Paper #187

A METAMODEL FOR STRATEGIC BUSINESS AND IT ALIGNMENT ASSESMENT

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Abstract

This paper proposes a metamodel based on Jerry N. Luftman's strategic business and information technology (IT) alignment assessment approach. It explains how this metamodel is deduced and how it will perform such an assessment, showing conformity with the expert's parent approach. Since Enterprise Architecture (EA) has emerged as a feasible model-based management tool for the systematic and holistic planning and decision-making of an enterprise's business and IT system operation and evolution, this paper also argues the metamodel's affiliation to EA as a guide or reference for identifying the relevant representations for specific concerns, mitigating the expenses and drawbacks of the often larger modeling required to apply the EA Frameworks.

Introduction

Many contemporary companies possess a truly complex IT system not evolved through careful and strategic planning; in large organizations several hundred interconnected systems may be employed in which the size of each may vary from custom-made niche products to enterprise resource planning (ERP) systems, and the interconnections between them are numerous and heterogeneous (Johnson 2002) (Linthicum 2000). Moreover, the rapid evolution of a enterprise's business operations and changes driven by mergers, strategic alliances, global partnership or dramatic economic pressures, among other reasons, demand immediate IT support (Reich 2003).

From the IT system perspective we often see redundant data storage, implementation of similar functions, and applications deployed on a wide variety of platforms using many different technologies. (Lindstrom 2006) (Mc Govern 2003). From the business perspective the operation and maintenance of the enterprise's system is more expensive than it need be, leaving fewer resources for creating extra value for the business. This includes a divided perception of the meaning of the relationship to the enterprise's IT organization: 46% consider it a necessary

burden and 46% a close partnership and value provider, with the remaining 8% neutral (Dailey 2001).

The combination of non-planned IT system development and rapid changes in and evolution of the business environment has made many enterprise IT systems inefficient and close to chaotic. It is thus not surprising that the concern of strategic business and IT systems alignment (hereafter shortened to alignment) is a major organization-wide issue that directly influences the company's overall performance (Xia 2002). In this paper alignment will be interpreted as a continuous conscious and coherent interrelation between all the company's components, personnel, and IT systems contributing to its performance over time (Maes 2000). This definition emphasizes the nature of alignment as evolutionary, covering different levels of organizational hierarchy, ranging from strategic to operational issues and including the human factor.

This paper is part of an ongoing research project on strategic business and IT alignment in the frame of Enterprise Architecture (EA) as a decision-making tool. Previous case studies applying variants on Luftman's business and information technology (IT) alignment assessment approach have been published (Ekstedt et al. 2005), another is currently developed, and further works in this research line are presented.

Assessing strategic business and IT alignment

The most widespread and accepted conceptual model of alignment was proposed by Henderson and Venkatraman (Henderson et al. 1993). This theoretical construct, also known as the strategic alignment model (SAM), is graphically represented in Figure 1. The concept of strategic alignment is based on two dimensions: (1) strategic fit between external focus, directed towards the business environment, and internal focus, directed towards infrastructure and processes and (2) functional integration between business and IT. Strategic fit refers to the concordance between internal and external domains. Functional integration refers to incorporation of the IT strategy into the business strategy, particularly integration of the internal IT strategies into the internal organizational procedures and strategies. Altogether, the model defines four domains that must be harmonized to achieve alignment (Marques et al. 2003) (Ekstedt et al. 2005). The alignment models derived from it help us understand alignment from the view of the involved components, such as Business Strategy, IT Strategy, Organizational Infrastructure and IT Infrastructure, and their interdependencies. However, analyzing the alignment among Business and IT requires a more detailed interpretation and definition than presented in this model (Marques et al. 2003).

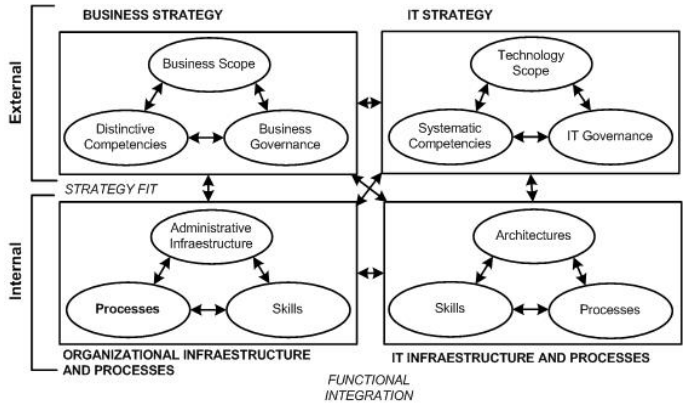

Figure1. Strategic Alignment Model (SAM)

Basically, all later alignment models and consulting practices start from or refer to Henderson and Venkatraman's SAM (Maes et al. 2000). Several assessment frameworks and process are developed from such foundations to indicate a representative value of alignment.

Assessment approaches as operationalized theory

Assessment approaches in general propose how a given phenomenon can be described by a set of underlying components measurable in terms of certain properties. Typically, this decomposition is used because it is easier to find empirical values for these properties compared to the original phenomenon as a whole. The assessment approaches consist of a set of principles and rules that combine the decomposed properties of the phenomenon, in order to perform analyses. These approaches can be thought of as a hierarchical breakdown of concrete phenomena that thus constitutes an operationalized theory of the original phenomenon under consideration.

Strategic Business and IT Alignment

In the field of strategic business and IT alignment, we find competing approaches (typically labeled models or frameworks) describing the nature of the phenomenon alignment (Henderson et al. 1993) (Maes et al. 2000) (Hackney et al. 2000) In this paper we adopt Luftman's strategic business and IT alignment assessment approach (Luftman 2003a) (Luftman 2003a 2003b) as the operationalized theory that correctly describes the complex phenomena alignment since it is empirically well founded. It is based on a combination of twelve relationships between SAM components and research results from previous studies on alignment inhibitors and enablers and has been used in 60 global companies (Luftman 2003b). Some might, of course, argue against considering his strategic business and IT alignment as truly representative approach, but that discussion is not the subject of this paper.

Luftman's Strategic Business and IT Alignment Assessment approach

Luftman's strategic business and IT alignment assessment approach, from now on cited as Luftman's alignment assessment approach, has been the subject of a benchmark studies jointly sponsored by the Society for Information Management (SIM) (www.simnet.org) and The Conference Board (www.conference-board.org) and has been applied in large and small companies at all levels. The alignment allows one to measure how well the technical and business organizations work together. It examines six dimensions, rating each on a scale of 1 (lowest) to 5 (highest). Luftman defines alignment by the six criteria shown in Table 1 (Luftman 1999):

Table 1. Luftman's criteria

Criteria	The ability to….
Communications (*)	Use a common and clear language between Business and IT organizations
Competency/ Value Measurements	The measurements of the contribution of the IT organization to the business strategy
Governance	The degree to which the authority making IT decisions is defined and shared among management
Partnership	The relationship between the business and IT organization and how each perceives the other's contribution
Scope and Architecture	Systematically determine the impact of the new IT investments on existing business processes
Skills	Minimize the impact of changes that come with new IT

For each criterion Luftman further defines several attributes, totaling thirty-eight for the six criteria. An example of one criterion and its particular attributes is presented in Table 2:

Table 2. The Communications criterion (*) and its pertaining attributes

Criterion	Attributes
Communications	Understanding of business by IT (**) Understanding of IT by business Inter/ intra organizational learning / education Protocol rigidity Knowledge Sharing Liaison(s) effectiveness

The attributes constitute the lowest, hence the operationalized level of the theory. Luftman bases the assessment on the concept of identifying the alignment level, hence each attribute is measured or assessed on a Likert scale from one to five. The number of the attribute is derived according to a set of conditions and properties, such as existence of organizational or information entities, scope of such entities, use of communication conventions or protocols and so on. The number derived follows a general meaning for all attributes: 1 means it does not fit the organization, 2 means low-level fit, 3 is moderate fit, 4 –indicates that it fits most of the organization, and 5 describes a strong fit throughout the organization. The overall level of a criterion is calculated as an average of all attributes, and the overall business and IT alignment level is calculated as an average of the six criteria (Ekstedt et al. 2005).

Table 3. The set of conditions and properties to assess the *attribute* Understanding of business by IT *attribute* (**)

Level	Description
Level 1	Use of Casual Conversation and Meetings
Level 2	Use of Newsletters, Reports, Group, e-mail
Level 3	Use of Training, Departmental Meetings
Level 4	Use of Formal Methods Sponsored by Senior Management.
Level 5	Existence of Learning Monitoring Procedure for Effectiveness

Luftman's alignment assessment approach represented as Theory Diagram

The purpose of the proposed *theory diagram* is to illustrate important aspects of the evaluation of Luftman's criteria. Firstly, it makes the operationalized theory explicit, facilitating both critical examination and reuse. Secondly, it will be our basis for presenting and explaining Luftman's metamodel in the next section.

Luftman's theory diagram is constructed by representing the above 6 criteria, all 38 attributes and alignment level for each attribute expressed by its set of conditions and properties. Each alignment level has a causal relationship to the corresponding attribute, while the attributes have a composition relationship with their corresponding criterion. Our complete graphical interpretation of Luftman's theory diagram can be found at www.BITA-EA-Research.uni.edu.ni/plazaola/theorydiagrams/LuftmanTD.html. For space reasons, this paper shows a partial representation of the Luftman's theory diagram using details from the selected example, see Figure 2.

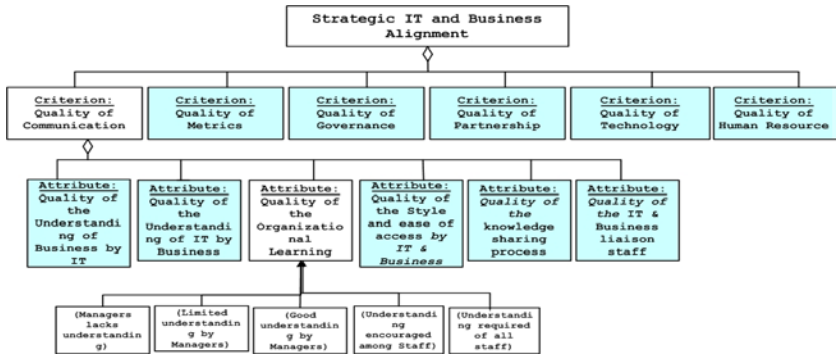

Figure 2. Luftman´s theory diagram

Luftman's alignment assessment approach represented as a metamodel

The purpose of the metamodel based on Luftman's alignment assessment approach is to propose a set of templates of artifacts from which to represent the relevant issues of a real enterprise's views for assessing alignment according to a procedure based in the instances, artifacts found in the real world. This facilitates analysis and decision-making, using views on the alignment concern, and serves as a clearer affiliation to Enterprise Architecture as further explained. The conformity of the proposed metamodel with its parental expert's approach is addressed by deriving this metamodel straight and clearly correlated from the already existing theory diagram of Luftman's alignment assessment approach presented in a previous article of this research group.

Building the metamodel

A straightforward syntactic and semantic analysis was applied from Luftman's theory diagram to develop the Metamodel. We started from the *level of alignment* at each *attribute*, set of conditions and properties defined in Luftman's approach to assess the 5 possible alignments levels of each *attribute,* see an example in table 3. We searched for academic and practitioners references to interpret such conditions and properties for assessing each *attribute* in order to

propose a set of artifacts (i.e. classes, enumerations, relationships, etc) that should be use as a template for modeling, thus becoming the original Luftman's *attributes* and its *level of alignment* as **viewpoint components** in the metamodel. See the corresponding interpreted template in Figure 3 below.

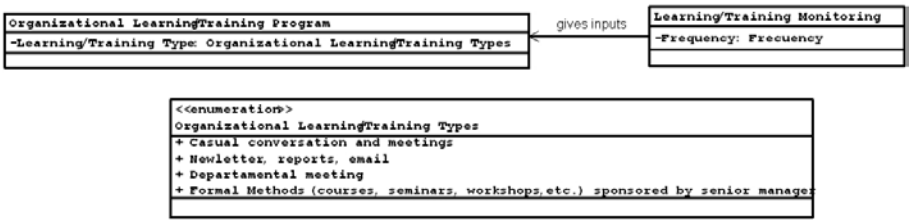

Figure 3. Artifacts of the viewpoint component Understanding of business by IT

In summary in the Luftman's theory diagram the criteria are viewpoints in the metamodel and the attributes and levels of alignment assessment are viewpoint components in the metamodel. Our proposed metamodel can be found at www.BITA-EA-Research.uni.edu.ni/plazaola/metamodels/luftmanmetamodel.html, for space reasons in this paper a partial representation of the metamodel is drafted and details are presented on the chosen example, see Figure 4.

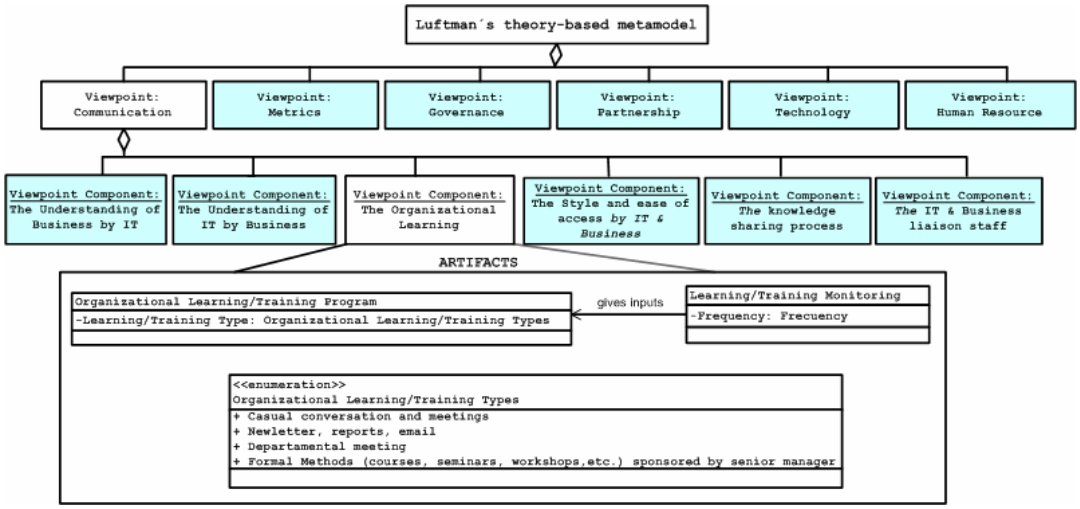

Figure 4 Luftman´s based metamodel

Since the set of artifacts has been deduced from the assessment conditions and properties complying with the Luftman's original intended assessment analysis. Table 4 shows the corresponding assessment procedure of the example used.

IF the instances ***Organizational Learning/Training Program*** has the attribute ***Learning/Training Type*** is ***Casual conversation and meetings*** THEN **Level 1**: *Withouth Process*
IF the instances ***Organizational Learning/Training Program*** has the attribute ***Learning/Training Type*** is ***Newsletters, reports, group, email*** THEN **Level 2**: *Beginning the process. (Limited)*
IF the instances ***Organizational Learning/Training Program*** has the attribute ***Learning/Training Type*** is D***epartamental meeting*** THEN **Level 3:** *Establishing process*
IF the instances ***Organizational Learning/Training Program*** has the attribute ***Learning/Training Type*** is ***Formal Methods (courses,seminars,workshops,etc.)*** THEN **Level 4:** *Improved process*
IF there are ***Learning/ Training Monitoring*** instances and gives inputs to the **Organization Learning/Training Program** THEN **Level 5:** *Optimal process*

Table 4. Assessment procedure for the *attribute* Understanding of business by IT of the criteria Communications of the Luftman´s theory diagram.

Alignment assessment process using the metamodel

This metamodel is a further contribution to the benefits of the wide-enterprise assessment approach published and applied in several case studies (Ekstedt et al. 2005). This approach puts forward an alternative to tackle some lessons learned, suggesting less ambiguous data collection processes and tools. We propose templates, set of artifacts for modeling, to build the view components, instantiations of view point components with the correspondent assessed level of alignment according to the inferences in Table 4.

In the assessment procedure proposed in this paper we kept the ample participation of stakeholders, this assessment process contributes by increasing credibility, transparency and common understanding of the data collected and results. Credibility in the data collection is addressed by standardizing the set of data to be collected in terms of graphical and documented templates of modeling artifacts, also enhancing standard measures of the same phenomena. Transparency and common understanding is further achieved partly by articulating more detailed and particularized theoretical assessment using graphical represented artifacts and partly because the method is intended for case study-oriented application. Altogether it addresses the general well-known problem related to business-IT alignment: lack of practical application of theory. The method is an extension of the already deployed enterprise-wide assessment published in Ekstedt et al. 2005.

Some steps have to be taken to do the assessment with this metamodel. The starting point is the metamodel, and then we have the templates of artifacts defined by Luftman's alignment assessment approach as explained in the previous section. It is thus necessary to continue as follows: **Data collection**: The input is the artifacts found at the enterprise under analysis. The modeler needs to identify the modeling artifacts at the enterprise at each viewpoint component, converting them into instances of that component that became a view component. **Analysis per view component**: The evaluation of the instantiated viewpoint component is then assessed by the assessment procedure explained in Table 4. **Overall analysis:** The alignment level of a viewpoint is calculated as an average of the aggregated viewpoint components (attributes), and the overall alignment level in an enterprise is calculated as an average of the alignment levels of the six viewpoints (criteria) according to the Luftman's approach, see Figure 5 for an example showing the assessed model of an enterprise. **Workshop:** This step should follow the assessment, but it should be performed by the company, applying its usual practice according to

its unique internal culture. It is important to perform this step to create acceptance of the assessment result within the organization. Management and key company personnel whose work is relevant for achieving better alignment and process or system owners or the like who are part of the company culture should participate in the final workshop. The input into this step is the instantiated and assessed metamodel resulting from the data analysis. The advantage of having a workshop based on the company's own model is that tinkering in discussion can be minimized. Furthermore, the importance of alignment, as well as clear findings of the opportunities for actions that could and should be taken to increase it stand out (Ekstedt et al. 2005). This step, however, is not dealt with in this paper and it is just one of the many alignment procedures a company can practice for alignment.

Carefully assessing an organization's alignment is an important step in identifying the specific actions needed to ensure that IT is used to enable or drive the business strategy appropriately (Luftman 2003a). We stand behind the concept that the final alignment score is not the most important output from the assessment, at least not when the assessment is being performed for the first time in an organization. The score only becomes important for comparison once the alignment assessment is incorporated into an organization as a regularly repeated dynamic and systematic process (Ekstedt et al. 2005).

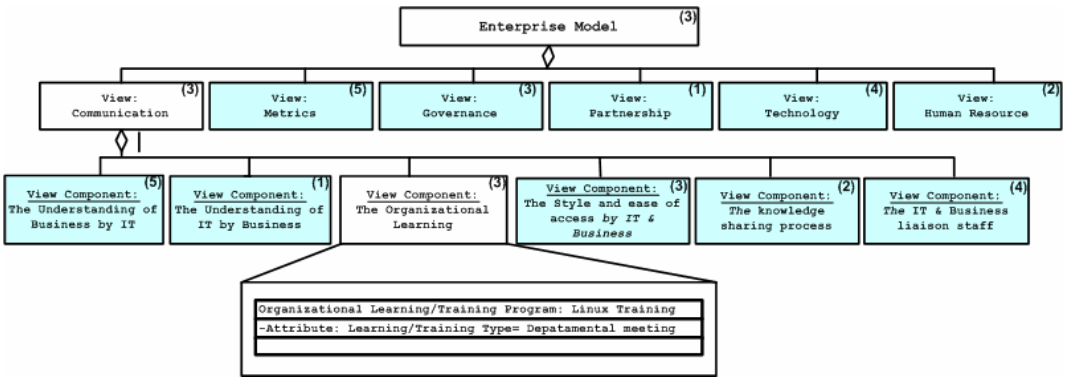

Figure 5. Partial representation of Luftman´s theory-based Metamodel instantiated and assessed.

The metamodel affiliation to Enterprise Architecture

The discipline of Enterprise Architecture (EA) has emerged in order to understand and manage the chaotic real world of enterprise systems. Because it has grown out of the need to take a holistic approach to IT-system management, the discipline focuses on not only the technical aspects but also the organizational context in which the IT systems operate. EA is thus both a technical and organizational undertaking (Rood 1994).

EA is a model-based management and planning approach whose methods and models are often presented in frameworks. Today ten or so well-known architectural frameworks exist for managing enterprise-wide IT systems (Zachman 1987) (Dodaf 2003) (TOGAF 2002). These frameworks propose that abstract models of the enterprise and its IT systems should constitute the basis for analysis, design, decision-making, understanding and communication at the enterprise level. Although the importance of good modeling is highlighted by the EA discipline, the plethora of proposed models available is overwhelming, and it is rarely evident when and

why a particular model is preferable over others. The main reason for this confusion is that normally the link between a model's contents and structure on the one hand and its purpose on the other is unclear or not well limited (Popkin 1999) (Johnson et al. 2004).

The metamodel presented in this paper has the artifacts to be used in clear correspondence with an established experts' approach of the specific concern of alignment. It is an expression of an approach that has gained ground and been refined in thoughtful field applications. The set of artifacts defined to be modeled from this metamodel is an aboveboard representation of the experience gained in understanding the nature of the concern. These characteristics are clearly affiliated with the promising EA discipline and its modeling frameworks. This metamodel can be used as a guide for identifying the relevant representations, the attributes to be documented, the relations that should be sought and the analysis procedures for a specific concern (Armour et al. 2005).

Conclusions

A strategic business and IT alignment assessment metamodel has been proposed using Jerry N. Luftman's alignment assessment approach as a reference. This approach is a research result in the search to enhance the application of expert's approach on real world cases. It is based on expert experience, since they have been proven and refined over time their approach, diminishing the risk of failure and the resources consumed in modeling a concern. The knowledge and maturity already available in expert's approaches can be properly reused for more efficient attention to research and practical modeling issues. Unfortunately though, many approaches are not always explicitly related to models, and limitations in their use can also be addressed, assuring credibility, transparency, clear understanding of the purpose and application and advantages. The affiliation of the metamodel to the EA discipline as a guide to identifying the relevant representations for specific concerns has been shown, mitigating the expenses and drawbacks of the often larger modeling undertaken to apply these frameworks.

Further works

A case study applying this metamodel for strategic business and IT alignment assessment is ongoing. It has been designed to be performed in the same enterprise where other variants of Luftman's alignment assessment approach have been applied, facilitating real feedback on the benefits and drawbacks among those variants. Special attention will be devoted to such issues as decision-support capabilities, cost/benefits and resource investments of such variants. A study is prepared where the 140 artifacts composing the metamodel will be searched in well known EA Frameworks in order to have some conclusions about how the business and IT alignment assessment concern is supported by them.

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Biographies

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