

2006

How to realise corporate value from enterprise architecture

C. Kluge
c.kluge@qut.edu.au

A. Dietzsch
andreas.dietzsch@mobi.ch

M. Rosemann
Queensland University of Technology, m.rosemann@qut.edu.au

Follow this and additional works at: <http://aisel.aisnet.org/ecis2006>

Recommended Citation

Kluge, C.; Dietzsch, A.; and Rosemann, M., "How to realise corporate value from enterprise architecture" (2006). *ECIS 2006 Proceedings*. 133.
<http://aisel.aisnet.org/ecis2006/133>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISEL). It has been accepted for inclusion in ECIS 2006 Proceedings by an authorized administrator of AIS Electronic Library (AISEL). For more information, please contact elibrary@aisnet.org.

HOW TO REALISE CORPORATE VALUE FROM ENTERPRISE ARCHITECTURE

Kluge, Christian, Queensland University of Technology, Faculty of Information Technology, Brisbane Qld 4000, Australia, c.kluge@qut.edu.au

Dietzsch, Andreas, Swiss Mobiliar, Bundesgasse 35, 3001 Bern, Switzerland, andreas.dietzsch@mobi.ch

Rosemann, Michael, Queensland University of Technology, Faculty of Information Technology, Brisbane Qld 4000, Australia, m.rosemann@qut.edu.au

Abstract

The design and ongoing management of an Enterprise Architecture is widely accepted as an established way of managing an organisation's complexities in relating business and Information Technology capabilities. While the focus of related research is predominantly on frameworks, tools and methodologies, only limited attention has been given to understand and improve the value realisation process of Enterprise Architecture. We adopted the DeLone and McLean model of IS success for the design of a value realisation model specific to Enterprise Architectures. Thereby we identified service quality and actual use as two major catalysts fostering an Enterprise Architecture's overall success. The amendments made were based on findings from two major case studies involving an Australian utility company and a Swiss insurance company.

Keywords: Enterprise Architecture, Success, Sustainability, Value Realisation, Business IT Alignment, DeLone and McLean Model of IS success.

1 2 INTRODUCTION

Increasing pressure for the establishment of adaptable enterprises due to factors such as globalisation, cutback of trading barriers and ongoing advances of new technologies demands a close integration between business and IT capabilities. Given Henderson and Venkatraman's model of IT and Business alignment (Henderson and Venkatraman, 1993), changes concerning business strategy, organisational structure and processes will affect IT strategy, IT related processes and infrastructure, and vice versa. Hence not only business and IT architectures, but also their development paths need to be synchronised in order to assure successful changes. However, the flexibility and lifecycles of business processes and related IT-applications are likely to differ significantly (Hafner and Winter 2005). Consequently, the necessary synchronisation of change issues in those areas requires appropriate support.

An Enterprise Architecture (EA) as "... a coherent whole of principles, methods and models that are used in the design and realisation of an enterprise's organisational structure, business processes, information systems, and infrastructure" (Lankhorst et al. 2005, p. 3) provides the comprehensive framework of an organisation required to manage the complexity involved. Though nowadays also seen as "joint actions of technological, organisational, and psycho-social measures during development and operation of enterprise information systems" (Schönherr and Aier 2005, p. 3) they provide an established approach for the integrated management of organisational capabilities, classically ranging from business processes over data, application to IT infrastructure. In doing so, EAs need to be considered as a toolbox rather than a single tool. As such, Enterprise Architectures attracted a substantial body of research. However, the majority of this research is dedicated to the development and revision of methodologies and tools. In contrast to these research efforts, the research question which underlies our work is how to utilise the tools provided by an EA in an efficient manner (focusing in particular on its use by non IT-related stakeholders), ensuring subsequent widespread use and successful changes.

We approach this topic in the following way. First, within section 2 we will detail the research question to be answered and discuss existing related research. In section 3 we introduce our case studies and present their empirical findings. Section 4 presents how we derived our proposed framework from related models and how it can be utilised to realise the value of an EA to business representatives. The framework will be amended by an in-depth exploration of the identified major factors. Finally, the paper closes with a short conclusion and discusses further research directions in this domain.

3 RESEARCH QUESTION AND RELATED WORK

The research question underlying this paper emerged from conversations with two organisations, an Australian utility company and a Swiss insurer, and a study of their major issues related to Enterprise Architecture management. Initial stock-takes at both sides showed, that both organisations maintained well-defined models covering relevant domains for all major stakeholders and were especially used by the two IT departments. Nevertheless the perceived value of the individual Enterprise Architecture differed significantly, in particular in the eyes of business representatives. Whereby the comprehensive information captured within the EA at the Australian site did not seem to affect the business people's decisions, the value of the Enterprise Architecture appeared to be much more appreciated at the Swiss insurance company. Therefore we focused our research efforts on the central question: *As Enterprise Architectures in both cases are regarded as valuable means by IT-staff, which requirements must be met to turn an EA into a tool with a value proposition shared by all stakeholders?*

A deeper analysis of this problem revealed that there are analogies to classical problems of the IS discipline. An Enterprise Architecture captures a comprehensive amount of integrated information, but it tends to be under-utilised by the business units of an organisation. In a similar way, a substantial body of knowledge was produced in the IS community, but in many areas there is only a low appreciation in practice (Moody 2000). Thus, we adopted a recent discussion in this domain by Rosemann and Vessey (2005). Although initially proposing to argue the lacking relevance of current IS research to practice they addressed a more general problem, i.e. factors hindering the wider uptake of comprehensive outcomes by their intended audience. The identified aspects are as follows:

- Lack of awareness
- Lack of understandability
- Lack of applicability
- Content presentation
- Lack of timeliness

We used these five factors to assess why specific divisions in an organisation under-utilise their Enterprise Architecture. As far as we are aware, recent work related to the management of Enterprise Architectures primarily focuses on the establishment and maintenance of such, not their actual use within an organisation. For example, Hafner und Winter (2005) developed a process model for the management of the application architecture. Given their requirements analysis, the authors stress the involvement of both, business and IT-related stakeholders. However, their model remains vague concerning the issue of how to foster the use of architecture by business people. Although it allows for a dedicated *architecture communication* step, the actual factors and underlying actions remain widely hidden and therefore vague. Instead, they only state that at this stage the identification of involved target groups is necessary to determine the required amount of training, informative literature and intranet content. Whereby this certainly holds true, it is not detailed enough to enhance an EA's value proposition amongst non-IT stakeholders. Further work on Enterprise Architectures focuses on the management of the implementation process primarily, i.e. omitting the fact that customising the architecture's modelled content does not necessarily assure its success amongst all affected stakeholders.

The majority of remaining EA-related work focuses on issues concerning the actual model content of an EA, EA frameworks, meta-models or methodologies (e.g. Perks and Beveridge 2003, Dern 2003, Bernus et al. 2003). Whereby these publications emphasise the importance of a sound stakeholder requirements analysis, they primarily use this information in order to select and populate the required sub-architectures. At the same time they often omit the fact, that stakeholders from non-IT-related domains might have established their own modelling languages and techniques, not necessarily compliant with common standard (IT) modelling languages (Lankhorst et al. 2005.) Hence they tend to be unfamiliar with primarily IT-dominated EA perspectives and therefore are overwhelmed by the amount of details provided and the presentation techniques used. This in turn lowers the acceptance and use of an EA threatening the success and sustainability of the overall change process.

Given an EA's impact on business and IT alignment (see section 1), not only IS-related literature but also research on organisational change needs to be considered as related work too. While we assume that sound EA approaches foster structural transformations substantially, the concept of organisational change needs to be grasped in broader coherences (e.g. Goldkuhl, 2003). In particular, the area of changing human interactions within a work practice (Goldkuhl and Röstlinger, 2003) is of importance to successful organisational change. Though, in this area EA can only be considered as one of the supporting tools amongst others. Due to space limitations, however, we are not able to further elaborate on this issue and it will be dealt with in future publications of this research project.

4 CASE STUDIES

The research project underlying this paper was originally initiated by an Australian utility company, striving to design an Enterprise Architecture framework. Currently, extensive parts of the organisation have been modelled and made available over the intranet. However, in particular business representatives still do not seem to be very familiar with the Enterprise Architecture. In fact, its utilisation concerning strategic planning and development is fairly limited.

As current research literature does not discuss an EA's actual value realisation in an organisation adequately, we decided to base our research on two explorative case studies, comparing the less successful EA approach of the Australian utility company with a more successful one. The latter one is represented by a Swiss insurance company. Whereby the approach of the Australian organisation suffers from limited acceptance amongst non IT-related stakeholders, the Enterprise Architecture at the Swiss insurance company site is overall regarded as a successful and valuable tool to the organisation. Consequently, our case study objectives focused on the exploration of those factors which facilitate a wider uptake of an Enterprise Architecture beyond the obvious use within the IT department. The data collection for both case studies was based on several interviews with information architects and business representatives and the analysis of corresponding documents.

4.1 Enterprise Architecture Domains

As depicted in Table 1, both EA concepts are based on a largely common set of covered domains except for the organisation (Australian utility company) and security architecture (Swiss insurance company) respectively. However, as our interviews showed, these two sub-architectures do not play an important role concerning the stakeholders' EA acceptance.

Australian Utility Company	Swiss Insurance Company
<ul style="list-style-type: none">• Business Architecture• Application Architecture• Technology Architecture• Information Architecture• (Organisation Architecture)	<ul style="list-style-type: none">• Business Architecture• Application Architecture• Technology Architecture• Data Architecture• (Security Architecture)

Table 1: The architectural layers in the two case sites

In both cases the architectural layers were used to document the As-Is architecture and (partly) the future To-Be architecture. Thereby, the Swiss insurance company's EA approach also comprises planning roadmaps, describing the intended transformation from As-Is to To-Be. In contrast, the Australian utility company maintains a set of documented guidelines and recommendations to be followed within projects.

4.2 Enterprise Architecture Processes

Enterprise Architecture at the Australian supplier site is predominantly developed in dedicated architecture projects by information architects. Conclusions and recommendations concerning the supplier's EA further development are presented to business stakeholders using extensive project conclusion reports. Thereby, extracts of the modelled artefacts expand into the final documents without any major amendments. Albeit business representatives acknowledge such reports as valuable means, but their impact on the organisation's strategic planning is rather limited.

In view of business people's refusal of the EA outcomes, information architects started to introduce modified tools to foster their acceptance. For example, application technology assessment results were not only published as a report. Alternatively, they were also visualised in chart form. In addition, architects positioned the EA as a set of recommendations offered to projects instead of a set of guidelines to be followed. Furthermore, they introduced CSC's POLDAT (Business Process, Organisation, Location, Data, Application, and Technology, see Computer Sciences Corporation (2006)) method as a corporate analysis approach to identify and assess a project's potential consequences. Although by now POLDAT is widely accepted and used within the IT department, it did not substantially foster the wider use of the modelled EA artefacts.

In contrast, the Swiss insurance company's EA approach was always characterised by its service orientation primarily, i.e. its strong alignment to stakeholders' needs. Thereby not only new architecture layers were introduced step-by-step on demand, but also the architecture's appropriate involvement in and contribution to strategic planning and implementation played an important role. For example, the organisation's departments use so-called roadmap documents to discuss further strategic development opportunities. Such a report comments on the various options from different perspectives, integrating requirements, context, to-be architecture, solution variants and time constraint view. Though it

is compiled from various sources, the company's Enterprise Architecture contributes significantly by providing application and process assessment, to-be architecture insights and architecture principles. Since the original EA information is processed according to the targeted audience needs and skills, such presentations might not contain any modelled artefacts at all. However, the reports must be compiled manually, which might negatively affect information's timeliness.

In order to emphasise EA's importance to the successful development of the company, members of the architecture department are part of the corporate steering committee too. The latter is responsible for example for the final determination of the company's strategic project portfolio, change request approvals and the acceptance of projects' final reports. As EA forms an integral part of the steering group, projects need to evaluate their corporate consequences before being promoted. This in turn will assure a higher alignment of the various project efforts with the overall corporate strategy. Exceptions are possible, but need to be well motivated and will be reevaluated regularly.

4.3 Case Study Results

Summarising the findings of our two case studies, we firstly found that a stakeholder oriented selection of the covered domains is a necessary condition for an EA's value, but it is certainly not sufficient. In fact, although both approaches cover the same architecture domains, their success differs significantly due to two fundamental issues concerning the implementation of the value proposition realisation process. First of all, as the Swiss insurance company's approach was always driven by the enterprise's needs as it required to cut down IT expenditures due to the application landscape's complexity. The need for a systematic application landscape transformation and the deployment of an architecture focused IT strategy approach led to the EA implementation. Consequently, the presentation of EA results has been always stakeholder-specific, i.e. different for the various target audience. In contrast, the EA implementation of the Australian utility company was triggered by the Information Services branch and extended to the business areas later on too. However, the presentation needs of the new audience groups have not been reflected adequately. In addition, we identified the tight integration of an EA within the organisation's governance framework as a second major issue influencing an EA's overall corporate value. Business triggered projects at the Australian utility company get approved even if they are contrasting the recommendations of the organisation's EA. Furthermore, information architects are only allowed a review of project proposals which can be overruled by the business representatives rather easily. In contrast, EA at the Swiss insurance company is positioned at the corporate steering committee too. In doing so, projects are forced to consider their corporate consequences too using the organisation's EA.

5 THE ENTERPRISE ARCHITECTURE VALUE REALISATION MODEL

Even though various authors acknowledge the need to involve business managers, there is only limited guidance on how to actually involve these stakeholder groups and provide them with a convincing value proposition encouraging a wider utilisation of an Enterprise Architecture. Given its nature, an EA's intrinsic value (consistent and integrated methodologies, wide coverage, etc.) will not be experienced by its stakeholders directly, but only indirectly. Consequently, its impact and benefits must be communicated explicitly. Or as Dietzsch (2003) describes it, the architecture management needs to proceed in a service-oriented manner since it barely disposes of any other enforcement facilities or value arguments. Therefore the intended *Enterprise Architecture Value Realisation Model* must aim towards a greater overall acceptance of an EA as a pre-requisite for its actual use.

As the underlying theoretical model for our proposed new framework, we selected the established IS success model by DeLone and McLean (2003). While this model has been originally designed for the area of Information Systems, it fundamentally captures the process of value realisation. In doing so, it is not only well-founded but its application can be extended to other areas too. For example, Sedera et al. used it to measure the success of business process modelling (Sedera et al 2002). As briefly discussed in section 1 we consider EA not as a tool only but rather as a toolbox. In order to prove it being valuable to the targeted stakeholders, its efficient deployment requires an accompanying value realisation process. Therefore, we propose the use of an adapted DeLone and McLean model in the area of Enterprise Architectures in this paper.

5.1 The DeLone & McLean Information Systems Success Model

DeLone and McLean's original model of Information Systems Success was published in 1992 synthesizing various research efforts in this area. In 2003, the initiators published an updated version (see Figure 1) taking into account various criticisms and advancements put forward since their initial paper.

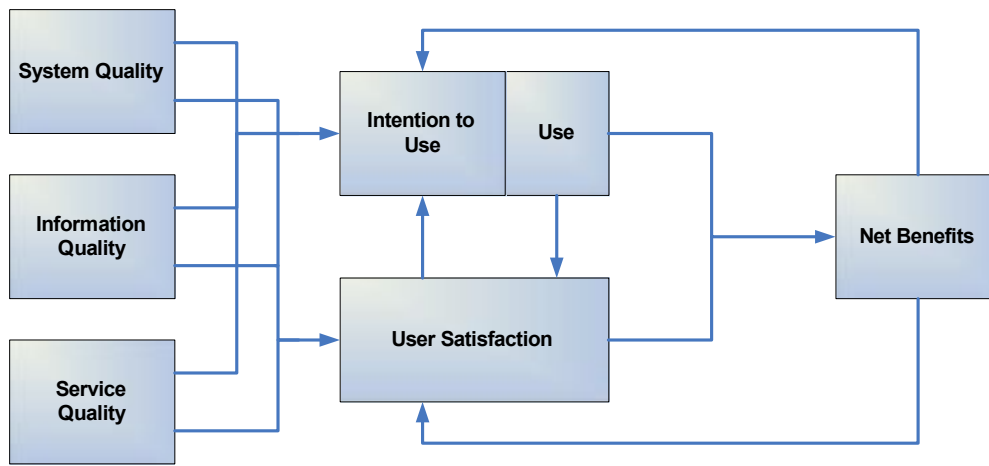


Figure 1: Updated DeLone & McLean IS Success Model (DeLone and McLean, 2003)

Most notably the initial success factor categories, being system quality, information quality, use, user satisfaction, individual impact and organisational impact, were complemented by service quality and intention to use. Additionally, DeLone and McLean also introduced the category of *Intention to use* in order to distinct between the various dimensions of use more clearly. Rounding up the revised model DeLone and McLean merged the categories of individual and organisational impact into *Net Benefits* to comprehend all sorts of impacts an IS could have on an organisation. Finally, two feedback loops were added symbolising the influence of a system's benefits on its usage and the associated user satisfaction shaping up the process character of the model.

In particular Seddon (1997) doubted the causal dependency between an IS's use and the resulting impact or net benefits to an organisation. As he outlines, a system's use certainly precedes any benefits generated by it (necessary condition). However, the use of a system does not necessarily imply any benefits (sufficient condition), since it needs to be complemented by appropriate changes in the business area too. As IS and EA significantly differ in the enforcement of their use, DeLone and McLean's model needed to be readjusted to reflect the characteristics of an EA appropriately.

5.2 Application of the DeLone & McLean Model to the Management of Enterprise Architectures

Given the results of our case studies, we firstly identified three major stages covering the value creation process of an EA and applied them to DeLone and McLean's model. The first one is formed by the model (system) and information quality describing the *potential value* of the EA on-hand. We define potential value as the value inherent in an EA, i.e. its "built-in" value which needs to be realised subsequently. Secondly, the categories of Intention to use and User satisfaction form the area of an EA's *perceived* or *awarded value*. It describes the portion of the potential value the targeted users or stakeholder are aware of, i.e. the value the stakeholders assign to it. Finally, the last category is formed by Net benefits, i.e. the impacts an EA has on an organisation. It was called *realised value*. Thereby it describes the portion of the potential value which was actually turned into real value for the organisation. It must be noted that we deliberately omitted the categories of service quality and use from our generalisation. Given our intention to use DeLone and McLean's model as an explanation for the value creation process of an EA, we found (from our empirical studies) that both are working as catalysts fostering the transition from one model stage to the next one. As service quality enables the transition from potential to awarded value, the use of a system facilitates the generation of realised value.

Furthermore, we added an extra feedback loop linking realised value and potential value. As we found in our case studies, stakeholders tend to provide better and more concise information feedback when they are convinced of its usefulness. Therefore the system's inherent quality starts to grow as the used knowledge or information base increases in turn fostering the stakeholders' awareness. At the same time we kept the separation of the feedback loops to express different stages of feedback. Here we take into account that realised Net Benefits will certainly influence stakeholders' value perception, but initially it might not be satisfactory enough to trigger actual information feedback. Nevertheless, we observed that at a certain stage the realised benefits (either positive or negative) will lead stakeholders to provide feedback influencing the EA's potential value subsequently. Figure 2 presents our modified *Enterprise Architecture Value Realisation Model*.

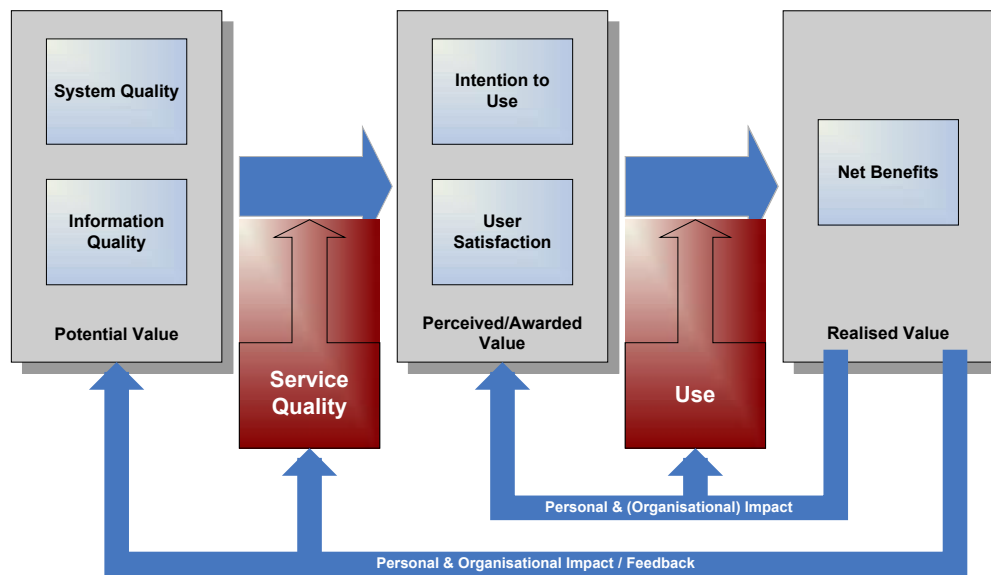


Figure 2: Enterprise Architecture Value Realisation Model (based on DeLone & McLean’s Model of IS Success (2003))

Applying DeLone and McLean initial concepts of system and information quality to EA, the latter’s potential value will be predominantly determined by a stakeholder oriented selection of the covered modelling domains (system quality) and the appropriate implementation of quality assurance means (information quality), like e.g. modelling guidelines. Indeed, as described by our model these issues are important in determining the overall achievable EA value, but they do not foster its actual realisation. Given the outcomes from our two explorative case studies, we found that an organisation’s design and implementation of its *Enterprise Architecture Presentation Strategy* (service quality) and its *Enterprise Architecture Governance Strategy* (use) will act as decisive catalysts concerning its EA’s value realisation. Both strategies will now be discussed in more detail.

5.3 Enterprise Architecture Presentation Strategy

As Schekkerman (2004) states, EA views “... are representations of the overall enterprise architecture that are meaningful to all stakeholders in and outside the organisation”. He applies the basic concept of views (representation of a system from a perspective of a related set of concerns) and viewpoints (perspective from which a view is taken) as described by ANSI/IEEE 1471-2000. Similar concepts have also been put forward by de Boer et al. (2004) and Dijkman et al. (2003). At the same time different views need to be presented by different techniques in accordance to the skills of the targeted stakeholders (Lankhorst et al. 2005).

Given the argument above, the refusal of EA artefacts by non IT-related stakeholder groups, as observed in our case studies, can be partly explained by the current predominant application of IT-related presentation techniques. As our empirical studies showed, Enterprise Architects mainly have an IT-related background and therefore use corresponding modelling approaches. While these methodologies and techniques have been optimised for the design of integrated and consistent models, they do not support a non IT-related audience seeking readily applicable decision-relevant information. Hence a more intuitive presentation layer is required, hiding the formalised way of modelling and consequently protecting stakeholders from being exposed to the barrier of dealing with EA-specific languages. The suitability of such a presentation strategy might be evaluated in accordance to the following dimensions:

- **Who** is allowed to read content?
- **Which** content can be read?
- **How** is the content presented?

Three inter-related presentation strategies can be differentiated in this context:

- **Access restrictions**, i.e. reduction of Enterprise Architecture artefacts according to the users access rights
- **Dedicated architecture languages**, i.e. the introduction of a new modelling language, specifically designed to the needs and skills of the various stakeholders in the different domains (as proposed by Jonkers 2004 and Lankhorst et al. 2005)
- **Dedicated architecture presentation layers**, i.e. the design and implementation of a specific additional layer on top of the EA which facilitates stakeholder’s information retrieval activities. Such a layer would pre-process and represent EA contents according to stakeholders’ needs and skills (e.g. as abstract high-level executives presentation, application fact sheet or business process model extract)

We summarise the coverage of the identified shortcomings hindering a sufficient use of an EA in an organisation by the selected presentation strategies in Table 2.

Presentation Strategy	Access Restrictions	Architecture Language	Architecture Presentation Layer
Lack of Awareness	× (Use of EA data still requires a significant amount of analysis time)	× (Use of EA data still requires a significant amount of analysis time)	✓ (Stakeholder task specific data interpretation and presentation)
Lack of	✓ (Reduction of the number of elements)	✓ (Stakeholder specific contents and modelling language)	✓ (Stakeholder specific contents and presentation techniques)
Lack of Applicability	× (Modelled data still needs to be understood and interpreted)	× (Modelled data still needs to be understood and interpreted)	✓ (Stakeholder task specific interpretation and presentation)
Content Presentation	× (Uses still IT-related languages)	(✓) (partly, due to use of specifically designed language)	✓ (Stakeholder specific presentation techniques)
Lack of Timeliness	(✓) (partly, due to reduced number of elements)	(✓) (partly, due to reduced number of elements and to use of specifically designed language)	✓ (Presented information is gathered, interpreted and processed according to stakeholders' needs)

Table 2: Comparison of EA presentation strategies according to acceptance shortcomings by Rosemann and Vessey (2005)¹

A dedicated presentation layer seems to be favourable in order to support the perceived value of an EA best. However, it also requires an additional piece of EA analysis software, covering sophisticated data retrieval, analysis, and presentation requirements. To the knowledge of the authors only a few meta-modelling tools like e.g. Metis and Alfabet feature promising presentation approaches, which need to be extended further. In contrast, many popular modelling tools provide access restrictions as a basic feature to ensure data confidentiality. Therefore, such a decision will always need to balance the trade-off between the desirable degree of EA support and the involved accessory charges.

5.4 Enterprise Architecture Governance Strategy

Sustainable and successful organisational changes request the participation of all affected members (participation strategy of sustainable developments as discussed by Aier (2004)). Given Henderson and Venkatraman's model of Business and IT alignment, one might expect a tight collaboration between the concerned departments. Yet, as the findings of our case studies clearly revealed, such teamwork does not seem to be self-evident in practice leading to various intra-organisational conflicts.

March and Simon (1958) ascribed such disagreements to three major causes:

- Involved groups feel a need for joint decision-making, but
- Stakeholders perceive reality differently and
- Stakeholders do not share a common set of goals.

Introducing an EA as a means to overcome the alignment deficits between business and IT requires remedying the differences in reality perception and the imbalance of the different goal sets between business and IT. Given the previous discussion, an appropriate EA presentation strategy can cover issues concerning reality perception. However, as stakeholders' differing goal sets are predominantly due to the distinctive environments they might not be assimilated but need to be equilibrated instead.

In accordance to March and Simon's work such clashes in interest might be resolved by four major strategies depending on the goals and the organisational power of the involved parties. Table 3 depicts the available strategies at a glance.

Resolution Strategy	Characteristics
Problem-solving	<ul style="list-style-type: none"> • Parties share common objectives • Parties need to identify a solution meeting a shared set of criteria
Persuasion	<ul style="list-style-type: none"> • Parties' individual goals may differ, but do not need to be taken as fixed • Parties assume, that on some (higher) level objectives are shared • Disagreement on sub-goals can be overcome by reference to common goals
Bargaining	<ul style="list-style-type: none"> • Parties' disagreement over goals is taken as fixed • Parties search for a solution without persuasion (fair and obvious solution) • Negotiations are labelled by conflicts of interests, threats, falsification of position and gamesmanship

Politics	<ul style="list-style-type: none"> • Similar characteristics as bargaining strategy, but the negotiation arena is not taken as fixed • Bargaining is labelled by the parties' quest to identify potential allies
-----------------	--

Table 3: Conflict resolution strategies for intra-organisational conflicts (March and Simon, 1958)

Adopting March and Simon's work to the paper's initial problem, all approaches share the mutual requirement for a common communication means in terms of a commonly understood language as well as a generally accepted status quo and future development strategy. Resorting to Lankhorst's EA definition as discussed in section 1, an EA features all necessary characteristics to overcome the described issues if it is used, i.e. actively designed and implemented, by all involved parties. As, with reference to our case studies, such procedures do not seem to appear autonomous, the question remains of who is in charge of governing an EA's use, i.e. implementing and maintaining the essential institutions, instruments and processes?

IT governance's focus, classically dealing with the specification of "the decision rights and accountability framework to encourage desirable behaviour in the use of IT" (Weill and Ross 2004), seems to be too limited as it is engaged with IT's alignment to business' requirements solely. Not only does Henderson and Venkatraman's model imply a retroaction of IT-related changes to the business, which need to be coordinated too. Additionally, as movements within business and/or IT are likely to affect other areas and vice versa, a more comprehensive approach is need.

In fact, *Enterprise Architecture Governance* would need to act on the interface between the involved domains, assuring that emerging mismatches would be handled appropriately. Taking into account EAs' current IT focus EA governance strategies are likely to be significantly influenced by IT governance practices as discussed by e.g. van Grembergen et al. (2004). Thereby, such governance procedures need not only to be adjusted to allow for interactive influences between domains, but also to envision precautions for an EA's appropriate application.

6 CONCLUSIONS AND FURTHER RESEARCH

This paper presented an EA value realisation model focusing especially on an EA's enhanced utilisation by non IT-related stakeholders. The aim has been to support a successful and sustainable development of the organisation (internally oriented sustainability, Aier 2004) by assuring sufficient consistency between business and IT as well as the participation of all affected stakeholders (Aier, 2004). Hence, the proposed framework exceeds current approaches which predominantly deal with an EA's effective implementation and maintenance.

Although the model was developed using findings from two international case studies, its credibility needs to be enhanced by further empirical evidence. Furthermore, the model explains the value realisation process of an EA within an organisation exclusively. In spite of ongoing research efforts in this area (e.g. Saha 2004), we have not yet seen any comprehensive and readily applicable value measurement model. Given an EA's indirect organisational impact the direct measurability of its value must be doubted at all, ruling out common value measurement approaches in this context. Therefore our approach uses the well-established DeLone and McLean model of IS success as its theoretical foundation to structure the value realisation process. Given the differences between IS and EA with regard to their value development, the original model was adopted to reflect EA's specific characteristics. We found that two initial success factors of DeLone and McLean's model, being service quality and actual use, serve as important catalysts within the EA domain. They can be pushed by the implementation of an appropriate EA presentation layer and an EA governance strategy respectively. In doing so, we found decisive leverages to turn an EA into a tool with a value proposition shared by all, in particular non IT-related, stakeholders.

The paper on hand represents the first issue in a series of publications from our research project. In doing so, its main objective is to introduce our EA value realisation model. Further research in this area must not only focus on the value measurement discussion, but also need to detail the presented EA governance and presentation strategies. Additionally, as briefly discussed in section 2, in particular business-related EA application areas (as e.g. the support of organisational change) need to be investigated in more detail to assure a truly corporate value of organisations' Enterprise Architecture approaches.

References

- Aier, S. (2004). Sustainability of Enterprise Architecture and EAI. In *Information Technology and Organizations in the 21st Century: Challenges & Solutions*. Proceedings of the 2004 International Business Information Management Conference, Amman, Jordan, 182 – 189
- Bernus, P. and Nemes, L. and Schmidt, G. (2003): *Handbook on Enterprise Architecture*, Springer-Verlag Berlin, Hei-

- Computer Sciences Corporation (2006): Catalyst Concepts, <http://www.csc.com/solutions/knowledgemanagement/mds/mds122/212.shtml>, Download: 04.04.2006
- de Boer, F. S. and Bonsanque, M. M. and Jacob, J. and Stam, A. and van der Torre, L. (2004): A logical viewpoint on architectures. In Proceedings of the Eighth IEEE International Enterprise Distributed Object Computing Conference (EDOC 2004), 73 – 83
- Dern, G. (2003): Management von IT-Architekturen, Vieweg Verlag, Wiesbaden
- DeLone, W. H. and McLean, E. R. (2003): The DeLone and McLean model of information systems success: A ten-year update. In Journal of Management Information Systems, 19 (4), 9 – 30
- Dietzsch, A. (2003): Positionierung eines Unternehmensarchitektur-Ansatzes: Erfahrung der Schweizer Mobiliar im Architekturmanagement. In Proceedings der Frühjahrskonferenz 2003 des GI-Arbeitskreis Enterprise Architecture (Vorabversion) (Schelp, J. and Winter, R. Ed.), Universität St. Gallen, <http://aim.iwi.unisg.ch/veranstaltungen/akea/downloads/ProceedingsAkEA.pdf>, Download: 25.10.2005
- Dijkman, R. M. and Quartel, D. A. C. and Pires, L. F. and van Sinderen, M. J. (2003): An Approach to Relate Viewpoints and Modeling Languages. In Proceedings of the Seventh IEEE International Enterprise Distributed Object Computing Conference (EDOC 2003), Brisbane, Australia, 14 – 27
- Hafner, M. and Winter, R. (2005): Vorgehensmodell für das Management der unternehmensweiten Applikationsarchitektur. In Proceedings of Wirtschaftsinformatik 2005 (WI 2005), Regensburg, Germany, 627 – 646
- Goldkuhl, G. (2003): Patterns of Change and Action: A Socio-Pragmatic Perspective On Organisational Change. In Exploring Patterns in Information Management: Concepts and Perspectives for Understanding IT-Related Change (Sundgren, B. and Martensson, P. and Mähring, M. and Nilsson, K. Eds), Stockholm School of Economics, Stockholm
- Goldkuhl, G. and Röstlinger, A. (2003): The significance of workpractice diagnosis: Socio-pragmatic ontology and epistemology of change analysis. In Proceedings of the International Workshop on Action in Language, Organisations and Information Systems (ALOIS 2003), Linköping, Sweden
- Henderson, J. C. and Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. IBM Systems Journal 32 (1), 4 – 16
- Institute of Electrical and Electronics Engineers (IEEE) (2000): IEEE Recommended practice for architectural description of software-intensive systems (IEEE Std 1471-2000), <http://ieeexplore.ieee.org/iel5/7040/18957/00875998.pdf?tp=&arnumber=875998&isnumber=18957>, Download: 25.07.2005
- Jonkers, H. and Lankhorst, M. M. and van Buuren, R. and Hoppenbrouwers, S. and Bonsanque, M. M. and van der Torre, L. W. N. (2004): Concepts For Modeling Enterprise Architectures. In International Journal of Cooperative Information Systems, 13 (3), 257 – 287
- Lankhorst, M. et al. (2005): Enterprise Architecture at Work: Modelling, Communication, and Analysis, Springer-Verlag Berlin, Heidelberg
- March, J. G. and Simon, H. A. (1958): Organizations, John Wiley & Sons, New York
- Moody, D. L. (2000): Building links between IS research and professional practice: improving the relevance and impact of IS research. In Proceedings of the Twenty First International Conference on Information Systems (ICIS 2000), Brisbane, Australia, 351 – 360
- Perks, C. and Beveridge, T. (2003): Guide to enterprise IT architecture, Springer New York
- Rechtin, E. and Maier, M. W. (1997): The Art of Systems Architecting, CRC Press, Boca Raton
- Rosemann, M. and Vessey, I. (2005). Linking Theory and Practice: Performing a Reality Check on a Model of IS Success. In Proceedings of the 13th European Conference on Information Systems (ECIS 2005), Regensburg, Germany
- Schekkerman, J. (2004): Another View at Extended Enterprise Architecture Viewpoints. Institute for Enterprise Architecture Developments (IFEAD), http://www.enterprise-architecture.info/Images/Extended%20Enterprise/E2A-Viewpoints_IFEAD.PDF, Download: 08.07.2005
- Schönherr, M. and Aier, S. (2005): Sustainable Enterprise Architecture – Central (EA) and Decentral (SOA) Approaches to Define and Establish Flexible Architectures. In Proceedings of the VIIth SAM/IFSAM World Con-

gress, Göteborg, Sweden

- Seddon, P. B. (1997): A Respecification and Extension of the DeLone and McLean Model of IS Success. In *Information Systems Research*, 8 (3), 240 – 247
- Sedera, W. and Gable, G. and Rosemann, M. (2002): Measuring Process Modelling Success. In *Proceedings of the 10th European Conference on Information Systems (ECIS 2002)*, Gdansk, Poland, 331 – 341
- Sha, P. (2004): A Real Options Perspective to Enterprise Architecture as an Investment Activity, Institute of Systems Science, National University of Singapore, http://www.opengroup.org/architecture/wp/saha-2/ROA_and_Enterprise_Architecture.pdf, Download: 09.09.2005
- van Grembergen, W. and de Haes, S. and Guldentops, E. (2004): Structures, Processes and Relational Mechanisms for IT Governance. In *Strategies for Information Technology Governance* (van Grembergen, W. Ed.), Idea Publishing, London, 1 – 36
- Weill, P. and Ross, J. W. (2004): IT Governance on One Page, CISR WP No. 349, Center for Information Systems Research, Sloan School of Management, Massachusetts Institute of Technology, <http://web.mit.edu/cisr/working%20papers/cisrwp349.pdf>, Download: 10.11.2005

(Footnotes)

¹ ✓ - deficit remedied by presentation strategy, (✓) – deficit partly remedied by presentation strategy, ✗ - shortcoming not remedied by presentation strategy