Modelling Sensible Business Processes

Building rich process models for knowledge sharing

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Intro

Business process management

Design of business
Servitisation
Automation
Workflow

Business transformation
IT capability
Intro

**Process modelling** is central to BPM approach

Codifying organisational knowledge and behaviour

Enabling computational support
Process modelling

- **Workflow**: control data, production data, flows, procedures, consistency
- **Automation**: unique cases, loose activities, human interventions
- **Servitisation**: context awareness, decision making, agility
- **Design of business**: coordination view: routing
Intro

Early days

Automation, rationalisation, and coordination

Nowadays

Design of business
Strategy, innovation, through-life services, collaboration, transparency, agility
Intro

Early days

Easy *elicitation-analysis-design cycle*
- Limited scope, known flows, clear procedures
- Expected exceptions, predefined behaviour

Nowadays

Complex *knowledge-sharing cycle*
- Unique cases, human discretion, changing goals
- Unexpected exceptions, emergent behaviour
Problem

How to capture and model process knowledge?

- Lack of realism/detail/context
- Lost in translation
- Lack of flexibility
- Lack of agility
Modeller: What do you do when event X arrives?
Domain expert: It depends on so many decisions…
Modeller: Sorry, I need to report ONE activity

Modeller: Which activity follows Y?
Domain expert: I often decide on the spot…
Modeller: Sorry, I need to know ALL conditions
Example

"Happy" path
Example

unexpected path

1. Buy clothes
2. Check alternatives
3. Wait 3 days
4. Take ferry
5. 2 days at sea
6. Fly back same day
7. Expense report
8. Fly to meeting
9. Meeting

10.
Classification of Processes

- Rich
- Lean
- Machine control
- Human control

Model
Classification of Processes

- **Mechanistic processes**
  - Behaviour clarity
  - Predictable
  - No decision-making
  - No disturbances
  - Typical BPM
Classification of Processes

- Exceptional events
- Workarounds
- Human ingenuity
- Typical case handling

2 Ad hoc processes
Classification of Processes

- **Model**
  - Rich
  - Lean

- **Behaviour**
  - Human control
  - Machine control

- **Generative processes**
  - Evolution
  - Breeding
  - Adaptation
  - Mining
Classification of Processes

- **Rich**
  - Machine control
  - Human control

- **Lean**
  - Machine control
  - Human control

**Sensible processes**
- Context sensitivity
- Sensemaking
- Augmentation
- Meta-design
Classification of Processes

- **Model**
  - Rich
  - Lean

- **Machine control**
  - Behaviour
    - Generative processes
    - Mechanistic processes

- **Human control**
  - Ad hoc processes
  - Sensible processes
Sensible Business Processes

A definition

Processes that leverage both the human capacity for sensemaking and decision making and the processing capacity of complex information systems
Sensible Business Processes

Our research questions

What process knowledge would be captured?
What methods and tools would be needed to capture such knowledge?
What would be the effectiveness of these tools and methods?
Research Paradigm

Design science

Building artefacts

Advancing the knowledge base

Demonstrating utility
Research Paradigm

1. **Build**
2. **Artefact**
3. **Evaluate**
Artefact

Process stories

Waiting: I waited for so long...

Complained: I called them on the telephone and asked what was going on with my order. They assured me it was on its way.

Paid: I got the pizza and paid the delivery boy in cash.

Ate Pizza: Ate the pizza
Process Stories

Process storytelling tool
A process story in storyboard view
Process Stories

A process story in structure view
Process Stories

Theoretical foundations

Sensemaking theory

“Sensemaking involves the ongoing retrospective development of plausible images that rationalise what people are doing”

Organisational storytelling theory

“Stories communicate complex ideas and spring people into action using narrative mechanisms”

“Stories bring detailed explanations, contextual information, values, and what-if considerations to knowledge sharing”
We needed 3 build-evaluate cycles to answer our research questions.
# Build-Evaluate Cycles

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Build</th>
<th>Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Features</td>
<td>Purpose</td>
</tr>
<tr>
<td>Cycle 1</td>
<td>Initial tool</td>
<td>Formative</td>
</tr>
<tr>
<td>Cycle 2</td>
<td>Improved editing</td>
<td>Summative</td>
</tr>
<tr>
<td>Cycle 3</td>
<td>Improved storytelling</td>
<td>Summative</td>
</tr>
</tbody>
</table>
## Cycle 1

<table>
<thead>
<tr>
<th>Case</th>
<th>Size</th>
<th>Data gathering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model existing process - Client relationship management</td>
<td>27 participants</td>
<td>1 stage:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Individual storytelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Informal feedback</td>
</tr>
</tbody>
</table>
Cycle 1

Results (disappointing)

- Many difficulties composing scenes (too many steps)
- Problems viewing process stories
- Wide variations in level of abstraction
- Lack of contextual details
- Lack of confidence expressing stories

Consequence

- Improved tool with fewer clicks and automatic if-then-else
- Improved training and instructions to users
## Cycles 2 and 3

<table>
<thead>
<tr>
<th>Case</th>
<th>Size</th>
<th>Data gathering</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cycle 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model <em>new process</em></td>
<td>Small team - leader plus 5 members</td>
<td>2 stages:</td>
</tr>
<tr>
<td>- IT service provisioning</td>
<td></td>
<td>- Individual storytelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Convergence meeting moderated by leader</td>
</tr>
<tr>
<td><strong>Cycle 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model <em>existing process</em> - administrative</td>
<td>Large organisation - 20 participants</td>
<td>3 stages:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Define reference process (sanctioned by the organisation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Modelling sessions (mainly individual)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Conversion of individual stories into BPMN and comparison with reference</td>
</tr>
</tbody>
</table>
Research Questions

RQ1. Did the subjects create detailed stories?
RQ2. Can workflow be derived from user stories?
RQ3. Did the stories portray emotion?
RQ4. Were unexpected situations depicted?
RQ5. Was contextualised knowledge applied?
RQ6. Did sharing stories help the team better understand the process?
RQ7. Did the gathered stories influence the final adopted practices?
Detail (Size & Complexity)

Number of stories with "x" scenes

- None
- Low
- Medium
- High
- Very high

Structural complexity

- None
- Low
- Medium
- High
- Very high

Low [1-4]
Medium [5-9]
High [10-19]
Very high [20-∞]
Did the subjects create detailed stories?

**Yes** - Regarding both size and complexity

Interestingly, size and complexity were higher with a new process

**Yes** - Regarding narrative

However, existing process had more narrative

**Depends** - Regarding dialogue

New process had less dialogue
Can workflow be derived from user stories?

Yes - Every story had at least one workflow element (activity, condition, flow)
Did the stories portray emotion?

Divided results (50% mark)

Existing process generated slightly more emotional elements
Were unexpected situations depicted?

Depends on type of process

Existing process very often described with surprising situations

New process completely focused on “happy path”
Was contextualised knowledge applied?

- Depends on type of process
- Existing process highly contextualised
- New process had low contextual cues
Understanding & Influence

RQ6. Did sharing stories help the team better understand the process?

RQ7. Did the gathered stories influence the final adopted practices?

To answer these questions, we had to adopt a different approach to data analysis:

- Chunking the process in logical segments and analysing individual contributions to each segment.
Understanding

Number of scenes per story

Chunk 1 | Chunk 2 | Chunk 3 | Chunk 4
---|---|---|---
0 | 4 | 8 | 12
20 | 16 | 12 | 8

Number of scenes in converged story

Chunk 1 | Chunk 2 | Chunk 3 | Chunk 4
---|---|---|---
0 | 4 | 8 | 12
20 | 16 | 12 | 8

New process
Understanding

Number of activities per individual process

Number of activities in reference process

Existing process
Understanding

Did sharing stories help the team better understand the process?

**Yes** - In both cases

- The *converged story* had more scenes than most individual stories (new process)
  - An excessively detailed story was toned down by the group
- The *reference process* had fewer activities than most individual processes (existing process)
Influence

% individual activities appearing in individual stories and converged story

New process
Influence

This story shaped chunk 3 of final story

This story had no influence on chunk 2

% individual activities appearing in individual stories and converged story

New process
Influence of individual activities on reference process

Influence

Existing process
Influence

Did the gathered stories influence the final adopted practices?

Yes - In both cases

The converged story was significantly influenced by some stories

Those stories exhibited high expertise in specific chunks of the whole process

The reference process was supported by all stories, but also contradicted by some stories
In a Glance

RQ1. Did the subjects create detailed stories?
    YES (size, complexity): New > Existing
    YES (narrative): Existing > New
    DEPENDS (dialogue): Existing > New

RQ2. Can workflow be derived from user stories?
    YES

RQ3. Did the stories portray emotion?
    Around 50% did

RQ4. Were unexpected situations depicted?
    DEPENDS: Existing = Yes, New = No

RQ5. Was contextualised knowledge applied?
    DEPENDS: Existing = High, New = Low

RQ6. Did sharing stories help the team better understand the process?
    YES

RQ7. Did the gathered stories influence the final adopted practices?
    YES
Discussion

Arguments in favour of sensible processes

Enriching knowledge of existing processes

- 85% process stories had high context reasoning
- 75% expressed surprising events
- 67% expressed emotion
- 100% activities supported the established process
- 43% activities contradicted the established process

Enriching knowledge of new processes

- 83% stories had high detail
- 66% had high complexity
Discussion

Enriching knowledge

This...  ...versus this
Discussion

Arguments in favour of sensible processes

Balancing the picture

Converged process was balanced when compared to individual process stories

More detail in some chunks, less in others

Reference process was simultaneously supported and contradicted by individual process stories

Better account of reality in some chunks

Integration with existing approaches

Every story contained workflow elements (mechanistic)

Stories identified alternative activities (surprises)
Discussion

Integration with existing approaches
Discussion

Domain experts, instead of modelling experts

- No specialised language or skills required

Collaboration

- Domain experts can effectively collaborate in building process stories

Process elicitation versus modelling

- No need for separate activities
Discussion

Regarding design science

Anonymous reviewer

“I understand what you intend, but the RQs are too fuzzy, 'can' can never be falsified. Sure, all you present CAN improve business processes, but it is more relevant whether and to which amount it really improves. There is no baseline/control group for comparison, still I think the results are interesting and should be reported”

Answer?

Design science is more about problem solving

“what”/ “can” type of research questions

Comparison with baseline was possible in one case (229% increase in number of process nodes), but not in others
Future Work

Alternative ways for capturing process stories
  Generic purpose tools?

Quality assessment of process stories
  Utility/understandability versus correctness/completeness?

Elicitation/modelling method
  Best practices?

More research needed for theory building
  New versus existing processes
  Big versus small organisations
  Consensus versus divergence


