Heavyweight and lightweight process automation

How do companies select between RPA and back-end automation?

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1. Motivation & Research question
Research question

In this study, I look into

*How do companies select between lightweight (RPA) and heavyweight (back-end) process automation approach?*

*What attributes affect the suitability of these approaches?*
Business Process Automation is entering new areas

- Societies more and more dependent on IT-enabled processes
- Automation increasingly important across various industries
  - Back offices from eg. telco, utilities, finance and health care under pressure to contain costs
  - Cost efficiency must be balanced with service excellence, scalability, flexibility, security, compliance... (Willcocks et al. 2015)

- Business Process Automation: eliminating costly, repetitive, and error prone manual tasks
  - Has been way of enhancing productivity in back-office
  - Moving increasingly to domain of knowledge work
  - McKinsey: “about 60% of occupations could have 30% or more of their constituent activities automated”
2. Literature
Bygstad (2016) suggests terms heavyweight and lightweight IT for dealing with two trends in IT industry

1. *Growing size and interconnectivity of IT systems*
   - attempt to integrate IT silo systems and reduce complexity caused by them
   - advanced but complex solutions

2. *Consumerisation*
   - a development challenging hegemony of IT departments
   - trends such as ‘bring your own device’, technologies bypassing the IT departments
   - response to bureaucratic solutions and mechanisms of company IT

Bygstad views both as responses to growing complexity of IT solutions
# Heavyweight and lightweight IT as theoretical framework

<table>
<thead>
<tr>
<th>Heavyweight IT (Mode 1, Core IT)</th>
<th>Type of systems</th>
<th>Lightweight IT (Mode 2, Agile IT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back-end, mission- or business critical</td>
<td>Market-facing/ front-end, non-critical</td>
<td></td>
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<tr>
<td>Mature, proven</td>
<td>Technology</td>
<td>Emergent, adopted spontaneously</td>
</tr>
<tr>
<td>Software engineering</td>
<td>Culture</td>
<td>Business and process improvement</td>
</tr>
<tr>
<td>Security, efficiency, reliability</td>
<td>Focus</td>
<td>Agility, innovation, speed</td>
</tr>
<tr>
<td>Well understood and known services</td>
<td>Application area</td>
<td>Un-known, development of new services</td>
</tr>
<tr>
<td>Invasive, data-access and business logic layer</td>
<td>Invasiveness</td>
<td>Non-invasive, presentation layer</td>
</tr>
<tr>
<td>High complexity and costs of systems</td>
<td>Problems</td>
<td>Isolated systems, privacy and security issues</td>
</tr>
</tbody>
</table>

*Table 1: Heavyweight and Lightweight IT, adapted after Bygstad (2016) and Horlach et al. (2016; 2017)*
Robotic Process Automation (RPA)
Lightweight

Emerging area in business process automation and one of the current hype words
  - RPA market to reach USD 8.75 billion by 2024

Lacity & Willcocks: RPA to routine, structured and rule-based service processes → productivity gains
  - Cost efficiency, decreased delivery times, improved service quality, low error rates, scalability...
  - Willcocks: RPA can provide ROI of 30-200% during first year

Consult reports suggest biggest benefits from RPA when applied as a part of process improvement program (Forrester Consulting 2014)
  - Not standalone solution
  - Complementing other tools
Back-end automation
Heavyweight

Defined here as “invasive” automation implemented by means of
• system development
• system integration on data or application layer

Strategies can include eg.
• extending current system
• purchasing a middleware solution
• purchasing a BPM solution with BPA extension (Mohapatra, 2009)

Example of heavyweight IT
• Invasive, as requires changes to existing systems or their interfaces
• Requires specialized knowledge and skills on the field of IT
3. Methods & Data
## Methods and data

### STANCE

| Qualitative | Inductive |

### RESEARCH STRATEGIES

| Semi-structured interviews | Case studies |

### DATA

| Expert interviews | Expert interviews were conducted in 4 companies:  
| | • 2 RPA service providers: CGI and Digital Workforce  
| | • a Finnish telecommunications and ICT service company ‘Telco Oyj’  
| | • a Finnish financial group ‘FinBank Oy’ |

| Observations for case studies | 2 automation cases were observed in Telco Oyj  
| | • selection between RPA and back-end automation |
RPA-driven approach, as this new method needs research

Themes in interviews
- Relationship of RPA and back-end automation
- RPA strengths & challenges
- Typical RPA cases
- Decision making criteria

Case studies
- What affected selection between RPA and back-end automation?

Outcome
Factors affecting companies’ selection between automation approaches
4. Results
1. Relationship of RPA & Back-end

<table>
<thead>
<tr>
<th>Finding</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPA should be viewed as one tool in company’s process development toolbox</td>
<td>Easy to get carried away with RPA and start implementing it everywhere</td>
</tr>
<tr>
<td></td>
<td>Important to go <em>process development first</em>, not tool first: careful consideration about best tool</td>
</tr>
<tr>
<td>RPA &amp; back-end automation <em>complementing</em>, not competing</td>
<td>Approaches go hand in hand: sometimes part of process can even be automated with back-end and part with RPA</td>
</tr>
<tr>
<td></td>
<td>Still, approaches have distinct roles</td>
</tr>
<tr>
<td>Collaboration between “traditional IT” and RPA team extremely important</td>
<td>Coordination especially with system owners is extremely important: <em>change management</em></td>
</tr>
<tr>
<td></td>
<td>RPA relies on well-functioning IT systems</td>
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</table>
“[RPA] has its own clear position in IT manager’s tool box. It’s not like a sledgehammer to hit everything with.”

[Having well-functioning systems] is the baseline, you shouldn’t cheat there, because RPA cannot work if you don’t have the base systems - or then your resource planning will soon be based on Excels that the robots are sending to each other, and you’ll lack proper data storages and the architecture will become vulnerable quite fast.”

Jari Annala, Digital Workforce, 21.3.2017
## 2. RPA Strengths

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</table>
| Process spanning over multiple systems | Integration work required for back-end automation can multiply  
• Systems built with different technologies and located in different unit- or technology silos  
Typical in eg. customer service         |
| Enables integrating closed systems | RPA useful when building interfaces impossible  
• Costs  
• Old technologies  
• System provider doesn’t provide interfaces: vendor lock-in |
| Flexible when processes still changing | CGI: RPA would have been better in back-end integration cases, where costs escalated due to changing requirements  
Continuous improvement important in RPA  
• Process starts producing KPI-information  
• No need to automate all exceptions at once |
### 3. RPA Challenges

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| **Change management** | Needed always, but with RPA especially challenging  
• presentation layers change more often than database structures  
• humans and robots don’t ‘see’ interfaces similarly  
Coordination with system owners & proper change management processes crucial |
| **Access rights and security** | Have caused a surprising amount of work  
Super-user problem  
• Robot needs user rights to all systems used in the process  
• Can end up with considerably wide access rights |
| **RPA limited by existing systems and interfaces** | RPA can only operate as fast as the interfaces allow  
In reality, never 24/7: effective operating times considerably smaller |
“Let’s say that in the beginning, RPA was marketed to us as really easy and really fast. It was described as ‘this is not system development at all’ – type of a thing, where business could just develop and boost its own processes itself. Well, by the experience that we have now developed, it’s not quite that rosy.”

FinBank, 30.3.2017
## 4. Typical RPA-cases

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</table>
| Automation for beginning or end of process life cycle | Prototyping or setting up new services quickly and cost effectively  
  • Smaller risk  
  • When established, other tools  
  Automating processes where system in the end of life cycle  
  • No longer business case for back-end automation |
| Process crosses company boundaries | When no control over all systems, integrations can be impossible if parties not willing to co-operate  
  RPA could reduce dependency on external parties? |
| Silo system data input or retrieval | Constructing reports to support experts work  
  Freeing up time of customer service personnel  
  Helping to move towards multi-channel customer service |
Cases in Telco Oyj

**Case 1:** Availability check of fibre-Ethernet products
Corporate customers

**Task:** Opening ticket in order and bid-delivery system, conducting capacity check in network information system, returning text-based information

**Alternative approaches:**
- HPOO
- WinAutomation

**Reasons for selecting RPA:**
- No interfaces between systems
- One of used systems pain-point of automation

**Case 2:** Adding new service to customer’s entertainment subscription
Consumer customers

**Task:** End-to-end subscription automation for entertainment service customers

**Alternative approaches:**
- System development

**Reasons for selecting RPA:**
- Back-end automation would have required changing also partner’s process
- Also data transfer methods would have needed renewing
Cases in Telco Oyj

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Task: Opening ticket in order and bid-delivery system, conducting capacity check in network information system and returning text-based information

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## HIGH LEVEL DECISION MAKING CRITERIA

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Business case</td>
<td>What are the current manual costs versus costs of implementing RPA or back-end automation?</td>
</tr>
<tr>
<td>Scope</td>
<td>How big part of the process could be automated with each approach?</td>
</tr>
<tr>
<td>Anticipated development of system architecture</td>
<td>What kind of changes in system architecture are anticipated in the coming years?</td>
</tr>
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### HEURISTICS

<table>
<thead>
<tr>
<th>FACTORS IN FAVOUR OF RPA</th>
<th>FACTORS IN FAVOUR OF BACK-END AUTOMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process uses multiple systems</td>
<td>Process uses only one system</td>
</tr>
<tr>
<td>Moderate process volumes (thousands/day)</td>
<td>High process volumes (10-100k/day)</td>
</tr>
<tr>
<td>Changes anticipated in business rules or process</td>
<td>Stable process and requirements</td>
</tr>
<tr>
<td>Stable user interfaces</td>
<td>User interfaces change regularly</td>
</tr>
<tr>
<td>No interfaces between systems</td>
<td>Systems have existing APIs</td>
</tr>
<tr>
<td>Automation is time critical</td>
<td>Automation is not time critical</td>
</tr>
<tr>
<td>Process is temporary</td>
<td>Process is permanent</td>
</tr>
<tr>
<td>IT pipeline is full</td>
<td>IT development resources are available</td>
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</table>
Main contributions

Better understanding of

• the factors affecting companies’ selection between different automation approaches
• what factors should be considered when assessing RPA vs. back-end automation

Empirical contribution to HW vs. LW IT
Thank you!

Feedback & Discussion