

Enterprise architecture management and its role in corporate strategic management

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Abstract A considerable number of organizations continually face difficulties bringing strategy to execution, and suffer from a lack of structure and transparency in corporate strategic management. Yet, enterprise architecture as a fundamental exercise to achieve a structured description of the enterprise and its relationships appears far from being adopted in the strategic management arena. To move the adoption process along, this paper develops a comprehensive business architecture framework that assimilates and extends prior research and applies the framework to selected scenarios in corporate strategic management. This paper also presents the approach in practice, based on a qualitative appraisal of interviews with strategic directors across different industries. With its integrated conceptual guideline for using enterprise architecture to facilitate corporate strategic management and the insights gained from the interviews, this paper not only delves more deeply into the research but also offers advice for both researchers and practitioners.

Keywords Enterprise architecture · Enterprise architecture management · Business architecture · Corporate strategic management · Strategic planning · Business model

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1 Introduction

Since the late 1980s, enterprise architecture (EA) and its fundamental logic have garnered increasing attention from both the scientific and practitioner communities. The benefits of reducing operating costs, improving project execution, and increasing alignment of business and information technology (IT) (Buckl et al. 2010b) are only some of what has spurred awareness of EA. In general, EA can be considered as a structured description of the enterprise and its relationships, which may make it the fundamental “management information system” for the enterprise. As such, it offers an integrated representation of different enterprise layers in descriptive models of past, current, and future states (Niemann 2006). At the highest level, these layers can be distinguished as business architecture and IT architecture.

EA can be employed in various scenarios. Most often, it is associated with IT business alignment (Winter et al. 2010) and IT consolidation. Other scenarios involve, for example, IT cost management, project portfolio planning, compliance management, project initialization, and post-merger integration (Winter et al. 2007). Unfortunately, the scenario of managing the corporate strategy—“the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals,” and thus defines what business the company is to pursue and what kind of organization it intends to be (Andrews 1987)—does not appear to be given much consideration in the literature and in practice, despite that the original idea of EA involves elements such as business goals, strategies, plans, products, and partners (Zachman 1987). More important, lack of consideration exists despite promising experiences with strategic business architecting (Aier et al. 2008a; Kurpjuweit and Winter 2009; Winter 2002) and the general importance attached to EA in strategic planning and business transformation (Aier et al. 2008b; Kappelman et al. 2008; Riege and Aier 2009; Schekkerman 2004; The Open Group 2009). A recent survey on the current state of EA programs reveals that many IT professionals perceive that business architecture is implemented only to a small extent of what they would really need (Leganza 2010).

Although EA is considered to provide the blueprint of the enterprise and should essentially be a business exercise, it seems its scope has been scaled down gradually to information technology (Buckl et al. 2009). So, the aforementioned alignment (Henderson and Venkatraman 1992; Goeken et al. 2008) with the business most often takes place only on an operational level (Aier et al. 2008b), that is, with respect to business processes and organizational units. Moreover, the business is essentially reduced to a context variable rather than being treated as a design variable. EA activities seem to be concerned most often solely with the documentation of “operational” business elements for IT alignment purposes rather than with real business engineering, that is, the method- and model-based construction of enterprises (Winter 2003) up to a strategic level. As such, EA is deemed to remain stuck in the IT environment.

At the same time, we find researchers in corporate strategic management, which we consider “the art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its objectives”

(David 2011), calling for a greater cross-fertilization of the field with other disciplines (Furrer et al. 2008). Specifically, systems thinking, which can be considered a basic principle of EA, is recognized as a promising means to facilitate the examination of the cause-and-effect-relationships between different strategic measures (Wang and College 2006). This is in line with the suggestion to rank strategies based not only on financial criteria but also on their prioritized relationship with the firm's mission (Hastings 1996), which is interesting given that relationships are at the core of any EA model. Another notion put forward is that of multiattribute value modeling, which essentially represents a procedure for evaluating different strategies against a set of objectives using decomposition to a level where relatively easy judgments can be made (Goodwin and Wright 2001). As such, it also relates to methods, which are at the heart of EA activities (i.e., modeling, decomposition); likewise, they are considered practical in formal planning of strategies (Goodwin and Wright 2001), which in previous studies has most often been found to be related positively to higher performance (cf. Capon et al. 1988).

Corporate strategic management, however, does not involve only the general stage of strategy formulation addressed above, but also those of programming/implementation and final evaluation/control (David 2011; Hax and Majluf 1984). Strategy implementation (including ongoing execution) in particular suffers from difficulties in achieving success in practice (Raps 2008; Cater and Pucko 2010). Among the most critical obstacles to successful strategy implementation recently identified are weaknesses in communicating strategy to lower organizational levels (Cater and Pucko 2010); again, this is an interesting finding given that one of the main functions associated with EA is to communicate organizational objectives (Kappelman et al. 2008).

Against this background, this paper aims to provide a detailed description of EA as a potential instrument for corporate strategic management. This is based on a comprehensive business architecture framework as the methodological foundation and the application of this conception to a number of aspects of corporate strategic management—something that seems not to have yet been established by past research and is this paper's main contribution. In fact, little progress has been made toward fully capturing business architecture, the “forgotten child” of EA. We employ a mixed method approach that combines design science (Hevner et al. 2004) with grounded theory (Glaser and Strauss 1967) to construct and apply the framework and, in particular, obtain empirical grounding through a series of interviews with strategic directors from different industries. Thereby, we not only address the gap between “original” EA and what it has been reduced to most often in practice (in that we enhance the understanding of EA's application in corporate strategic management), but also survey the requirements of strategic management practitioners and deduce limits of EA as practiced today in terms of real business engineering. In other words, we set out to answer two main questions. What support can EA management, as the overall practice of developing and maintaining the EA, provide within corporate strategic management, and on what conception of business architecture is this based? In what areas does EA management need to develop to permeate corporate strategic management more deeply?

The remainder of this paper is structured as follows. The next section surveys research pertaining to the role of EA in corporate strategic management and fundamental elements of EA that have been given little consideration to date. In particular, this involves the concept of the business model. We then sketch out the research methodology used for this paper. Next, we provide the conceptual foundation and introduce the business architecture framework. The subsequent section builds on the framework and details potential benefits of EA in corporate strategic management. The penultimate section elaborates on this and presents the results of our interviews with a number of strategic directors. The final section briefly summarizes our findings and discusses potential future research.

2 Related work

Strategic, with strong business roots, EA may serve as an instrument for several aspects of business management, from strategy to execution. However, there is little research dealing with the relationship of EA management and corporate strategic management. In a recent and the only study close to ours, Radeke (2011) illustrates how to apply EA management to the process of strategic change. However, this work does not ground its assertions in a thorough representation of what constitutes business architecture, which we consider crucial for a proper substantiation of relating EA with corporate strategic management. In addition, no insights from practitioners of corporate strategic management are included.

Apart from that, Ross et al. (2006) is one of the very few and well-known examples that aims to provide a bridge from EA to strategic management; the authors define EA as “the organizing logic for business processes and IT infrastructure reflecting the integration and standardization requirements of the company’s operating model.” Thus, they link EA closely to the operating model, which represents the enterprise’s level of business process standardization and integration and can thus be considered as “a general vision of how a company will enable and execute strategies.” They distinguish between four types of operating models: diversification (low standardization, low integration), coordination (low standardization, high integration), replication (high standardization, low integration), and unification (high standardization, high integration). Thereby, they clearly stress that EA is a business issue rather than an IT issue. Unlike with a holistic approach to EA, though, the business strategy and operating model are not considered as integral elements of EA itself; rather, in their view EA only reflects strategic choices—an approach basically shared by Whittle and Myrick (2004) as well as Versteeg and Bouwman (2006), for example, who position business architecture between business strategy and different architectural initiatives (e.g., organization architecture, IT architecture).

Both Bernard (2005) and Pereira and Sousa (2005) offer a different view, stating that EA includes the current and future business objectives, goals, visions, and strategies. This is also reflected in the work of Spewak and Hill (1993), who see business modeling as an integral part of EA planning. Parker (2009) details the strategic dimension of EA and explicates associations and links to the main

constituents of strategic management: strategic analysis, strategy formulation, strategic execution, and strategic governance. Likewise, Aitken (2009) contributes to EA's integration with strategic planning. This is based on his view that EA is considerably more than simply describing current and future states of the enterprise. In fact, the author emphasizes EA's design capability, where he believes EA distinguishes itself by assisting the enterprise to determine which road to take to reach its target state and gain maximum competitive advantage. In particular, this is because EA may be used as a tool to capture the strategic context of the enterprise, both internal and external. Ganesan and Paturi (2009) also promote using EA for strategic planning; they suggest integrating business architecture with the business motivation model, as an acknowledged "scheme or structure for developing, communicating, and managing business plans in an organized manner" (Object Management Group 2010), and with the balanced scorecard approach, used to monitor the achievement of business goals in the context of financial, customer, internal business, and learning and growth performance measures (Kaplan and Norton 2001).

Bernus et al. (2003) offer a comprehensive handbook on EA as the science of enterprise engineering, including, for example, strategy formulation and business model design. As part of this handbook, Molina (2003) proposes a framework for defining the enterprise concept, with the business concept (mission, vision, and culture), strategy (competitive strategy, value chain strategy, and production/service strategy) and the action plan (core processes, core competencies, business plan) as major components. According to Kalpic et al. (2003), a company needs to develop a view of its strategy. To allow more than just instrumentalist annual planning, they suggest establishing a strategic architecture that "provides a blueprint for building competencies needed to dominate future markets."

All in all, however, business strategy and, particularly, the business model find themselves underrepresented in the EA literature; this is evidenced in a recent, very extensive analysis of EA research (Simon et al. 2013), in which the discourse on EA, apart from its general focus on IT issues, is shown to concentrate far more on business elements at the operational (e.g., business processes) than at the strategic level. This is despite the findings of Burkhart et al. (2011), who in their recent review of the business model literature identify an insufficient consideration of relations and dependencies between different business model elements as well as an absence of formalized means of graphical representations that allow structured and comparable visualizations of business models—issues that one may expect to be resolved by EA research.

According to Uppington and Bernus (2003), the business model represents the system of relationships between the business entities involved. Detailed research on the business model concept has been done by Hedman and Kalling (2002, 2003), Osterwalder and Pigneur (2002, 2003), Osterwalder et al. (2005), Fritscher and Pigneur (2010), zu Knyphausen-Aufseß and Meinhardt (2002), and most important, Osterwalder and Pigneur (2010), who introduce the "Business Model Canvas." In general, this canvas describes different building blocks that constitute the business model, such as customer segments, business partners, and distribution channels. This is mainly in line with Kaplan and Norton (2004), who use "strategy maps" to

describe how the organization creates value and to visualize the cause-and-effect relationships among the components of corporate strategy.

Returning to the EA literature, Keller (2009) accounts for the fact that business capabilities have evolved to become one of the latest “hot topics” in EA management. In fact, he demonstrates how capabilities can be used to facilitate decision making. Close resemblance to this approach can be found in Brits et al. (2007), who further distinguish between different types of capabilities (e.g., strategic capabilities) and suggest a method for business capability modeling. Further, Barroero et al. (2010) recognize the crucial role of capabilities in EA, offering a business capabilities-centric EA approach based on an extension of “The Open Group Architecture Framework” (TOGAF) (The Open Group 2009).

In summary, EA may encompass a variety of business elements (Österle et al. 2007), including those of a strategic nature. The importance of business architecture is supported by the findings of a survey among European practitioners conducted by Riege and Aier (2009), indicating that more mature EA practices engage in this field and are also involved in business strategy development. However, in this respect, the related work has left significant room for further scientific contributions. First, comprehensive discussions of EA management in light of corporate strategic management are rare and those that do exist are not based on thoroughly specified frameworks of business architecture content (e.g., Radeke 2011). Second, existing frameworks of business architecture content show different emphases that could be integrated into an overall picture. Third, insights and requirements from strategic management practitioners have not yet been explored systematically in the EA context. Fourth, formalized means of representation for certain strategic management activities are missing (cf. Burkhart et al. 2011). So, to sum up, a systematic assimilation of key business architecture entities in a comprehensive frame of reference and, on this basis, an application of EA to major concerns in corporate strategic management still seems to be lacking. This motivates the development of our approach in this paper.

3 Research methodology

In line with guidelines from previous research (Adams and Courtney 2004; Beck et al. 2012; Gregory 2010; Goldkuhl 2004; Holmström et al. 2009; Müller and Olbrich 2011), our research approach represents a reasonable combination of the design science paradigm (Baskerville 2008), which aims at extending “the boundaries of human and organizational capabilities by creating new and innovative artifacts” (Hevner et al. 2004), with the grounded theory concept (Glaser and Strauss 1967), used to study primarily qualitative data to generate theories (in terms of conceptual categories and the relationships between them) of both practical relevance and scientific rigor. In particular, we drew upon the design science research process proposed by Rossi and Sein (2003) (cf. Peffers et al. 2006), with subsequent steps of (a) identifying a need, (b) building a methodology using good design principles and best practices, (c) evaluating the methodology, and, finally, (d) learning and theorizing.

As a more general research approach, design science can be used in combination with various research methods (Gregory 2010). So, inspired by the theory-generating design science approach presented by Beck et al. (2012), which combines design science and the grounded theory method, we complemented the above steps with supportive techniques from grounded theory, such as theoretical sampling (see below). We consider this complementary use reasonable: both design science and grounded theory are inherently iterative in that data collection and analysis, on the one hand, and artifact creation and evaluation, on the other hand, are closely intertwined (cf. Beck et al. 2012; Glaser and Strauss 1967; Hevner et al. 2004).

Specifically, as suggested by Beck et al. (2012), we employed grounded theory characteristics and techniques to benefit from additional data collection and analysis following initial artifact creation, thereby generating additional theoretical insights and increasing the understanding of the usage of the artifact [see also Weedman (2008), another exemplary work that uses grounded theory techniques to support the analysis and evaluation in a design science research project; while not mentioning grounded theory, the author employs techniques resembling closely those of grounded theory (e.g., theoretical sampling) (cf. Beck et al. 2012)]. In this respect, we followed the guidelines of Offermann et al. (2009), who in their proposed design science research process include the presentation of the problem and its solution to practitioners in lectures or workshops, followed by a survey (including questions such as “Do you think the presented artifact provides a viable solution to the problem?”) to evaluate perceived viability. Here, as proposed by Gregory (2010), the relationship of the designed artifact with organizational tasks (in line with our first research question)—something that can be considered an appropriate subject of a grounded theory—was to form the basis for this evaluation [thereby accounting for the findings that the grounded theory method may find particular applicability in the evaluation phase of the design science research process (Gregory 2010; Gregory and Muntermann 2011)].

So, while the first step of our research process (identification of need) was in form of the literature review above, the second step (development/creation) involved building on existing theories that were applied and extended (Hevner et al. 2004) to design a comprehensive business architecture framework and, using this as the basis for our understanding, elaborate a descriptive (Hevner et al. 2004) application of EA to corporate strategic management to develop theory further around EA as an artifact. This went hand in hand with the subsequent step of (qualitative) evaluation (i.e., the evidence of utility), where we (initially) mirrored the above to practice through a series of semi-structured interviews [as a common means used in grounded theory-based research (Müller and Olbrich 2011)] with experienced practitioners, which, being at the core of our research, were for the purpose of empirical grounding (Goldkuhl 2004) intended to ensure an adequate level of research rigor (cf. Hevner 2007). We did this against the background of various examples of design science work published in recognized IS journals or conference proceedings (e.g., Bartenschlager and Goeken 2010; Bekkers et al. 2010; Bradford et al. 2006; Felden and Buder 2012; Jansen et al. 2012; Repschlaeger et al. 2012; Urbach and Würz 2012; van Steenberg et al. 2010) that employ expert interviews as the selected instrument (or at least a major instrument

among others) for the (initial) evaluation/validation of the constructed artifact (cf. Flick 2009, stating expert validation of findings as a main way of using such interviews). The rationale behind this is the possible reconstruction of (exclusive) specialist knowledge (particularly process and interpretive/explanatory knowledge)—knowledge that has the chance to become (at least partly) asserted in a specific organizational or functional context and can thus be considered of high practical relevance, structuring “the practical conditions of other actors in their professional field in a substantial way” (Flick 2009). In the design and evaluation of reference conceptual models in particular (of which our framework can be considered), the use of expert interviews with potential users is deemed advisable to obtain a deeper understanding of the addressed problem situation and evaluate the created artifact in terms of quality (vom Brocke and Buddendick 2006).

The interviews conducted also provided the bridge to the final step of learning and theorizing. Although we began with a focused set of research questions on the established business architecture framework and the associated role of EA management within corporate strategic management, we remained open to new insights that might emerge from the interview data rather than solely testing associated hypotheses (Madill et al. 2000). This is in line with the grounded theory nature as an iterative process of yielding new findings based on empirical data (Glaser and Strauss 1967), and, if necessary, enriching these with insights from the literature (despite myths that the grounded theory method involves sole reasoning from empirical data and does not consider other knowledge sources, such as the literature (Gregory 2010), there are several IS grounded theorists (e.g., Fernandez 2004; Levina and Vaast 2005) that make use of the literature alongside empirical data to raise the conceptual level of their analyses).

We identified potential interviewees based on purposeful sampling (Morse et al. 2002; Sandberg 2000) of individuals holding positions as “strategic director,” “head of corporate strategy,” or “managing director strategy.” We limited our requests to these key positions because they were “golden sources” for the research questions we were asking, with firsthand knowledge because they carry responsibility for those aspects of strategic management relevant to our research (Morse et al. 2002). Our aim was to have interviewees who would represent major industries. We thus drew on the principles of theoretical sampling (i.e., cases are chosen for theoretical, not statistical, reasons), which is at the core of grounded theory and suggests the iterative analysis of a collection of independent slices of empirical data representing a set of cases selected based on their potential to reveal new insights, while a representative character has less priority (Glaser and Strauss 1967; Eisenhardt 1989; Gregory 2010; Müller and Olbrich 2011). In total, we contacted and briefed eighteen individuals about the research project, and seven agreed to participate. Although this is not a fully representative sample, key industries were in fact represented and we could take advantage of a balanced interview portfolio (see Table 1); of course, more extensive field research will be required in the future to validate the findings further and extend them in terms of the effective usage in practice.

Between April and October 2010, we conducted seven semi-structured, guideline-based interviews (Gläser and Laudel 2004; Hopf 2005) of one- to two

Table 1 Interviewees by position and industry

	Position of interviewee	Industry of interviewee
1	Managing director Western Europe	Courier, express & parcel
2	Director Strategy, business development & equity investments	Post
3	Head of strategy/project coordination strategic business unit full-range national	Retail
4	Director strategy & business development	Car rental
5	Head of strategic architecture (on behalf of managing director strategy & innovation)	Telecommunication
6	Director strategy/new business development	Chemicals
7	Senior vice president corporate strategy and planning	Automotive

hours' duration. Each began with a short introduction to our research and the objectives and agenda of the interview, followed by a concise overview of the EA discipline. We then introduced seven potential application scenarios of EA management in light of corporate strategic management, using one or two presentation slides per scenario. We then asked the interviewee's view on each scenario and, finally, the corresponding level of agreement (none, partial, full). Open questions of this sort, asked in a way to exclude interviewer bias (Kvale 1989), initiated intense discussions and allowed us to explore the scenarios in greater depth. To facilitate the approach outlined, we also drew on basic ideas of appreciative interviewing (Schultze and Avital 2011), inviting the interviewees to draw paths to "ideal" types of corporate strategic management by reflecting on their personal experiences.

Since we expected little agreement to having the interviews recorded, we used a documentation sheet to capture the interviewee's narratives. We later created a transcript from these notes and from memory, which we then verified with the interviewees [in line with Dubé and Paré (2003), we will present several quotes later in our study]. Armed with the interview data, we applied a form of qualitative content analysis, iterating between the interdependent meaning of parts and the whole they form (Klein and Myers 1999) and categorizing the interviewees' statements (Flick 2008; Gläser and Laudel 2004; Kvale 2007; Schmidt 2005). We then revisited each scenario based on the additional insights gained and charted the territory for future EA research and practice.

4 Conceptual foundation: a business architecture framework

Generally speaking, EA management captures all those processes, methods, tools, and responsibilities needed to build a holistic and integrated view of the enterprise and allow for a continually aligned steering of business and IT (Matthes et al. 2008; Niemann 2008). As such, EA management deals with different architectural layers, one of which is business architecture—a structured description of the business

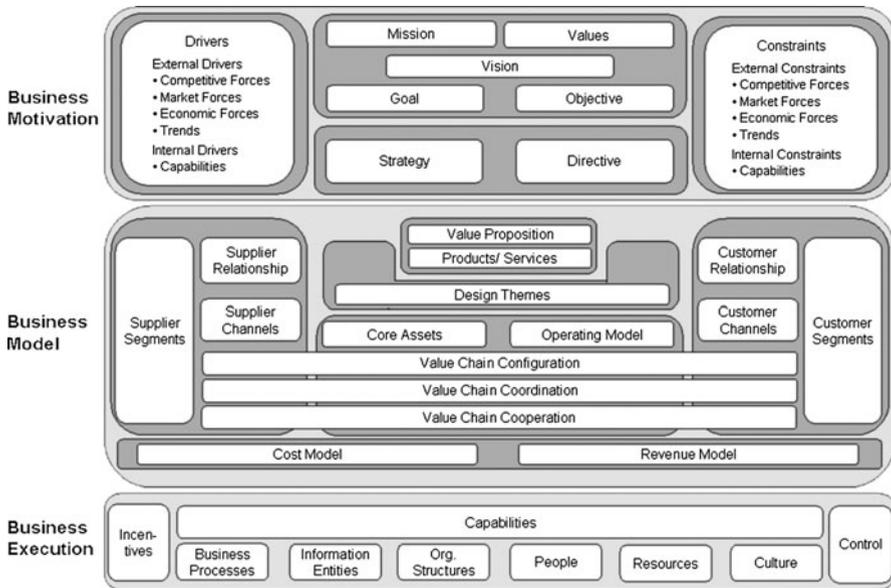


Fig. 1 Business architecture framework

comprising a set of components and their interrelationships (as such, one significant aspect area of EA alongside, e.g., IT architecture). Business architecture is, however, subject to ambiguous use in the literature (cf. Glissman and Sanz 2009; Versteeg and Bouwman 2006). To allow for a holistic approach to EA management (e.g., its application to corporate strategic management), we suggest a three-layered business architecture framework in the form of a comprehensive taxonomy (see Fig. 1) that extends previous research (Bernard 2005; Graves 2010; Hoogervorst 2004; Osterwalder et al. 2005; Wirtz 2011; Zachman 1987) and encompasses the concept as a whole, including different levels of abstraction (“contextual,” “conceptual,” “logical,” and “physical”) (cf., e.g., Op’t Land et al. 2009). Given this motivation, the decisions for the design of the framework’s structure and its inherent elements were based on a careful literature synthesis; in addition, talks with several EA practitioners about business architecture content and the first author’s knowledge of different EA practices and their business architecture models informed our design process. Within this process, we considered three criteria as additional requirements beyond comprehensiveness and a variety of abstraction levels: extensibility, on the one hand, and simplicity and understandability, on the other hand (cf. Hirvonen et al. 2007; Österle et al. 2007).

At the top of our resulting framework is the business motivation (Ganesan and Paturi 2009), which captures the strategic context of the business and explains why it operates in a certain way. This is most often referred to as the strategy layer (cf. Winter and Fischer 2007). Strategy is, however, only one of the elements. In line with the Object Management Group (2010), we see three constituents of the business motivation: business end, business means, and business influencers. The

business end includes essential elements of aspiration such as mission (the fundamental purpose of an enterprise's existence), values (ideals, customs, or institutions an enterprise promotes or agrees with), vision (overall image of what the enterprise wants to be or become), and goals and objectives (both of which represent desired results: objectives quantify goals and may thus additionally be linked with key performance indicators and/or critical success factors) (cf. David 2011; Kalpic et al. 2003; Kantabutra and Avery 2010; Object Management Group 2010); business means represent the instruments employed to achieve those ends. Business strategy, as the general course of action, is at the core of the business means (it may be detailed by tactics; like strategies, they channel efforts towards goals/objectives) (Object Management Group 2010); it is complemented by business directives such as policies, principles, and rules. The employment of business means and thus the achievement of business ends are affected by business influencers, either internal or external to the enterprise, with the external factors basically encompassing the established PEST (political, economic, social, and technological) forces (Peng and Nunes 2007). An assessment of these influencers may result in a classification into strengths and weaknesses (both internal) as well as opportunities and threats (both external) (Object Management Group 2010). As such, they represent drivers and constraints of strategic choice.

This leads us to the bottom layer of our framework—business execution. Most often referred to as the organization layer (cf. Winter and Fischer 2007), this primarily includes business processes, information entities, organizational structures (functional, geographical and legal), people, culture, resources, and their aggregation into “logical” business capabilities (cf. Barney et al. 2001; Brits et al. 2007; Hoogervorst 2004; Kohlborn et al. 2009). A business capability is an enterprise's ability to execute a defined and repeatable pattern of activities and produce a desired outcome (e.g., product, service) by deploying specific resources and expertise and processing information in a defined organizational and cultural environment (cf. Eisenhardt and Martin 2000; Helfat and Perera 2002; Kalpic et al. 2003; Osterwalder and Pigneur 2003). In general, business capabilities abstract from their realization through business processes, entities, organizations, people, culture, and resources (cf. Klinkmüller et al. 2010), thus being the fundamental and stable building blocks of the business (cf. Kohlborn et al. 2009) and potential influencers of business means. With technology not being part of capability realization (as opposed to, e.g., Brits et al. 2007) and thus treated as a separate aspect, business capabilities are also clearly delineated from information system capabilities—a differentiation that seems crucial both for IT architecture planning based on real business requirements and for a proper evaluation of the business value of information systems. The adequate application of the organization's capabilities is assured by a governance system of incentives and control (Albers 2010; Raps 2008), which round out the building blocks of the business execution layer. All in all, this includes those components of the business necessary to execute the middle layer of our framework—the business model.

The business model expresses the fundamental business logic and therefore represents the entire system of creating and delivering value to customers, capturing this value by earning profits from these activities and sustaining this value capture

(cf. Osterwalder and Pigneur 2002, 2010; Shafer et al. 2005). As such, it can be considered a conceptual blueprint of the business strategy (cf. Osterwalder and Pigneur 2003, 2010), which given its Greek origin *strategia* (i.e., the art of war) is typically defined at a high level of abstraction. The business model offers several perspectives (cf., e.g., Al-Debei and Avison 2010; Feurer and Chaharbaghi 1994; Fritscher and Pigneur 2010; Hedman and Kalling 2003; Kaplan and Norton 2004; Shafer et al. 2005; Winter 2002; Wirtz 2011; Zott and Amit 2009) that facilitate translating strategy into execution models [and associating these with adequate performance measures (cf. Kaplan and Norton 2004)]. We suggest six business model perspectives: the offering perspective (value proposition, products/services); customer perspective (customer segments, customer relationships, customer channels); supplier perspective (supplier segments, supplier relationships, supplier channels); activity perspective (value chain configuration, coordination and cooperation (cf. Zellner 2008), core assets (e.g., core competencies (as those capabilities being of strategic nature) or intellectual assets like reputation), operating model); financial perspective (cost/revenue model); and sustainability perspective (design themes) (as opposed to, e.g., Hedman and Kalling (2003), we do not consider competition as part of the business model, since competitors cannot necessarily be chosen).

Together, the supplier, activity, and customer perspectives describe the entire architecture of value creation (cf. zu Knyphausen-Aufseß and Meinhardt 2002), which provides the basis for a certain offering. With customer co-creation and open innovation (Reichwald and Piller 2009; Schlagwein et al. 2010), this could also mean that customers themselves carry out key value chain activities. This aspect is related closely to other parts of the business model, such as the available set of core assets (Amit and Schoemaker 1993; Hafeez et al. 2002), the choice of key coordination mechanisms such as postponement and speculation (Pagh and Cooper 1998; Pfohl 2004), and cooperation throughout the value chain by establishing strategic partnerships (Dussauge and Garette 1999). The architecture of value creation is also reflected within the financial model, as regards both revenues and costs. To sustain competitive advantage achieved by design and implementation of the business model, the enterprise may eventually consider design themes (Zott and Amit 2009) such as branding (Winter 2002), the use of patents, and customer lock-in through standardization.

With these elements, the business model becomes an important part of a business plan when establishing a new business (cf. Osterwalder and Pigneur 2010). Figure 1 illustrates the three-layered business architecture framework outlined. As indicated, the elements of business motivation, model, and execution possess various interrelationships. These can be captured in a meta model, that is, the conceptual scheme of the EA including its content elements and their relationships and attributes (cf. Kurpjuweit and Winter 2007). Populated with concrete instances (e.g., the business capability to “meet regulatory requirements” and business processes such as “financial reporting” and “recruitment”), this provides the basis for the practical use of EA in corporate strategic management and the application of architectural thinking—with its focus on the structure of components and their interrelationships with each other and the environment (The Open Group 2009)—to the

evolution of the business. In particular, this involves using specific views of this model (e.g., a capability realization map) that can assist in certain aspects of strategic management, as detailed in the following subsection. Views are representations of the architecture in terms meaningful to stakeholders. A view, in turn, is defined by an associated viewpoint, that is, a schema that specifies the information that should appear in the view and that proposes a way to present that information (Buckl et al. 2007; The Open Group 2009).

5 The use of enterprise architecture in corporate strategic management

Research to date identifies different stages of strategic management, basically ranging from strategy formation [“whereby goals and objectives are identified, policies are formulated, and strategies are selected in order to achieve the overall purposes or mission of an organization” (Steiss 1985) (thus including visioning as a step that precedes actual strategy identification)] to programming/implementation and evaluation/control (David 2011; Ganesan and Paturi 2009; Hax and Majluf 1984). According to Schäffer and Willauer (2003), the intensity of strategic planning is related positively to its effectiveness. To shed light on the role of EA therein, we distinguish between seven EA application scenarios (cf. Winter et al. 2007) in light of corporate strategic management (cf. Kalpic et al. 2003; Parker 2009; Raps 2008): strategic analyses, strategic choice, design of future business execution, business transformation readiness assessment, strategy implementation planning, strategy review, and strategic governance (see Table 2). These scenarios represent distinct tasks of strategic management as found in the literature, which we use to theorize regarding the use of EA in a more specific way than at the level of the stages above. We ground the descriptions of the scenarios (which relate either to one specific stage or link two stages) in the conception of EA in terms of what constitutes business architecture (which has been established in the previous section with our framework), stretching from business motivation to business execution, both linked by the business model layer. By doing this, we derive research propositions for the seven scenarios; we believe that with their substantiation by our

Table 2 Strategic management stages and related EA application scenarios

Stage of strategic management	EA application scenario	
Strategy formation	Strategic analyses	
	Strategic choice	
	Business execution design	Business transformation readiness assessment
Strategy programming/implementation	Strategy implementation planning	
	Strategy review	
Strategy evaluation/control	Strategic governance	

empirical data set later in this paper we contribute to reducing the gap between EA and corporate strategic management.

5.1 Strategic analyses

Strategy formulation is typically preceded by thorough strategic analyses that capture factors both external and internal to the enterprise and determine the set of available strategic options. While the external perspective is at the heart of the market-based view (Porter 1980), the internal perspective is related closely to the resource-based view (Barney 1991, 1996; Barney et al. 2001), suggesting that unique resources provide the fundamental basis for strategic choice and achieving competitive advantage. With the progress achieved through research on the resource-based view, it has become clear that the notion of resources needs to go beyond its original meaning to include capabilities (Eisenhardt and Martin 2000; Grant 1991; Helfat and Pereraf 2002).

With the business architecture framework outlined being translated into a meta model (see, e.g., Malik 2009; Österle et al. 2007; Smith 2011), EA allows for modeling both the external and internal drivers and constraints of strategic choice and setting them in relation to specific strategic options. Based on a classification of these factors, a SWOT (strengths, weaknesses, opportunities, threats) matrix (Bernard 2009) may be created as a specific view that provides immediate input for strategy formulation. Similarly, entire hierarchies of (and/or causal relationships among) goals and objectives can be depicted (Buckl et al. 2010b; Österle et al. 2007; Samavi et al. 2009) and related to strategies, for example, using goal realization/contribution views as described in The Open Group (2012) and depicted in Fig. 2 [in which the top three icons represent goals, while the three others can be understood as representations of strategies (The Open Group (2012) uses the concept “requirement” to denote means to realize goals); the dotted arrows

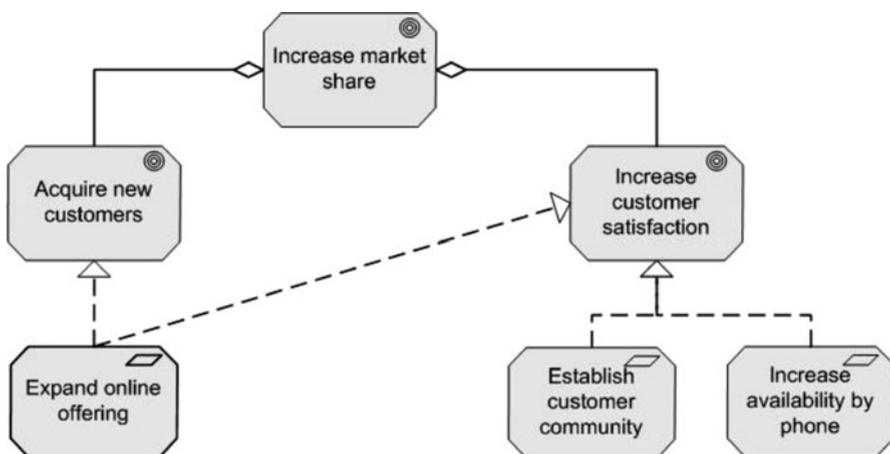


Fig. 2 Exemplary goal realization view [adapted from The Open Group (2012) and Kaplan and Norton (2004)]

represent realization relationships, and the relationships between goals are aggregations]. Such a complete picture not only allows for transparency of the strategic context and requirements (Aitken 2009), but also offers the possibility of a model-based validation of strategy (e.g., strategy can be checked for overall consistency and alignment with business goals) and even of the underlying strategic identity (Kalpic et al. 2003) as captured in the business ends.

As for the internal drivers and constraints of strategic choice, that is, the business capabilities, the role of EA may go even further, since EA may actually provide the methodological basis for capability identification. Given the heterogeneity of business capabilities across different firms (Amit and Schoemaker 1993) and that they represent a multi-dimensional construct realized by various elements (e.g., business processes) and typically embedded deeply within the organization, this has been found to be a significant challenge (Day 1994). Based on integrated models of capability-realizing components such as business processes, information entities, and organizational units captured within the EA (represented in, e.g., information flow diagrams), the enterprise's current business capabilities can be identified in a bottom-up way (cf. Brits et al. 2007; Day 1994; Hafeez et al. 2002) and visualized in capability maps (Klinkmüller et al. 2010) at different levels of granularity (Beimborn et al. 2005; Kohlborn et al. 2009) (which may take the form of nested box diagrams representing functional groupings). For example, a mergers & acquisitions capability may be derived by composition of (among others): the business processes "market analysis," "due diligence checking" and "contract management"; the information entities "partner" and "contract"; and the "business insight," "corporate development," and "legal" units. This approach puts business capabilities into the context of the overall enterprise model.

Capability heat maps (in which capabilities are color coded as per certain attribute values) (Keller 2009) can be used to detail capability types such as strategic and basic capabilities (Brits et al. 2007), or visualize hot spots within the capability landscape (e.g., capabilities with disproportionately high costs). Strategic capabilities are of particular relevance, since they constitute the core competencies (Prahalad and Hamel 1990) of the enterprise (Brits et al. 2007; Hafeez et al. 2002; Kalpic et al. 2003) and are thus among the enterprise's core assets captured in the business model [other assets include brands, patents, and institutional capital (Reihlen et al. 2010), for example (Amit and Schoemaker 1993; Hafeez et al. 2002)]. All in all, EA may inform corporate strategic management about the current business situation (Parker 2009), and thus provides a methodological basis for developing adequate strategies according to both internal and external preconditions.

Proposition 1 EA facilitates the analysis of the internal and external business context and the development of different strategic options.

5.2 Strategic choice

Based on the set of alternative strategies developed, strategic choice constitutes the next step within the strategic planning process (Kalpic et al. 2003). Such a choice may have significant impacts on procedures, routines, and structures within the

enterprise. With a consistent EA model from business motivation to business execution (cf. Aitken 2009; Ganesan and Paturi 2009) and the underlying IT architecture, there is a profound basis for systematic impact analyses (cf. Micklich 2005) and weighing alternative strategies against one another. In this way, EA can be used as the “feasibility sounding board” (Parker 2009) within strategy evaluation (Kalpic et al. 2003), which facilitates gaining an early idea of whether a considered strategy can really be executed, thus mitigating the risk of the “bogus strategy syndrome” of strategies that are not feasible or relevant (Parker 2009). A strategic option such as the launch of an online product offering can thus be evaluated in terms of, for example, the affected stages of the value chain, the underlying business processes as well as the supporting application systems and infrastructure that may need to be changed at certain costs and/or risks (e.g., to meet new availability requirements). For strategies of a more complex nature and that actually represent a set of strategic choices, the structured description of the business model may be of particular value for analysis. Through their reflection in the business model, these strategic choices can be tested for whether they are mutually supportive and internally consistent (Shafer et al. 2005), followed by an evaluation against alternative strategies as depicted above.

Consider, for example, a value proposition of customized, high-quality product bundles. This may conflict with an operating model of diversification (low standardization and integration of business processes), which may impede cross-selling and product bundling across different businesses. It may also contradict mechanisms of speculation for coordinating activities along the value chain, since this approach may not allow the envisioned production of customized end products. Once the business model has been analyzed in terms of consistency, one can also assess the impacts of the represented set of strategic choices on the IT architecture. For an insurer that aims to provide third-party administration services (e.g., claims settlement), it may be necessary to equip the involved application systems, as visualized in process support maps (Buckl et al. 2008), with multi-tenancy capability, for example. That being said, EA may provide a methodological frame of reference for corporate strategic management (Aitken 2009) in the process of strategy evaluation.

Proposition 2 EA facilitates strategic choice with model-based analysis options.

5.3 Business execution design

The implementation of a defined strategy, which follows strategy formation (Kalpic et al. 2003), requires translation into a corresponding business execution layer. Again, this is where the business model as the conceptual blueprint of the business strategy, that is, the representation of a set of strategic choices (Shafer et al. 2005), can provide the necessary bridge from strategy to execution (cf. Osterwalder et al. 2005). Based on a structured description of the business model related to both overarching business motivation and underlying business execution (as introduced above), EA may represent a powerful instrument for closing the chasm between formulations of business strategy and execution. This is due to the structure offered in the design of the future business model, based on the strategic direction (cf.

Osterwalder et al. 2005) (i.e., the translation of strategic choice into the fundamental (grouped) elements of a promising business logic, including their relationships (e.g., “value chain configuration enables value proposition”) (cf. Fritscher and Pigneur (2010), as visualized in graph-layout maps (Matthes et al. 2008) or simple matrices), and the derivation of future business capabilities required to execute this business model, thereby shaping the strategic architecture of the future (Prahalad and Hamel 1990). A strategy of expanding business operations from the original home market to neighbouring countries to serve customers more directly than previously via the Internet results in a value proposition that involves an improved customer service, for example. To offer this service in equal quality than in the home market, a certain degree of standardization in business processes, as captured in the operating model, would be reasonable. The overall value chain, however, might still be configured in a way that does not require the establishment of own sites in the new market but builds on partners that provide the services on behalf of the organization. A required capability that results from this business model is, for example, “manage partners.”

On that basis, business capabilities are to be broken down into the components that make such capabilities realizable. Eventually, this leads in particular to the design of the future organizational structures and business processes (ideally based on re-usable architectural standards documented). Being less stable than abstract business capabilities (Kohlborn et al. 2009), they are likely to be much more difficult to anticipate. Strategy deduction by use of the business model and its translation into future business capabilities may, however, facilitate the specification of individual elements of capability realization and the specification of their relationships, for example, the mapping of the decision authority to the organizational structure (Bernus 2003). This is because the “organizational fit” (Bernus 2003) depends significantly on the business model established, for example, on factors such as being part of a partner network and the associated level of trust with partners. EA thus provides a conceptual bridge to achieve an adequate fit within business execution based on its structured description of the business model.

Proposition 3 EA facilitates business execution design aligned with business motivation.

5.4 Business transformation readiness assessment

Having determined future business execution, an understanding of the organization’s readiness to accept change is a key to successful business transformation. There are many dimensions to change, with the human element likely the most important (The Open Group 2009). The degree of transformation that is immediately realizable may depend significantly on the complexity of current business execution and the underlying IT landscape (Mocker 2009; Simon et al. 2010). Such complexity may hinder architectural transformations to keep up with new business needs (Simon et al. 2010), especially in cases where considerable gaps exist between the current and future architectures.

EA makes this complexity visible and manageable (Schekkerman 2004; Simon et al. 2010), which allows for transparency as regards transformation readiness and

the measures necessary to enable transformation. Business activities that are highly interlinked with one another, but at the same time operate on different information entity implementations and are subject to specific incentives that promote function rather than process orientation, might give rise to difficulties in an outsourcing of whole (non-core) processes to a shared service center, for example. To extend further beyond enterprise boundaries, other, IT-related aspects typically documented in the EA are also relevant: the extent to which standardized, “plain-vanilla” interfaces are used; the length of transactions in automated business processes [as loosely coupled application systems (across enterprise boundaries) should not have a common transaction context (Engels et al. 2008)], and the number of dependencies of application systems affected by a planned transformation (e.g., system to be outsourced) as visualized in graph-layout maps. While certain aspects of the business transformation readiness assessment may have already been addressed within strategy evaluation to gauge feasibility (Uppington and Bernus 2003), this is also a major issue at the initiation of implementation planning (cf. The Open Group 2009).

Proposition 4 EA facilitates the business transformation readiness assessment by providing transparency regarding the current business and IT landscape.

5.5 Strategy implementation planning

To implement strategic choice and modify business execution accordingly, initiatives and projects are planned and established (Op’t Land et al. 2009). These may differ in terms of their significance, and may be subject to budget and resource constraints. Therefore, they must be reasonably prioritized. With the chain of relationships from business strategy to capabilities captured in the EA (based on which the capabilities’ strategic value can be determined) and the project proposals assigned systematically to the business capabilities affected (i.e., project candidates mapped onto business capabilities, visualized using cross reference tables and/or project context diagrams), there is a conceptual basis for assessing the strategic importance of each potential project (Aier et al. 2008a) and visualizing this in portfolio matrices (Buckl et al. 2008). In the case of the example above of an outsourcing strategy, the capability “manage supplier” is likely to become particularly important; projects that are related to this capability thus turn out to be important alike. Knowing the affected business capabilities, inter-dependencies between different projects can also be revealed (e.g., “manage supplier” may be in scope of two different projects) and used to refine project planning and synchronization.

From there, a final transition program (Aitken 2009) and implementation order can be developed that focuses on strategic and monetary (cf. Hafeez et al. 2002) business outcomes (rather than “technical deliverables”) (The Open Group 2009). This, in turn, can be broken down into individual project increments (cf. Osterwalder et al. 2005). All in all, that allows for identifying strategic capabilities not being sufficiently covered by the transition program, which can then be re-

addressed prior to any implementation activities. At its heart, this capability-based planning thus represents a systematic approach to implementing strategy.

Proposition 5 EA facilitates informed decision making with respect to strategy implementation.

5.6 Strategy review

Following the completion of strategy implementation, planned and carried out according to the capability-based paradigm outlined, strategy is reviewed in terms of the results achieved and potential needs for re-design (Kalpic et al. 2003). In this post-implementation review, the insights gained during strategy implementation are consolidated and fed back to strategic choice (cf. Feurer and Chaharbaghi 1995a).

With a consistent picture from strategy down to execution and the underlying IT architecture (e.g., which business processes (and IT components) have been transformed according to which strategic choice and which changes in the business model), EA allows for tracing the implemented business execution and, more generally, the solutions back to the strategic choices (Op't Land et al. 2009), e.g., the business process “procurement,” transformed into an e-procurement solution, to an envisioned cost leadership (as the basic strategy) with its associated supplier channels and relationships (as part of the business model) that focus primarily on the Internet. Along with adequate performance indicators (Aitken 2009) attached to elements of business execution [such as, e.g., in a balanced scorecard, which (among others) suggests the definition of internal process measures and their connection to value proposition elements (cf. Kaplan and Norton 2004)], this may provide a solid basis for measuring and visualizing the degree of strategy and goal fulfillment (Buckl et al. 2008), showing the added value achieved by the strategic choices implemented and thus indicating necessary strategy modifications. All in all, this supports a sustainable benefits management.

Proposition 6 EA facilitates strategy re-design due to the traceability provided from execution back to strategy.

5.7 Strategic governance

To ensure the execution of the strategic choices and thus achieve sustainable strategy conformity, there is a need for ongoing strategic governance (cf. Raps 2008). First and foremost, this requires proper strategy definition that allows for communicating strategy in an unambiguous and straightforward way (Op't Land et al. 2009)—a challenge with which many companies apparently have struggled in the past (Kaplan and Norton 2001; Osterwalder et al. 2005; Raps 2008). The structured representation and decomposition of strategy into the business model provided by EA does, however, represent a powerful way to communicate strategic choices (Kappelman et al. 2008; Shafer et al. 2005) and create visibility and a shared understanding of the strategic direction and the business logic (Osterwalder et al. 2005; Parker 2009).

Beyond that, EA can be leveraged to evaluate change requests from a strategic point of view. Potential changes within business execution can be evaluated in terms of how this conforms to the overall business model (Op't Land et al. 2009). Likewise, modifications of the business model can be assessed in terms of resulting impacts (Osterwalder et al. 2005). If, for example, the activity split between the enterprise and the customer, or specific business units and an internal service organization, is supposed to change, a structured description of the business model provides systematic means to identify and analyze possible effects on the financial model.

Based on the relationships around strategic choices captured within the EA and a breakdown of strategy into operating terms (i.e., with measures and metrics deconstructed to various business process levels) (cf. Ganesan and Paturi 2009), eventually there is also a basis for regular conformity checks (cf. Parker 2009). Core elements of business execution, such as business processes and organizational units, can thus be reviewed in terms of their strategy compliance, potentially revealing strategic hot spots within the business landscape. This also goes for business capabilities, which, as already outlined above, can be visualized in heat maps of their strategic fit (Keller 2009). Additionally, capability radars as suggested by The Open Group (2009), which visualize the (current or planned) status of capability-realizing components at certain times, may be used to govern the evolution of business capabilities as defined within strategy implementation. More specifically, such radars can be understood as kivi diagrams, in which the lines radiating from the center represent the realizing components (e.g., business process, information entity); against each line, evolution points may be determined and joined up into a closed loop for specific transformation states (The Open Group 2009). This can be checked against the actual progress as part of strategic governance.

Proposition 7 EA facilitates sustainable strategy execution.

All in all, the consistent and structured representation of business motivation, business model, and business execution in one model, which can be visualized, analyzed, and tracked using dedicated viewpoints (Buckl et al. 2008) that expose specific relationships, dependencies, impacts, and conflicts (Parker 2009), may make EA a frame of reference for corporate strategic management (Aitken 2009). In particular, it can make strategy explicit down to the execution level and thus strengthen management and decision-making competence. Figure 3 (as a simplified illustration) summarizes the connections between our framework and the application scenarios we introduced. It shows which parts of the framework (including their links, both “internal” and “external” ones to other architecture layers/elements) are of primary relevance in which application scenarios. In other words, it shows which application scenarios may operate on which main components of the framework—or may use corresponding views of the components—with which temporal state, whether “as is” (which applies to all components not explicitly labeled otherwise) or “to be.” In the scenario strategic choice, for example (as illustrated above), one might benefit from a structured representation of the strategic options at hand, including any parts/sub-options, and the possible translation into the resulting future business model. For instance, in the example that outlined the option to increase the

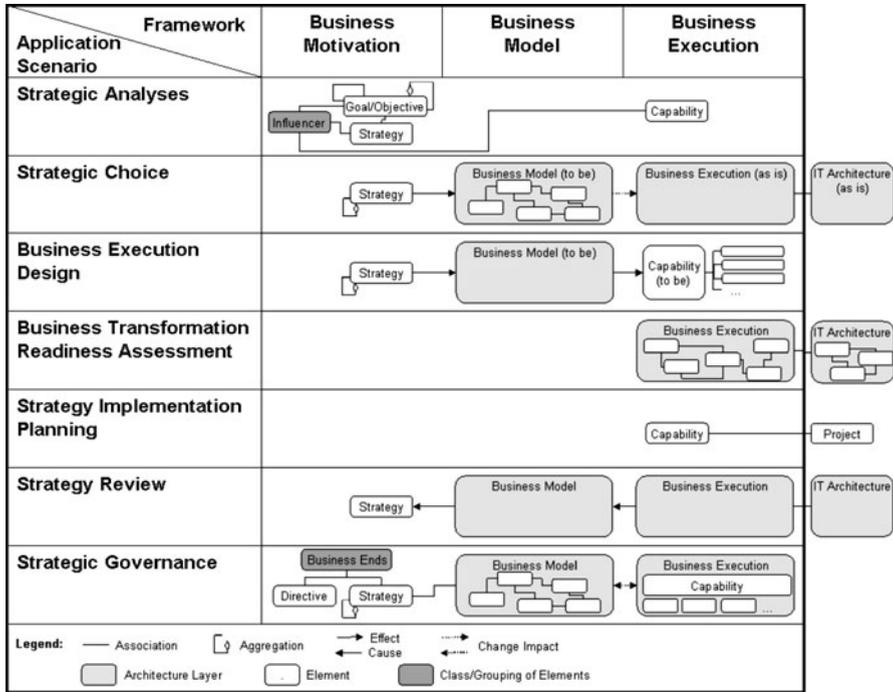


Fig. 3 Connections between business architecture framework and application scenarios

Table 3 EA application scenarios in corporate strategic management and associated benefits

Application scenario	Benefits
Strategic analyses	Business capability identification; business context understanding; strategy documentation & validation/confirmation
Strategic choice	Intra-strategy evaluation; inter-strategy evaluation
Business execution design	Strategy decomposition (business model representation); strategy deduction (capability design)
Business transformation readiness assessment	Business complexity/dependency analysis; IT complexity/dependency analysis
Strategy implementation planning	Prioritization of transition initiatives/projects; project dependency analysis; strategic validation of project portfolio
Strategy review	Strategy traceability
Strategic governance	Strategy communication; evaluation of change requests/new requirements; strategic alignment check; business capability monitoring

offering of customized product bundles, the future business model may show a high integration of business processes, as captured in the operating model, along with postponement as a main coordination mechanism. Based on the changes this likely entails with respect to current ways of business execution and the associated IT architecture (e.g., the degree of data sharing/centralization), one may then evaluate

the strategic option in terms of criteria such as costs and risks. The illustrations of the other application scenarios in Figure 3—that is, the framework components and their interrelationships on which the scenarios operate, including, in particular, the cause-and-effect-relationships in the components' design and the interdependencies of change—explain themselves accordingly, as is evident in the description of the scenarios given above. On that basis, Table 3 summarizes the benefits to be gained by using EA within corporate strategic management.

6 Enterprise architecture as a facilitator of corporate strategic management: practitioner interviews

Having depicted the potential use of EA in corporate strategic management, we now present and discuss the results of our practitioner interviews to elaborate on the application scenarios outlined and further analyze the research propositions derived from applying our framework. First, we describe the interview results step by step along the seven application scenarios, using quotes from our interviewees and some comparisons to findings in the existing literature. Second, we present a cross-case synthesis of the findings, in which we summarize the extent of interviewee agreement with the propositions, consolidate the benefits and limitations of EA (including the business architecture framework) within corporate strategic management and provide lessons learned with suggestions for how to solve certain identified issues.

6.1 A step-by-step description of the interview findings

6.1.1 Strategic analyses

The interviews revealed no disagreement that there are different factors that should have an impact in strategy formation. According to the strategy director of an international car rental service, it is “a mixture of market, future prospects, competitors, capabilities and, of course, the overall business vision.”

What became particularly salient, however, was the precedence taken by the market-based view therein. Consider the following statement by the strategy director of a chemical company: “Within the past years, there has been a clear tendency towards the market-based view. ... No, the resource-based view is not left unconsidered, but it's primarily the market that determines what we are going to do.”

Trends are of particular importance within an appraisal of the external environment. This comes through in several interviewee statements. For example: “It is very important not to put too much emphasis on historical data. From my point of view, you should instead draw on industry trends—also beyond your own ‘home’ industry—and also mega trends within the entire society. This might give you a much broader view of potentially new product/market combinations than looking backwards or in your own silo.”

In fact, nearly every interviewee pointed out that anticipation is key to successful strategic analyses, and that market trends need to be captured as early as possible. As outlined above, capturing the business context can be done in a structured form within the EA—a benefit that was largely valued by our interviewees.

While internal capabilities should not be left unconsidered, there was consensus among the interviewees not to constrain strategic choices to an inappropriate extent. As one of our interviewees insisted, “First you define a strategy. Then you ask yourself whether you have the required capabilities and, if not, how they can be acquired.”

The senior vice president for corporate strategy and planning of a leading automotive company provided a more colorful description: “At the beginning, there is no ‘right’ or ‘wrong.’ From my point of view, you should start by spanning the whole corridor instead of limiting yourself with any restrictions. Consider the roots of Lego as some sort of carpenter’s shop or those of Nokia as a manufacturer of boots, for example. Both would not have evolved to what they are today if they had made themselves subject to too many constraints and had not thought innovatively. The more important questions you need to answer are: ‘What do I want to be?’ and ‘What am I really capable of?’”

In simple terms, the first question corresponds to the statement made by another interviewee: “Do we pursue being the ‘Aldi’ or ‘Porsche’ of our industry?” As for the second question, most of the interviewees saw the value of EA, as the following statement indicates: “I agree with you. It is not easy to define capabilities. Enterprise architecture may, indeed, facilitate this definition.”

As the interview findings suggest, another important aspect is the differentiation between capabilities and core competencies. As a constituent of business capabilities, resources represent a particular determinant of strategy formation. One interviewee stressed that this especially requires investigating the available monetary resources. Emphasis was also placed on the corporate culture (cf. Raps 2008), illustrated by the following statement: “One of the biggest mistakes in strategy development you can make is to design a new strategy that does not fit into the cultural footprint—the DNA—of the company.” This is, however, where many of our interviewees saw difficulties in applying EA.

One interviewee explained: “With enterprise architecture, you don’t get the soft facts like corporate culture or abilities of individual teams. It’s only about hard facts.” Translated to McKinsey’s 7S-framework for strategy implementation and organizational development (cf. Raps 2008), EA was thus described as a more powerful tool for describing the hard (strategy, structure, systems) than the soft elements (shared values, skills, style, staff).

6.1.2 Strategic choice

During the discussion of the role of EA in strategic choice, it became apparent that a more detailed definition of strategy is needed. This is in line with Feurer and Chaharbaghi (1997), who identify several dimensions that may be associated with this term, for example, scope (market selection, activities, etc.), content (diversification, growth, etc.), and timeframe. To allow a more differentiated use of the

term, one may distinguish between corporate strategy (specialized into growth strategy, stability strategy, retrenchment strategy) for general market definition, competitive strategy (including alliance strategy) for specific market navigation and leapfrogging respective competitors, and functional strategy (e.g., IT strategy, marketing strategy) (cf. Raps 2008; Hax and Majluf 1984), all of which are reflected in the business model.

While interviewees largely acknowledged the role of EA as a facilitator of strategic choice, we were confronted with the question of why a detailed feasibility study is needed. According to one interviewee, “Strategies are always feasible if management has done its strategy development process properly. ... Culture is the only thing you cannot work against; it has to be adapted slowly. Specific capabilities, for example, can be acquired or improved.” Elaborating, the interviewee added: “Sometimes, it’s simply best to say ‘that’s what I want; please work out how I will get there’.”

6.1.3 Business execution design

Following the discussion of strategic choice, we discussed the breakdown into the business model as the basis for shaping the future business execution, which met with equal appreciation by our interviewees, as evidenced by this exemplary statement: “Using such a structured description to translate strategy into the future business organization sounds very promising.”

Based on capturing the different business model perspectives in the EA model, specific business model viewpoints (both intra- and inter-perspective) may help create adequate representations, as our interview findings indicate. Inspired by architectural viewpoints such as the business support matrix that displays the support of business processes in organizational units by application systems (cf. Buckl et al. 2008), interviewees found similar matrices of interest with respect to the business model. In particular, this involved a customer channel matrix (two-dimensional matrix of products and markets, populated by the customer channels used for specific combinations) and a business collaboration matrix (two-dimensional matrix of value chain stages and markets/products, displaying the internal and external actors present on these stages for a particular market or product).

It was noted, however, that translation into the future business execution does not follow a fully deterministic logic and may work only up to a certain level of granularity. “While the high-level organizational structure can be derived from the strategy and the corresponding business model, detailed organizational design is subject to constraints, especially company politics,” said one interviewee.

Whether there need to be any changes at all was also questioned: “Strategy changes do not necessarily result in a transformation of the business organization. You don’t change the organization that quickly.”

The aforementioned automotive industry representative went even further: “Such a structured description of the business model may help, but it is not critical. There are other criteria that have a greater impact on the future business organization. Whether the organization is structured along functions or business divisions—this is not something the business model determines, but is a general question of the

governance vision. The same business model may lead to absolutely different business organizations. An example would be the business model of mobility services. If, for whatever reason, a credit card becomes part of the offering, it is instead a philosophical question that determines what the business organization will look like. Is the credit card considered as a complementary service or is it expected to become a considerable source of revenue generation? This is what you need to answer in that context, for example.”

6.1.4 Business transformation readiness assessment

It was with respect to the assessment of business transformation readiness where the interviewees showed the highest level of agreement regarding the facilitating role of EA. A managing director of a leading player in the express delivery market made a notable remark: “I definitely see the value of enterprise architecture. But there are many factors that may affect transformation readiness. We have already discussed the role of corporate culture, for example. But that’s only one part. Employment protection, the shop committee, these are other aspects that may play a role here. ... In general, you need a thorough and very convincing storyline to make the organization ready for transformation. And sometimes you may only achieve this if you manage to increase the level of suffering before you start the transformation process.”

Notably, this brought us back again to EA, since this may be an appropriate instrument with which to establish a colorful storyline and thus address what may be the most important dimension to change—the human element (The Open Group 2009).

6.1.5 Strategy implementation planning

Strategy implementation planning as another scenario to be facilitated by EA generally garnered at least partial agreement. The use of business capabilities was appreciated, but only seen as one facet of implementation planning, as one of our interviewees put it in a nutshell: “I agree with you that capabilities may help here. Honestly though, they are not sufficient. We employ a whole set of strategic assessment criteria.”

Furthermore, in one interview we had to clarify the difference between EA and traditional decision tree techniques. After some discussion and a review of the business architecture framework, the interviewee himself concluded that such techniques may still be well applied, but EA can provide an information base from which such trees may be generated on an ad hoc basis and stored for historical traceability.

6.1.6 Strategy review

The weakest agreement was on EA’s role in strategy reviews. This is due to the variety of aspects other than the strategy itself that may have led to poor performance, as expressed in the following statement: “In general, I see your point. However, what you need to find out is whether unsatisfactory results are due to strategic or implementation problems.”

Similarly, the strategy director of a postal service explained (cf. Feurer and Chaharbaghi 1995b): “Once you have implemented the defined business strategy, you should make an honest assessment of the targets set and the results achieved. In searching for reasons for any deviations, however, you should not forget to consider soft facts such as the employee’s resistance to change. So, results such as insufficient performance or high costs cannot be attributed automatically to the business strategy itself and do not necessarily mean that the defined strategy was the wrong choice.”

Consequently, one should give equal concern to strategy and its implementation and subsequent execution in the search for explanations of failures, as further supported by the following point made by an interviewee: “Once strategy has been implemented, what you basically do from my point of view is a comparison of the defined to-be with the achieved as-is. I mean, you should have defined qualitative and quantitative goals at the beginning of the process, which should serve as the basis for this. ... Are you aware of the EFQM management model (EFQM 2011)? If you look into this model, you will find several criteria that all have their impact on the achievement of certain outcomes. These are called the ‘Enablers.’ The business processes play a central role here. Maybe this is where something does not work well. In that case, it’s the strategy execution that is the deficient aspect, not the strategy itself.”

6.1.7 Strategic governance

Eventually, our interviews involved very diverse discussions around EA’s position in strategic governance. While some of our interviewees saw EA’s greatest value as providing this “sanity check” to ensure sustainable strategy execution, others were less convinced: “Based on my experiences, you need to develop shared views of the strategic direction. This can be achieved only by thorough discussions.”

6.2 Discussion and synthesis of the interview findings

All in all, the interviews provided fair support for EA’s facilitating role in strategic management, while pointing to specific issues to be addressed in future EA research and practice with respect to its strategic management facet. Table 4 summarizes the application scenarios as judged by our interviewees, pointing out that each of our propositions led to at least partial agreement from the interviewees [based on a scale

Table 4 Evaluation of EA application scenarios

Application scenario	Mean score	SD
Strategic analyses	1.43	0.98
Strategic choice	1.57	0.79
Business execution design	1.57	0.79
Business transformation readiness assessment	1.71	0.49
Strategy implementation planning	1.14	0.9
Strategy review	0.86	0.69
Strategic governance	1	1

from 0 to 2, where 0 represents “no agreement,” 1 represents “partial agreement,” and 2 represents “full agreement,” as captured in the interviews (see research methodology section)]. Inter-rater reliability among the interviewees, which we calculated in SPSS 17.0.2 as an intraclass correlation coefficient (ICC) with two-way mixed effects (Shrout and Fleiss 1979), was, however, rather low (0.088 with a 95 % confidence interval from -0.6 to 0.515), and the ratings’ variance largely differed across the scenarios observed, ranging from 0.238 to 1. This reflects the widely acknowledged need for an enterprise-specific and-situated approach to EA management (Buckl et al. 2010a). While EA in one organization might be considered particularly valuable for the purpose of strategic analyses, a different organization might not see these benefits or not see a certain need for EA in that context. Among others, this may depend on the schools of strategic management (Mintzberg et al. 1998) prevalent in the enterprise’s strategic management activities.

The value of EA in strategic analyses was, on the one hand, attributed to the possible structured capturing of the business context (as part of the business motivation layer of our framework) by our interviewees. In fact, given that drivers and constraints can also be assigned with concrete timestamps (Saat 2010), EA may become even more beneficial for strategic analyses, addressing the temporal aspect of the context factors, which was also raised as a major concern during the interviews (see the above discussion around trends). On the other hand, it was EA’s support in defining business capabilities (as per the business execution layer of our framework) that was appreciated by our interviewees. This may apply in particular to “hidden” capabilities, which may be identified based on the various perspectives integrated within the EA. In cases where capability types (e.g., strategic capabilities) are made subject of the EA meta model, also the mentioned differentiation between capabilities and core competencies can be thoroughly modeled and made available for strategic analyses. In contrast, limitations may exist in capturing the soft elements of the enterprise. While the hard elements may indeed reflect the roots of EA, we believe that this may, however, not necessarily imply that the soft elements, for example, corporate culture (cf. Raps 2008), cannot be represented architecturally at all, so long as they can be made identifiable and tangible.

Similarly, the interviewees recognized a facilitating role of EA models within strategic choice. Following the discussions around different strategy levels, EA management may, however, be well-advised to distinguish between those levels and incorporate this in its meta model (see Fig. 4) to actually provide effective assistance in corporate strategic management.

Questions around the necessity of detailed analyses of strategy feasibility that we faced in some interviews seem to mirror a certain philosophy of strategic management (Feurer and Chaharbaghi 1997), in which planning is primarily driven by a certain vision, without great concerns about available capabilities, and which thus relates back to the “school of thought” (Mintzberg et al. 1998) mentioned earlier. However, even in an approach of “that’s what I want; please work out how I will get there,” we can conclude that EA still represents a reasonable tool that can be drawn upon to identify those capabilities that are to be acquired or improved.

The possible breakdown of strategy into the business model as the basis for designing the future business execution was one of the main benefits associated with

EA (and our underlying business architecture framework) in corporate strategic management, which provides fundamental support for the three established framework layers. As per the additional strategy levels identified (see Fig. 4), the corporate strategy is likely to determine the main customer segments and the offering perspective of the business model and drives the business model’s overall evolution. While the remaining parts of the business model are the subject mainly of the competitive strategy (which may differ across the product/market combinations selected), the functional strategies are not left unconsidered and may be reflected quite specifically (e.g., the procurement strategy in the business model’s supplier perspective). As our interviewees concluded, specific business model viewpoints for the purpose of visualization are likely to increase the understanding and facilitate the process of business execution design.

Definitely, limitations exist when we come to detailed organizational design, which is affected significantly by company politics. While the factor of power games taking place in the organization should not be underestimated, the supportability of statements that the business model does not determine organizational structures at all (see the above quote from the automotive representative), however, more likely depends on the perception of what constitutes a business model. Contrary to our concept introduced above, such a statement reflects a rather narrow view. In this case, translation into the future business execution apparently becomes much more limited.

The business transformation readiness assessment is the scenario, in which EA is considered most significant, as it makes complex relationships (at the business execution layer and the underlying IT architecture) transparent. By doing this, EA also serves as an instrument for exposing the need for transformation and thus facilitating change management, as our interview findings suggest.

The application scenario of strategy implementation planning is, again, where the possible use of business capabilities (as captured in the business execution layer of our framework) was appreciated, although criteria other than impacts on business capabilities should be taken into consideration as well for strategic assessments and informed decision-making with respect to strategy implementation.

As indicated, the weakest agreement was on the proposition that EA facilitates strategy re-design, since the business processes in their current state of execution, for example, and not necessarily strategic choices, may have led to poor performance. Even then, however, we can conclude that the benefit offered by

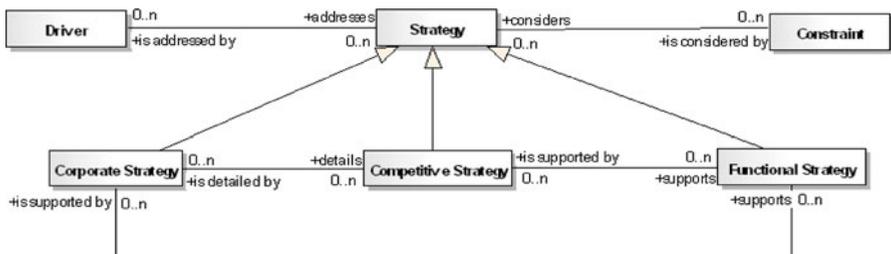


Fig. 4 Strategy levels meta model fragment

EA remains the possible navigation of the paths from strategy to execution and vice versa, and thus may indicate what requires review in further detail.

Eventually, EA was also valued in terms of its role in strategic governance [although we found the most varying opinions here (see Table 4)], because it supports monitoring and evaluating conformance with strategy and the corresponding business model. Particular comments that shared views of the strategic direction are most crucial and that these can be achieved only by thorough discussions do not reject, but rather support, our thesis of sustainable strategy execution facilitated by EA, since we found broad agreement with the assertion that strategy communication is among EA's major benefits.

The immediate core implications of the interviews on the framework and its application (i.e., in terms of modifications and/or amendments), as captured in the depicted scenarios, can thus be summarized as follows:

- Framework:
 - Business motivation:
As strategies may exist at different levels, the element “strategy” is specialized to distinguish between corporate strategy, competitive strategy, and functional strategy.
 - Business execution:
As capabilities may be of different types, the element “capability” is specialized to distinguish between basic and strategic capabilities. Integrative capabilities represent an optional element to be used to bind together several capabilities of another type (cf. Brits et al. 2007).
- Application scenarios:
 - Business execution design:
 - Based on the introduced strategy levels, the business model is derived from strategic choices as follows. While the main customer segments and the offering perspective are determined by the corporate strategy, the remaining business model parts are the subject primarily of the competitive strategy (with potential differences across the product/market combinations selected). Some parts of the business model may be designed based on additional input from specific functional strategies (e.g., supplier channels and relationships based on the procurement strategy).
 - Organizational structures are derived not only from the business model and its translation into corresponding capabilities, but also from other factors such as company politics.
 - Strategy implementation planning:
Criteria other than impacts on business capabilities should be taken into consideration as well for the strategic assessment of project candidates.
 - Strategy review:
In the review of implemented strategic choices, one must be aware that the business processes in their current state of execution, for example, and not

necessarily strategic choices, may have led to poor performance. In this respect, the transparency of which elements of business execution are related to which strategic choices helps in identifying what requires review in further detail.

Beyond these insights gained through the discussion of the seven application scenarios, there is another lesson we can learn from the interviews. As one interviewee said, “Most managers are hands-on people.” This is something other interviewees also emphasized, suggesting that the process and instruments of strategic management should not be overformalized but that they should be tailored to the enterprise’s management style. Corporate strategic management facilitated by EA may thus follow the design school rather than the planning school of strategic management (cf. Mintzberg et al. 1998), taking advantage of an approach to strategy development and execution that is both analytical and straightforward, and avoiding endless strategy formulation that may jeopardize the achievement of strategy execution (Op’t Land et al. 2009). This means that while the designed framework may act as a reference that provides a structure of relevant content and helps guide strategists through essential tasks of strategic management, not necessarily all of its elements and/or their relationships may actually be explicitly instantiated and thus formally modeled in the scenarios in which they have been found to be relevant. Strategy implementation planning, for example, may be done without a detailed assignment of project candidates to the affected business capabilities that finds its way into the EA model; rather, the project candidates’ strategic value may be assessed in an informal way using a capability map as a reference, if that better fits into the management style of a given enterprise in a certain situation.

This lesson was reflected in a comment by another interviewee: “I think what you have to keep in mind is the cost-benefit relationship of doing this. I can imagine that this requires a lot of effort.” It thus seems essential to find a satisfactory middle ground that avoids becoming paralyzed by disproportionately great efforts. In general, this lesson connects to aspects that, apart from any methodical deficits and/or gaps, may have impeded the adoption of EA in corporate strategic management to date (despite the explored benefits): different world views/cultures of strategists and architects (van Gils 2009); a lack of experienced architects (Lucke et al. 2010) capable of making strategists understand and use EA; and the lagging acceptance of EA by strategic managers due to its affiliation to the IT department. So, such issues should be taken into additional consideration and, to the extent possible, resolved in EA practice; it is then that EA (including the suggested business architecture framework) can apparently prove its greatest value.

7 Conclusion

Having examined EA in light of corporate strategic management from both a theoretical and, through practitioner interviews, a practical point of view, we now draw some final conclusions and outline the implications for both research and practice. To answer our first research question (“What support can EA management

provide within corporate strategic management, and on what conception of business architecture is this based?”), we have designed a comprehensive business architecture framework where one that embraces the concept as a whole had been lacking. This framework proposes three interrelated layers: business motivation, business model, and business execution. On this basis, EA has been applied to key tasks of corporate strategic management: strategic analyses, strategic choice, business execution design, business transformation readiness assessment, strategy implementation planning, strategy review, and strategic governance. This application argues for the use of EA as the frame of reference for corporate strategic management, which allows modeling of the business from strategy to execution and may thus yield several benefits within the aforementioned scenarios.

Our empirical findings obtained through the interviews revealed further interesting insights. In general, our interviewees appreciated the role EA may take in corporate strategic management and thus bolstered the research propositions developed regarding this facilitating role of EA. This is particularly true for the business transformation readiness assessment. Also, the scenarios of strategic analyses, strategic choice, and business execution design found considerable agreement, mainly due to the support EA offers in business capability identification, business context understanding, and strategy decomposition into the business model. EA's limits within strategic management come from the difficulties of modeling the soft elements of the business comprehensively; from company politics that affect, for example, organizational design; and from diverse aspects from strategy to execution that may influence results.

All in all, we believe this approach of using design science to develop and apply a consistent business architecture framework, combined with ideas of grounded theory to allow for a qualitative examination through a series of interviews with strategic managers, is a way to move more deeply into the research area and offers ideas and advice for academics and practitioners alike. Aside from the academic value that lies in its analysis and understanding, the framework (and our theorizing about its application) may for practitioners serve as a conceptual guideline for implementing and applying comprehensive business architecture management, which facilitates establishing EA within the strategic management arena and paves the way for it to become an accepted tool in the business. In fact, our research may contribute to a greater understanding among strategic business managers of how EA models can support their work, and may illustrate to architects how EA can be used way beyond the management of the IT landscape.

For both EA practitioners and academics, our research also provides a qualitative foundation on which to draw in the future and points to areas in which the EA discipline still needs to develop further or to which it is well-advised to turn greater attention to meet specific requirements imposed by corporate strategic management. Accordingly, as the answer to our second research question (“In what areas does EA management need to develop to permeate corporate strategic management more deeply?”), this involves in particular the differentiation and alignment of defined strategy levels, in line with the research agenda charted in the Furrer et al. (2008) state-of-the-art review of strategic management suggesting a greater focus on the alignment between corporate and competitive strategies, and the explicit

consideration of corporate culture as a central element of strategy execution (cf. Raps 2008). Business capability modeling and business model architecting have been shown to be crucial and should thus be investigated further. For the latter, this requires in particular the consideration and visualization of dedicated business model viewpoints [for example, using the modeling language ArchiMate (The Open Group 2012)], in line with the research gaps identified by Burkhart et al. (2011) stated earlier. This may aid practitioners in actually applying business architecture at the strategic level.

Having said this, the research design allowed us to capture a fairly large part of reality (because key industries were represented in the interviews) without foregoing the benefits offered by qualitative methods. This is despite the relatively small sample of interviewees and limited time in the interviews to achieve a full understanding of EA and its practical application, which also explains the few interview statements that reveal difficulties in grasping the concept of EA or initial perceptions of an architectural approach to corporate strategic management being too model-based. As indicated, further research and empirical evidence is thus required to make EA a significant part of the vocabulary of each and every strategic manager (potentially including further interviews with a more limited scope—e.g., focus on fewer application scenarios—in favor of an increased level of detail). Our framework as set out, applied, and examined in this paper represents an essential step on this journey toward strategic business management based on EA.

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