“A selection-method for selecting Enterprise Application Integration solutions”

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Outline

• Introduction

• Research triggers, question, design

• Method construction

• Validation

• Results, findings, conclusions, future research

• Questions and discussion
Introduction (II)

• In the past IT was used to support distinct functional areas to improve specific business process.
  • Fragmentized and decentralized software and information.
  • This reduces performance and productivity of the organization.*

• The need for integration!

• No single and ready-to-use solution for application-integration problems. **

• Earlier attempts resulted in EDI and ERP

• ERP systems are not able to support ALL business processes of an organization. The need for integration remains...

* Davenport (1998)
** Irani et al. (2003)
In the last few years, Enterprise Application Integration (EAI) is used to integrate an organization’s applications.

New trends, such as cloud computing, will most likely increase the need for integration solutions by organisations.
Problems and research triggers

• 70% of the EAI projects fail in some way*. Common cause can be considered as management issues.

• Technology is often not the problem!

• **Our observation:**
  Organizations have difficulties in approaching EAI problems.

• Literature is primarily focussed on technical implementation.

• Void in literature regarding the selection of a solution.

“How should a method be constructed for the selection of enterprise application integration solutions?”
Research info.

- Utrecht University
- UWV
  - Dutch governmental organization
  - Responsible for employee insurances and social security in the Netherlands
  - Approximately 20,931 employees and 127 locations across the Netherlands
  - Last year UWV helped almost 254,000 unemployed people with finding a new job.
Enterprise Application Integration (EAI)

• Definition:

“The unrestricted sharing of information between two or more enterprise applications. A set of technologies that allows the movement and exchange of information between different applications and business processes within and between organizations.

An EAI solution consists of both technology and organizational measures.”

• So...

Technology + Organizational measures = EAI Solution!
Method construction (I)

• Assembly-based method engineering process*:
  
  • Analyze situation and identify method needs.
  
  • Select candidate methods that meet one or more aspects of the identified needs.
  
  • Analyze candidate methods and store relevant method fragments in a method base.
  
  • Select useful methods by using routemap configuration to obtain situational methods.

* Adapted from Weerd et al. (2006)
Method construction (II)

• Method needs:
  • Analysis of the case study problem
  • Obtained from interviews
  • Relevance checked against CSF’s for EAI projects from literature.

• Candidate methods:
  • Integrated Information Technology Infrastructure methodology (Themistocleous & Irani, 2006).
  • Enterprise Integration Methodology (Lam & Shankaraman, 2004).
  • Steps in EAI projects (Linthicum, 1999)
  • General COTS selection process (Mohammed, et al. 2007)
Method construction (III)

- Activities and deliverables are described and modelled in a process deliverable diagram.

- Resulting method consists of the following phases:
  - Modeling
  - Problem analysis
  - Restructuring
  - Requirement analysis
  - Advisory
Method construction (IV)

1. Determine the enterprise problem-domain
2. Describe data structure
3. Describe process structure
4. Describe application interfaces and IT infrastructure
5. Mapping models
6. Analyze integration ‘gaps’
7. Restructuring activities
8. Identify restrictions and conditions
9. Define requirements
10. Select solution
11. Advise

See Fig. 1 of the paper
Restructuring activities

1. Reducing redundancy in data, processes, applications and infrastructure.

2. Optimize exchange of data (and reengineer business processes).

3. Defining ownership and responsibilities for data, processes, applications and infrastructure.

4. Creating a canonical data model.
Advisory report

• The selection criteria that are used during the selection process.

• Long-list of EAI solutions (if technology is needed)

• Short-list of EAI solutions

• Selected solution and rationale behind the decision.
  • Organizational measures
  • Technical solution (if needed)

• (Optional: Proof of concept and vendor selection)
Validation (I)

- Method quality criteria*:
  - Completeness
  - Consistency
  - Efficiency
  - Reliability
  - Applicability.

- March & Smith (1995) states that methods, created in design research projects, should be validated on:
  - Operationality
  - Efficiency
  - Generality
  - Ease of use.

* Brinkkemper et al. (1998)
Validation (II)

- Case study at UWV
  - Selection of an EAI solution for integrating applications that use employee data.
  - Different scenarios:
    - Current situation
    - “New World of Work”

- Expert review
  - Semi-structured interview with integration experts
Results and findings (I)

- No cure for all diseases, small situational changes will often be needed. But the method was found to address the right issues.

- Method resulted in a useable advisory report for integrating UWV’s applications.

- No issues regarding *completeness, consistency, reliability* and *applicability* were found during case study and expert review.

- Modelling activities are needed, but effort should be focussed on the problem in order to avoid *inefficiencies*.
Results and findings (II)

- Model metadata (e.g. version info) could be a point of future improvement.

- Method needs/requirements found to be relevant by experts.

- EAI solution characteristics found to be relevant by experts, but difficult to create a finite list.

- Requirement-driven selection process is generic and is not limited to specific technologies.
Results and findings (III)

• Underlying principle: First restructure, before adding additional technology, was found to be suitable by experts.

• The GAP-analysis was also a *useful communication tool* between the involved parties.
Conclusions

• Definition of an EAI solution is presented.

• Existing candidate methods are selected and analyzed. Fragments are selected based on the method needs.

• Method engineering approaches are analyzed and compared. Most suitable approach is used.

• Research question answered using the construction and validation of the selection-method for EAI solutions.
Future research

• Validate with additional case studies.

• More insight in the long-term successfulness of the selected solution.

• Consensus on EAI solution characteristics
  • There is still debate by experts and vendors, while there already is some scientific literature on this topic.

• Further enrich method with best-practices.

• Development of a maturity model based on the method.
Questions and discussion?
Restructuring activities

1. Reduce redundancy
2. Optimize flow of data and exchange
3. Define ownership and responsibility
4. Create canonical data model
Selection an EAI solution

1. Find available application-integration solutions

2. Filter results based on 'must-have' criteria and create shortlist.

3. Evaluate short-list solutions

4. Analyze results and select optimal solution

[Else]

[Proof of Concept Needed]

5. Find proof of concept
EAI Solution characteristics

- Category in EAI taxonomy (scope)
- Integration style
- Layers of integration
- Form of the software solution
- Degree of integration (coupling)
- Target applications
- Organizational measures
GAP Analysis Example
Method construction (IV)

Modelling
1. Determine problem domain
2. Describe data-structure
3. Describe Process-structure
4. Describe interfaces and IT infrastructure

Problem Analysis
5. Mapping Models
6. Analyze integration ‘Gaps’

Restructuring