Chapter 9 - Process Aware Information Systems

Types of Process-Aware Information Systems

- **Automated Business Process/Workflow**: a process that is partly or wholly automated by a software system passing information from one participant to another for action.

Domain-Specific Process-Aware Information Systems

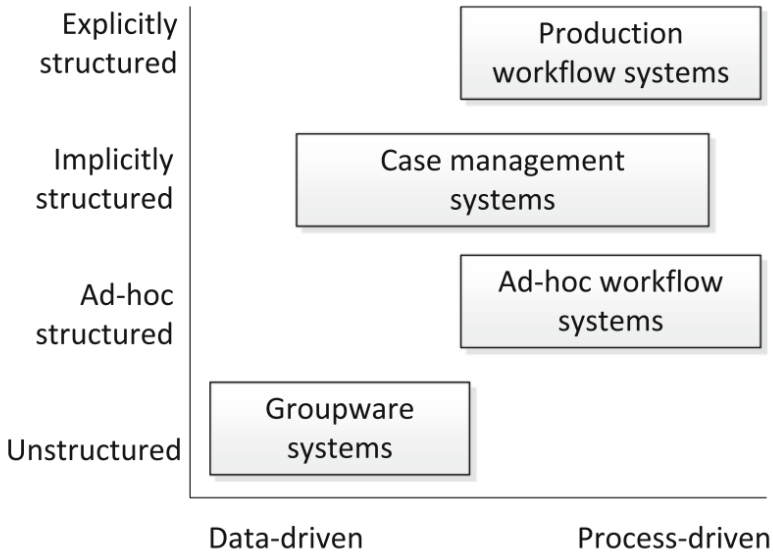
- **ERP systems**: provide essential and generic business functionality supporting accounting, controlling, HR management and production management.
    - Fully cover **procure-to-pay** and **order-to-cash** processes.
- **Customer Relationship Management (CRM) systems**: support marketing and sale processes that directly interact with the customer both on individual and aggregated level.
    - **Individual level**: document interactions with customers be it through email, telephone, personal encounters etc...
    - **Aggregated level**: supports sales and marketing activities related to products, pricing, distribution and campaigning
    - This system is an extensive database of information on existing and future customers.
    - Covers **campaign-to-leads** and **lead-to-order** processes.
- **Supply Chain Management (SCM) systems**: supports logistic operations that integrate with suppliers and customers.
    - **Operational level**: supports the management of transportation, storage and inventory.
    - **Technical level**: supports electronic data interchange like bar code scanning and tracking techs.
    - Covers **order-to-delivery** and **return-to-refund** processes.
- **Product Lifecycle Management (PLM) systems**: support the engineering and design processes of products.
    - **Conception and design phase**: products specified, designed and validated.
    - **Realization phase**: products are built, assembled and tested.
    - **Service phase**: products are sold and delivered.
    - Covers **idea-to-launch**, **build-to-order**, **engineered to order** and **assembled-to-order** processes.

Note: There also exists domain agnostic PAISs which are based on fixing issues or managing documents.

Business Process Management Systems (BPMS)

- **BPMS**: system that supports the design, analysis, execution and monitoring of business processes on the basis of explicit process models.

Fig. 9.1 The spectrum of BPMS types



- **Groupware systems**: allows document and info sharing and direct communication with other users.
  - **Advantage**: high operational flexibility
  - **Disadvantage**: does not support business processes directly
- **Ad hoc workflow systems**: allows on the fly process definition and even redefinition (like adding steps to a process) however this has a **restriction**: processes should only be defined by people that know the process in general and that are capable of modelling it with the appropriate tools. So it can't always be applied.
- **Production Workflow Systems**: allows to define process models (ex: camunda tool) and the management of data is handled by a DBMS, you can't deviate from a process logic that was not captured in the process model.
  - **Administrative**: supports work performed by people.
  - **Transaction**: supports fully automated processes.
- **Case Management Systems**: supports processes that aren't strictly specified by using **implicit models** with a conventional flow that the user can deviate from unless strictly illegal. Supports production workflow too if it is a hybrid BPMS.

Architecture of a BPMS

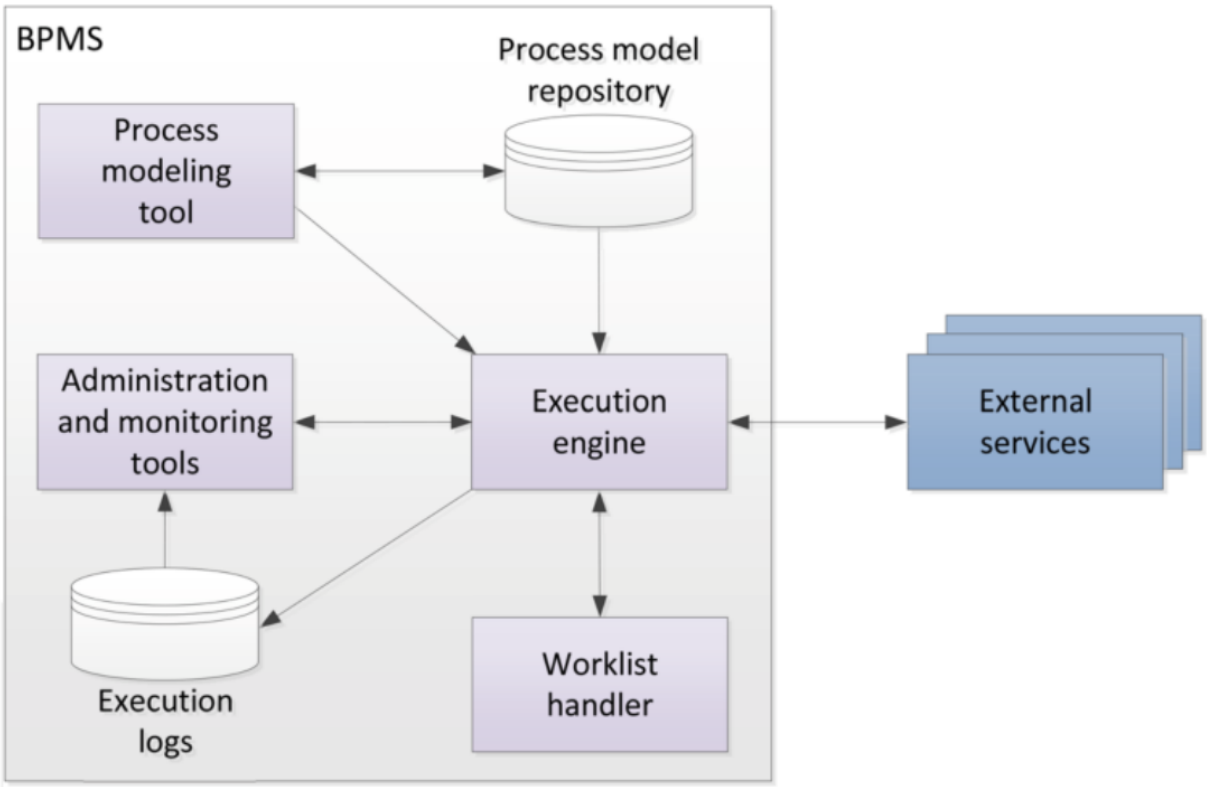


Fig. 9.2 The architecture of a BPMS

- **Execution Engine**: creates executable process instances, distributes work to process participants to execute a business process from start to end, automatically retrieve and store data required for the process and deleted activities to the software apps across the organization.
- **Process Modelling Tool**: users can create and modify process models, annotate the models with more data such as participants or inputs/outputs, store and share process models from a repository
- **Worklist handler**: process participants are offered work items and commit to these, the execution engine keeps track of which items are due and makes them available through the worklist handlers.
- **External Services**: service interfaces with which the engine can interact, the execution engine provides the required data the service will need to perform its activity.
    - If we need to transfer control over cases between different organization units we can simply use an external BPMS with a service interface for this purpose (being an external service).
    - Ex: consider a global insurance company that has offices in three different time zones: Japan, the UK, and California. At the end of the working day in each of these time zones, all work items can be transferred to the execution engine in the next zone where the work day has just started. In this way, the execution of the business process never stops.
- **Administration and monitoring tools**: take care of all **operational** matters such as not allocating work items to someone that is ill or in a vacation or to remove outdated work items from the system. They also have a **monitoring** functionality to measure the performance of running business processes like average cycle times or cases that are delivered too late.

Advantages of Introducing a BPMS

Workload Reduction

- A BPMS **automates** part of the work done by people. It takes care of transporting work by dispatching work items online instead of by post office.
- A BPMS provides **coordination**, workers don't need to figure out the route of the work item (because the BPMS does this) so they always know what should they do next.
- A BPMS gather all the relevant info regarding a task so the worker doesn't have to do this himself. Ex: finding the right file can be time consuming (assuming a paper-based organization).

Flexible System Integration

- BPMS can glue together separate systems (however they do not integrate data, careful with redundant information).

Execution Transparency

- A BPMS keeps track of which work items there are. It provides with Operational information (recent, running cases) and Historic Information (completed cases).

Rule Enforcement

- A BPMS assures the business process will be carried out precisely in the way it was designed.

Challenges of Introducing a BPMS

Technical Challenges

- A BPMS can integrate separate systems together. However, what happens when a system wasn't designed with coordinate use in mind? Often, the developers of such apps are not available to know how the structures of the app work so there is no way to know how the BPMS will exchange info with that system.
- A solution for this was **screen scraping**: the key strokes that an end user should make are emulated by the BPMS and the signals sent to the display are tracked to establish the progress of carrying out an activity. There is also **Robotic Process Automation**: software that automates tasks (or entire business processes) which are based on clerical/administrative work that are highly repetitive tasks.

Organizational Challenges

- The introduction of a BPMS can cause organizational rules to change, departments to be scrapped or combined, participants to get other responsibilities, and new products to be introduced or taken off the market.
- Must give process participants hands-on experience of using a BPMS for them to really appreciate the advantages it brings. Clarify how the information it records will be used. (Big brother is watching you - we don't want this)

Change Management

- ***What should we have in mind when introducing a BPMS?***
    - **Factors of Influence**: DICE

        - **D**uration of the initiative
        - **I**ntegrity of the project team
        - **C**ommitment of the top management at the affected employees
        - **E**ffort demanded from employees on top of their usual work
    - The shorter the project, the more capable the project team, the higher the commitment and the lower the excess effort and bigger the chance of success.
    - **Early Victory**: victory declared too soon, the useful changes disappear over time. **Instead, focus on short term wins and small projects and use these as stepping stones for bigger projects.**
    - **The Nature of Resistance**: skilled employees actually do nothing to make the change successful like assigning more and more difficult project to an employee all the time may demotivate them. **Take time to understand people's behavior.**
    - **Programatic Change Fallacy**: misconception that change can only be made by change programs driven my corporate staff teams. The individual units must have room to adopt a modified version of the envisioned change, only after this the formal structure should change to institutionalize the applied changes.