Complexity Levels of Representing Dynamics in EA Planning

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Abstract. Enterprise Architecture (EA) models provide information on the fundamental as-is structure of a company or governmental agency and thus serve as an informational basis for informed decisions in enterprise transformation projects. At the same time EA models provide a means to develop and visualize to-be states in the EA planning process. Results of a literature review and implications from industry practices show that existing EA planning processes do not sufficiently cover dynamic aspects in EA planning. This paper conceptualizes seven levels of complexity for structuring EA planning dynamics by a system of interrelated as-is and to-be models. While level 1 represents the lowest complexity with non-connected as-is and to-be models, level 7 covers a multi-period planning process also taking plan deviations during transformation phases into account. Based on these complexity levels, a multi-stage evolution of EA planning processes is proposed which develops non-dynamic as-is EA modeling into full-scale EA planning.

Keywords: EA planning, EA modeling, dynamics of EA.

1 Introduction

The ANSI/IEEE Standard 1471-2000 defines architecture as "the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution" [1]. Most authors agree that enterprise architecture (EA) targets a *holistic scope* and therefore provides a broad and aggregate view of an entire corporation or government agency [2, 3] covering strategic aspects, organizational structure, business processes, software and data, as well as IT infrastructure [4, 5, 6]. Enterprise architecture management can provide systematic support to organizational change that affects business structures as well as IT structures by providing constructional principles for designing the enterprise [7]. In order to provide support for transformation in an efficient way, EA has to be driven by business and/or IT oriented application scenarios [8] based on stakeholders concerns [9, 10, 11] (*goal orientation*) [3, 6]. Since the involvement of heterogeneous stakeholder groups may create conflicting requirements in a complex

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environment, an appropriate documentation and communication of the EA is vital. A suitable degree of *formalization* is needed in order to ensure traceable and repeatable results. Furthermore (semi) formalized models and well structured methods are needed to enable division of labor among the stakeholder groups [12, 13]. The general characteristics and purposes of EA are summarized in Table 1.

While documentation and analysis of EA (represented by as-is models) are well covered in academic and practitioner approaches, EA planning is covered much less so far. Since neither the corporation or government agency itself, nor its environment remains static during a transformation project, and because to-be models may change as projects are launched, the consideration of EA dynamics is an important aspect for EA planning.

Table 1. Characteristics and Purposes of EA

Characteristics	Purposes
- Holistic scope - Goal orientation - Formalization	- *Documentation* of organizational structure including artifacts from business and IT and their interrelationships (As-Is architecture), - *Analysis* of dependencies and relationships of As-Is models, - *Planning* and comparing future scenarios (To-Be models), and derivation of transformation projects and programs to achieve a desired EA.

However, as the following section illustrates, the field of EA planning—and information systems (IS) planning in general—is broad and covers very heterogeneous topics. Therefore this contribution focuses on the modeling of EA dynamics in order to support EA planning. In particular, we conceptualize model complexity associated with EA dynamics in business planning and business transformations. In a first step, existing IS/EA planning approaches are analyzed against a holistic, goal oriented and formalized understanding of EA. In a second step, we reflect existing modeling requirements for EA planning from actual industry projects. Based on the findings, a generic EA planning process is proposed, and complexity levels of EA dynamics are described that need to be addressed as EA approaches mature towards a more comprehensive support of EA planning.

In analogy to a process model for design research in information systems [14], this article “identifies a need” for more comprehensive EA planning and lays the foundation for the following “build” phase. However, in this article the respective method artifact is neither built nor is its utility evaluated.

The remainder of this paper is organized as follows. Section 2 presents a literature review of IS/EA planning in the context of to-be modeling and business transformation support. Experience from industry projects in this domain is summarized in section 3. Based on this foundation, requirements for EA planning support including dynamic aspects are derived and subsequently structured by complexity levels in section 4. We then analyze how these complexity levels are addressed by a consolidated EA planning process and which additional steps are necessary. Preliminary results of our research in progress are discussed, and further research activities are proposed in section 5.

2 Literature Review

Only a few contributions to the field of modeling for EA planning support exist so far. However, significant contributions to the broader areas of EA planning and IS planning have been made. Therefore we review not only current literature on EA planning, but also older sources on IS planning which have influenced EA planning.

2.1 IS Planning

Historically, EA planning and to-be modeling evolved from strategic IS planning which was firstly addressed in an MISQ contribution by King in 1978 [15]. This paper proposes a process to design a management information system (MIS) in accordance to the strategy of a corporation or government agency and thereby define a MIS strategy comprising MIS objectives and MIS constraints. As markets, organizational structures and system landscapes added more complexity to the matter of strategic planning and the alignment of business and IT, this approach as well as similar contributions were evolutionarily refined. Strategic enterprise-wide information management [16] and more institutionalized IS planning processes became an issue in the 1990ies [17]. A prominent example for IS planning methods is IBM's Business System Planning (BSP) [18]. BSP aims to (re-)group IT functionalities according to data use and thereby identify application candidates with high internal integration intensity, but limited external interfacing to other applications.

2.2 EA Planning

IS planning and EA planning differ in their approach, goal, and scope. While IS planning is technology driven and refers to the planning of systems (what systems do we need?), EA planning focuses on the business (What do we do now and what do we want to do? What information is needed to conduct our business in the future?) [19]. The offer of new architectural paradigms, such as service orientation, requires for EA planning focusing on supplying information to stakeholders in order to support organizational change.

The term EA planning was first introduced by Spewak, who defines EA planning as "the process of defining architectures for the use of information in support of the business and the plan for implementing those architectures." [19] The underlying understanding of EA covers the whole of data, applications, and technology. Plan—in this context—is referred to as the definition of the blueprint for data, application, and technology as well as the process of implementing the blueprint within an organization. The work of Spewak was updated in 2006, emphasizing the importance of business knowledge and organizational issues during the planning process [20]. Fig. 1 gives an overview of the proposed enterprise architecture planning method that is also referred to as the Wedding Cake Model. A detailed description of the method can be found in [19, 20].

The process steps are to be read top down and from left to right. The definition of the to-be architectures for data, application, and technology are based on their current states as well as on business knowledge that determines major requirements. Yet, the

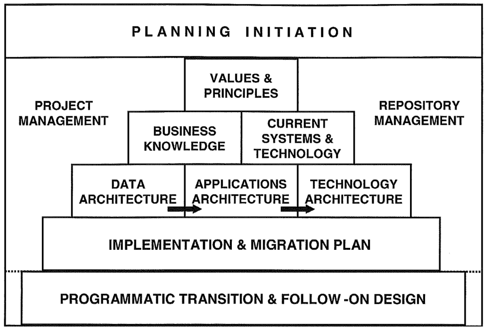


Fig. 1. Wedding Cake Model [19, 20]

process ignores that the business requirements and therefore respective to-be architectures can change as the process is executed.

Based on an extensive literature review, Pulkkinen and Hirvonen propose an EA development process model that guides the incremental stepwise planning and development of EA [21, 22]. Due to the high complexity of the EA development task, only discrete EA development projects are considered. Moreover, the EA process model is intended to cover both EA planning and enterprise systems development.

The authors emphasize the aspect of user participation and decision making in the process which is structured by the EA management grid [23]. Following this two-dimensional grid, the process model proposes that even at the enterprise level technology decisions should be made and then transferred to the underlying levels.

The EA process is further refined in [21] which is depicted in Fig. 2: Pulkkinen proposes parallel domain level decisions implementing the decisions made on the enterprise level (arrow A). After parallel sub-cycles in domain decisions, system level decisions are derived (arrow C). Additionally, the reuse of successful implementations from lower levels to the enterprise level is supported (arrow B). The author

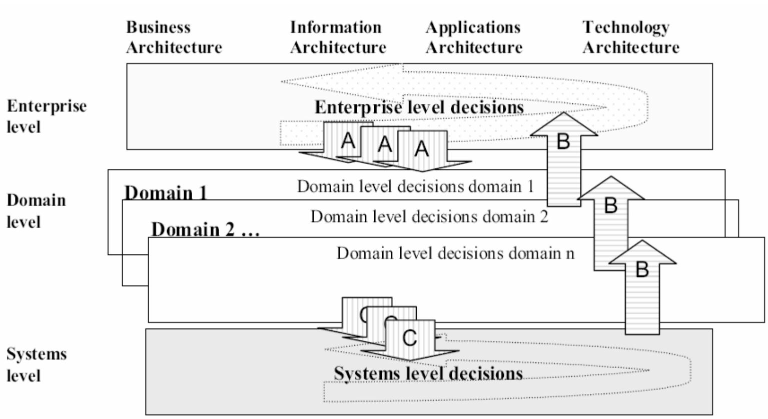


Fig. 2. The Refined EA Process [21]

especially points out the importance of detection of domains within EA development which may result in concurrent planning efforts requiring additional coordination.

Similar approaches for establishing the EA, comprising evaluation, creation and development, are presented by Op't Land et al. [11] and Niemann [24] (cf. Table 2).

Leppänen et al. propose a first step towards an EA planning method by developing a contingency framework that lists several situational factors derived from method engineering and information system development literature [25]. These factors include enterprise/organizational characteristics, persons involved, goals pursued and characteristics of the EA method to be constructed. The contingency model is supposed to support the selection and adaptation of EA method engineering approaches in order to develop a situational method for EA planning.

A specific view on dynamic aspects of EA Planning is presented by Murer et al. under the term "Managed Evolution" [26]. This approach aims at balancing the ratio between the benefits for business and the IT development efficiency. This is realized by using metrics and evaluating both aspects in short time horizons, i.e. for each development project, in order to carefully plan the evolution of large information systems.

2.3 Modeling of EA Planning

The work of Buckl et al. [27] focuses on models for the management of application landscapes with emphasis on temporality aspects, i.e. information about projects that change the application landscape or business changes that affect IS applications. The authors identify three time-related dimensions that need to be considered: an application landscape is planned for a specific time, it has been modeled at a certain time, and different variants of planned landscapes may exist concurrently. Furthermore, five key requirements for supporting temporality aspects in application landscape management are identified. Among these, there are the deduction of future application landscapes from project tasks, the integration of project portfolio management with the application landscape planning process and the possibility to compare variants of future application landscapes. Referring to findings from discussions on object-oriented models, the authors propose the transfer of temporal patterns to model application landscapes considering temporality aspects. As one approach to compare different application landscape models, the evaluation of failure propagation via metrics is presented Lankes et al. in [28] and [29].

The modeling aspect of EA planning is also addressed by EA tool vendors. Based on an extensive survey that analyzes 13 EA management tools, Matthes et al. find that the static complexity of constituents and dependencies is handled well by current vendors, e.g. by providing visualization and collaborative maintenance functionalities [30]. However, dynamic aspects resulting from changes over time are not addressed well by most current EA management tools [31]. While nearly all tools support as-is and to-be modeling, road mapping, versioning and transformation paths are usually not addressed in a sophisticated manner. In addition, EA metrics that would allow for comparison of different to-be scenarios are not covered well in current EA tool support [30]. Also Gartner [32] and Forrester [33] attest a good coverage of niches of dynamic aspects in EA management such as lifecycle management and simulation capabilities. However, there is no EA tool comprehensively addressing dynamic aspects of EA.

2.4 Evaluation

Regarding the premise of a holistic scope of EA, approaches that are restricted to IS or application landscapes cannot be satisfactory (e.g. [19, 20] but also [27, 28, 29] need to be questioned). Findings from IS planning give valuable hints, but have to be significantly extended in order to be useful for EA planning.

Another result of the literature review is that the majority of research results only focuses on EA planning as an unidirectional planning process that aims at improving the current architecture [21, 22, 23, 25]. This includes a defined start date and end date of the process as well as a defined result, i.e. one target architecture for one point in time. In addition, most sources cover individual dynamic aspects such as adaptations of target architecture models to changing conditions, life cycles of individual artifacts, the evaluation of model alternatives or the support of transformation from as-is architecture to to-be architecture. However, there is no comprehensive modeling method for EA planning. Extensions for existing modeling processes for EA planning focusing on dynamic aspects are therefore proposed in section 4.

3 Review of Current Industry Practices

In order to illustrate the need of a more comprehensive approach to modeling for EA planning, we will present two cases from the financial services industry.

3.1 Company A

Company A provides IT outsourcing services and banking solutions. The primary product is an integrated banking platform that is offered to private banks and universal banks. The organization focuses on three main fields, namely application development, application management and operations, and therefore offers an integrated portfolio to its customers. The application development division is responsible for the development of the integrated banking platform. The development activity management is planned and controlled by the architecture team using a home grown solution to create to-be models and manage development projects within the banking platform. This solution combines modeling features and project management capabilities to ensure consistent evolution of the platform. Major challenges within the architectural development plan are the coordination of the activities of the development teams and assurance that milestones of the various integration and development activities are met simultaneously. If, for example, a component of an application needs an interface to a component of another application at a certain time for a certain milestone (e.g. test or release), it has to be assured that both components are available at that very point in time. This simple example grows very complex as the banking platform comprises of over 200 applications, each consisting of a multitude of components that each have their own lifecycles as well as precursor and successor relationships. Generally speaking, the following questions need to be answered within the architectural development plan:

- What are the relationships of architectural elements and what are the impacts of local changes to other elements?
- How can lifecycles of elements and their impacts be modeled?

These dynamic aspects of the architectural development are to some extent supported by a homegrown solution, but yet need strong governance caused by various manual steps in the planning process. This is partially due to specifics of the planning method that is based on implicit knowledge held by individuals.

3.2 Company B

Company B is an internationally operating bank based in Switzerland. During recent decades, mergers led to an increasing complexity of its application landscape. Regarding architecture layers, business architecture (i.e. partly strategy, but mainly organizational artifacts), application and integration architecture, software and component architecture (i.e. software artifacts), and technical architecture (i.e. infrastructure artifacts) are distinguished. Architecture management is realized by more than 90 architects and comprises architecture governance that is enforced in individual IS projects. However, while IT architecture is strong in the bank's home country, the bank has to face challenges due to heterogeneous local solutions in almost every country.

In order to enable a better management of the heterogeneous application landscape, an EA project is currently being conducted. The project focuses on an integrated view on the different solutions the IT departments offer to the company's operating departments and teams worldwide. Such an integrated view should enable solution roadmap planning, too. Therefore, the following questions need to be answered continuously:

- Which projects should be shifted back or forward in order to meet the needs of a certain solution roadmap?
- Which projects affect which lifecycle planning of a certain solution?
- Does postponing of a project affect the lifecycle planning of a certain solution?

An EA approach aiming at these requirements must be capable of consolidating information on different projects affecting solution development, e.g. release planning, component development and customer request management for customized solutions. This approach requires the inclusion of dynamic aspects such as solution and component lifecycles, but especially the support of multi project management. Regarding the actual planning process, the EA approach must support the transformation process from as-is (application) architecture to to-be (application) architecture.

3.3 Implications

Although we provide only two cases from current industry practices here, these examples show the multitude of dynamic aspects that need to be considered during EA planning and evolution. The challenges faced by both companies imply that there is an actual need for an integrated planning method that combines all dynamic aspects and takes into account their interrelationships. For example, company A has identified the need to combine to-be modeling with lifecycles on one hand and the coordination of development activities on the other hand. Similarly, company B is aiming at an alignment of solution roadmap planning and multi project planning. These experiences require the integration of

- project management (organizing programs and individual projects)
- release management (planning development roadmaps), and
- lifecycle management (phases and milestones for different EA elements).

Additionally, complex temporal as well as technical interdependencies between the planning of EA elements, of partial architectures and of projects need to be addressed. The challenge for enterprise architects in the presented cases is to extend the transparency of a current situation provided by as-is EA models to a number of future situations represented by alternative to-be models. Due to the complexity of the interdependent system of as-is as well as alternative to-be models, a sound method supported by EA tools is needed.

Current practices also indicate that not only precise models of one or several target architectures are in use, but that all planning efforts are guided by an "architectural vision". Such a vision serves as a guideline for the architectural evolution, while in most cases there are no ambitions that it will actually be materialized ever. The architectural vision might be deducted from a strategic vision given by business departments or IT departments. It may, for example, specify the substitution of a certain standard software product or platform. The influence of such a vision on the planning process needs to be considered in an integrated concept for EA planning. Ultimately, in order for an EA planning concept to be applicable in practice, it needs to take into account contingency factors like budget, general architecture management guidelines, business support, or legacy architecture.[1]

4 A Concept to Capture Dynamics in EA Planning

The results from the literature review and the review of industry practices (chapters 2 and 3) lead to a set of dynamic aspects which need to be considered and structured along the EA planning process. We therefore propose an EA planning process that is derived and combined from existing approaches. We then propose levels of complexity that structure EA planning dynamics and finally evaluate the process' capabilities to address such levels.

4.1 EA Planning Process

For EA planning purposes, enterprise architects need to know what they are going to plan and how they should proceed in the planning process. Therefore, we firstly derive a generalized EA planning process from respective proposals in literature. Table 2

[1] A first step towards the definition of such factors has been done by Leppänen et al. [25] and also Aier et al. [34].

Table 2. Existing EA Planning Processes

Spewak et al. [19, 20]	Niemann [24]	Pulkkinen et al. [21, 22]
A1. Planning initiation	B1. Define goals	C1. Initiation
A2. Define values and principles	B2. Documentation	a. Define goals
A3. Indentify business knowledge and current systems and technology	B3. Analysis	b. Resources and constraints
A4. Blueprint data, applications and technology architecture	B4. Planning alternative scenarios	C2. Planning and development: define needed changes in architectural dimensions
A5. Develop implementation and migration plan	B5. Evaluation of alternative scenarios	C3. Ending phase
A6. Define programmatic transition	B6. Implementation	a. Plan, design and evaluate alterative architectures and solutions
		b. Define long term and short term targets

gives an overview of existing approaches. The presented approaches are similar in general yet different in detail. The following process (cf. Fig. 3) condenses the essence of the three approaches described. Subsequently, a more detailed explanation of the steps is given.

Step 1: Define Vision (based on A1, A2, B1, C1a, C1b): Long-term goals and an architectural vision cover the desired state of the architecture that might never be achieved, but delivers the general direction for future plans.

Step 2: Model As-Is Architecture (based on A3, B2): These architectural models serve to document the as-is structure of the organization and are therefore necessary for stakeholder communication and as a planning foundation.

Step 3: Model Alternative To-Be Architectures (based on B3, B4, C3a): Based on the analysis of the as-is architecture, some architecture elements will be more relevant to the planning process than others, e.g. some elements might be subject to higher volatility while others remain stable. Therefore the parts most likely to be changed must be identified, and to-be models depicting the desired changes can be created. Since the architectural vision might be approached in multiple ways, multiple to-be architectures will be built during this phase. Some of these to-be architectures are alternative to each other while some are related to different points in time.

Step 4: Analyze and Evaluate Alternative To-Be Architectures (based on B3, B5, C3a): In order to plan the next state of the current as-is architecture, one of the alternative to-be architectures needs to be chosen. This selection process requires an analysis, evaluation and comparison of the given options.

Step 5: Plan Transformation from As-Is to To-Be Architecture (based on A5, C3a): After the desired to-be architecture is identified, the detailed planning for the transformation process can take place. This step involves project and program planning as current or planned development projects may affect mutual architectural elements. Furthermore, project interrelationships should be identified in order to consolidate projects and resources.

Step 6: Implement Transformation (based on A6, B6): Lastly, the transformation has actually to be implemented. When this step is completed, one of the to-be models becomes the as-is model and the next iteration of the process starts. As this paper focuses on modeling aspects rather than on implementation, this step is not regarded in the following sections.

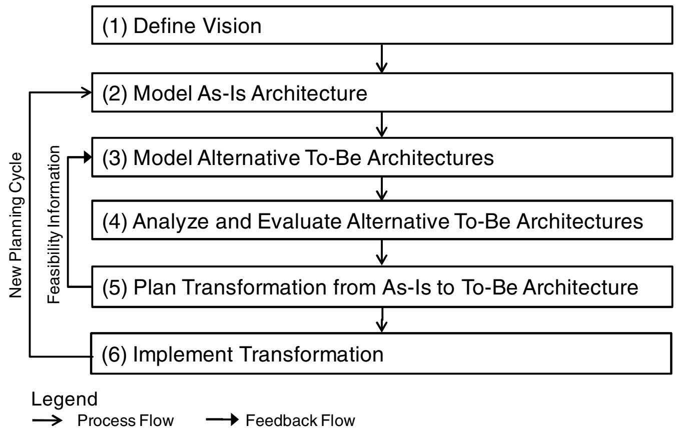


Fig. 3. EA Planning Process

The continuity of time causes dynamic changes within the EA planning process. This especially influences the actuality of the to-be architecture models: Conditions for certain decisions might change with proceeding time. Therefore the point in time when the model was created should be captured as well [27].

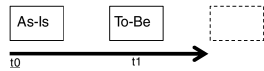
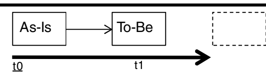
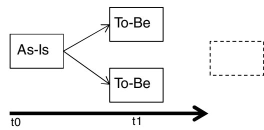
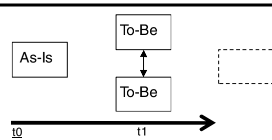
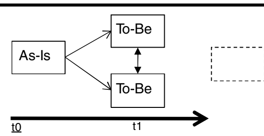
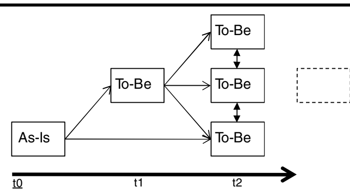
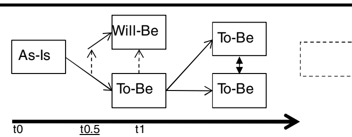
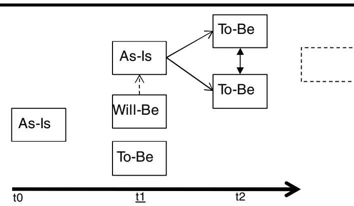
During the detailed planning for the transformation process, further knowledge about the possible future states of the as-is architecture may arise. This information should be re-integrated in the modeling process (step 3). The same can occur while conducting the project and in program management: if, for example, concurrent use of resources is detected, this information needs to be fed back into step 3, too. Both aspects have continuous influence on the “decision tree” that is generated by modeling different to-be architectures.

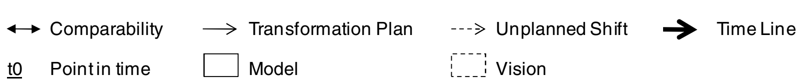
4.2 Complexity Levels in EA Planning

The general temporal influences on the EA planning process result in high complexity that appears while putting the planning process into action. In order to capture this complexity and address open issues from the case studies in section 3, we break down the complexity into different dynamic aspects. On this basis, we distinguish different levels of complexity in EA planning (cf. Table 3).

The first level comprises an *as-is model*, a *to-be model* and, according to step 1 from the EA planning process presented in chapter 4.1, an *architectural vision*. On level 2, the *transformation plan* connecting the as-is state and the to-be model is added. Levels 3 and 4 incrementally include the modeling of *alternative to-be models* and their *comparability*. *Multi-step to-be modeling* and *transformation planning* is regarded from level 5 on. The continuous influence of time and consequential changes like *unplanned amendments* of to-be models are included in level 6 and level 7, while the latter additionally considers further effects on multi-step planning.

Table 3. Levels of Dynamic Complexity in EA Planning

Level 1: Based on an as-is model in t0, a to-be model for t1 is created according to the architectural vision.	
Level 2: There exists a plan how to transform the as-is architecture into the desired to-be architecture.	
Level 3a: Multiple to-be models are created that contribute to the development of the current architecture towards the architectural vision. These alternatives might address priorities of different stakeholders or be favorable for different goals. Alternative transformation plans are possible, too.	
Level 3b: Multiple to-be models are created. The alternatives can be compared, e.g. by adequate metrics. Therefore an idea exists which alternative is more favorable under given assumptions.	
Level 4: Combination of levels 3a and 3b.	
Level 5: There are alternative to-be models and also various models for different points in time. Planning a multi-step transformation path helps to structure the transition. It needs to be considered that uncertainties about the usefulness of a to-be model in tx will rise the more time elapses between t0 and tx. Alternative transformation plans might also address different intermediate to-be models.	
Level 6: During the transformation from the as-is to a to-be state, say in t0.5, changes might occur which cause unplanned shifts. This might require adjustments in the transformation plan and the to-be architecture, which is then called the will-be model.	
Level 7: The will-be model created in t0.5 for t1 (again depending on the time elapsed and uncertainties emerged between t0.5 and t1) however might not be the actual model in t1. Then the actual model in t1 is a new as-is model and the foundation for future planning.	



4.3 Evaluating the EA Planning Process for Complexity Levels

This section investigates how the proposed EA planning process supports dynamic complexity. Therefore it is analyzed which process steps address the dynamic aspects associated with the different levels of dynamic complexity.

Table 4. Dynamic Aspects in the EA Planning Process

	Step 1: Vision	Step 2: As-Is Architecture	Step 3: Multiple To-Be Models	Step 4: Evaluation of To-Be Models	Step 5: Transformation Plan
Vision	●	●	○	○	○
As-Is Architecture	○	●	○	○	○
To-Be Architecture	○	○	●	○	○
Transformation Plan	○	○	●	○	●
Alternative To-Be Architectures	○	○	○	●	○
Comparability	○	○	○	●	○
Multi-Step Transformation	○	○	○	○	○
Unplanned Shifts	○	○	○	○	○

Legend ● step explicitly addresses dynamic aspect ○ step does not address dynamic aspect

This evaluation shows that most dynamic aspects can currently be supported by the EA planning process. But multi-step transformation, the consideration of unplanned shifts and the deviation of models from reality are not addressed yet. If applied to the levels of complexity, this means that levels 1–4 can currently be supported by the steps included in the EA planning process. Levels 5–7 however require an extension of the proposed EA planning process. The following discussion describes the requirements and Fig. 4 depicts a proposal for an extension of the EA planning process.

Level 5 describes a multi-step "decision tree" that demands for the selection of one transformation path. In order to support planning over longer periods of time, the planning process also needs to address intermediate to-be models as partial results as well as the comparison and selection of different combinations of multiple subsequent to-be models. This can reflected in the new process steps 3b and 4b in Fig. 4.

For a realization of levels 6 and 7 the EA planning process must also address the adjustments of to-be models in will-be models due to unplanned shifts during the transformation. Furthermore, respective changes in transformation plans that have an effect on future to-be models need to be covered. Such unplanned changes might also originate from aspects that cannot be modeled but influence any kind of planning process: politics or budgets, for example. Applied to the EA planning process, unplanned changes affect the process steps 2 and 5 (cf. Fig. 4). Finally, these influences trigger feedback to the modeling and comparison of to-be models which need to be adjusted (cf. "Feedback" arrows).

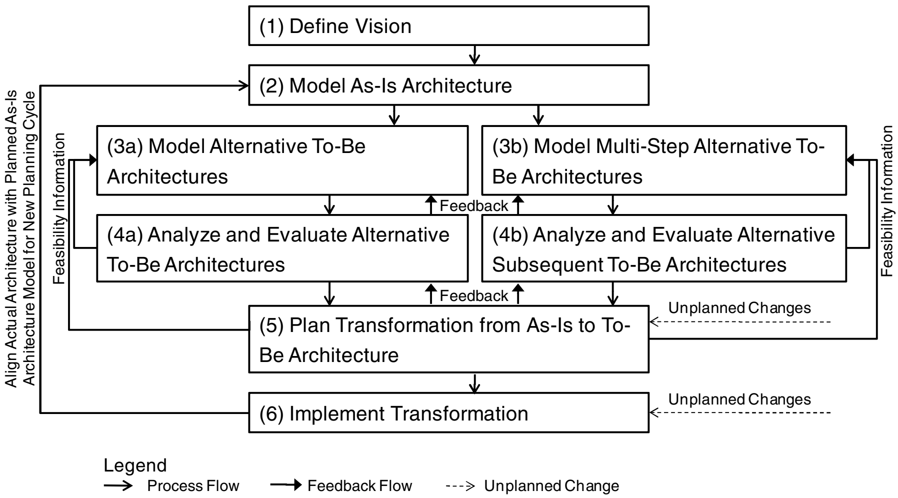


Fig. 4. Extended EA Planning Process Proposal

5 Discussion and Conclusion

This paper presents research in progress related to capturing dynamic aspects in EA planning. To that means, existing approaches in literature as well as open questions from practitioner projects have been analyzed. After consolidating an EA planning process on this basis, we have analyzed how different complexity levels of dynamics are addressed by the different steps of the planning process. This analysis implies extensions to the proposed process model. Multi-step planning as well as capturing differences between models and unplanned changes that have an impact on the planning results are not yet fully addressed. Future research activities will investigate how these aspects can be incorporated into the planning process. Open questions to be answered in this context include:

- Is there a desired level for dynamic complexity in EA planning?
- How can the tradeoffs between (a) pragmatic solutions that only partly consider the complexity levels and (b) sophisticated solutions that include all complexity levels but potentially cause higher planning efforts be addressed?

Furthermore the individual steps of EA planning process need to be detailed. Therefore existing methods for the different tasks will be reviewed in order to analyze their capabilities to capture dynamic aspects in EA planning. This may finally lead to a comprehensive method for EA planning addressing dynamic aspects. Open questions to be answered in this context include:

- How do we decide what architectural elements are relevant for planning, and are therefore part of to-be models?
- How do we capture dynamics of EA models and artifacts by graphical representations?
- What are relevant dimensions and methods for the evaluation of to-be models?

- What lessons can be learned from project and program management to structure the transformation process?
- What are the requirements for an integrated planning method?

In regard to the proposed complexity levels, a comprehensive method for EA planning should be adaptive: Depending on the desired level of complexity to be addressed, the method should provide a situational solution. In analogy to the process model for design research, the method artifact should then also be evaluated, for example, by industry cases.

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