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Decision-Making and Risk Management in Architecture Work

On this page, the following two topics are addressed:

- Architectural Decision-Making: Introduction to decision-making in architecture work
- Architectural Risks and Architectural Risk Management: Introduction to risks encountered in architecture work

Architectural Decision-Making

Decision making is generally understood as a cognitive process leading to the selection of a course of action among alternatives. It begins when a need to do something exists but the course of action is not yet clear. The **decision making process** involves

- definition of the problem,
- information gathering,
- identification and evaluation of alternatives,
- the actual decision,
- its implementation, and
- follow-up assessment (Power 2002).

In reality the process is not an explicit cycle but iteration is done between and during tasks. A decision may set a course for follow-up decisions, initiating a new decision making process. Decisions are also made on various levels in organizations including

- strategic management,
- IT portfolio management and
- project management.

Finding the right information to make the decision is a constant challenge and typically the party that collects the information and presents the alternatives is different to the actual decision maker. Solution alternatives are evaluated with a certain decision making criteria. In **rational decision making**, alternatives and their consequences have to be known, decision makers must have a set of preferences to guide decision making, and a decision rule has to be utilized to select a single alternative on the basis of its consequences for the preferences (Shapira 1997).

In the architecture context, decisions are typically related to architectural plans and models. A complex architecture can reflect thousands of decisions (Tyree & Akerman 2005). Architecture decisions relate to different architectural levels (e.g. enterprise, domain, application and component architecture) and should only define elements on that specific level (Malan 2002).

On **the level of EA**, architecture decisions are high level decisions that can involve

- Selection of architecture plans (target, transition, vision)
- Selection of architecture standards, principles and guidelines

- Decisions about the objectives of architecture work in the organization.

In **the SA domain**, architecture decisions are typically made on the level of architectural models and typically define (see Bass et al. 1998)

- a system's key structural elements,
- the externally visible properties of these elements and their relationships, and
- how to achieve the architecturally significant needs and requirements.

When making architectural decisions it should be first considered whether the decision actually is absolutely necessary to achieve business strategy and meet architectural objectives (Malan & Bredemeyer 2002; 2004). Thus, the decision should be traceable to business objectives and not be overly detailed on the enterprise level (Malan & Bredemeyer 2002; 2004). It is futile to make decisions if they are not enforceable and actually enforced (Malan & Bredemeyer 2002; 2004). Decisions should also take into account possible change needs to the architecture in the future by building in agility to the architecture. To enable follow-up evaluation of decisions and increase stakeholder commitment to them, decisions should be communicated to the stakeholders with their rationale. Decisions may be documented to share them with stakeholders but merely storing documentation in a repository is not sufficient.

In the architecture context, decision making points and levels are dependent on the organization in question. Some organizations do not want to establish new decision making points for architecture, so architectural decision making may be fragmented to various existing decision making points. Since architectural decisions are made on many levels in the organization, decision makers involve various roles including architects, project roles and business management roles. Architecture may have influence on other decision in the organization (e.g. IT portfolio and project planning) but on the other hand, some architectural decisions may need approval from various other decision making points (e.g. business or IT management).

It should be noted that architecture is only one way of enforcing organizational strategies and thus business may have a first say when planning organizational improvements. Business may even make architecture decisions without considering the big picture. Therefore, architects need to communicate with stakeholders to find a common ground.

All in all, architectural decision-making is similar to other kinds of organizational decision-making. Therefore it should be carefully considered whether or not separate decision-making mechanisms are needed for architecture decisions.

For more information on the subject, see report Architecture Planning and Decision Making in Companies.

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Architectural Risks and Architectural Risk Management

Because EA is an extensive program, it requires considerable investments and may thus result in many political, project management and organizational challenges (Kaisler et al. 2005). As with any investment, also EA investments (investments related or driven by EA) involve risks which need to be identified and managed (Saha 2006). Organizations investing in EA may face unexpected materialized risks related to business and ICT alike, threatening the success of the EA program. Moreover, since EA is a critical management

tool materialized risks can have serious consequences in the organization utilizing EA.

The extensive, continuous and iterative nature of the EA approach further complicates EA risk identification and management. Unpredictable effects may arise from EA processes (e.g. planning, development, management, maintenance and use) or may be associated with any of the levels of architectural models of the organization (e.g. business, information, information systems, technology) (Baldwin et al. 2007). However, literature on risks in the context of EA is rare even though risks have been extensively discussed in generic risk literature (see e.g. Crouhy et al. 2001; Lam 2003; Reuvid 2005) and related contexts such as IT and IS (see e.g. Boehm 1991; Benaroch 2002; Sherer and Alter 2004; Keyes 2005; Benaroch et al. 2006). In the EA context, work on EA investment risks and options has been conducted (see Saha 2006).

The Collins English Dictionary defines risk as

> "the possibility of incurring misfortune or loss".

However, in risk literature many authors do not even provide a definition for the term. This may be partly explained by the complex nature of risks. First, they have many characteristics such as

- exposure (maximum amount of damage suffered),
- severity (amount of damage that is likely suffered),
- volatility (variability of potential outcomes),
- probability (how likely a risky event occurs),
- time horizon (the time exposed to the risk),
- correlation (amount of correlation between different risks) and
- capital (how much capital is needed to cover losses) (Lam 2003).

Second, all risks are temporal and can thus be materialized in complex chains of risks and mitigations over time (Alter and Sherer 2004). Third, risks are not always negative but may also have positive consequences when they materialize (Alter & Sherer 2004). Risks can also be conceptualized in a number of different ways. We suggest that **EA risks** are

- any factors that may lead to negative outcomes in the EA program, and
- any negative outcomes resulting from these factors.

A large number of risks have been uncovered in literature and different classifications for them have been proposed. **The work system framework of risks** (see Sherer and Alter 2004) is adapted for the classification of EA risks because of its genericity and extensive literature base. Generic work system risks apply to the IS context (Sherer and Alter 2004), suggesting that they may apply to the EA context as well. The framework includes nine elements which all contribute to the operation of the system. For each of the elements, a number of risks are adapted from literature (see Sherer and Alter 2004), complemented by the practical experiences of the participants of a focus group interview of practitioners.

Regarding to EA risk management, it should be noted that even though EA-related risks are not currently considered in detail in organizations, there seems to be the need of managing them. EA risk management is not an independent 'island' in an organization; on the contrary, it should be in a close connection or a part of organizational risk management. In turn, EA facilitates organizational risk management. In EA-related decision-making, risk management activities should be utilized to optimize the risk-gain

ratio, and decision follow-up implemented as a continuous activity. To control EA risks, communication, common language and sufficient EA documentation are important activities. In addition, EA risk management responsibilities should be clearly defined, also more extensively than on the level of one architectural development project.

For more information on the subject, see report Enterprise Architecture Risks - An Overview.

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