Misalignment Symptom Detection with XML-based Enterprise Architecture Model Analysis

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Abstract: This novel directions talk deals with the concept of misalignment, with special attention on enterprise architecture (EA)-based analytical potential. In the following study, the problem of business-IT alignment will be translated into the aspects and concepts of enterprise architecture. The main purpose of the proposed research is to analyse strategic misalignment between the business dimension and the information systems dimension. The contribution of the novel directions talk is to connect typical misalignment symptoms to relevant EA analysis types. The significance of the proposed research is the clear and accurate compound of research methods and implementation instruments to approach EA-based misalignment symptom detection. The results of the proposed research will contribute to alignment assessment by expanding the ways of addressing alignment problems. Specifically, it contributes to analysing the state of misalignment in a complex EA model structure.

Keywords: Strategic Alignment Perspectives, Enterprise Architecture Alignment, Misalignment Symptoms, Enterprise Architecture Analysis.

1 Introduction

Several difficulties (the misalignments) encumber the achievement of strategic alignment. Misalignment assessment means a momentous step in achieving strategic alignment since it helps to reveal the barriers of alignment. Understanding the underlying causes of misalignments, as well as trying to correct the existing misalignments are one of the possible ways to achieve alignment [CS08]. The majority of alignment studies deal with achieving alignment. On the contrary, misalignment assessment (detecting, analyzing, correcting and preventing misalignment) is considerably underemphasised in existing works. The state of (mis)alignment can be examined with several methods. Most of the methodologies approach (mis)alignment from management, organisational culture, and communication perspectives. In contrast to popular approaches, one of the main research methods for (mis)alignment evaluation is enterprise architecture-based assessment. This study deals with the concept of misalignment, with special attention to enterprise architecture (EA)-based analytical potential. In the following study, the problem of business-IT alignment will be translated into the aspects and concepts of enterprise architecture. The main purpose of the proposed research is to analyse strategic misalignment between the business dimension and the information systems dimension.

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The proposed research relates to the concept of strategic alignment. This research aims to approach strategic alignment from the perspective of misalignment. In this research, the problem of revealing the typical symptoms of misalignment will be addressed in order to assess the state of alignment in an organisation. The research builds on the traditional Strategic Alignment Model (SAM) by [HV93]. The research aims to provide suitable tools and instruments to detect the symptoms of misalignment [CS08]. Misalignment assessment will be based on the analysis of the underlying enterprise architecture models [Za87]. EA-based analysis is based on rule generation and testing.

2 Research Foundation

The study discusses the strategic misalignment between the business dimension and the information systems dimension. The aim of the study is to contribute to the above-mentioned concerns and gaps by introducing a novel direction that addresses these issues. Expected outcomes from the proposed research include: 1) Classification of different misalignment symptoms: EA indicators on misalignment, EA detection techniques. 2) A framework which can support EA-based misalignment assessment. 3) Case studies on the operation and correctness of the framework. The main research objective lies in identifying general ways for detecting the symptoms of misalignment in the underlying EA models. The sub-objectives of the above-introduced research objective consist in the breakdown of the main research objective into smaller, logically connected parts, viz.: 1) What are the typical symptoms of misalignment according to the operation of the SAM model? 2) How to transform misalignment symptoms into formally analysable statements? 3) What are the formal analysis methods of detecting misalignment symptoms in EA models? Based on expected outcomes and research objectives, the proposed research focuses on the following research questions: 1) Which misalignment symptoms can be detected via EA assessment? 2) Which dimensions and domains are needed to examine in an EA model to detect misalignment symptoms? 3) How do EA models manifest different misalignment symptoms? 4) With which methods can we explore the different misalignment symptoms in EA models?

The proposed research aims to address the above-introduced research objectives and research questions by introducing a novel direction for EA-based misalignment symptom analysis. *Figure 1* introduces the conceptual research model of the study. The proposed direction introduces an approach for EA-based alignment assessment, i.e. a solution for assessing alignment phenomenon in EA models.

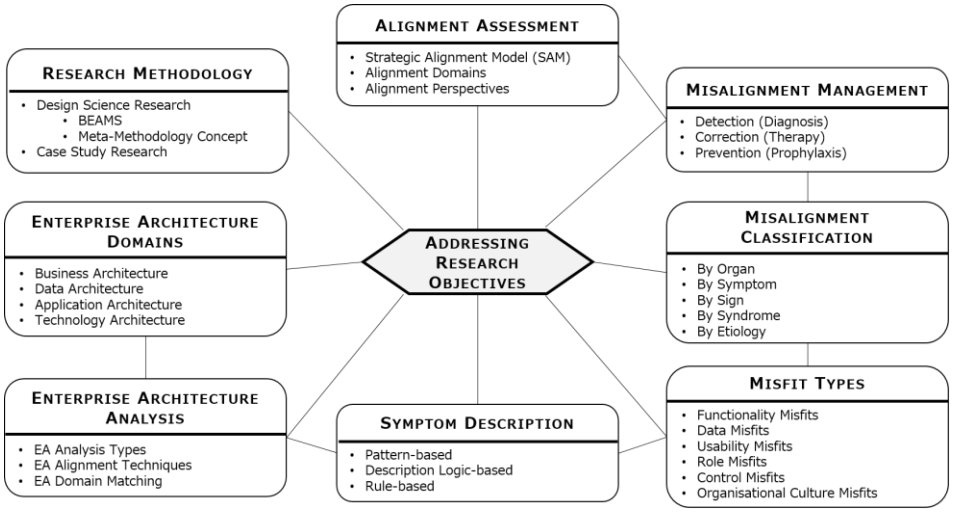

Fig. 1: Conceptual Research Model

3 Proposed Research Methodology

The research shall take a rule-based approach to reveal the symptoms of malfunctioning alignment areas. The research steps shall be aggregated into three layers: 1) Misalignment Layer, 2) Enterprise Architecture Model Layer and 3) Analysis Layer. *Misalignment Layer* is concerned with the construction and formal description of misalignment symptoms. Misalignment symptom construction is based on the matching of the SAM alignment domains. A formal description of misalignment symptoms consists of pattern generation. *EA Model Layer* aims at preparing the underlying enterprise architecture models for the misalignment symptom detection. The phase consists of model transformation, artefact decomposition, and export file generation. *Analysis Layer* is concerned with the implementation details of the proposed research. EA-based misalignment symptom detection shall be performed by means of formal rule testing, i.e. the analytical potential of rule generation and rule testing shall be exploited. Misalignment symptoms shall be defined as formal rules. After rule construction, rule-testing approaches shall be introduced. Implementation details include the following: Queries for EA-based misalignment symptom detection shall be written by in XPath language and Schematron language. Schematron language shall be used for reporting assertions about patterns (i.e. misalignment symptoms) found in the XML exports of the EA models under review. XPath language serves as a supportive language for defining the context of the queries. Schematron-based queries shall be written and validated in an XML validation tool. The tool includes an editor for composing Schematron queries and an inbuilt validator engine for validating XML-based models against Schematron queries.

4 Challenges and Concerns of EA-based Misalignment Assessment

Misalignment symptom analysis and detection provides insights about query types. The proposed research direction shall be applicable for detecting the following types of misalignment symptoms: 1) Symptoms in which the presence or lack of the certain types of attributes has to be investigated. 2) Symptoms in which the cardinality of certain connection types has to be analysed. This type is applicable to three cases: Firstly, one particular model is analysed in terms of connection cardinality. Secondly, sole model variants are analysed in terms of connection cardinality and the query is processed for every available model variant. Thirdly, model variants under review are analysed with another type of static or dynamic EA model in terms of connection cardinality. 3) Symptoms in which more models have to be compared. This type is applicable to two cases: Firstly, model variants have to be compared with another group of model variants according to the project phases. Secondly, model variants have to be compared with a static catalogue. 4) Symptoms in which more model variants have to be analysed and compared during the progression of the project.

The proposed research provides highlights significant analytical potential compared to the inbuilt query power of sole EA modeling tools. The study also gives an account for symptom validation, e.g. by follow-up interviews at case organisations after operating a research framework. The topic of validation raises two concerns which have to be clarified. First, the proposed research does not provide the potential for matching the EA models under review with an ideal model. This approach would imply the existence of an ideal, aligned model which can be used for benchmark. The presence of a fully aligned model base at case organisations would elicit the need for further alignment steps. Thus, this kind of matching cannot be accomplished, and the proposed research does not deal with the analysis of this kind of ideal alignment model base. Second, the preliminary validation of misalignment symptoms cannot be done due to the specific follow-up interpretations of misalignment phenomena at test organisations. There is no need for the in vitro testing of misalignment symptoms, i.e. the preliminary interpretation and evaluation of misalignment symptoms. This kind of validation also involves a reference model about the ideal state of a case organisation, against that an organisation can evaluate the presence of misalignment symptoms in advance. In contrast to the need for in vitro testing, the proposed research shall use a soft, follow-up validation based on post factum interviews and the interpretation of specific organisational characteristics and organisational context.

The proposed research direction has limitations on the following areas. The first is that the framework examines only the model environment, i.e. the details that are modeled. In fact, the real operation of an organisations cannot be investigated, only the part which is presented at the modeling level. This observation recalls the need for investigating the state of models and the difference between models and reality in form of further follow-up interviews. Future work should concentrate on solving this issue. The second limitation is the problem of modeling tool lock-in and document format lock-in. The same misalignment symptoms in different modeling tools and in different document

formats have to be defined in a different way, which undermines the portability of the proposed model. This limitation could be solved by an intermediate transformation layer between the layer of documents under review and the layer of misalignment rule generation. This topic is also deferred to future work. Another way to solve the problem of lock-ins is to use XSLT transformation language to filter the relevant analysis details from documents in different formats. This approach would make the models in different document formats comparable for processing detection of the same misalignment symptom. Further work needs to be carried out to implement the standardisation of different document formats.

5 Conclusion

The paper dealt with the concept of enterprise architecture-based misalignment analysis. It presented a research approach for EA-based misalignment assessment. The novelty of the study lies in: 1) approaching the phenomenon of alignment from misalignment perspective, 2) using a symptom-based approach to detect the state of misalignment in an organisation, 3) using the concept of EAM to perform misalignment symptom detection and 4) applying rule testing and XML validation techniques in EA environment. The research produces structured data on the symptoms of misalignment. In a broad sense, the usage of the proposed direction facilitates and eases the planning and evaluation of IT service portfolio in large, complex and heterogeneous organisations. In addition, it supports the development of strategic directions. The results of developing the proposed model addresses two concerns: On the one hand, it confirms the compliance and relevance of misalignment patterns described from existing, real-world misalignment symptoms. On the other hand, it verifies the proper construction and operation of the analysis methods provided.

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