preserved for the near future"
- **Empower**: "Give workers most of the decision-making authority instead of relying on middle management"
  - Empowerment should go hand-in-hand with accountability



H8 - PROCESS Level - Communication optimization

- Reduce the number of messages exchanged with customers and business partners.
- Automate handling of messages (send/receive)
- Use EDI, XML, Web Services whenever economical to prevent communication erros
- **If possible, use asynchronous instead of synchronous communication**.



H9 - PROCESS Level - Automation

- Use **data sharing** (Intranets, ERPs) to:
  - Increase availability of information to improve decisions or visibility (subject to security/privacy)
  - Avoid duplicate data entry, paper copies
- Use **network technology** to:
  - Replace materials (e.g. paper document) flow with information flow
    - E.g. querying government agency DBs replacing document flow
  - Increase communication speed: e-mail, SMS
  - Note: e-mails are unavoidable, but not always desirable

- Enable self-service (e.g. online forms)

(T+,Q+/-,C+/-,F-)

- Use tracking technology to identify/locate materials and resources where reasonable
  - Identification: Bar code, RFID
  - Location: indoor positioning, GPS
- Automate tasks and decisions
  - Capture and automate business rules where effective
- Automate end-to-end processes

Make sure to do the equipment rental process exercise here in the slide 33

Advanced Re-Design Heuristics

Customer Heuristics

- Focus on improving the interaction with customers.
  - **Control Relocation**: "Move controls towards the customer"
  - **Contact Reduction**: "Reduce the number of contacts with customer and third parties"
  - **Integration**: "Consider the integration with a business process of the customer or a supplier"

	Time	Cost	Quality	Flexibility
Control relocation	·	−	+	·
Contact reduction	+	−	+	·
Integration	+	+	·	−

Business Process Operation Heuristics

- Focus on the elements of a business process:
  - **Case Types**: "Determine whether activities are related to the same type of case and, if necessary, distinguish between new business processes"
  - **Activity Elimination**: "Eliminate unnecessary activities from a business process"
  - **Case Based Work**: "Consider removing batch-processing and periodic activities from a business process"
  - **Triage**: “Consider the division of a general activity into two or more alternative activities”

- **Activity Composition**: "Combine small activities into composite activities and divide large activities into workable smaller activities"

	Time	Cost	Quality	Flexibility
Case types	+	+	−	−
Activity elimination	+	+	−	·
Case-based work	+	−	·	·
Triage	·	−	+	−
Activity composition	+	+	·	−

Business Process Behavior Heuristics

Regulates the logic within the business process:

- **Resequencing**: "Move activities to more appropriate places".
- **Parallelism**: "Consider whether activities may be executed in parallel".
- **Knock-out**: "Order knock-outs in an increasing order of effort and in a decreasing order of termination probability".
- **Exception**: "Design business processes for typical cases and isolate exceptional cases from the normal flow".

	Time	Cost	Quality	Flexibility
Resequencing	+	+	·	·
Parallelism	+	−	·	−
Knock-out	−	+	·	·
Exception	+	−	+	−

Organization Heuristics

First Set: Structure of the organization (mostly the allocation of resources):

- **Case assignment**: "Let workers perform as many steps as possible for single cases".
- **Flexible assignment**: "Assign work in such a way that maximal flexibility is preserved for the near future".
- **Centralization**: "Treat geographically dispersed resources as if they are centralized".

- **Split responsibilities**: "Avoid shared responsibilities for tasks by people from different functional units". (process break points)
- **Customer teams**: "Consider to compose work teams of people from different departments that will take care of the complete handling of specific sorts of cases".
- **Numerical involvement**: "Minimize the number of departments, groups and persons involved in a business process".
- **Case manager**: "Appoint one person to be responsible for the handling of each type of case, the case manager".

	Time	Cost	Quality	Flexibility
Case assignment	·	·	+	−
Flexible assignment	+	−	·	+
Centralization	+	−	·	+
Split responsibilities	·	·	+	−
Customer teams	·	·	+	−
Numerical involvement	+	−	·	−
Case manager	·	−	+	·

Second Set: organizational population and the resources being involved in terms of type and number:

- **Extra resources**: "If capacity is insufficient, consider increasing the available number of resources".
- **Specialist-generalist**: "Consider to deepen or broaden the skills of resources".
- **Empower**: "Give workers most of the decision-making authority instead of relying on middle management".

	Time	Cost	Quality	Flexibility
Extra resources	+	−	·	+
Specialist-generalist	+	·	+	−
Empower	+	·	−	+

Information Heuristics

Focus on the information the business process uses, creates, may use or may create.

- **Control addition**: "Check the completeness and correctness of incoming materials and check the output before it is sent to customers".
- **Buffering**: "Instead of requesting information from an external source, buffer it and subscribe to updates".

	Time	Cost	Quality	Flexibility
Control addition	−	−	+	·
Buffering	+	−	·	·

Technology Heuristics

Focus on the technology the business process uses or may use.

- **Activity automation**: "Consider automating activities".
- **Integral technology**: "Try to elevate physical constraints in a business process by applying new technology".

	Cost	Quality	Time	Flexibility
Activity automation	+	−	+	−
Integral technology	+	−	·	·

External Environment Heuristics

Focus on the improvement upon the collaboration and communication with the third parties.

- **Trusted party**: "Instead of determining information oneself, use the results of a trusted party".
- **Outsourcing**: "Consider outsourcing a business process completely or parts of it".
- **Interfacing**: "Consider a standardized interface with customers and partners".

	Cost	Quality	Time	Flexibility
Trusted party	+	+	·	−
Outsourcing	+	+	·	−
Interfacing	+	·	+	−

Make sure to do the equipment rental process exercise here in the slide 50