MISALIGNMENT SYMPTOM DETECTION
with XML-based Enterprise Architecture Model Analysis

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AGENDA

- Motivation and Problem Statement
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- Purpose of the Study and Research Questions
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- Research Methodology
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- Purpose of the Study and Research Questions
- Research Methodology
- Conclusions
MOTIVATION
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- The need for strategic alignment and in growing enterprise complexity
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- The need for strategic alignment and in growing enterprise complexity

- Use IT effectively to achieve business goals
- The ability of IT to create business value
- Bridge the gap between business and IT
- Integrate IT to business strategy, mission and goals
MOTIVATION

- The need for strategic alignment and in growing enterprise complexity
- The role of misalignment analysis in achieving alignment
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- The role of misalignment analysis in achieving alignment

**Misalignment Classification**
- Organ
- Symptom
- Sign
- Syndrome
- Etiology

**Misalignment Management**
- Diagnosis (detection)
- Therapy (correction)
- Prophylaxis (prevention)

**Misalignment Assessment Framework using a Medical Science Analogy (Carvalho and Sousa, 2008)**
MOTIVATION

- The need for strategic alignment and in growing enterprise complexity
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- The capability of EAM for (mis)alignment assessment
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- The capability of EAM for (mis)alignment assessment
PROBLEM STATEMENT

Assessing strategic alignment from the perspective of strategic misalignment

Misalignment assessment by misalignment symptom detection

Enterprise architecture-based misalignment assessment

The relevance of EA analysis methods
## Purpose of the Study

**Main Goal**

To analyse **strategic misalignment** between the business dimension and information systems dimension

**Research Objectives**
**PURPOSE OF THE STUDY**

<table>
<thead>
<tr>
<th><strong>MAIN GOAL</strong></th>
<th>To analyse <strong>strategic misalignment</strong> between the business dimension and information systems dimension</th>
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<tr>
<th><strong>RESEARCH OBJECTIVES</strong></th>
<th><strong>RO1:</strong> What are the typical symptoms of misalignment according to the operation of the SAM model?</th>
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<tr>
<td></td>
<td><strong>RO2:</strong> How to transform misalignment symptoms into formally analysable statements?</td>
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<td></td>
<td><strong>RO3:</strong> What are the formal analysis methods of detecting misalignment symptoms in enterprise architecture models?</td>
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RESEARCH QUESTIONS

RQ1 • Which misalignment symptoms can be detected via enterprise architecture assessment?

RQ2 • Which dimensions and domains are needed to examine in an EA model to detect misalignment symptoms?

RQ3 • How do EA models manifest different misalignment symptoms?

RQ4 • With which methods can we explore the different misalignment symptoms in EA models?
CONSTRUCTION OF THE RESEARCH
CONSTRUCTION OF THE RESEARCH

**Research Design** | The interactive model by Maxwell
Research Design | The interactive model by Maxwell

**Research Purposes** — **Conceptual Context**

**Research Questions** — **Validity**

**Research Methods**

**THE INTERACTIVE MODEL OF RESEARCH DESIGN BY MAXWELL (1996)**
CONSTRUCTION OF THE RESEARCH

Research Design | The interactive model by Maxwell
Framework Building | Design Science Research
CONSTRUCTION OF THE RESEARCH

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The Process Map of DSR Methodology (Peffers et al., 2007)
CONSTRUCTION OF THE RESEARCH

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Framework Building | Design Science Research
Empirical Validation | Case Study Research
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**The Process of Case Study Research (Yin, 2013)**

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**Motivation and Problem Statement**  **Purpose of the Study and RQs**  **Construction of the Research**  **Conclusions**
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RESEARCH FRAMEWORK

Concept Categorization | Review of related concepts
# Concept Categorization | Review of related concepts

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Application</th>
<th>RQ Asgmt.</th>
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<tr>
<td>Review of Business and IT Areas</td>
<td>The most important organizational areas to review before proceeding alignment assessments</td>
<td>RQ2</td>
</tr>
<tr>
<td>Means of Symptom Analysis</td>
<td>Symptom description and classification approaches</td>
<td>RQ1, RQ4</td>
</tr>
<tr>
<td>Means of Model Overview</td>
<td>EA-based architecture domain and SAM domain overview</td>
<td>RQ2, RQ3</td>
</tr>
<tr>
<td>Means of Model Analysis</td>
<td>Possible alignment domain matching techniques, architecture domain matching techniques and EA analysis types</td>
<td>RQ4</td>
</tr>
<tr>
<td>Supportive Concept Frameworks</td>
<td>Supportive concept frameworks for EA alignment methods</td>
<td>RQ4</td>
</tr>
<tr>
<td>Potential Directions for Implementation</td>
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<td>RQ3, RQ4</td>
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RESEARCH FRAMEWORK

Concept Categorization | Review of related concepts
Conceptual Design | The 3-layer research model
RESEARCH FRAMEWORK

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Conceptual Design | The 3-layer research model

**Misalignment Layer**  » RQ1, RQ2
- Construction and formal description of misalignment symptoms
  - Domain Matching | Symptom Classification | Pattern Generation

**EA Model Layer**  » RQ3
- Preparing the underlying EA models for the misalignment symptom detection
  - Model Transformation | Artifact Definition | Model Export

**Analysis Layer**  » RQ4
- Implementation details of the proposed research
  - Rule Construction | Rule Testing | Output Generation
RESEARCH FRAMEWORK

- **Concept Categorization** | Review of related concepts
- **Conceptual Design** | The 3-layer research model
- **Proposed Research Methodology** | Operation of the framework
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THE CONSTRUCTION OF EA-BASED MISALIGNMENT DETECTION FRAMEWORK
RESEARCH FRAMEWORK

Concept Categorization | Review of related concepts
Conceptual Design | The 3-layer research model
Proposed Research Methodology | Operation of the framework

A FRAMEWORK FOR IDENTIFYING SYMPTOMS FOR EA SCOPE ANALYSIS

- Code
- Alignment perspective
- Alignment type
- Symptom definition
- Literature reference
- Sign, presence
- Occurrence, presence in EA model
- Containing EA model
- Occurrence on model entity level
- Other necessary sources for investigation

A FRAMEWORK FOR DETECTING MISALIGNMENT SYMPTOMS IN EA SCOPE

SYMPTOM CATEGORIZATION

- Code
- Symptom definition
- Suitable EA analysis to detect the symptom
- Occurrence, presence in EA model
- Containing EA model
  - In organisational model structure
- Occurrence on model entity level
  - In organisational model structure
- Occurrence in XML-based model export
- Occurrence on model entity level in XML export
- XML-based query
- Query in Schematron language

Motivation and Problem Statement | Purpose of the Study and RQs | Construction of the Research | Conclusions
Concept Categorization | Review of related concepts
Conceptual Design | The 3-layer research model
Proposed Research Methodology | Operation of the framework
Formal Implementation | Rule-based XML validation on semi-structured data – Schematron-based assertion queries
DELIMITATIONS OF THE STUDY

Conceptual limitations

• Not for alignment maturity assessment
• Not for soft alignment characteristics (e.g. organizational culture)
• Not all misalignment phenomena can be detected via EA assessment (e.g. culture or shared values)
• Undocumented symptoms cannot be identified with the framework
• Not misalignment correction and prevention, only detection
• Not other classification schemes, except the symptom-based approach

Methodological limitations

• Not cross-sectional case studies
Query types

- Symptoms in which the presence or lack of the certain types of attributes has to be investigated.
- Symptoms in which the cardinality of certain connection types has to be analysed.
- Symptoms in which more models have to be compared.
- Symptoms in which more model variants have to be analysed and compared during the progression of the project.

Symptom validation

- The proposed research does not provide the potential for matching the EA models under review with an ideal model.
- The preliminary validation of misalignment symptoms cannot be done due to the specific follow-up interpretations of misalignment phenomena at test organisations.
FUTURE WORK
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Extensions of the framework
- Additional alignment perspectives
- Analysis of S.C.03 symptoms
- Expansion of misalignment symptom catalogues and EA analysis collections
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A tool-independent, automated implementation of the framework
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Examining the goodness of fit of the framework with pre-defined fit measures
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Generation of Description Logic statements to open the door to ontology-based analysis
CONCLUSIONS

CONTRIBUTION

A formal approach for EA-based misalignment assessment

Formal rule testing and XML validation in complex EA models

Recommending artifacts and EA analysis types to misalignment symptoms

SIGNIFICANCE

The compound of methods for EA-based misalignment assessment

(Mis)alignment assessment in a complex EA model structure

The combination of theoretical foundation and algorithmic implementation
Assessing the state of alignment/misalignment in an organisation

Looking for misalignment symptoms in enterprise architecture models

Identifying inaccurate mappings between architecture layers

**MISALIGNMENT SYMPTOM DETECTION with XML-based Enterprise Architecture Model Analysis**

**THANK YOU FOR YOUR ATTENTION!**

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REFERENCES


