

CA441: Business Process Management

Class: CAIS 4
Lecturer: Martin Crane

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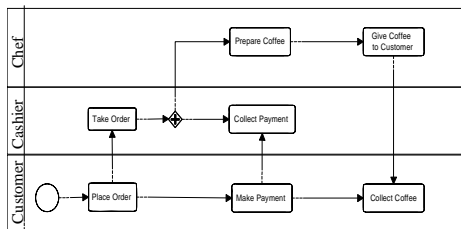
What are Business Processes anyway?

- Def: A collection of interrelated work tasks, initiated in response to an event, achieving a specific result for the customer and other stakeholders of the process (Sharp & McDermott)
- No Result - No Process!
 - + Customer Relationship Management is not a process!
 - + Confirm Market Opportunity is a process
- BPM = Management of Business Processes

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A Simple Business Process Example

- Customer Buying Cup of Coffee
- Different Actors involved: Customer, Cashier, Chef



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BPM Timeline

- Origins in manufacturing (1700s):
 - + One person making an item from start to finish
 - + Specialisation: division of labour (Adam Smith)
- Analysis of Specialised Tasks/ 'Time & Motion' Studies (1900s)
- Work Process Flow (early to mid-1900s) (Frank Gilbreth)
 - + Disenchantment with the Assembly Line (1930s)
- Workflow (mid-1970s):
 - + Document-based at a departmental process level
- The Quality Era (1980s):
 - + Continuous Improvement (Total Quality Mgmt- Deming & Juran)
- Business Process Reengineering (BPR) (1990s)
 - + Revolution V Evolution (Hammer & Champy)
- Business Process Modelling (2000s)
 - + Multilevel, whole organization process integration & modelling

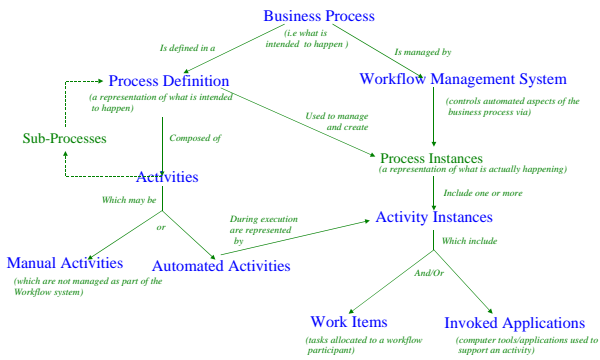
BPM Caveats...

- BPM has potential to transform organizations into more nimble, agile entities, leveraging both human & tech capital effectively.
- However, often BPM efforts are spoiled by an emphasis on technology, diagrams, or other pedantry.
- BPM is not primarily about these; its purpose is *to improve business*. If you cannot demonstrate the *business value* of a BPM effort, go back to the drawing board.
- Processes are a view on organizations, but are an abstraction from reality & do not cover all aspects of a complex system. Don't mix up the map with the territory it represents.

BPM Caveats....cont'd

- BPM efforts require structure & methodology.
 - + structure to guide efforts at different levels of abstraction (separating *what* from *how*), i.e. a level framework.
 - + also need a structure to navigate among the processes of your organization, i.e. a process architecture.
 - + need a methodology to retain & leverage what you have learned about managing & conducting BPM projects
- Shouldn't try to improve everything at once, but review the most important aspect (i.e. 'Pinchpoints') of an organization.

Relationship Between Concepts



Course Objectives

- Examine the main concepts of Business Process Management and Business Process Re-design
- Examine techniques for modelling Business Processes.
- Examine the environmental conditions and the enabling technologies.
- Compare BPR with other management techniques.

Course Structure

Lectures

- Introduction - scope, objectives.
- Workflow Modelling (understanding current WF/ designing new WF)
- Introduction to Business Process Redesign
- Business Process Re-engineering
- Successful Re-engineering Projects
- Socio-Technical Systems
- Workflow Tools
- Workflow Management
- WF Management in Practice: Petri-Nets
- Business Process Modelling

Timetable

Lectures

Monday 12 - 1 Q158
Thursday 2 - 3 C167

Labs

None

Tutorials

Monday 3 - 4 X131 as required

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End-of-Semester Mark

- Assignments 50%
- Exam 50%

Assignments

- Essay in form of a research paper
- Details to be announced

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Information

See my web page at:

<http://www.computing.dcu.ie/~mcrane/CA441/>

Research Papers/Lecture Notes on various topics will be put on this page throughout the course

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BOOK LIST

Jackson, Michael & **Twaddle**, Graham *Business Process Implementation* Addison Wesley.

Hammer, Michael & **Champy**, James *Reengineering the Corporation* Nicholas Brealey.

Sharp, Alec & **McDermott**, Patrick *Workflow Modelling* Artech House.

Davenport, Thomas H. *Process Innovation* Harvard Business School Press.

Other books and articles will be recommended for reading from time to time.

Workflow Modelling

(Sharp & McDermott)

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Method

Frame the Process

Understand the current ("as-is") process

Design the new ("to-be") process

Develop use-case scenarios

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Process Enablers

Workflow design

- Workplan for responding to an event

Information technology

- Focus on information systems

Motivation and measurement

- Explicit and implicit reward systems
- People do what they are measured on

Human resources

- Knowledge, skills and experience
- Training, organisational structure, job definitions ...

Policies and rules

- Internal and external
- May be obsolete

Facilities design

- Workplace design and infrastructure

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Context Framework

(aka a FW for putting analysis of Bps in context with analysis of IS Requirements)

Mission, strategy and goals

Business process

Information system

- Presentation
- Logic
- Data management

Modelling techniques

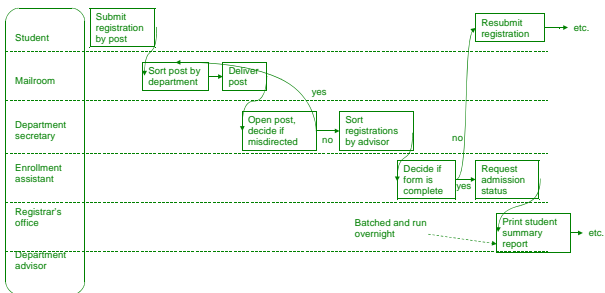
Business process: process workflow models ("swimlane" diagrams)

Presentation: use case scenarios

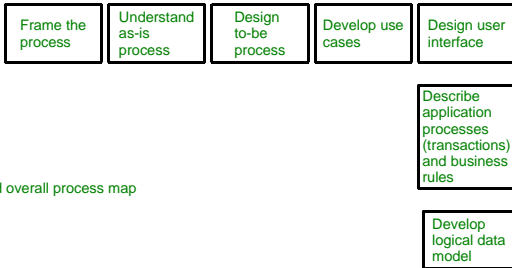
Application logic: various

Data management: various

Process Workflow Model



Workflow-driven Methodology



Framing the Process

- Identify a set of related processes, and develop an overall process map.
- Establish the scope of the target process.
- Review or document mission, strategy, goals.
- Initial process assessment.
- Process vision and performance objectives
- Glossary of terms and definitions.
- Observations on culture, core competences, management systems.

A business process is ...

A collection of inter-related work tasks, initiated in response to an event, that achieves a specific result for the customer of the process.

achieves a specific result
for the customer of the process
initiated in response to a specific event
work tasks
a collection of inter-related

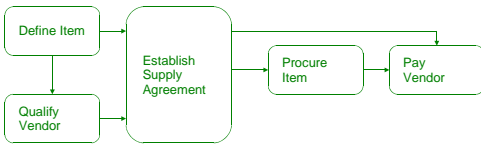
Framing the Process

(document the scope of the process)

- Process name in verb-noun format
- Event that triggers the business process
- Result achieved by the process
- Customer that receives the result
- Other stakeholders and the result(s) they expect
- 5 – 7 major activities or milestones
- Actors with a rôle in the process
- Mechanisms
- Timing and frequency
- Related processes

Overall process map

Simply a set of related processes:



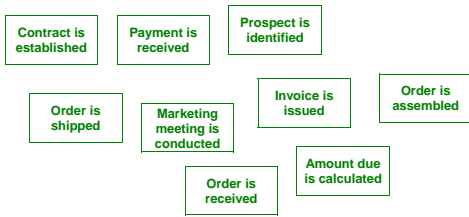
Overall process map for Supply Management area.

Identifying processes

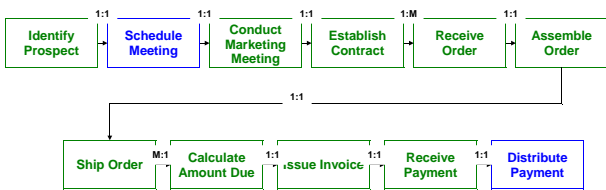
(bottom-up)

- Identify 'milestones' (results from processes)
- Link the milestones
- Identify cardinality (1:1), (1:m), (m:1)
- Set of (1:1)s identifies a process!
- Name the process
- Identify the triggering event
- Identify stakeholders and expected results

"Milestones"

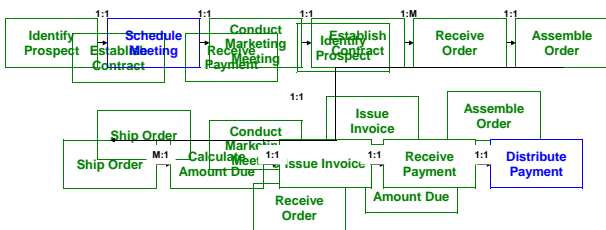


Analyse Links



(Add extra steps if necessary)

Analyse Links



(Add extra steps if necessary)

Initial Assessment

2 Questions:

- What's wrong with the process anyway?
- What will be better when we're done?

Perspectives:

- Stakeholders
- Enablers
- Metrics

Metrics

- Give a guide of where to focus efforts - no point in optimising a process that occurs infrequently, or uses few resources.
- Allow us to evaluate success.
- Collect all the metrics available:
 - Volumes
 - Frequencies
 - Effort
 - Exceptions
- Need to be appropriate for the process , not the function

What metrics

- How many?
- How long?
- How much effort?
- Who's involved?
- Efficiency
- Cost

Assessment by stakeholder

3 essential groups:

- Customers
- Performers
- Owners

May also consider:

- Suppliers
- Government & other regulatory agencies
- General public
- Industry bodies

Assessments by SH:

Customer
Performers
Managers & Owners
Suppliers
Other Groups

Assessment 1 - Customer

- Has the product or service got the right characteristics?
- How much effort is required of the customer?
- Does the process require too many interactions?
- Is the customer the only one monitoring the process?
- Are the rules & requirements reasonable?

Assessments by SH:

Customer
Performers
Managers & Owners
Suppliers
Other Groups

Assessment 2 - Performers

- Is this how you'd do it if you had a choice?
- Does this process help you meet your goals?

- Remember that the performers are not the customers!

Assessments by SH:
Customer
Performers
Managers & Owners
Suppliers
Other Groups

Assessment 3 - Managers & Owners

- Process must be efficient and profitable.
- In a not-for-profit setting, it must be fiscally responsible.
- Consider opportunity cost as well as actual cost.

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Assessments by SH:
Customer
Performers
Managers & Owners
Suppliers
Other Groups

Assessment 4 - Suppliers

- “How easy is it to do business with us as compared to other customers?”
- “What errors or actions on our part cause difficulties for you?”

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Assessments by SH:
Customer
Performers
Managers & Owners
Suppliers
Other Groups

Assessment 5 - Other groups

- General public – ethics, safety, environment.
- Local community – involvement in local initiatives.
- Regulators.

Don't assume - ask!

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Process Enablers (review)

Workflow design

- Workplan for responding to an event

Information technology

- Focus on information systems

Motivation and measurement

- Explicit and implicit reward systems
- People do what they are measured on

Human resources

- Knowledge, skills and experience
- Training, organisational structure, job definitions ...

Policies and rules

- Internal and external
- May be obsolete

Facilities design

- Workplace design and infrastructure

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[Information technology](#)
[Motivation and measurement](#)
[Human resources](#)
[Policies and rules](#)
[Facilities design](#)

Enabler perspective

Workflow design:

- **Examine**
 - + steps
 - + precedence
 - + flow
 - + handoffs
 - + decision points
- **What is the one thing you would do to improve this process?**
- **What aspect of this process causes you the most problems?**

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[Information technology](#)
[Motivation and measurement](#)
[Human resources](#)
[Policies and rules](#)
[Facilities design](#)

Information Technology

- Primarily manifested as systems. In many cases the system *is* the business process.
 - **What's old and doesn't work?**
 - **What's new and might work? ... or has become a necessity?**
- Not only need to do things right – need to do the right thing. Many application development projects automate the root cause of the problem.
- Work from the bottom up in the framework:
 - + **Are the right data being maintained, and is the right information being presented to each step?**
 - + **Are the right activities being automated?**
 - + **Are the user interfaces appropriate for the task and the person using them?**
 - + **Is the flow of work automated wherever possible and appropriate?**

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Motivation and Measurement

- People don't pay much attention to what management says; they pay attention to what management measures.
- Do the measures of performers support or impede process goals?
- NHS example – waiting lists!

Human Resources

- How do organisational structures, job definition and skills impact the process?
- Will the workforce need to change?
- Will new staff skills and training be required?
- Keep the unions involved.

Policies and Rules

Rules reflect the organisation's bias. e.g. two possible policies on refunds could be:

- "refunds up to a certain amount can be handled by a sales person on the retail floor, at their discretion, whether or not the customer has a receipt."
- "all refund requests must be accompanied by a sales receipt and a completed refund reason form; they will be processed by the Customer Service and Accounts departments, and a cheque will be posted."

The process will be different in each case.

Facilities Design

- Workflow design/physical infrastructure getting more attention
- Design of eg Offices detrimental to work being done
 - Cubicle seems private but can be overheard/disturbs others
 - For highly collaborational Workgroups with meetings etc need a meeting room and usually not enough available.
- Space, quiet, privacy & ability to avoid interruptions are key productivity enablers that are frequently ignored in modern office layouts (open-plan)

Approve customer credit application						
Event	Subprocesses					Result
Credit application is submitted	Complete application	Evaluate application	Decide on application	Inform customer	Set up customer	Customer is notified, recorded and enabled to place orders
Case for action			Vision			
<ul style="list-style-type: none"> We're losing market share to competitors offering fast or instant credit, and our image is declining. Our paper-based workflow involves many starts and stops, and involves several departments and job functions. We don't capture the right information on the application, so we need to go back to the Customer repeatedly. We can't answer Customer queries about in-process applications. The effort and delay aren't justified for small Customers who pose minimal risk as a group. Credit Representatives spend most of their time on small accounts, not on large ones where their expertise is needed. Unless we fix the process, our market share will continue to erode and closure of the operation is likely. 			<ul style="list-style-type: none"> We will offer instant, secured credit to small Customers. Applications from large Customers will be handled in two days or less. All staff will perform higher-value work, and have more authority – Credit Reps will focus on large clients, and Credit Admin Clerks will handle small applications completely. Independent surveys show that Customers perceive us as the Customer Service leader in our industry. Once the new process is implemented, our market share decline will slow, and within one year we will again be growing at 12% per year. 			
Actors		Mechanisms		Metrics		
<ul style="list-style-type: none"> Applicant Sales Representative Credit Representative Credit Administration Clerk Credit Bureau Word Processing Clerk Marketing Administration Clerk Customer Data Maintenance Clerk 		<ul style="list-style-type: none"> Credit Application Credit Report Notification Letter Sales System 		<ul style="list-style-type: none"> 1 to 4 hours and up to 7 elapsed days per application 6 Credit Representatives 150 applications per month, growing 10% per year 75% approved, 25% declined 80% of applications come from small customers 90% of sales volume comes from 10% of customers 10% of applications come from previously denied Applicants, and 10% from former Customers Small Customer bad debt write-offs are less than 2% of sales, and overall they are approximately 1% of sales 		

A "poster" summarising the results of framing the process

The Environment

Any redesigned process must fit into the environment and 'culture' of the organisation.

Issues:

- Mission and strategy, especially strategic differentiation.
- Organisational culture.
- Core competences.
- Business context and focus.

Mission and strategy.
Organisational culture.
Core competences.
Business context & focus.

Business mission, strategy and goals

Mission:

- what we do, and who we do it for.

Strategy:

- Why would a customer choose us?

Goals:

- performance targets, to focus effort and gauge progress.

Mission and strategy.
Organisational culture.
Core competences.
Business context & focus.

Strategic discipline

Study by Treacy & Wiersema (in *The Discipline of Market Leaders*) shows that leading companies choose to excel in one of three disciplines:

- Operational excellence
- Product leadership
- Customer intimacy

"Also rans" make no choice or choose to be good at all three

Mission and strategy.
Organisational culture.
Core competences.
Business context & focus.

Strategic disciplines

	The Three Disciplines		
	Operational Excellence	Product Leadership	Customer Intimacy
Core business processes that...	Sharpen distribution systems and provide no-hassle service	Nurture ideas, translate them into products, and market them successfully	Provide solutions and help customers run their business
Structure that...	Has strong central authority and a finite level of empowerment	Acts in an ad-hoc, loosely-knit and ever-changing way	Pushes empowerment close to the point of customer contact
Management systems that...	Maintain standard operation procedures	Reward individuals' innovative capacity and new product successes	Measure the cost of providing service and of maintaining customer loyalty
Culture that...	Acts predictably and believes "one size fits all"	Experiments and thinks "out of the box"	Is flexible and thinks "have it your way"

Adapted from Fortune, Feb. 6 1995, p. 96.

Some process improvement goals...

- Flexible in meeting the needs of individual customers
- Easier for an entry-level workforce to adopt with relatively little training and support
- Fewer customer interactions
- Absolute auditability and adherence to applicable regulations
- Accessible anytime, anywhere, via any medium
- Easier to standardise and maintain at international locations
- Less time and effort to integrate new suppliers or customers into the process
- More suitable for support by commercial off-the-shelf (COTS) software

Beliefs and Culture

- Organisational behaviour stems from a few basic beliefs:
 - "There's always a better way"
 - "We have a bias towards informed action"
 - "Decision-making should be close to the action"
 - "Our clients are trying to cheat us, the public misunderstands us and the media are out to get us. (and our employees couldn't care less)"

Identifying Culture

1. Are there stories or corporate legends that provide examples?
2. What factors continually get in the way?
3. What factors are seen as expediting progress?
4. How are decisions made?
5. Are all employees free to offer opinions or challenge decisions?
6. Is the orientation towards the individual or the group?
7. Whose opinion is valued?
8. Are there any identifiable behaviours that are rewarded or punished?
9. Is there a high tolerance for ambiguity?
10. Does the organisation favour results or following procedure?
11. Is the organisation cautious or will it take risks?
12. Is the emphasis on relationships and social interactions, or on tasks and getting on with the job?

Core Competences

- What are we really good at?
- World-class organisations have up to five or six core competences that their core products or services are based on.
 - "Core competence is the collective learning of the organisation, especially the capacity to coordinate diverse production skills and integrate streams of technologies. It is also a commitment to working across organisational boundaries."
 - "organising around strategic business units is problematic because they under-invest in core competences, imprison resources and bind innovation" (Prahalad & Hamel)
- We can scale down the idea of a Core Competence to the process level - design processes that play to the strengths of the performers.

Scoping questions - 1

- 1.What is the primary business objective driving this project?
- 2.What is the current situation?
- 3.Is this essentially a business process improvement project?
- 4.What is the technical or project objective?
- 5.Which business data will or will not be involved?
- 6.Organisationally who will be impacted by this?
- 7.What areas outside the process will be impacted, or will require interfaces?

Scoping questions - 2

- 8.Are there other initiatives we should be aware of?
- 9.What could go wrong?
- 10.What could go right?
- 11.Have any significant issues or difficulties arisen?
- 12.Are there any constraints we need to take into account?
- 13.Have any important decisions already been made?
- 14.Have project structure and personnel been identified?
- 15.Are you really the sponsor?

References

Sharp, A. & McDermott, P. (2001), *Workflow Modelling*, Artech House, Boston & London.

Prahalad, C. K. & Hamel, G. "The Core Competence of the Corporation" *Harvard Business Review*, May-June 1990, pp. 79-91.

Treacy, M. & Wiersema, F. (1995), *The Discipline of Market Leaders*, Addison-Wesley, Reading, MA.

Business Process Redesign. Introduction

Based on: Malhotra, Business Process Redesign: An Overview,
<http://www.brint.com/papers/bpr.htm>.

Processes

Identified in terms of:

- beginning and end points,
- interfaces,
- organisation units involved, particularly the customer unit.

High Impact processes should have process owners.

Examples of processes include:

- developing a new product;
- ordering goods from a supplier;
- creating a marketing plan;
- processing and paying an insurance claim;
- etc.

Processes

Defined based on three dimensions:

- **Entities:** Processes take place between organisational entities. They could be Interorganisational (e.g. EDI), Interfunctional or Interpersonal (e.g. CSCW).
- **Objects:** Processes result in manipulation of objects. These objects could be Physical or Informational.
- **Activities:** Processes could involve two types of activities: Managerial (e.g. develop a budget) and Operational (e.g. fill a customer order).

(Davenport & Short 1990)

Relationship between BPR & Information Technology?

- IT is the key enabler of BPR (Hammer).
- Use IT to challenge the inherent assumptions from before the advent of modern computer and communications technology.
- Core of reengineering is "discontinuous thinking -- or recognising and breaking away from the outdated rules and fundamental assumptions underlying operations... These rules of work design are based on assumptions about technology, people, and organisational goals that no longer hold."

"Principles of reengineering" (Hammer)

- (a) Organise around outcomes, not tasks;
- (b) Have those who use the output of the process perform the process;
- (c) Subsume information processing work into the real work that produces the information;
- (d) Treat geographically dispersed resources as though they were centralised;
- (e) Link parallel activities instead of integrating their results;
- (f) Put the decision point where the work is performed, and build control into the process;
- (g) Capture information once and at the source.

"The new industrial engineering" (Davenport & Short)

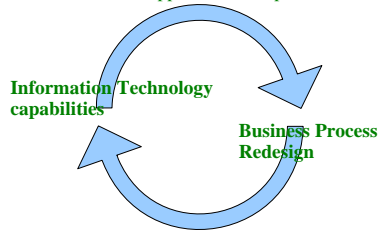
BPR requires broader view of both IT and business activity, and relationships between them.

- **IT** — more than an automating or mechanising force: to fundamentally reshape the way business is done.
- **Business activities** — more than a collection of individual or even functional tasks.

IT and BPR have a recursive relationship. IT capabilities should support business processes, and business processes should be in terms of the capabilities IT can provide.

Recursive relationship between IT capabilities and BPR

How can IT support business processes?



How can business processes be transformed using IT?

“The new industrial engineering” (Cont.)

Business processes represent a new approach to coordination across the firm

IT impact is as a tool for reducing the costs of coordination.

“The new industrial engineering” (Cont.)

Awareness of IT capabilities can – and should – influence process design.

How IT capabilities affect the organisation – 1

- Transactional** – can transform unstructured processes into routinised transactions
- Geographical** – can transform information with rapidity and ease across large distances
- Automational** – can replace or reduce human labour in a process
- Analytical** – can bring complex analytical methods to bear on a process

"The new industrial engineering" (Cont.)

How IT capabilities affect the organisation – 2

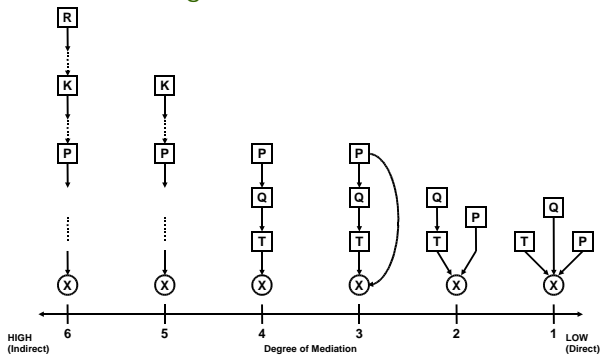
- Informational** – can bring vast amounts of detailed information into a process
- Sequential** – can enable changes in the sequence of tasks
- Knowledge Management** – allows capture and dissemination of knowledge
- Tracking** – allows detailed tracking of task status
- Disintermediation** – can be used to connect two parties within a process that would otherwise communicate through an intermediary

BPR & IT (Teng)

The way related functions participate in a process (functional coupling of a process) can be differentiated along two dimensions:

- degree of mediation - the extent of sequential flow of input and output among participating functions
- degree of collaboration - the extent of information exchange and mutual adjustment among functions when participating in the same process.

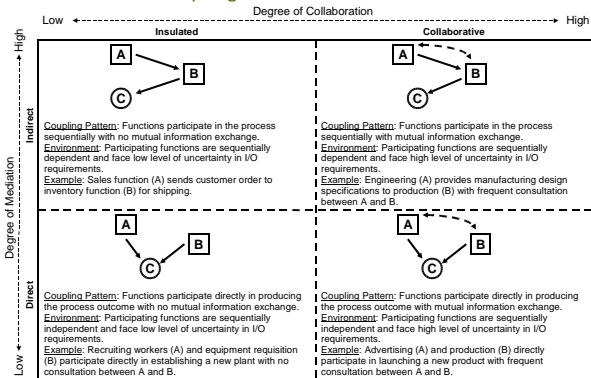
Degree of Mediation (Teng)



Degree of Collaboration

- Frequency and intensity of information exchange between two functions ranges from *none* (completely insulated) to *extensive* (highly collaborative).
- Many process can be improved by increasing the degree of collaboration.

Functional Coupling Framework of Business Processes



BPR & IT (Teng)

- IT reduces the Degree of Mediation and enhances the Degree of Collaboration.
- Innovative uses of IT leads many firms to develop new, coordination-intensive structures, enabling them to coordinate their activities in ways that were not possible before.
- Such coordination-intensive structures may raise the organization's capabilities and responsiveness, leading to potential strategic advantages.

BPR Methodology. (Davenport and Short)

five-step approach to BPR:

- **Develop the Business Vision and Process Objectives:**
 - + prioritise objectives and set stretch targets
- **Identify the Processes to be Redesigned:**
 - + Identify critical or bottleneck processes
- **Understand and Measure the Existing Processes:**
 - + Identify current problems and set baseline
- **Identify IT Levers:**
 - + Brainstorm new process approaches
- **Design and Build a Prototype of the New Process:**
 - + Implement organisational and technical aspects

What is Business Process Redesign?

- "the analysis and design of workflows and processes within and between organisations" (Davenport & Short 1990).
- "the critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures." Teng et al. (1994)

What is a Business Process?

"a set of logically related tasks performed to achieve a defined business outcome."

structured, measured set of activities designed to produce a specified output for a particular customer or market.

Implies a strong emphasis on how work is done within an organisation" (Davenport).

Processes have two important characteristics:

- (i) They have customers (internal or external),
- (ii) They cross organisational boundaries, i.e., they occur across or between organisational subunits.

How Does BPR Differ from TQM?

- In recent years, increased attention to business processes is largely due to the TQM. TQM and BPR share a cross-functional orientation. (Teng)
- Quality specialists tend to focus on incremental change and gradual improvement of processes, while proponents of reengineering often seek radical redesign and drastic improvement of processes. (Davenport)

BPR vs. TQM

- *Quality management* (TQM or continuous improvement), refers to programs & initiatives that emphasise incremental improvement in work processes & outputs over an open-ended period of time.
- *Reengineering*, also known as business process redesign or process innovation, refers to discrete initiatives that are intended to achieve radically redesigned and improved work processes in a bounded time frame. (Davenport)

Process Improvement (TQM) versus Process Innovation (BPR)

From Davenport (1993, p. 11)

	<u>Improvement</u>	<u>Innovation</u>
Level of Change	Incremental	Radical
Starting Point	Existing Process	Clean Slate
Frequency of Change	One-time/Continuous	One-time
Time Required	Short	Long
Participation	Bottom-Up	Top-Down
Typical Scope	Narrow, within functions	Broad, cross-functional
Risk	Moderate	High
Primary Enabler	Statistical Control	Information Technology
Type of Change	Cultural	Cultural/Structural

References - 1

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Business Process Re-engineering

Based on: Teng, Grover & Fiedler, Business Process Reengineering: Charting a Strategic Path for the Information Age,

Facilitators for BPR

IT

- shared databases
- imaging

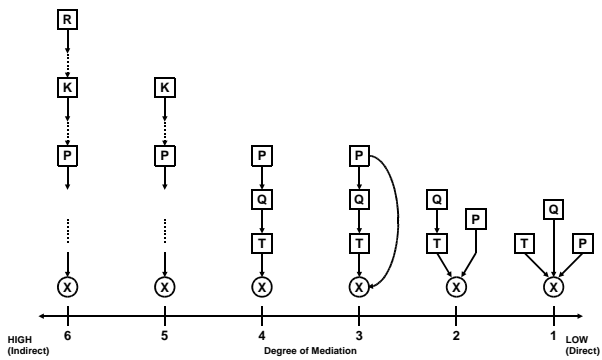
Telecommunication

- LANs
- E-mail & Bulletin Boards
- groupware

Others

- Quality movement (continuous improvement V drastic change)

Degree of Mediation Dimension of Business Processes

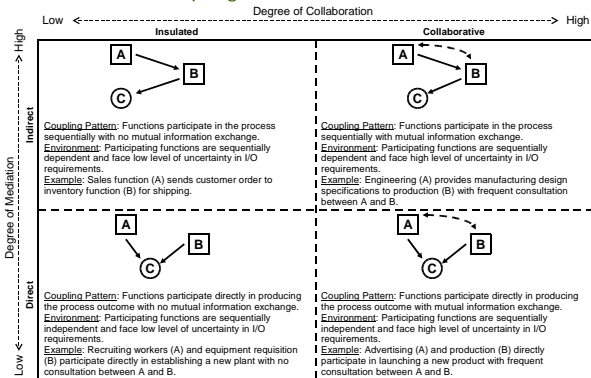


Reducing Mediation through IT

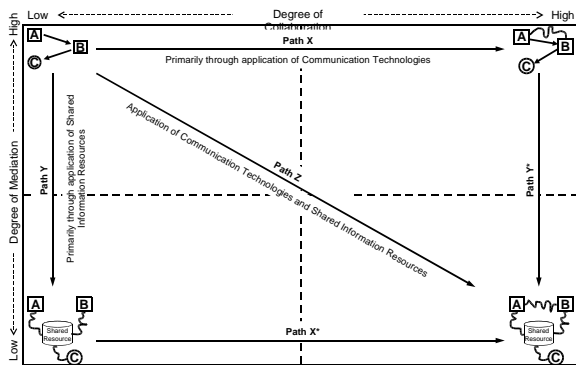
Ford Motor Corp.

- **Old process** involved 3 functions - purchasing, inventory and accounts payable
- participated *indirectly*
- sequential document flow
- **New process** uses shared database
- every function participates *directly*
- 75% reduction in work-force (500 -> 125)

Functional Coupling Framework of Business Processes



Application of IT in Alternative Paths for Process Reengineering



IT creates a "public good"

Resource that can be accessed by many functions.

- Shared information resource is not "used up" by usage, and retains its value for other users.
- Provides comprehensive information that facilitates accomplishment of process objectives on a more global basis.

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Other enablers

Behavioural & organisational techniques:

- self-directed teams
- process generalists
 - + Kodak example
 - + IBM Credit

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IBM Credit

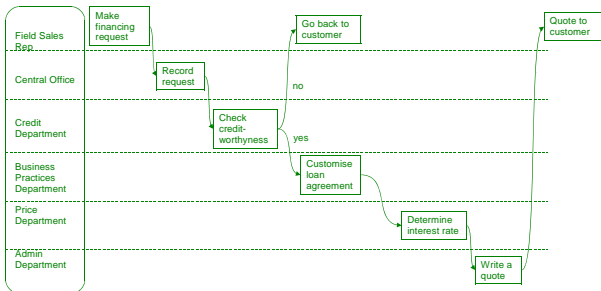
IBM Credit Corporation finances the computers, software, and services that the IBM Corporation sells.

five steps:

1. On a request from an IBM field sales representative an operator in the central office wrote down the request on a piece of paper.
2. The request sent to credit department where a specialist checked the client's creditworthiness, wrote the result on the piece of paper and sent it to the business practices department.
3. The business practices department customised the standard loan covenant to the client. Special terms attached to the request if necessary.
4. Request went to the price department where a pricer determined the appropriate interest rate.
5. Administration department wrote a quote letter for the field sales representative.

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IBM Credit



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IBM Credit – problems

- Process took six days on average.
- In this time the customer could be seduced by another computer vendor.
- Request couldn't be tracked.

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IBM Credit – attempted fixes

- Install a control desk, so they could answer the sale representative's question about the status of the request.
- Instead of forwarding the request to the next step in the chain, each department returned the request to the control desk for logging before sending out the request again.
- Solved tracking problem, but took yet more time.

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IBM Credit - gains

- Turnaround reduced from six days to four hours.
- Dramatic performance breakthrough by making a radical change to the process - i.e. reengineering.
- IBM Credit did not ask, "how do we improve the calculation of a financing quote? How do we enhance credit checking?" It asked "How do we improve the entire credit issuance process?"
- In making its radical change, IBM Credit shattered the assumption that every request needed specialists.

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Successful Re-engineering Projects

Based on: Teng, Jeong & Grover, Profiling Successful Reengineering Projects. Communications of the ACM, Vol 41. No. 6 June 1998

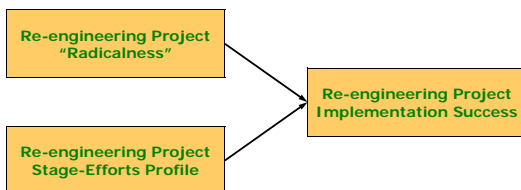
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The questions

- Are reengineering projects aimed at more radical change resulting in higher implementation success?
- If limited attention and resources must be allocated among the different stages of a reengineering project, which stage (or stages) should receive more emphasis in order to achieve higher implementation success?

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Research Model



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Comparison of variables:

- Re-engineering project radicalness
 - Measured in seven dimensions
- Re-engineering project stage-efforts profile
 - Eight typical stages in a project
- Re-engineering project implementation success
 - Perceived level of success
 - Goal fulfilment.

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Project stages and tasks (see Klein)

- | | |
|---|---|
| <p>Stage 1: Identification of BPR opportunities</p> <ul style="list-style-type: none"> Establish a steering committee Secure management commitment Align with corporate and IT strategies Identify major business processes with an "business model" Understand customers' requirements Prioritise processes and select one for implementation <p>Stage 2: Project preparation</p> <ul style="list-style-type: none"> Plan for organisational change Organise a BR team for the selected process Train the team members Plan the project <p>Stage 3: Analysis of existing process</p> <ul style="list-style-type: none"> Analyse existing process structures and flows Identify value-adding activities Identify opportunities for process improvement <p>Stage 4: Development of a process vision</p> <ul style="list-style-type: none"> Understand process customers requirements Identify process performance measures Set process performance goal Identify IT that enables process re-design Develop a vision for the redesigned process | <p>Stage 5a: Solution: Technical design</p> <ul style="list-style-type: none"> Develop and evaluate alternative process designs Detailed process modelling Design controls for process integrity IS analysis and design for the new process Prototype and refine the process design <p>Stage 5b: Solution: Social design</p> <ul style="list-style-type: none"> Empower customer contact personnel Define jobs and incentives Develop and foster shared values Define skill requirements and career paths Design new organisational structure Design employee performance measurement Design change management programme <p>Stage 6: Process transformation</p> <ul style="list-style-type: none"> Develop and test rollout plans Implement the social and technical design Train staff and pilot new process <p>Stage 7: Process evaluation</p> <ul style="list-style-type: none"> Monitor performance Continuous improvement |
|---|---|

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Project Radicalness

Extent of change to:

1. Patterns of process workflow
2. Rôles and responsibilities
3. Measurements and incentives
4. Organisational structure
5. Information technology
6. Shared values
7. Skills

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Success

- Perceived level of success
- Goal fulfilment
 - Cost reduction
 - Cycle-time reduction
 - Customer satisfaction level increase
 - Worker productivity increase
 - Defects reduction

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Research sample

- Questionnaires sent to members of the Planning Forum, a professional association focussing on strategic management.
- 239 responses out of 853.
- 105 of the 239 had completed at least one BPR project
- 2/3 of respondents were in manufacturing, financial or service industries
- Most were large companies

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Research sample

- 3 most popular processes were:
 - Customer service (13.7%)
 - Product development (13.7%)
 - Order management (10.5%)
- Others were:
 - Business planning and analysis (5.7%)
 - Financial systems (4.8%)
 - Accounting processes (3.8%)

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Effort by Stage (averaged from 1 - 5!)

Stage 3: Analysis of existing process	3.94
Stage 1: Identification of BPR opportunities	3.80
Stage 4: Development of a process vision	3.63
Stage 2: Project preparation	3.46
Stage 6: Process transformation	3.39
Stage 5a: Solution: Technical design	3.37
Stage 7: Process evaluation	3.21
Stage 5b: Solution: Social design	3.09

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Correlation of radicalness with success

Project Success	Patterns of process workflows	Roles and responsibilities	Performance measurements and incentives	Organizational structure	Information technology applications	Shared value (culture)	Skill requirements	Overall extent of change
Overall success level	.427 ***	.324 ***	.351 ***	-.102	.280 ***	.173 *	-.166	.409 ***
Cost reduction	.209 * .092	.159 .194	.231 .093	.260 * .030	-.165 -.050	-.139 .058	.129 .022	.291 ** .110
Cycle time reduction	-.191 -.127	.134 .050	.198 .194	-.033 -.157	-.033 -.021	-.111 .029	.098 .008	-.171 .052
Customer satisfaction increase	-.258 -.242	.187 .129	.282 .366	-.180 -.242	-.022 .039	-.019 .024	-.112 -.168	-.182 .098
Worker productivity increase	.122 .061	.107 .197	.159 .431 ***	-.131 -.069	.013 -.187	.047 .053	-.043 -.132	-.125 .134
Defects reduction	-.124 -.073	-.041 .109	.151 .044	.113 .011	-.091 -.380 *	.058 -.138	-.218 -.272	-.015 -.173

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Correlation of radicalness with success

Project Success	Patterns of process workflows	Roles and responsibilities	Performance measurements and incentives	Organizational structure	Information technology applications	Shared value (culture)	Skill requirements	Overall extent of change
Overall success level	***	***	***		***	*		***
Cost reduction	*			*				**
Cycle time reduction								
Customer satisfaction increase			*					*
Worker productivity increase			***					
Defects reduction					*			

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Aspects of BPR Success due to National Culture: China & India

1

Introduction

- BPR originating mainly in US/Europe important for (all) large organisations.
- "Large", nowadays usually means multinational/ multicultural but in context of certain countries means current or former State Owned Enterprises (SOEs)
- BPR came from US but really a re-implimentation of TQM from Japan (showing some cultural adjustments possible)
- Now and in future, China & India's economic preeminence in the world makes understanding cultural and national aspects influencing BPR more important
- BPR has been defined earlier as a radical redesign of business processes using IT to achieve drastic improvements (Davenport).
- Focuses mainly on the process, a set of logically related tasks performed to achieve a defined business outcome.

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2

National Culture Aspects of BPR

- Two Questions:
 - To what extent is radical readjustment possible?
 - When does national culture act as a brake for BPR?
- First need a definition of National Culture:
 - Hofstede (2003), defines it as "the collective programming of the mind which distinguishes the members of one group or category of people from another".
 - Suggests that people share a collective national character that represents their cultural mental programming.
- Information is "culture specific":
 - According to Cochrane & Atherton (1980) "for considering information services", should consider "cultural community" which is composed of potential users who may have distinct values, beliefs, and attitudes towards external information services."
 - Result is: info is "incommunicable unless it has been acculturated"
- Consider here 2 cases China & India:
 - China: Fastest growing global major economy (avg 10% growth over past 30yrs)
 - India: Large off-shoring impact in past 20 years
- How to examine Cultural/ National Aspects of a Country?
 - Set out most influential theories of national culture

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3

National Culture Aspects of BPR cont'd

- How to quantify dimensionally the Cultural/ National Aspects of a Country?
 - Outline most influential theories of NC (Defs below from Jayaganesh & Shanks 2009)
- 1. Power Distance (see Hofstede 2003, House et al 2004)

"the extent to which members of institutions & organizations within a country expect & accept that power is distributed unequally."
- 2. Individualism/Collectivism (see Hofstede 2003, House et al 2004)

"the strength of ties within a social network."
- 3. Uncertainty Avoidance (see Hofstede 2003, House et al 2004)

"the extent to which the members of a culture perceive ambiguous or unknown situations as threats as opposed to opportunities."
- 4. Performance Orientation (House et al 2004)

"extent to which a society rewards innovation, quality & performance improvement."
- 5. High/Low Context (Hall 1976)

"degree of explicit background information required for effective communication."
- 6. Masculine/Feminine (Agrawal and Halsem 2003)

"extent to which society differentiates between the sexes and places emphasis on 'masculine' values of assertion, competition, performance & visible achievements versus 'feminine' values of intuition, team building and cooperation."

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4

Culture & Use of IT/IS

- Know already that IT is a key enabler in BPR (Hammer).
- Given that IT is of itself neutral, is there a universal regard/use of IT in different cultures?
- Or, put another way are there factors (irrespective of technological development level) that are culture specific?
- Theories in sociology, psychology and organisational behaviour suggest that just because a theory applies in one culture, *that* theory does not carry over to others (Hofstede & Bond, 1988)
 - National differences substantially contribute to variations in managers' beliefs & attitudes (2/3 national, 1/3 individual) (Haire et al 1966).
 - Results by Herbig & Day (1990) indicate that certain socio-cultural conditions have to be in place for innovation to occur.
 => implications for BPR?
- People, after all, interact with IS thro a human interface and so culture impacts on attitudes towards the use of computers.

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5

Culture & Use of IT/IS cont'd

- Often main problem is concerning the acceptance of IT.
 - Even if the technology exists, or a company can purchase it, the technology could be challenged by workers, reluctant to modern technology, computer-oriented jobs and services.
 - More true when talking about a company with a lot of experienced (and therefore old) workers.
 - These workers might not accept the changes imposed and the obligation to use IT on an everyday basis as easily as the new/ young workers.
- This is more of a social problem than a cultural one. But can say for some cultures, IT would be accepted more readily than others.
 - "the technical knowledge, creativity and energy of a younger generation that holds low-level positions would have to be accommodated by a culture that has a deeply embedded tradition of deference to superiors and respect for experience." (Martinsons and Hempel, 1998)
- Also IT-enabled changes suffer from the fact that most new technologies come from the West/USA. So it can be hard for Middle Eastern workers, to even accept using US tools, on principle
 - Doesn't apply to all in these countries, but can be a risk that this causes a problem in workers' minds, at least at the beginning of the BPR attempt.

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6

Chinese-Specific Cultural Aspects

- China PRC made up of mainly ethnic Han Chinese, though other significant ethnic groupings exist.
- China also can be said to vary according to dialect group identity (probably arising out of geographical location)
- Chinese ethical & philosophical system developed from teachings of Confucius.
- Although difficult to generalise over 1.5Bn+ people, can say that Confucianism remains predominant social reference in China (Martinsons and Hempel, 1998)
- Difference exists between cultural traits of Chinese Nationals and those of Chinese born overseas (mainly US-, UK-, Indonesian-, Malaysian-born Chinese).
- Also cultural differences exist between Asian societies e.g. regarding Teamwork (Martinsons and Hempel, 1998)
 - Japanese tend to consider the society as a unit.
 - Chinese tend to give more importance to family.

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7

Relationship & Face in Chinese Business Relationships

- Other aspects of Chinese Society Relevant to Doing Business:
 - **GUANXI 关系** ("relationship")
 - Refers to value of an ongoing relationship between people including its future network possibilities which are cultivated with energy, subtlety in China.
 - Amounts to currency of getting things done/ getting ahead in China.
 - It is a relationship between two people containing implicit mutual obligation & assurances.
 - In business, serves as the informal channel for movement of information & money.
 - Based on personal interest & mutual trust, constraining use of formal co-ordination & control mechanisms
 - **MIANXI 面子** ("face"):
 - Face refers to one's moral character & is a person's most precious possession in the Chinese context as without it, cannot function in society.
 - Also refers to a person's reputation / prestige & is based on personal accomplishments, political status, or bureaucratic power.
 - Can be enhanced by acts of generosity in terms of time, gifts or praise of others.
 - In business context, can act as a major barrier to change in an organisation

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8

Aspects of Chinese Cultural Relevant to BPR

- **Power Distance:**

According to Confucianism "All humans are born unequal", making the idea of uneven power distributions more acceptable in China & other countries influenced by Confucianism (e.g. Japan, Korea, Vietnam, Taiwan).
- **Individualism/Collectivism:**
 - Chinese tend to achieve social order thanks to a "harmony-within-hierarchy" arrangement (Zhang et al 2005), in contrast to (western) emphasis on individual rights and freedoms.
 - Chinese workers tend to score high in collectivism (Hofstede 2003, House et al 2004) & poorly outside group setting, (Early, (1989)
- **Performance Orientation:**
 - Chinese companies (into the 21st C) tend towards subjective, activity-based rather than process-based performance measures.
 - Individuals not rewarded only on their results but rather according to relationships.
- **Uncertainty Avoidance:**
 - Tendency among Chinese companies to accept difficult situations as they are rather than problems to solve, (Lu & Xiang 2008)
 - Compounded by Confucian ideas of respect for superiors/ authority figures and concept of "face"

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9

Comparative Study of BPR in China

- He (2005) surveyed 195 Senior Managers at Tsinghua U's Mgmt Training Class to ascertain their attitudes to BPR success.
- 63% of the (110) respondents were at Pres, VP, CFO or CIO level
- Results:
 1. Potential benefits of BPR
 - a) BPR facilitates comms & improves info sharing (92% agreed)
 - b) BPR enforces competitiveness (87% agreed)
 - c) BPR helps improve productivity & reduce costs (86% agreed)
 - d) BPR enhances corporate strategy (86% agreed)
 - o Compare & Contrast w CSC/Index (Ranganathan, Dhaliwal, 2001) study of BPRs
 - Top 3 benefits of BPR to US firms: Improves BP speed; cost cutting; service & quality improvement.
 - Improving efficiency and cutting costs are important to US firms but facilitating communications & improving info sharing has special importance to Chinese Bosses
 2. Major obstacles to BPR in China
 - a) A culture that resists change and new ideas (73% agreed)
 - b) Lack of innovation incentives to SOEs (72% agreed)
 - c) Seniority-, not performance-, based promotion (62% agreed)
 - d) Unemployment pressure of process restructuring (57% agreed)
 - e) Lack of senior management commitment (55% agreed)
 - f) Lack of a coherent BPR strategy (50% agreed)

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10

Martinsons & Hempel (1998) on BPR in China

- In an influential and much-cited paper Martinsons & Hempel (1998) make the following conclusions on BPR in China
 - o Preparing for radical, IT-enabled change, Chinese Businesses tend to have difficulty:
 - ignoring status quo & use clean-slate thinking in their IT enabled change effort
 - justifying formal planning & design
 - constructing (Western-style) formal business models than their US counterparts
 - o Designing IT-enabled change, Chinese Businesses tend to:
 - be less able to unilaterally design IT-enabled change
 - be less likely to choose radical forms of IT-enabled change
 - find it more difficult to design performance appraisal & reward systems
 - find it less difficult to make use of process-based work teams than their US counterparts
 - o In implementing change, Chinese Businesses tend to have:
 - less difficulty initiating a radical, IT-enabled change effort
 - more difficulty completing a radical, IT-enabled process change effort
 - more difficulty rapidly implementing (radical forms of) IT-enabled change
 - more difficulty implementing proc-based performance appraisal & reward systems
 - more internal discomfort from radical IT-enabled proc change effort than their US counterparts
 - o As a result, authors conclude, Chinese BPR will evolve to be characterized by less formal planning & documentation (Context/Face/Collectivism), more gradual implementation (UA) & more authoritarian management (PD) than US BPR efforts.

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11

Survey on Indian National Culture & BPR Success

- Agrawal & Haleem (2003) surveyed 800 organisations in US & India to determine if/how 4/6 factors above determined BPR Success.
- Can summarise findings as:
 - o Power Distance (PD):
 - In India, values for PD are high relative to their US counterparts
 - 1. Agrawal found that these high values helps in success of BPR applications (+ive corr)
 - 2. However, also found that employees don't want bosses to monitor them while learning BPR technology, wanting to operate in a free environment.
 - Values for US firms for PD corroborate these correlations.
 - o Uncertainty Avoidance (UA):
 - In India, values for UA are low relative to their US counterparts
 - 1. Agrawal found low values of UA helps success of BPR applications (-ive corr).
 - 2. Values for US firms for UA corroborate these correlations.
 - o Individualism:
 - In India, values for this are low wrt to their US, due to family ties.
 - 1. Agrawal found this to be -ively correlated with success of BPR applications due, he says, to more individual control of processes having possible adverse effects.
 - 2. Values for US firms for Individualism corroborate these correlations.
 - o Masculinity:
 - In India, values for this are high wrt to their US
 - 1. Agrawal found Masculinity to be -ively correlated with success of BPR applications
 - 2. Values for US firms for Masculinity corroborate these correlations.

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12

Indian Case Study #1: MNC-Co [from Jayaganesh & Shanks (2009)]

- Established in Japan in 1940's, MNC-Co manufactures & retails consumer durables.
- A subsidiary (est'd post Indian Economic Liberalization in 90's) is a leader with 2nd position in terms of Indian market share
- Early 2000's, lack of integration btw systems id'd as causing lack of insight into initiatives across org & various other tactical/operational bottlenecks.
- Solution Implementation
 - Senior mgmt saw limits in existing way of working & impl'd an ERP-enabled BPM citing their:
 - Commitment to engagement in BPM
 - Understanding of adv of adhering to global process standards
 - Belief that local needs considered wrt global standards thro representative project team with global, regional and local members
 - Process KPIs aligned with organisational objectives
 - Establishment of
 - Process-based Organisational structure ✓
 - Process-related roles & responsibilities ✓
 - Process definition & documentation: in place but only used for new recruits
 - Process standards & QA: Global standards for core processes as none available in context of Indian subsidiary.

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13

Indian Case Study #2: Ind-Co [from Jayaganesh & Shanks (2009)]

- Est'd 1955: Ind-Co a market leader in manuf of consumer durables.
- Leadership position* in domestic market due to ability to supply high quality products at affordable prices.
- Mgmt believes survival of company based on progressive philosophy embracing ability to change while emphasizing essentially Indian id.
- Company wants to explore possible export opportunities so set up a subsidiary in US.
 - At the same time prior leadership position* perceived insufficient for future strategic plans.
 - Hence an emphasis on *operational excellence* introduced to complement brand & design capabilities.
- ERP-enabled BPM Strategy at Ind-Co
 - Senior mgmt
 - Committed to ERP but did not explicitly define BP Strategy
 - Implied in IT strategy => ERP sys: tech proj under IT dept's mgmt/ctrl
 - Process objectives not explicitly defined or aligned with corporate goals.
 - Process-oriented org structure
 - Established during ERP system implementation & maintained since
 - Process-related roles & responsibilities: as no exp BPM strategy est'd, process-related decisions focussed on IT rather than on business.

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14

Indian Case Study Analysis

- *Power Distance:*
 - At MNC-Co, two trends apparent:
 1. Senior/Middle mgmt levels:
 - More impersonal mgmt style observed.
 - Relationships are short-term, formal & egalitarian as employees are either expats or Indians who have worked globally as expats.
 - Asynchronous communications (email etc) used extensively.
 2. Operational level of mgmt:
 - Employees establish emotional bonds thro long-term relationships.
 - Subordinates look to their superiors for direction & appreciation.
 - Informal communication thro face-to-face conversation.
 - At Ind-Co
 - Respect for authority & expertise reflected by need for their favour.
 - This in turn motivates employees to be compliant to org'l processes.
 - In the event of non-compliance, employees are reprimanded/coaxed into line in a quasi-*parent-child*-like manner.
 - Communication dependent on established relationships & constrained by power distance.

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15

Indian Case Study Analysis cont'd

- **Individualism:**
 - At MNC-Co
 - Employees often moved across projects, geo borders => short term r'ships.
 - Employee's relationship with org is mainly impersonal => high attrition rates in middle mgmt.
 - At lower levels of mgmt employees identify strongly with org, relating its fate to their own => motivator for performance.
 - At Ind-Co
 - Employees at all levels of mgmt identify strongly with org, relating its fate to their own.
 - Common: at lower levels (MNC-Co), all levels at Ind-Co:
 - Stronger bonds formed with members of same functional unit, providing a basis for all work-related activity.
 - Most employees tend to stay in the org, with the length of relationship with org further increasing ties between employee and org.

CA441: BPR National Cultural Aspects of BPR

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Indian Case Study Analysis cont'd

- **Uncertainty Avoidance:**
 - At both MNC-Co & Ind-Co ambiguity prevails over every aspect of BPM.
 - Mgmt of BPM-related activities is thro individual expertise on *ad hoc* basis.
 - Only exception to this is at MNC-Co are those processes requiring interaction with global partners which are standardised & documented with care.
- **Performance Orientation:**
 - Both orgs conform to the tendency in India towards low P.O.* to varying degrees, with one exception:
 - Theory suggests that orgs in India place less emphasis on results.
 - Authors found that employees in both orgs (esp at operational level) 'focussed on delivering outcomes over adherence to defined processes.'
 - Achieved this thro high task skill levels and adaptability/ capability to improvise without much regard for rules.
 - Reward systems in both orgs emphasize results over processes being followed.
- Results in broad accordance with Agarwal & Haleem (2003):
 - Collectivism & high Power Distance -ively affect BPR impl in an Indian context.
 - However, contradicting these, Jayaganesh & Shanks (2009) found that low UA results in less emphasis on setting up of process roles, definition & standards

CA441: BPR National Cultural Aspects of BPR * with high value placed on relationships/loyalty & less on training & devpt, results & rewards¹⁷

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Socio-Technical Systems

Click to add text

Information Systems Failure

Study by Lucas (1975) of over 2000 systems in 16 companies found:

"It is our contention that the major reason most information systems have failed is that we have ignored organisational behaviour problems in the design and operation of computer-based information systems."

Other researchers have made similar findings.

Bostrom & Heinen 1997 (1)

Reasons for failure

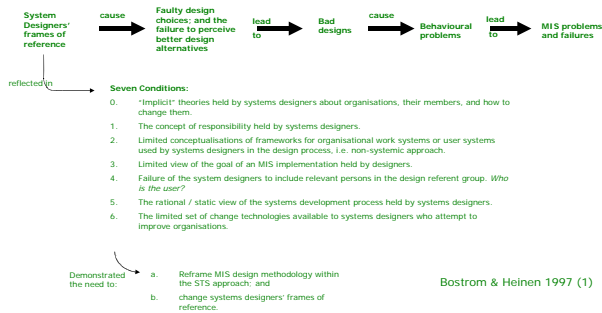
Information technology is commonly blamed, because it is seen as inflexible.

However, IT is neutral. What has more effect is System Designers implicit theories.

Most subscribe to "Theory X".

Bostrom & Heinen 1997 (1)

Rationale for Socio-Technical Design Methodology



Principles of Socio-Technology

Joint optimisation of Social and Technical system

- Social
 - + Attributes of people (attitudes, skills, values, etc.)
 - + Relationships among people
 - + Reward systems
 - + Authority structures
- Technical
 - + Processes, tasks, technology
- Optimisation of one at the expense of the other is sub-optimal

Quality of Work Life

Participation

Semi-autonomous work groups

Munkvold (2000)

Quality of Work Life

Historically only included:

- Wages
- Hours
- Physical conditions.

These are still included in the concept, but it is expanding to include other concerns such as :

- Meaningful and satisfying work
- Control and influence
- Opportunities for learning

Working definition: involves an interesting, challenging and responsible job as perceived by the job holder

Example methodology – Pasmore (1988)

1. Define scope of system to be re-designed
2. Determine environmental demands
3. Create vision statement
4. Educate organisational members
5. Create change structure
6. Conduct socio-technical analysis
7. Formulate re-design proposals
8. Implement recommended changes
9. Evaluate changes / re-design

Munkvold (2000)

Applying Socio-Technical Principles

Make the system designer's frame of reference more explicit

Focus more on the inter-relationship between social and technical design

3 stages:

1. *Strategic design process* - making the goals and responsibility of the project explicit
2. *Socio-technical design process* - joint consideration of technical system requirements and social system requirements
3. *Continuing management process* (action research process) - constant monitoring of the new system to see if it is meeting its goal, with necessary adjustments being made.

Munkvold (2000)
Bostrom & Heinen 1997 (2)

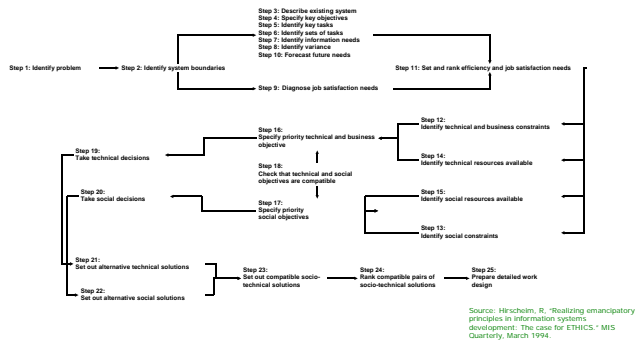
Mumford – ETHICS

(Effective Technical and Human Implementation of Computer-based Work Systems)

1. Essential systems analysis
2. Socio-technical systems design
3. Setting out alternative solutions
4. Setting out compatible solutions
5. Re-working socio-technical solutions
6. Preparing a detailed work design

Munkvold (2000)

Stages of the ETHICS Methodology



Four fundamental objectives of ETHICS

1. Encourage participation
2. Improve the general conditions of work
3. Produce systems that are "technically efficient and have social characteristics that lead to high job satisfaction"
4. Follow the socio-technical philosophy of trying for joint optimisation

<http://www.enid.u-net.com/C1book1.htm#The Design Challenge>

Mumford – ETHICS

Specifies the formation of two design teams, focussing on technical and social design.

Facilitator used to overcome obstacles related to:

- lack of trust,
- conflicts of interest,
- time pressure and stress
- low morale
- effects of authority
- communication gaps

Does not seek to increase Quality of Work Life at the expense of economic efficiency – increased QWL will increase quality and efficiency.

Munkvold (2000)

Criticisms of Socio-tech

- Emphasis on balance and consensus ignores political conflicts in organisations
- Participative design will only function when employee numbers are small

Munkvold (2000)

Use of STS in Organisational Design

Changed environment in the last two decades:

- Increasing global competition
- Deregulation of markets
- Increasing customer selectivity on price, quality and service
- Environmental protection issues
- Rapid technological development

Munkvold (2000)

Organisational Design

New organisational forms fashionable, e.g.:

- virtual organisations
- dynamic networks

key characteristics in common

- Focus on business processes instead of traditional functional organisation
- Focus on team organisation
- Decentralised decision-making
- IT as an important enabler
 - + Sometimes deflects attention from other important organisational factors such as power and authority.

Munkvold (2000)

Total Quality Management (TQM)

Based on quality theories of W. Edwards Deeming, Joseph Juran and Kaoru Ishikawa. Became very popular in US, initially in industry, but then in other organisations: health care, public service, voluntary organisations, education...
Now fashionable in most of the industrial world.

TQM philosophy

- Primary purpose of an organisation is to stay in business - so that it can:
 - promote the stability of the community
 - generate products and services that are useful to customers
 - provide a setting for the satisfaction and growth of organisation members.
- Focus on preservation and health of the organisation
- 4 interlocking assumptions - about quality, people, organisations and the role of senior management

Assumptions

- Quality is less costly to an organisation than poor workmanship
- Employees naturally care about the quality of their work, and will take initiatives to improve it.
- Organisations are systems of highly interdependent parts.
 - Cross-functional problems must be addressed collectively by representatives of all relevant functions
- Quality is ultimately and inescapably the responsibility of senior management.

Change Principles

- Focus on work processes.
- Analyse variability. Identify root causes of variability and control them.
- Management by fact. Collect data, use statistics, test solutions by experiment.
- Learning and continuous improvement.

Interventions

- Explicit identification and measurement of customer requirements.
- Creation of supplier partnerships.
- Use of cross-functional teams to identify and solve problems.
- Use of scientific methods to monitor performance, and to identify points of high value for performance improvement.
 - Control chart
 - Pareto analysis
 - Cost-of-quality analysis
- Use of process-management heuristics to enhance team effectiveness.
 - Flowcharts
 - Brainstorming
 - Cause-and effect diagram

TQM in practice – techniques

- Use of short-term problem-solving teams to simplify and streamline work practices.
- Training in quality practices:
 - Interpersonal skills
 - Quality-improvement processes and problem-solving
 - Team leading and building
 - Running meetings
 - Statistical analysis
 - Supplier qualification
 - Benchmarking
- Top-down implementation.
- Developing relationships with suppliers.
- Obtaining data about customers:
 - Free-phone complaint lines
 - Market research
 - Focus groups

Additional interventions

Competitive benchmarking – gathering information about 'best practices' from other organisations. Serves several functions:

- Determining what customers can expect from the competition
- Learning alternative work processes
- Indicating quality-improvement goals

Employee involvement:

- Suggestion schemes
- Quality meetings between managers and employees
- 'Quality days'
- Self-managing teams

Divergences

- Reduced use of scientific methods
- Relating reward systems to achievement of quality goals

Relating BPR to STS

Similarities:

- (re)design of business processes
- Use of semi-autonomous teams
- Empowerment

Differences:

- Radical change (BPR) vs. continuous change (STS)
- Purpose of team-building and empowerment in BPR is to support business goals, rather than to improve quality of work life.
- While re-engineering has led to improvements in performance, it has failed to produce the number of highly-motivated employees needed to ensure consistently high-performing organisations.

Relating TQM to STS

Key principles:

- Customer focus
- Focus on work processes
- Use of cross-functional teams
- Employee involvement
- Self-management
- Analysis of variability
- Benchmarking
- Learning and continuous improvement

Focus on empowerment conflicts with strong focus on top-down implementation.

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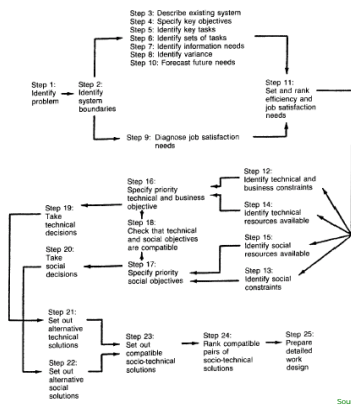


Figure 1. Schematic of the Stages of the ETHICS Methodology

Source: Hirschheim, R. "Realizing emancipatory principles in information systems development: The case for ETHICS." MIS Quarterly, March 1994.

Workflow Tools

Based on: Hollingsworth, The Workflow Reference Model.

Workflow Management Coalition Document Number TC00-1003 19-Jan-95
<http://www.wfmc.org/standards/docs/tc003v11.pdf>

Definitions (from the *Workflow Management Coalition*)

Workflow:

- "The computerised facilitation or automation of a business process, in whole or part."

Workflow technology is often an appropriate solution to BPR activities.

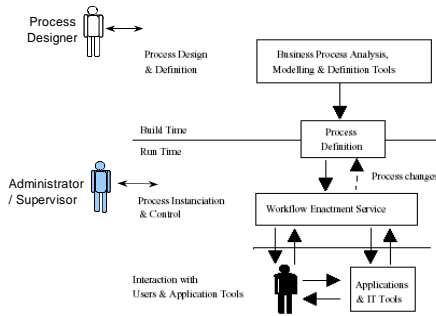
Workflow Management System

- A system that completely defines, manages and executes "workflows" through the execution of software whose order of execution is driven by a computer representation of the workflow logic.

Workflow Management Systems provide support in three functional areas.

- **the Build-time functions**, concerned with defining, and possibly modelling, the WF process and its constituent activities
- **the Run-time control functions** concerned with managing WF processes in an operational environment and sequencing the various activities to be handled as part of each process
- **the Run-time interactions** with human users and IT application tools for processing the various activity steps

Workflow System Characteristics



Build-time Functions

- Result in a computerised definition of a business process.
- Business process is translated from the real world into a formal, computer processable definition by the use of one or more analysis, modelling and system definition techniques.
- Resulting definition is sometimes called a **process model**, a **process template**, **process metadata**, or a **process definition**.

Process Definition

- A number of discrete activity steps.
- Associated computer and/or human operations.
- Rules governing the progression of the process through the various activity steps.
- May be expressed in textual or graphical form or in a formal language notation.
- Some workflow systems allow dynamic alterations to process definitions at run-time.

Run-time Process Control Functions (1)

Process definition is interpreted by software which is responsible for:

- creating and controlling operational instances of the process
- scheduling the various activities steps within the process
- invoking the appropriate human and IT application resources, etc.

Run-time process control functions link the process as modelled and the process as seen in the real world.

Run-time Process Control Functions (2)

Core component is the basic workflow management control software (or "engine"), responsible for:

- process creation & deletion
- control of the activity scheduling within an operational process
- interaction with application tools or human resources.

Software is often distributed across a number of computer platforms to cope with processes which operate over a wide geographic basis.

Run-time Activity Interactions

Individual activities within a workflow process are typically concerned with:

- human operations, often realised in conjunction with the use of a particular IT tool (e.g. form filling), or
- information processing operations requiring a particular application program to operate on some defined information (e.g. updating an orders database with a new record).

Must interact with the process control software to

- transfer control between activities
- ascertain the operational status of processes
- invoke application tools and pass the appropriate data, etc.

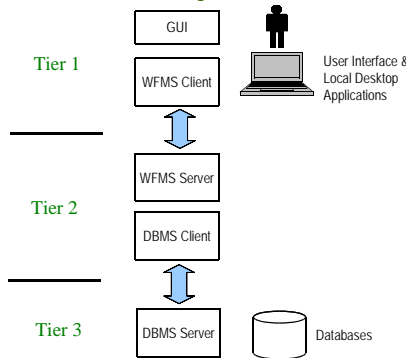
Benefits of a standardised supporting framework include:

- use of a consistent interface to multiple workflow systems
- the ability to develop common application tools to work with different workflow products.

Distribution and System Interfaces

Ability to distribute tasks is a major distinguishing feature of runtime infrastructure.
May operate at a variety of levels
May use a variety of communications mechanisms

WFMS 3 Tier System Structure



Tiers in Detail

- User Interface Tier
 - Deals with all user interactions & focuses their efficient accessibility
 - Usually a GUI on User's desktop
 - Invokes methods on Business Logic Tier & thus acts as client for it
- Business Logic Tier
 - Server-based code (made up of business objects that perform logical business operations) with which client interacts
 - Resides at a shared server to optimize allocation of system resources
- Data Storage Tier
 - Part of the dist'd application that manages access to data and storage mechanisms eg DBMS.
 - Made up of objects that encapsulate DB routines interacting with DBMS routines directly.

Interoperability

Flow of work may involve transfer of tasks between different vendors' workflow products so that different parts of the business process can be enacted on different platforms.

Flow within the central box passes between two or more workflow products - for example activities 1,2 and 5 may be executed by one workflow system and 3 and 4 by a different system, with control passed between them at appropriate points within the overall workflow.

Standards to support this transfer of workflow control enable the development of composite workflow applications using several different workflow products operating together as a single logical entity.

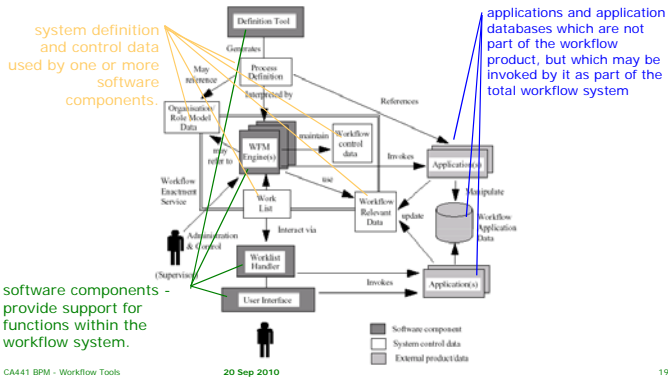
Range of interface definitions

- specifications for process definition data and its interchange
- interfaces to support interoperability between different workflow systems
- interfaces to support interaction with a variety of IT application types
- interfaces to support interaction with user interface desktop functions
- interfaces to provide system monitoring and metric functions to facilitate the management of composite workflow application environments

Product Implementation Model

- Despite the variety in WF products, possible to construct a general implementation model of a WF system which can be matched to most products in the marketplace.
- This approach identifies main functional components within a WF system and the interfaces between them as an abstract model.
- Many different concrete implementation variants of this abstract model will exist and therefore the interfaces specified may be realised across a number of different platform and underlying distribution technologies.
- Not all vendors want to expose every interface between the functional components within the model; this is dealt with by having a variety of conformance levels which will identify the particular interworking.

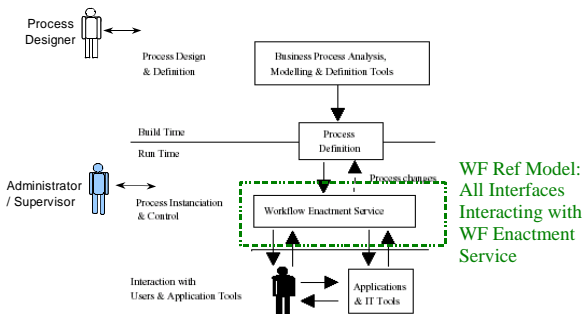
Generic Workflow Product Structure



Workflow Reference model

- Developed from the generic WF application structure by identifying the interfaces that allow products to interoperate at a variety of levels.
- All WF systems contain generic components which interact in a defined set of ways; different products exhibit different levels of capability within each of these generic components.
- Need a standardised set of interfaces and data interchange formats between components.
- Distinct interoperability scenarios can be constructed by reference to the interfaces, - different levels of functional conformance as appropriate.

Workflow System Characteristics



Workflow Control Data

Definition:

Internal data that are managed by the workflow management system and/or workflow engine.

The workflow enactment service maintains internal control data to identify the state of individual process or activity instances and may support other internal status information. These data are not accessible or interchangeable, but some of the information content may be provided in response to specific commands.

Workflow Relevant Data

Definition

Data that are used by a workflow management system to determine the state transition of a workflow process instance.

- May affect the choice of the next activity to be executed.
- Such data are potentially accessible to WF applications for operations on the data and thus may need to be transferred between activities by the WF enactment software.
- When operating in a heterogeneous environment, such data may need to be transferred between WF engines, where the process execution sequence spans two or more WF engines.

Workflow Application Data

Definition

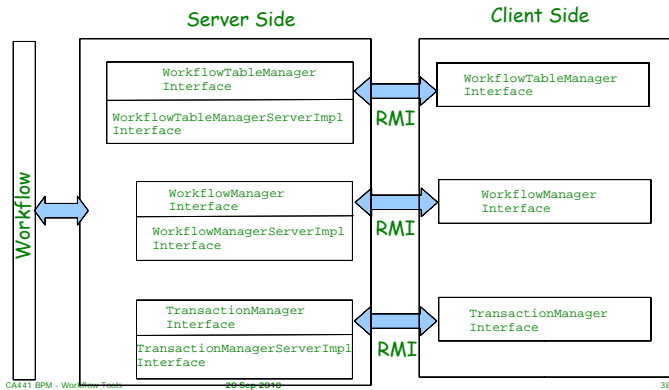
Data that are application specific and not accessible by the workflow management system.

- Manipulation of application data may be required within each activity of a process.
- WF model must cope with interchange of case data between the various activities.
- May also require transformation of case data between different tool data formats, for example conversion of a document or spreadsheet from one application format to another.
- WF application data are not used by the workflow enactment software.

Components of JWFM

- Clients/Server communicate thro dist'd RMI interface classes
- These classes function like C/S APIs & called *xyzManager* with methods allowing clients access to system objects (eg Wfs,transactions, users etc)
- Client
 - + first acquires client instance of relevent manager class thro RMI protocol
 - + invokes public method to retrieve java object for info client needs to operate
 - + e.g. If client wants to modify WF uses *WorkflowManager* interface class to retrieve *Workflow* java object
 - + When changes need to be saved, client uses *updateWorkflow()* method in *WorkflowManager* interface class
- Manager Interface classes needed for Server API for WF Mgmt:
 - + *WorkflowTableManager* Interface (stores info on WF activities in a table)
 - + *WorkflowManager* Interface (executes/automates WF activities)
 - + *TransactionManager* Interface (guarantees atomicity of transactions)
 - + Thus each of these export functions thro the various Interface classes

Components of JWFM: Graphical



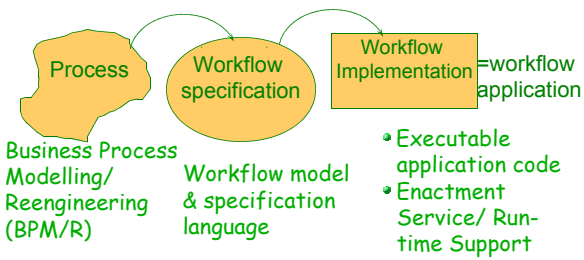
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Modelling Workflow with Petri Nets

Workflow Management Issues

Georgakopoulos, Hornick, Sheth



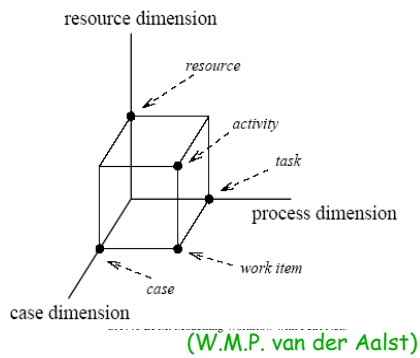
Workflows & Petri Nets (PNs)

- WFMS give an explicit representation of the BP logic thus allowing for computerized support
- PNs are an established tool for modelling & analyzing business processes:
 - Can be used as a design language for the specification of complex WFs
 - PN theory provides for powerful analysis techniques for verifying the correctness of WF procedures.
- PN primarily used to study dynamic concurrent behaviour of n/w-based systems with a discrete flow.

Workflows & Petri Nets (cont'd)

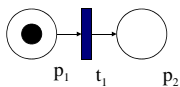
- Workflows are *case-based*, i.e., every piece of work is executed for a specific *case*.
 - Case: the subject of operation in a business process execution. E.g. mortgage application, hospital admission, insurance claim, tax declaration, order, request for information...
- A workflow process is designed to handle similar cases. Cases are handled by executing tasks in a specific order.

A three-dimensional view of a WF



Basics of Petri Nets

- Petri nets comprise two types of nodes: *places* and *transitions*. An arc exists only from a place to a transition or from a transition to a place.
- A place may have zero or more *tokens*.
- Graphically, places, transitions, arcs, and tokens are represented respectively by: circles, bars, arrows, and dots.



Dynamic modelling with Petri nets

- **Transitions are the active components.**
 - often represent an event, an operation, a transformation or a transportation.
- **Places are passive.**
 - usually represents a medium, a buffer, a geographical location, a state a phase or a condition.
 - depends on how the token in place is interpreted
- **Tokens often indicate objects.**
 - can play a role as physical object, e.g. a product/person;
 - an info object, e.g. a message;
 - an indicator of state a process is in or state of an object;
 - an indicator of a condition, i.e. the presence of a token indicates whether a certain condition is fulfilled.

CA441 BPM: Modelling Workflow with Petri Nets

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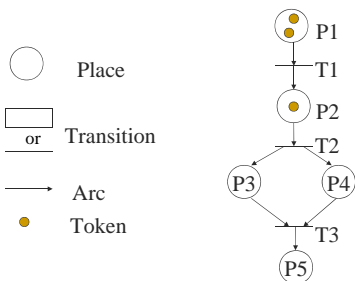
Object Life Cycle (OLC) with Petri Nets

- A Petri net attaches to a life cycle of objects of a class
- States correspond to places
- Initial state: state with token, there is only one initial state in an OLC
- Transitions correspond to events, conditions (verify a condition) or processes (or atomic process: method) that changes object state
- Tokens represent objects in this class

CA441 BPM: Modelling Workflow with Petri Nets

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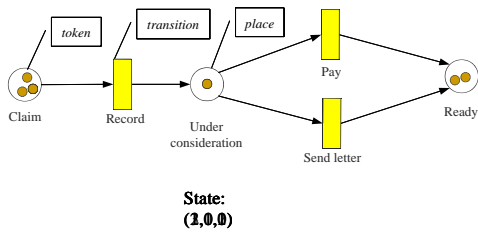
Basics of Petri Nets (cont'd)



CA441 BPM: Modelling Workflow with Petri Nets

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Example – claims process

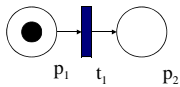


CA441 BPM: Modelling Workflow with Petri Nets

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Basics of Petri Nets (cont'd)

- Below is an example Petri net with two places and one transaction.
- Transition node is ready to *fire* if & only if there is at least one token at each of its input places



state transition of form $(1, 0) \rightarrow (0, 1)$
 p_1 : input place p_2 : output place

CA4 BPM PetriNets

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Formal Notation of Petri Nets

- A bipartite graph, $PN=(P, T, I, O)$
- P: finite set of places
- T: finite set of transitions
- I: $(P^*T) \rightarrow N, I(p,t)=n$, if $n>0, p \in P, t \in T$, then p is an input place of t ; n is an input multiplicity (weight) for each input arc (p,t)
- O: $(T^*P) \rightarrow N, O(t,p)=m$, if $m>0, p \in P, t \in T$, then p is an output place of t ; m is an output multiplicity(weight) for each output arc (t,p)

*By default, the weight of an arc is equal 1, otherwise it will be noted.
 The input multiplicity of an arc between an input place and a transition determines how many tokens have to be present in the place so that the transition is enabled*

CA441 BPM: Modelling Workflow with Petri Nets

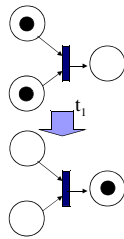
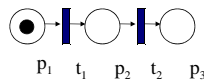
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Formal Notation of Petri Nets (cont'd)

- A **state** of a Petri net is a function $s: P \rightarrow \mathbb{N}$, assigning to each place $p \in P$ a number of tokens at this place. A **state space** of a Petri net is a set of all $s(p), p \in P$. (E.g. state space is (2,1, 0, 0, 0))
- A transition t is **enabled**, $t \in T$ in state $s: P \rightarrow \mathbb{N}$, if there are enough tokens present in each of the input places of t , i.e. if and only if $\forall p \in P, s(p) \geq I(p,t)$
- A transition t can **fire** in a state s whenever it is enabled in this state. When it fires, it **consumes** $I(p,t)$ tokens from each input place p and **produces** $O(t,q)$ tokens in each output place q . If t fires in state s , this leads to a new state s' where $\forall p \in P, s'(p) = s(p) - I(p,t) + O(t,p)$

Properties of Petri Nets

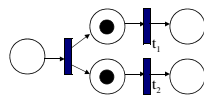
- **Sequential Execution**
Transition t_2 can fire only after the firing of t_1 . This imposes the precedence of constraints " t_2 after t_1 ."
- **Synchronization**
Transition t_1 will be enabled only when a token there are at least one token at each of its input places.
- **Merging**
Happens when tokens from several places arrive for service at the same transition.



Properties of Petri Nets

(contd)

- **Concurrency**
 t_1 and t_2 are concurrent. With this property, Petri nets can model systems of distributed control with multiple processes executing concurrently in time.

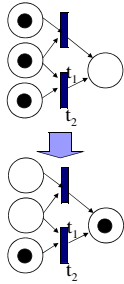


Properties of Petri Nets

(contd)

- **Conflict**

t_1 and t_2 are both ready to fire but the firing of one leads to the disabling of the other transitions.



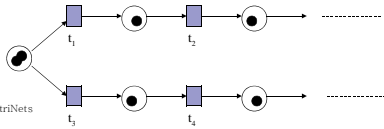
CA4 BPM PetriNets

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Properties of Petri Nets (contd)

- **Conflict - (contd)**

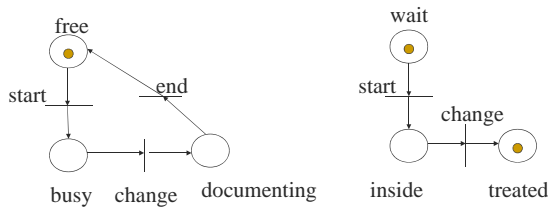
the resulting conflict may be resolved in a purely non-deterministic way or in a probabilistic way, by assigning appropriate probabilities to the conflicting transitions. e.g:



CA4 BPM PetriNets

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Example: Patients & a Specialist



Tokens : Specialist

Tokens : Patient

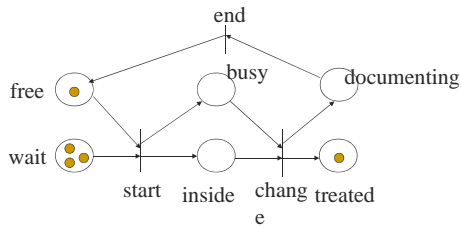
(W.M.P. van der Aalst)

CA441 BPM: Modelling Workflow with Petri Nets

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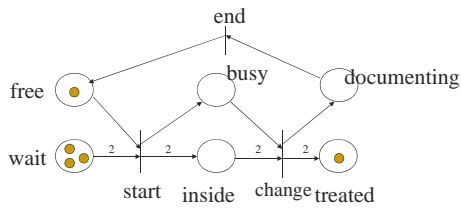
Example: Patients & a Specialist (cont'd)

The process of a specialist treating patients:

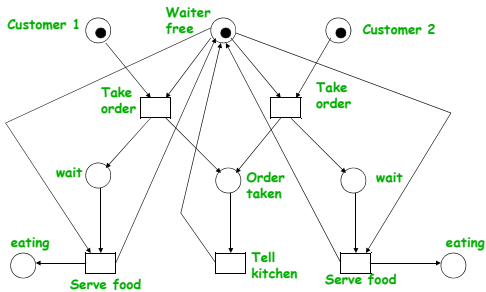


If a specialist always treats two patients at the same time ?

Example: Patients & a Specialist (cont'd)



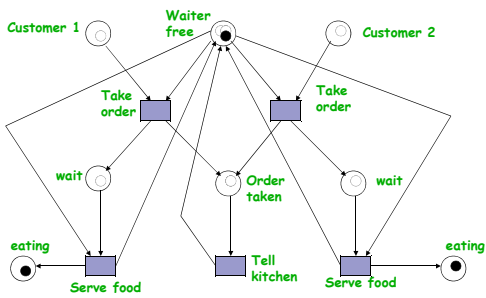
Example: In a Restaurant



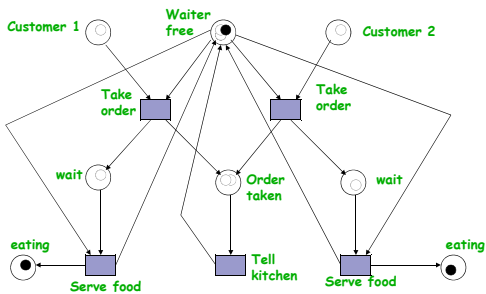
Example: In a Restaurant (cont'd) Two Scenarios

- **Scenario 1:**
 - Waiter takes order from customer 1; serves customer 1; takes order from customer 2; serves customer 2.
- **Scenario 2:**
 - Waiter takes order from customer 1; takes order from customer 2; serves customer 2; serves customer 1.

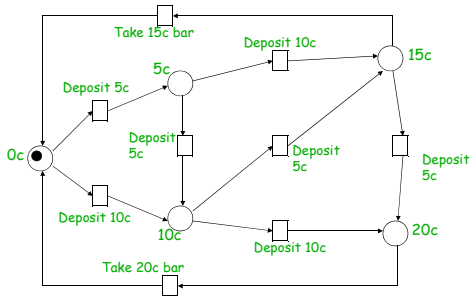
Example: In a Restaurant (Scenario 1)



Example: In a Restaurant (Scenario 2)



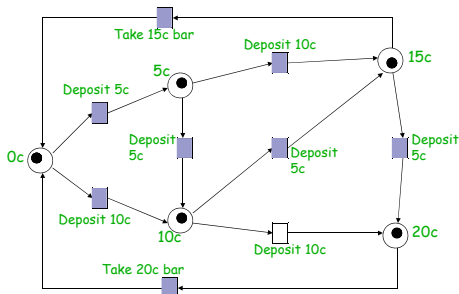
Example: Vending Machine



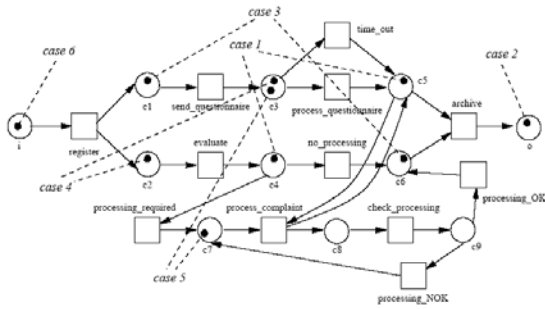
Example: Vending Machine (3 Scenarios)

- Scenario 1:
 - Deposit 5c, deposit 5c, deposit 5c, deposit 5c, take 20c snack bar.
- Scenario 2:
 - Deposit 10c, deposit 5c, take 15c snack bar.
- Scenario 3:
 - Deposit 5c, deposit 10c, deposit 5c, take 20c snack bar.

Example: Vending Machine (Token Games)



Example: Insurance complaint process



- To manage different cases, two solutions:
1. Token is added a value (case identifier or colour) for distinguish different cases
 2. Each case corresponds to a unique instance of the Petri nets

Petri Nets over Time

- 1962 - Carl Petri originally proposed Petri Nets without any notion of time. Concept of time was intentionally avoided because addition of time restricts the behavior of the net.
- 1970s ~ - Addition of time has been discussed in order to analyze the performance of modelled system.
- Many properties are still undecided for Petri nets extended with data and time.

References

- <http://www.wfmc.org/standards/model.htm>
- "The Application of Petri Nets to Workflow Management", W. van der Aalst, J. Circuits, Systems & Computers, Vol. 8(1) (1998), pp. 21-66
- "Design and control of workflow process", Hajo A.Reijers, LNCS Springer, 2003
- "Coupling Object-Oriented and Workflow Modelling in Business and Information Process Reengineering", Gregory N. Mentzas, IOS Press, 1999
- "Workflow Management Coalition Terminology and Glossary" (WFMC-TC-1011). Technical report, Workflow Management Coalition, Brussels, 1996.

Business Process Modelling

Click to add text

Historical View of BP Modelling

- **Work Process Flow (early to mid 1900s)**
 - + Frank Gilbreth & his 'Flow Process Charts' (= *flowcharts*)
 - + First structured method for documenting process flow
- **Work Flow (mid-1970s)**
 - + Motivation was disenchantment with the above
 - + Acted as a genesis for BP Modelling
- **Business Process Modelling (2000s)**
 - + Trend towards new manuf'ing paradigm - Virtual Enterprise
 - + VE=distributed & parallel BP execution from each VE entity
 - + Need effective process modelling with strict model analysis

Business Process Modelling- The "What?"

- Business process modelling (BPM) is the activity of representing processes of an enterprise, so that the current process may be analyzed and improved.
- Typically performed by business analysts & managers seeking to improve process efficiency and quality.
- The process improvements identified by BPM may or may not require IT involvement, although that is a common driver behind modelling a business process.

Business Process Modelling- The "Why?"

- Business process modelling (BPM) helps companies in the following ways:
 - + To become more process-oriented
 - + To optimise business processes thro Process Change Mgmt: long term planning, execution & control of processes
 - + To document and manage processes on an ongoing basis
 - + To simulate processes using, i.a. Monte Carlo simulation & Discrete Event Simulation

Business Process Modelling Notation

- Why BPM Notation (BPMN)?
 - + => a notation that can be understood by all business users.
 - + i.e. business analysts (creating initial drafts of processes)
 - + & technical developers (implementing technology performing those processes).
- Where does BPMN fit in with tools so far (WF/PNs)?
 - + swimlanes/WF not flexible for VE/whole organisations so BPMN encapsulates WF models thro use of swimlane diagrams
 - + process is sound = for each state reachable from the initial state, a firing seq exists leading system to the final state. In a process model with formal execution semantics, these types of properties can be defined precisely & verified automatically by tools.
 - + BPM Diagrams can be translated to PNs for analysis & verification.
 - + Can be mapped to UML.

BPMN – Yet Another Bloody Standard??

- *Business Process Management Initiative* (www.bpmi.org)
 - + established to promote & develop use of Business Process Management (BPM) through the use of standards for process design, deployment, execution, maintenance, and optimization of processes.
- BPMI has developed three standards to facilitate BPM
 - + *BPMN*, as a standard for modelling business processes,
 - + *Business Process Modelling Language (BPML)*, as the standard business execution language, &
 - + *Business Process Query Language (BPQL)*, a standard management interface for the deployment & execution of e-Business processes.

BPMN: Business Process Diagrams

- BPMN specifies one Business Process Diagram (BPD).
- Diagram designed to do two things well:
 - + easy to use and understand, used to quickly & easily model business processes, & easily understandable by non-tech users (usually mgmt).
 - + offers expressiveness to model very complex business processes & can be naturally mapped to business execution languages.
- Steps:
 - + model the events that occur to start a process, processes that get performed, & end results of the process flow.
 - + business decisions and branching of flows is modelled using gateways.
 - + process can contain sub-processes, shown by another BPD connected via a hyperlink to a process symbol.
 - If a process is not decomposed by sub-processes, considered a task - the lowest-level process.
 - A '+' mark in the process symbol denotes that the process is decomposed; if it doesn't have a '+' mark, it is a task.

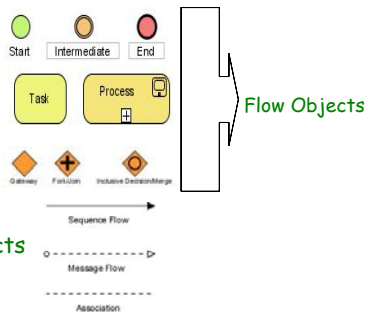
BPMN: Business Process Diagrams

The four basic categories of elements are:

- + Flow Objects
- + Connecting Objects
- + Swimlanes
- + Artifacts

BPM Notation: Flow Objects & Connecting Objects

- Events
- Activities
- Gateways
- Connecting Objects



BPM Notation: Flow Objects: Events

- Represented with a circle
- Denotes something that happens (rather than Activities which are something that is done).
- Icons within the circle denote type of event (e.g. envelope for message, clock for time).
- Events are also classified as
 - + *Catching* (ie catch an incoming message to Start process) or
 - + *Throwing* (ie throw a message at End of process).
- Types: Start, Intermediate, End

BPM Notation: Flow Objects: Events

Start event:

- + triggers process;
- + indicated by a single narrow border;
- + can only be *Catch*, so shown with open (outline) icon.

End event:


- + represents result of a process;
- + indicated by a single thick/bold border;
- + can only *Throw*, so shown with a solid icon.

Intermediate event:


- + something happening btw start & end events;
- + indicated by a tramline border;
- + can *Throw* or *Catch* (using solid/open icons as appropriate) - eg, task could flow to an event throwing a message to another pool & a subsequent event waits to catch the response before continuing.

BPM Notation: Connecting Objects


Sequence Flow:

- + represented by a solid line with a solid arrowhead 
- + used to show order (sequence) that activities will be performed in a Process.

Message Flow:

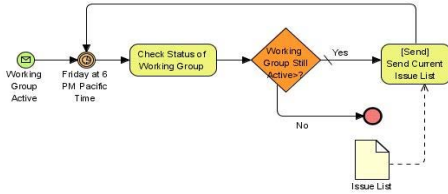
- + represented by a dashed line with an open arrowhead 
- + used to show flow of messages btw 2 separate Process Participants (business entities/business roles) that send & receive them.
- + in BPMN, 2 separate Pools in Diagram will represent two Participants.

Association:

- + represented by a dotted line with a line arrowhead 
- + used to associate data, text, & other Artifacts with flow objects.
- + used to show inputs & outputs of activities..

BPM Notation: Example 1

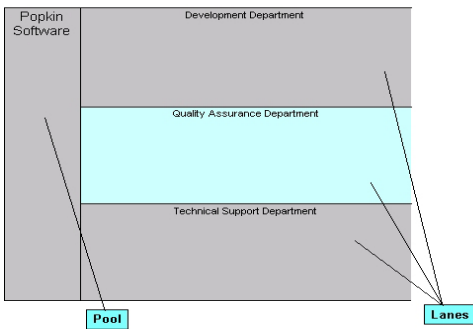
- Example: A process with a normal flow with the Business Process Modeling Notation.



BPM Notation: Swimlanes

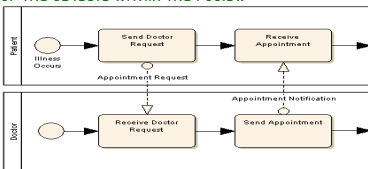
- As seen, swimlanes are a mechanism to organize activities into separate visual categories to illustrate different functional capabilities or responsibilities. BPMN supports swimlanes with two main constructs. The two types of BPD swimlane objects are:
 - Pool:
 - + represents a participant in a process.
 - + also acts as a graphical container for partitioning a set of activities from other Pools usually in the context of B2B situations.
 - Lane:
 - + a sub-partition within a Pool extending entire length of the Pool, either vertically or horizontally.
 - + used to organize & categorize activities.

BPM Notation: Swimlanes cont'd



BPM Notation: Example 2: Swimlanes

- Pools are used when diagram involves 2 separate business entities or participants & are physically separated in the diagram.
- The activities within separate Pools are considered self-contained Processes.
- + => Sequence Flow may not cross the boundary of a Pool. Message Flow is defined as being the mechanism to show the communication between two participants, &, thus, must connect between two Pools (or the objects within the Pools).



BPM Notation: Artifacts

- BPMN designed to allow modellers and modelling tools flexibility in extending basic notation & in providing ability to add additional context appropriate to a specific modelling situation.
- Any number of Artifacts can be added to a diagram as appropriate for the context of the business processes being modelled.
- Current version of BPMN specification pre-defines only 3 types of BPD Artifacts:

BPM Notation: Artifacts cont'd

- BPMN specification pre-defines only 3 types of BPD Artifacts:
- Data Objects:
 - + mechanism to show how data is required or produced by activities.
 - + connected to activities through Associations.
- Group:
 - + repr'd by a rounded corner rectangle drawn with a dashed line
 - + can be used for documentation or analysis purposes, but does not affect the Sequence Flow.
 - + used to organize & categorize activities.
- Annotations:
 - + repr'd by an open rectangle containing annotation text.
 - + mechanism for a modeller to provide additional text info for reader of a BPMN Diagram



BPMN Software cont'd

- These BPMgmt solutions can be used to easily create applications to automate processes such as:
 - + Change management
 - + Quality control
 - + Customer service
 - + Claims management
 - + Complaint management
 - + Procurement
- There are many BPM / WF solutions out there. Will look at some *open source* solutions to evaluate before looking at the proprietary/commercial ones.

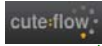
BPMN Software cont'd:

- ProcessMaker: open source, BPMgmt & WF s/w designed for SMEs.
- User friendly solution to manage WF effectively and efficiently.
- Business users & process experts without programming experience can design & run WFs, automate processes across systems ie HR, finance & operations.
- Can easily create WF maps, design custom forms, extract data from external data sources to optimize WF mgmt & bus. ops.
- one advantage is online library with process templates to download & edit to reduce learning curve. Process templates include:
 - + Credit card application
 - + Expense report process
- Review at <http://www.wareprise.com/2009/04/12/an-initial-review-of-processmaker-open-source-bpm/>

BPMN Software cont'd:

- Bonita Open Solution is an intuitive & powerful open source BPMgmt solution applicable to simple & complex processes.
- The Bonita Studio which meets BPMN is part of the Bonita Open Solution including Bonita Execution Engine & Bonita User Experience.
- One strong point about Bonita Open Solution is its great user experience which is quite similar to standard email Inbox to easily and quickly organize your work, follow up on tasks / cases and collaborate with colleagues.

BPMN Software cont'd:

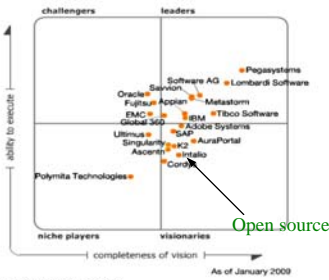


- Unlike ProcessMaker, CuteFlow is a web based open source document circulation & workflow system.
- Users able to define "documents" for sending step by step to every station/user in a list.
- Cuteflow helps to automate document circulation process within office internal environment.
- All operations like starting a WF, tracking, WF-definition or status observation done within a comfortable and easy to use web interface.
- Some key features of Cuteflow include:
 - + Integration of workflow documents in e-mail message
 - + Unlimited amount of sender, fields, slots, receiver...
 - + Workflows can attach data and files
 - + Flexible user management with substitutes
 - + Wide user base

BPMN Software cont'd: Commercial

- Figure 1 (from Gartner) evaluated on:
 - + Implementation of a Specific Process-Based Application
 - + Support for a Continuous Process Improvement Mentality
 - + Redesign for a Process-Based SOA
 - + Business Transformation Initiatives

Figure 1. Magic Quadrant for Business Process Management Suites



BPMN Software cont'd: Lombardi

<http://www.youtube.com/watch?v=GEGdEiQ2WvM>

References

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