

EA and IT Governance – A Systemic Approach

Janne J. Korhonen, Kari Hiekkanen, Jouni Lähteenmäki
Helsinki University of Technology, Helsinki, Finland

Abstract: Enterprise architecture (EA) is often managed within the IT function of organizations. With the lack of business ownership and involvement, the potential of EA cannot be fully realized on an enterprise scale. We view that the management processes and control mechanisms of IT governance are inadequate for holistic governance of enterprise architecture. Whereas IT governance primarily focuses on running daily IT operations, EA is primarily focused on designing the future state of architecture in support of business. IT governance frameworks such as CobiT define policy development and good practice for IT control, but EA still calls for comparable governance measures.

In this paper, we propose an approach to EA and IT governance based on proven theories from organizational research and construct theoretically motivated Agile Governance Model (AGM) that bridges both types of governance. We view that a responsive organization must have both mechanistic and organic characteristics. It must be efficient in face of business as usual and effective in transformative changes. To that end, a formal, hierarchical structure of authority and control as well as a network structure of communication and coordination are called for. We argue that IT governance predominantly contributes to organizational efficiency, whereas EA governance addresses effectiveness.

Using the constructed model, we analyze EA and IT governance in the case company, a financial institution, identifying weaknesses in the company's extant governance structures and pointing out several areas for improvement. Due to the generic nature of the underlying organizational theories, the model is potentially generalizable. Further work would include applying AGM in a number of other companies to test the model's external validity and applicability to different types of organizations.

Keywords: Governance, information technology (IT), enterprise architecture (EA), agile governance model

1. Introduction

Corporate governance (CG) can be defined as "involving a set of relationships between an organization's management, its board, its shareholders and other stakeholders" (OECD 2004). Governance as a whole defines the structures, processes and mechanisms which are used to effectively manage and govern an organization. International Federation of Accountants (IFAC 2004) divides governance to conformance and performance aspects, where the conformance aspect focuses on risks and accountabilities and the performance aspect focuses on strategic planning and execution.

Established theoretical perspectives in the corporate governance literature include agency theory (Jensen & Meckling 1976), resource dependence theory (Pfeffer & Salancik 1978) and stewardship theory (Donaldson & Davis 1991; Davis et al. 1997). Agency theory (Jensen & Meckling 1976) views governance as board oversight of inherently self-interested executives. The theory postulates that a principal-agent relationship bears agency costs accruing from measures to mitigate conflicts of interest in co-operative behavior.

According to the resource dependence theory, the board of directors facilitates the acquisition of resources critical to the firm's success (Johnson et al. 1996) and enhances organizational functioning, firm performance and survival (Daily et al. 2003). Stewardship theory views executives and directors as less self-serving and opportunistic than in the agency theory and acknowledge that executives

frequently have motives that are aligned with the objectives of their principals: serving shareholders' interests also serves their own interests (Daily et al. 2003).

CG frameworks such as International Financial Reporting Standards (IFRS), Generally Accepted Accounting Principles (GAAP) or OECD Principles of Corporate Governance (OECD 2004) have a common goal: to promote the financial and functional integrity of the corporations and aligning the goals of shareholders with the strategic goals of the management (Lazarides 2007).

As the role of information technology has become more important and integral part of modus operandi for modern organizations, strategic and holistic control of IT is needed. Due to the linkage of IT and business and tightening corporate governance regulation, senior management must be more involved in the governance of IT (Weill 2004). IT governance (ITG) can be defined as a set of structures, processes and mechanisms which are used to manage and control the information technology and related assets inside an organizational context (Van Grembergen 2000, ITGI 2003).

Several different approaches and frameworks to ITG have been proposed (ITGI 2003, Weill and Woodham 2002, Weill and Ross 2004, Henderson and Venkatraman 1993, Van Grembergen and De Haes 2004). Although the frameworks such as CobiT address both conformance and performance related aspects, it appears that organizations implementing ITG guidelines overemphasize the conformance side and the respective accountability and risk management aspects in ensuring their ongoing operational efficiency of IT function. We view that the more future-looking, strategic side does not receive enough attention.

Enterprise architecture (EA) extends traditional IT architecture with more business-related artifacts such as organizational goals, products and services, markets, or competitors, thereby providing better business-IT alignment (Winter and Schelp 2008). Although enterprise architecture is often limited to an "as-is" description of existing organizational artifacts, its distinctive essence is the forward-looking nature, whose full potential can only be unleashed through "to-be" and target views. Accordingly, we define enterprise architecture as a holistic, high-level approach to organizational design description and prescription.

Enterprise architecture is typically managed within the IT function of organizations and thereby falls short in business ownership and involvement. We view that the management processes and control mechanisms of IT governance are inadequate for holistic governance of enterprise architecture. IT governance frameworks such as CobiT define policy development and good practice for IT control, but EA governance still calls for comparable measures (Winter and Schelp 2008). Whereas IT governance is an established notion and has been extensively studied, enterprise architecture governance as a concept has not been properly defined (Hansen 2006). We subscribe to the view that there is a need for a distinct definition of EA governance that addresses the strategic, forward-looking aspects of EA, currently downplayed by IT governance.

The underlying basic assumption of traditional CG and ITG frameworks is that of agency theory: economic self-interest of agents creates goal conflict in the principal-agent relationship. However, we build upon the view of McGinnis et al. (2004) who leverage the idea of stewardship and suggest that social relationships of leaders are pivotal as an instrument of integration, not control. They argue that personal interactions, intermediaries and interactive structures are suited to complex tasks in uncertain environments.

2. Research method

Our research method was based on the integrative framework by Lee (1991), in which modernism and symbolic-interpretivism are combined into a single framework, consisting of "the three levels of understanding":

1. The understanding at the first level (*the subjective understanding*). Everyday common sense and everyday meanings, which guide the behavior in socially constructed settings.
2. The understanding at the second level (*the interpretive understanding*). The organizational researcher's interpretation of the first-level understanding.
3. The understanding at the third level (*the positivist understanding*). The understanding of the empirical reality that the researcher creates and tests.

The subjective understanding of pertinent phenomena in the case organization was achieved through a series of theme interviews with an enterprise architect of the case company. The interpretive understanding was then created by aligning the empirical findings with theoretical propositions and tested for content validity through subjective evaluations by researchers. These evaluations of the relevance and appropriateness of the interpretations arguably provided some degree of face validity, as all of the researchers are subject matter experts and bring industry experience in the field. The process was iterative in nature: based on the theories found in literature, hypotheses for the model were outlined and specified based on the subjective understanding. Finally, based on the resulting interpretive understanding, the theoretical model — Agile Governance Model — was abstracted.

The first test for the construct validity, as proposed by Lee (1991), was conducted by having the enterprise architect validate that the elements of the model reflected the subjective meanings recorded in the interpretive understanding. The other two tests remain to be done in further research 1) to test whether reliable predictions can be derived from the model, and 2) to test the predictions empirically.

3. Theoretical underpinnings

As the specification of roles, accountabilities and policies is in the core of governance, the natural first step in establishing a governance model is to create a governance structure with relevant layers and aspects that guides the specification of requisite decision and policy making entities. In our attempt to bridge the IT and EA governance, we turn to organizational research literature to address the following criteria:

1. The governance model shall allow for both efficiency and effectiveness
2. The governance model shall specify decision-making levels
3. The governance model shall specify a proper communication structure

3.1 The governance model shall allow for both efficiency and effectiveness

According to Burns and Stalker (1961), mechanistic organizations operate like machines and can be engineered into a high-performance system. Organic organizations, in contrast, have less specialization and formalization, are less hierarchical and have considerably more lateral communication and coordination. The former aims at predictability and accountability, whereas the latter promotes flexibility, adaptability and innovation. This is in line with the aforementioned distinction between conformance and performance aspects of governance.

Performance is a function of both efficiency and effectiveness (Ostroff and Schmitt 1993). Whereas efficiency measures resource utilization, or the comparison between input and output, effectiveness refers to the absolute extent to which the goals are accomplished. When the structural form is functional, the objective of an organization is that of internal efficiency and tight hierarchical control is necessary to ensure overall work success, but when the form is organized around end products and services, the focus is on external effectiveness (Zmud 1984).

An organization pursuing both efficiency and effectiveness must have both mechanistic and organic characteristics. It must be prepared to respond to two types of changes: predictable contingencies as well as disruptive discontinuations in its circumstances. According to the structural contingency theory (Lawrence and Lorsch, 1967), the most suitable organizational structure for the former type of changes is a formal, hierarchical structure of authority and control, whereas the latter type of changes calls for lateral communication and coordination.

Establishing governance is a lengthy undertaking and thereby governance design should be done as infrequently as possible (Weill 2004). In our attempt to specify a governance model that addresses both IT and EA governance, we should thereby allow for both efficiency and effectiveness, both mechanistic and organic organization. This would leave room for adjustments within the established structure.

Consequently, we distinguish two aspects in our governance model:

1. *Planning*, which ensures external effectiveness and has emphasis on EA governance
2. *Execution*, which ensures internal efficiency and has emphasis on IT governance

3.2 The governance model shall specify decision-making levels

Weill (2004) identifies layered approach as a critical success factor for governance. We view that the theory of Requisite Organization (Jaques 1998) would provide a viable basis for such layering of the governance structure.

Requisite Organization is a systemic model for effective managerial leadership. It is based on the tenet that organizational performance comes from a proper structure stratified by the complexity of work. Jaques (1998) defends hierarchy as a natural and efficient form of social organization, concluding that it is a reflection in organizational life of discontinuous steps in the nature of human capability.

In Requisite Organization, the hierarchy reflects the complexity of problem solving. The greater the complexity (level of work) in a role, the higher in the organization should the person in the role be. A simple measure of the level of work is the time span of discretion in a role — the span of time over which a worker needs to exercise discretion and judgment regarding the pace and quality of work. The longer the time span of discretion, the higher the level of work. Jaques maintains that the increasing role complexity is stratified to discrete bands as shown in Table 1.

Table 1: Strata in Requisite Organization (Jaques 1998).

Stratum	Task Type	Exemplary Roles	Time Span	Order of Complexity	Mental Process
VIII	Parallel Processing, Conceptual-Abstract	Super-corporation CEOs	50+ years	Conceptual-abstract	Parallel
VII	Serial Options	CxOs of large corporations	20–50 years	Conceptual-abstract	Serial
VI	Cumulative Processing, Conceptual-Abstract	Corporate EVPs	10–20 years	Conceptual-abstract	Cumulative
V	Unified Direct Action	Business unit presidents	5–10 years	Conceptual-abstract	Declarative

Stratum	Task Type	Exemplary Roles	Time Span	Order of Complexity	Mental Process
IV	Parallel Processing Tasks	General managers	2–5 years	Symbolic-verbal	Parallel
III	Alternative Paths	Serial Managers of mutual recognition units; senior professionals	1–2 years	Symbolic-verbal	Serial
II	Diagnostic Accumulative Tasks	First-line managerial work; specialist work	3 months to 1 year	Symbolic-verbal	Cumulative
I	Direct Action Tasks	First-line manual and clerical work	1 day to 3 months	Symbolic-verbal	Declarative

Requisite strata I through IV in Jaques' model comprise the symbolic-verbal order of information complexity. According to Jaques, a self-governing organization such as a middle-size business or an independent business unit of a large corporation operates within this order of complexity. We view that these strata are relevant to our study, as the architectural artifacts at this level of abstraction can be described in discrete symbolic terms such as processes, activities, services, applications, etc. Higher level strata pertain to conceptual-abstract order and strategic information that is difficult to express in explicit symbolic-verbal terms. Thereby, we find it natural to restrict the scope of interest to the lowest four strata.

3.3. The governance model shall have a proper communication structure

Based on the ideas of Endenburg (1988), Romme (1998) proposes that a circular learning and communication structure superimposed to the managerial accountability hierarchy can be used to re-engineer and re-organize work processes. In this circle organization, a circle is a policy-making unit of people that formulates and updates its objectives, performs the three functions of operating, measuring, and directing, and maintains the quality of its resources (Romme and Endenburg 2006).

To take into account the perspectives of the higher-level circle and lower-level circles, each circle is always double-linked to the overlapping circle via at least two people who belong to and take part in the decision making of both circles (Romme 1996). One of these links is appointed from the higher-level circle and is the person with overall accountability for the lower-level circle's results, and the other is a representative elected from within the lower-level circle. The double-linking between the circles enables vertical coordination through relationships, whereby organizational activities can be integrated (McGinnis et al. 2004).

Horizontal integration structures include liaison roles, formal groups and managerial team arrangements (Peterson 2004). Structural devices such as steering groups and advisory boards can be institutionalized as an overlay structure in the organization to provide advice and guidance, whereas competence and expertise centers can be used to pool knowledge and develop valuable skill sets.

4. Agile Governance Model

Given the theoretical frame and an interpretive understanding of empirical phenomena, we construct the structure of Agile Governance Model (AGM) as depicted in Figure 1. In line with the theoretical underpinnings, the structure has two aspects: planning and execution, and stratifies decision-making to four levels: strategic, tactical, operational, and real-time.

Each level comprises of two abstract circles that include one or more governance bodies responsible for setting up roles, accountabilities and policies in their sphere of influence and for making decisions pertaining to planning and execution at that level, respectively. An exception is the strategic level, at which the planning and execution aspects can hypothetically be combined in the same governance bodies.

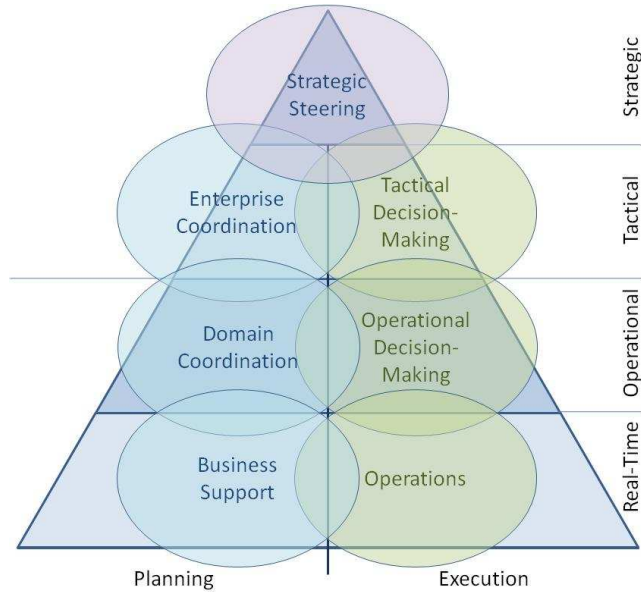


Figure 1: Agile governance structure.

The respective roles of EA governance and IT governance are depicted in Figure 2. Based on our interpretive understanding, the center of gravity in EA governance is on the planning side and at the tactical level, whereas the emphasis of IT governance is on the operational execution. In EA governance, the perspective appears to be organization-wide and attention to be directed toward external effectiveness. In contrast, the objective of IT governance would be that of internal efficiency.

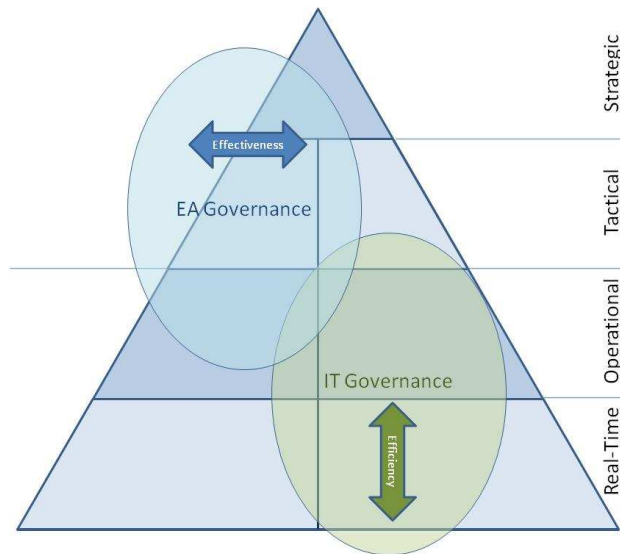


Figure 2: The respective roles of EA governance and IT governance.

The characteristics of decision-making at each of the four levels are described in more detail below.

4.1 Strategic level

The strategic level aligns with Jaques' (1998) requisite stratum IV, whose time span is 2 to 5 years. Decisions at this level pertain to the organization's business models, long-term objectives, future directions as well as formulation of corporate objectives and policies. These decisions are usually made in the face of external influences – technical advances, market shifts, environmental factors, or competition. The mental process of an executive, such as general manager, at this level is parallel (Jaques 1998): several interlinked projects with interrelated goals are conducted simultaneously.

Topmost in the governance structure, a strategic level steering circle sponsors architecture and development work in the enterprise. The steering circle articulates the vision, strategy and goals of the enterprise and aligns business development endeavors to strategic goals. The circle establishes and prioritizes required development programs, reviews and approves their roadmaps, project plans and budgets, enforces pertinent governance rules, and ensures that proper budgets and funding are in place. With a strategic multi-year perspective, it develops an organizational framework for change.

4.2 Tactical level

The tactical level corresponds to requisite stratum III with time span of one to two years. Tactical decisions pertain to plans such as business process re-engineering or organizational redesign. The mental process of a manager is serial (Jaques 1998): a line of thought is constructed of a sequence of linked reasons.

On the planning side of the governance structure, enterprise-wide coordination circle coordinates different development programs, typically from an architectural perspective. It is manifested by governance bodies such as Enterprise Architecture Office or Enterprise Program Management Office. An architectural coordination function at this level has authority over logical artifacts such as architectural blueprints, business process models and enterprise architecture elements. It coaches, guides and helps the programs, builds enterprise architecture in alignment with the strategy, develops various standards and guidelines and enforces best practices. It also monitors the use of architectural standards, guidelines, principles and constraints in the programs and assesses the process performance.

On the execution side, a number of tactical development programs are conducted. These programs translate the strategic intent to organizational capabilities and business processes. A business process development program is typically led by a business process owner, who has responsibility for the process end to end. When the development program concludes, the responsibility of the maintenance and continuous development of the process remains in the hands of the process owner. Exemplary governance bodies and roles on the business execution side at the tactical level include Business Unit managers, IT managers, end-to-end process owners and steering groups of development initiatives.

4.3 Operational level

The operational level correlates with requisite stratum II with time span of 3 months to 1 year. Operational decision-making is related to concerns of the immediate future: resource allocation, priorities, and expenditures. The mental process at this level is cumulative (Jaques 1998): a number of different ideas are brought together to arrive at a conclusion.

On the planning side, domain-specific coordination circle guides and supports operational level development. Such operational level governance bodies include IT Project Office, Integration Competence Center and SOA Center of Excellence. These support functions ensure that the implementation projects are conducted according to consistent architectural principles, best practices and rules, and that they fulfill the pertinent functional and non-functional requirements.

On the execution side, a number of operational development projects, e.g. system, service or process implementations, are conducted, sometimes as part of higher level development programs. Exemplary governance bodies and roles include line-of-business managers, middle-managers in IT units, process stewards and steering groups of implementation projects

4.4 Real-time level

The real-time level corresponds with requisite stratum I with the time-span of 1 day to 3 months. It is about first-line manual work and clerical work; real-time decisions pertain to current activities and are an integral part of the modus operandi of the enterprise. The decisions are made within the operations themselves, in line with the operational plans, by automation or people conducting the work. Mental processing at this level has a disjunctive, declarative quality (Jaques 1998): the work is scripted and reasons are separate from each other.

Clerical level business support and guidance is given to projects and operational business within the limits set in the lowest level governance circles. Examples of such support functions include provision of infrastructure services, IT help desk, training and on-site support.

5. EA and IT governance at case company

The Agile Governance Model is based on an analysis of extant and planned EA and IT government structures within a large financial corporation in relation to the theoretical considerations presented herein before. The financial corporation consists of several separate businesses served by a centralized IT function. The scope of the study is limited to one of the businesses and its architecture support given by the IT function. The case company is in the midst of transforming the IT organization and changing the role of its EA team. Thereby, we were also able to analyze the reasons for organizational and governance structure change.

IT governance has largely been established in the case company and the respective processes have been modeled. The focus is on operational IT that aims at stability and minimization of risks. This creates tension with business development that calls for agility and better responsiveness to the changing environment. A corporate level EA steering group and a business unit level EA team are being established. The link between EA and operational IT management has not been considered yet. However, these links must be created to be able to manage business through enterprise architecture.

We reviewed the current and planned governance bodies and positioned them onto AGM as guided by the planning/execution distinction and Jaques' Requisite Organization theory; this was relatively straightforward. The mapping is depicted in Figure 3. The center of gravity of the established governance bodies is on the execution side and at the operational level, whereas the envisioned governance entities pertaining to EA are positioned on the planning side.

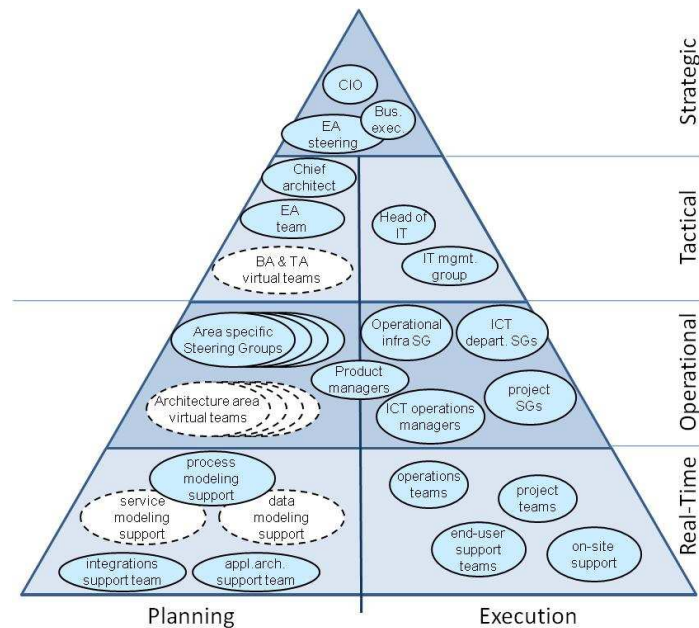


Figure 3. Case company governance entities mapped to Agile Governance Model.

In Section 3, we outlined three criteria for a governance model. These criteria were used as guidance in analyzing the case company’s current and planned EA and IT governance functions.

5.2 Observations on planning vs. execution

Although it was easy to position the governance entities to either planning or execution side, the types of decisions and the mode of operation did not always match the intended governance role of the entities. Most notably, planning and coordination bodies are being used as case-by-case acceptance forums for operational changes. A case in point is the Infrastructure Development Steering Group that on a monthly basis handles all operational IT infrastructure changes arising from project needs or production infrastructure evolution. Rather than taking care of decisions on single cases, the steering group should set the overall direction for development and the guidelines that ensure coherence. The respective execution side body Operational Infrastructure Steering Group focuses currently merely on co-operation with the IT facility management partner and the related IT operations.

A more explicit planning vs. execution distinction would improve the overall performance of the organization.

5.3 Analysis of decision-making levels

The CIO of the company is involved in strategic level decision-making, but his main focus is in managerial work at the tactical level. He runs the IT management function, coordinating the operations between Business Units and IT services. A more strategic CIO role would be beneficial for the long-term success of the enterprise.

Likewise, the role of Chief Enterprise Architect and the EA Office currently operate underneath the CIO within the IT management function, which severely constrains the area that EA office can coordinate. Enterprise architects at the EA office, who should act at the tactical level, currently perform IT project guidance and support case by case, thus working at the operational and real-time levels. This prevents them from fulfilling their main role of enterprise-wide coordinators between business areas. Delegating these activities downward to application or integration architects has

already been planned. Several new planning and coordination bodies are established in the form of virtual teams presented in Figure 3.

One of our findings was the lack of an intermediating governance body between Chief Enterprise Architect and Business Executives and Executive Board. This hinders the successful functioning of EA. The recently formed EA Steering Committee helps to overcome this shortcoming. It intends to provide the link between strategic business decision-making and tactical EA coordination work.

5.4 Analysis of communication structure

Double-linking mechanism is currently not used between the governance entities. Downward supervision links are explicit, but upward links are weak and only used for escalation of issues. Many linkages are informal and undocumented, especially in horizontal communication. As the respective roles of governance bodies and the linkages between them are not formally documented and agreed upon, different parties may have different notions of governance procedures and responsibilities. It is, for instance, possible that business decisions conflicting with architecture plans can be carried out without the planning body being involved in the decision-making or even informed about it.

Explicit linkages between the governance entities in the form of proper double-linking mechanism would facilitate communication throughout the enterprise and contribute to its overall responsiveness. Particular attention should be paid to the link between traditional IT governance that has been built bottom-up and envisioned EA governance that is being established top-down.

6. Conclusions and further work

In this paper, we analyzed current and planned EA and IT governance in a case company, a financial institution. To that end, we constructed a theoretically motivated governance model called Agile Governance Model (AGM) that accounts for both types of governance. As a methodological approach we employed Lee's (1991) integrative framework.

The constructed model helped in identifying weaknesses in the company's extant governance structures and pointing out several areas for improvement. AGM was perceived as an intuitive and helpful analysis framework by the enterprise architects of the case company.

Due to the generic nature of the underlying organizational theories, the model is potentially generalizable beyond the case company. It could be utilized as a predictive and generative model that would help companies design EA and IT organizations with a more balanced governance structure, alleviating the inherent conflict between EA, whose main objective is to support business change, and IT, whose main objective is to minimize risk and ensure compliance.

Further work would include applying AGM in a number of other companies to test the model's external validity and applicability to different types of organizations. The model could also be analyzed and validated through a comparison with established governance models such as CobiT.

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