



Aalto University
School of Business

Heavyweight and lightweight process automation

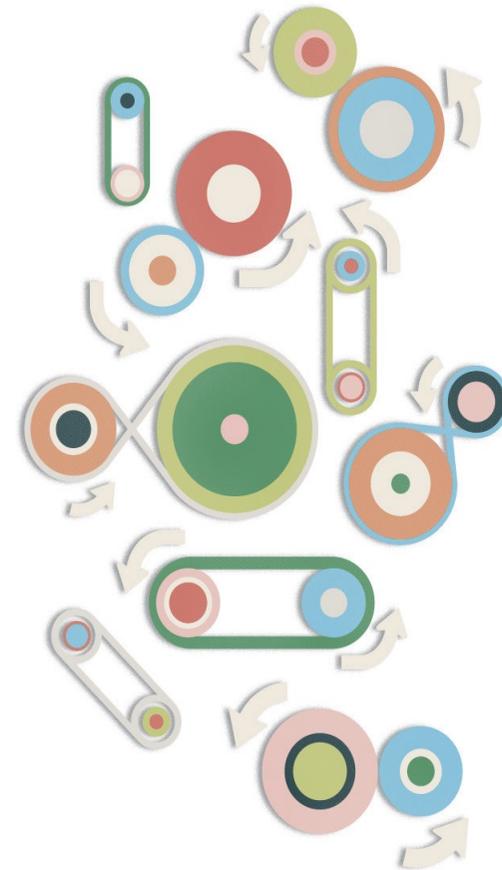
How do companies select between RPA and back-end automation?

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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

Heavyweight and lightweight IT as theoretical framework

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

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

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

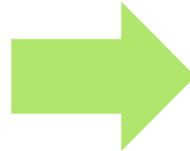
STANCE	
Qualitative	Inductive
RESEARCH STRATEGIES	
Semi-structured interviews	Case studies

DATA	
Expert interviews	Expert interviews were conducted in 4 companies: <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• 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



Outcome

Factors affecting companies' selection between automation approaches

Case studies

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

4. Results

1. Relationship of RPA & Back-end

Finding	Discussion
RPA should be viewed as <i>one</i> tool in company's process development toolbox	Easy to get carried away with RPA and start implementing it everywhere Important to go <i>process development first</i> , not tool first: careful consideration about best tool
RPA & back-end automation <i>complementing</i>, not competing	Approaches go hand in hand: sometimes part of process can even be automated with back-end and part with RPA Still, approaches have distinct roles
Collaboration between "traditional IT" and RPA team extremely important	Coordination especially with system owners is extremely important: <i>change management</i> RPA relies on well-functioning IT systems

“[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

Finding	Discussion
Process spanning over multiple systems	<p>Integration work required for back-end automation can multiply</p> <ul style="list-style-type: none">• Systems built with different technologies and located in different unit- or technology silos <p>Typical in eg. customer service</p>
Enables integrating closed systems	<p>RPA useful when building interfaces impossible</p> <ul style="list-style-type: none">• Costs• Old technologies• System provider doesn't provide interfaces: vendor lock-in
Flexible when processes still changing	<p>CGI: RPA would have been better in back-end integration cases, where costs escalated due to changing requirements</p> <p>Continuous improvement important in RPA</p> <ul style="list-style-type: none">• Process starts producing KPI-information• No need to automate all exceptions at once

3. RPA Challenges

Finding	Discussion
Change management	<p>Needed always, but with RPA especially challenging</p> <ul style="list-style-type: none">• presentation layers change more often than database structures• humans and robots don't 'see' interfaces similarly <p>Coordination with system owners & proper change management processes crucial</p>
Access rights and security	<p>Have caused a surprising amount of work</p> <p>Super-user problem</p> <ul style="list-style-type: none">• 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	<p>RPA can only operate as fast as the interfaces allow</p> <p>In reality, never 24/7: effective operating times considerably smaller</p>

“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

Finding	Discussion
Automation for beginning or end of process life cycle	<p>Prototyping or setting up new services quickly and cost effectively</p> <ul style="list-style-type: none">• Smaller risk• When established, other tools <p>Automating processes where system in the end of lice cycle</p> <ul style="list-style-type: none">• No longer business case for back-end automation
Process crosses company boundaries	<p>When no control over all systems, integrations can be impossible if parties not willing to co-operate</p> <p>RPA could reduce dependency on external parties?</p>
Silo system data input or retrieval	<p>Constructing reports to support experts work</p> <p>Freeing up time of customer service personnel</p> <p>Helping to move towards multi-channel customer customer service</p>

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

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 and returning text-based information

Alternative approaches:

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Case 2: Adding new service to customer's entertainment subscription

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➔ Selection criteria

HIGH LEVEL DECISION MAKING CRITERIA

CRITERIA	DESCRIPTION
Business case	What are the current manual costs versus costs of implementing RPA or back-end automation?
Scope	How big part of the process could be automated with each approach?
Anticipated development of system architecture	What kind of changes in system architecture are anticipated in the coming years?

➔ Selection criteria

HEURISTICS

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

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