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Abstract

Enterprise architecture (EA) is a description of an organization from an integrated business and IT perspective. Current literature conceptualizes EA as a comprehensive blueprint of an enterprise organized according to a logical framework and describing its current state, desired future state and migration roadmap. However, the current concept of EA originates from non-empirical sources, lacks demonstrated examples of its successful practical implementation and deviates from the real practical use of EA in organizations in multiple important aspects. Due to these and other problems the notion of EA needs to be reconceptualized in order to more accurately reflect empirical realities. In this paper, based on an extensive EA literature review, I describe the problems with the current concept of EA, demonstrate the critical inconsistencies between this concept and the real practice use of EA in organizations and illustrate them based on a recent exemplary case study of a successful EA practice. Although this paper justifies the need for the reconceptualization of EA and points to the most essential aspects of this reconceptualization, it does not offer an alternative ready-to-use conceptualization and represents only the first step towards developing a new, evidence-based concept of EA.

Keywords: Enterprise Architecture (EA), Frameworks, Problems, Management Fads, Reconceptualization.

Introduction

The role of IT for modern companies is important. Companies spend significant amounts of money investing in IT. However, in order to realize the full potential value of IT investments, the IT strategy and infrastructure of a company should be aligned with its business strategy and processes (Gerow et al., 2014). Enterprise architecture (EA) is a description of an enterprise from an integrated business and IT perspective intended to bridge the communication gap between business and IT stakeholders. Using EA helps companies to improve business and IT alignment and brings a number of other benefits (Bradley et al., 2011; Schmidt and Buxmann, 2011; Tamm et al., 2011). Unsurprisingly, EA is practiced by the majority of large companies (Ambler, 2010; van der Raadt et al., 2007) and makes a significant contribution to their success (Ross et al., 2006).

Some authors (Beijer and de Klerk, 2010; Greefhorst and Proper, 2011; Harrell and Sage, 2010; Rivera, 2013) argue that the modern concept of EA originates from the PRISM architecture framework (PRISM, 1986), others (Bernard, 2012; Lohe and Legner, 2014; Tamm et al., 2011) state that the concept of EA was introduced with the publication of the Zachman Framework (Zachman, 1987), while the roots of EA lay deeper in the Business Systems Planning (BSP) methodology initiated by IBM in the 1960s (BSP, 1975; Kotusev, 2016b; Spewak and Hill, 1992). The popular EA literature conceptualizes EA as a comprehensive blueprint of an enterprise consisting of individual artifacts organized according to a certain framework and describing the current state of an enterprise, desired future state of an enterprise and roadmap describing how to migrate from the current state to the future state (Armour et al., 1999b; Bernard, 2012; Boar, 1999; Spewak and Hill, 1992; TOGAF, 2011).

However, empirical evidence suggests that the real practical use of EA in organization differs in multiple critical aspects from the most commonly accepted conceptualization of EA offered by the popular EA literature. For instance, the feedback from EA practitioners suggests that the comprehensiveness of EA is impractical or even unachievable (Erder and Pureur, 2006; Kim and Everest, 1994; Lohe and Legner, 2014; Schmidt and Buxmann, 2011), EA frameworks are too complex and often not used in practice (Aziz and Obitz, 2007; Basten and Brons, 2012; Buckl et al., 2009; Fallmyr and Bygstad, 2014; Haki et al., 2012; Obitz and Babu, 2009), most companies do not document both current and future states (Roth et al., 2013; Schneider et al., 2015; Winter et al., 2010), and many companies do not develop roadmaps (Aziz and Obitz, 2005, 2007; Obitz and Babu, 2009). These and other inconsistencies demonstrate the existence of a huge gap between the current theoretical concept of EA and the real practical use of EA in organizations (Holst and Steensen, 2011; Tanigawa, 2004). Moreover, as shown in this paper, the current concept of EA originates from non-empirical sources, cannot be traced to any underlying evidence-based research, has no demonstrated examples of its successful practical implementation and is likely to be only a management fad.

Therefore, despite the evident practical importance, high potential and widespread use of EA (Holst and Steensen, 2011; Ross et al., 2006; van der Raadt et al., 2007), the current theoretical conceptualization of EA looks inadequate and is generally inconsistent with empirical realities. In line with other calls for reconceptualization (Holst and Steensen, 2011; Janssen, 2012), I argue that there is a strong need to reconceptualize the very notion of EA in order to realign it with real industry practices and create a solid foundation for a consistent EA theory.

Based on a comprehensive EA literature review, this paper analyzes the problems of the current concept of EA, demonstrates a number of critical deviations of the current conceptualization from empirically established facts and presents a sound case for redefining the notion of EA. Importantly, this paper

justifies the very need for the reconceptualization of EA and points to the most essential aspects of this reconceptualization, but it does not propose an alternative ready-to-use conceptualization instead of the current concept of EA and represents only the first step towards developing a realistic, evidence-based concept of EA.

This paper continues as follows: (1) I provide an overview of the previous EA literature reviews and explain why this review is necessary, (2) I describe in detail the research methodology of this review, (3) I describe in detail the current concept of EA, (4) I discuss the problems with the current concept of EA and explain why this concept is questionable, (5) I demonstrate how exactly the current concept of EA differs from the real practical use of EA in organizations, (6) I illustrate the problems of the current concept of EA and the real practical use of EA based on a recent case study described in literature, (7) I discuss the contribution of this paper to the EA discipline, directions for future research and limitations of this study and (8) I conclude the paper.

Previous EA Literature Reviews

The EA discipline represents a broad research stream containing more than a thousand diverse publications (Kotusev, 2017c). Historically the EA research stream has been subjected to multiple literature reviews. Some of these reviews were comprehensive and analyzed the EA discipline in general, while others were rather narrow and focused on specific aspects of an EA practice.

On the one hand, comprehensive EA literature reviews analyzed the distribution of EA publications in time and their reference disciplines (Langenberg and Wegmann, 2004), their contents, theory types and empirical basis (Radeke, 2010), origins and geography (Mykhashchuk et al., 2011), citation statistics and co-authorship patterns (Simon et al., 2013), research methodologies, topics, themes

and many other indicators (Kotusev, 2017c). On the other hand, narrow EA literature reviews analyzed highly specific EA-related topics including EA benefits (Boucharas et al., 2010; Lange et al., 2012; Niemi, 2006; Tamm et al., 2011), goals (Schneider et al., 2013), principles (Haki and Legner, 2012; Stelzer, 2009), stakeholders (Niemi, 2007), management (Kotusev, 2017a; Kotusev et al., 2015a), development and implementation (Lucke et al., 2010; Rouhani et al., 2015), terminology and language communities (Schelp and Winter, 2009; Schoenherr, 2008) and some other aspects of an EA practice (previous EA literature reviews have been also discussed in more detail in Kotusev (2017c)).

However, despite the existence of multiple previous EA literature reviews, none of these reviews addressed the very concept of EA and its problems. Therefore, the concept of EA itself, despite being central to the entire EA discipline, was never subjected previously to a critical scrutiny and detailed analysis.

Research Methodology

The core intent of this study is to analyze the adequacy of the current concept of EA via scrutinizing its assumptions and comparing various aspects of this concept with the empirical evidence regarding the practical use of EA in organizations. This goal essentially implies two separate tasks: (1) describing the current concept of EA and (2) identifying its problems. Due to their disparate nature, these two tasks require following different analysis methodologies.

Describing the Current Concept of EA

The first task implies reconstructing the current concept of EA, i.e. describing in detail what exactly is understood in the EA literature under "enterprise architecture". This task can be achieved via synthesizing the descriptions of EA provided by the publications considered as seminal for the EA discipline. These

core publications can be identified through the exhaustive citation analyses provided by Mykhashchuk et al. (2011) and Simon et al. (2013). Specifically, the most highly cited EA publications arguably can be considered as seminal for the EA discipline and definitive for the very concept of EA. Consequently, descriptions of EA and its various aspects provided by these publications essentially define the current academic understanding of the notion of EA. The citation analyses (Mykhashchuk et al., 2011; Simon et al., 2013) suggest that the core of the EA discipline is represented largely by the four most popular EA frameworks, i.e. TOGAF (TOGAF, 2011), Zachman (Sowa and Zachman, 1992; Zachman, 1987), FEAF (FEAF, 1999) and DoDAF (DoDAF, 2009), and some other widely known EA publications (Lankhorst, 2013; Schekkerman, 2004; Spewak and Hill, 1992). Synthesizing the key ideas reflected in these EA publications allowed describing the current concept of EA.

Identifying the Problems of the Current Concept of EA

The second task is more complex and implies a comprehensive analysis of the available EA publications to identify possible problems of the current concept of EA, its questionable underlying assumptions and contradictions with empirical evidence. This analysis was performed as part of my recent extensive EA literature review covering 1075 EA publications (Kotusev, 2017c) as well as during the subsequent analysis of additional 307 EA publications that were not included in the formal review due to various reasons (appeared after the review was completed, marketing publications, vendor presentations, reports, whitepapers, blogs, etc.). The methodology of this review is described in detail in Kotusev (2017c) and briefly summarized in Table 1.

Table 1 - Summary of the Review Methodology (Kotusev, 2017c)	
Aspect	Review methodology (see Kotusev (2017c) for more detail)
Sources	229 ranked IS journals, 234 ranked IS conferences, books for EA practitioners and additional specific EA-related sources (JEA, TEAR, EMISA, PRET and CISR)
Keywords	"Enterprise Architecture", "Enterprise Architectures", "Enterprise Architecting", "Enterprise Architectural", "Enterprise Architect", "Enterprise Architects", "EA", "EAM"
Search engines	Google Scholar, IEEE Xplore, AIS Electronic Library, SpringerLink, ACM Digital Library, Amazon website
Additional publications	Publications found by references, publications that appeared after the formal review was completed and publications of questionable origin (marketing publications, vendor presentations, reports, whitepapers, blogs, etc.)
Result	1382 EA publications have been studied covering the period from 1986 to December of 2017

The study of the available EA publications identified according to the search methodology described in Table 1 was driven largely by the following key questions intended to uncover potential problems with the current concept of EA:

- What are the empirically established facts regarding the use of EA?

- Which of these facts contradict the suggestions of the current concept of EA?

- How can these contradictions be interpreted or explained?

- What are the origins and assumptions of the current concept of EA?

- Which of these assumptions are unfounded or taken for granted?

A comprehensive EA literature analysis guided by these and similar questions allowed identifying the flaws and problems of the current concept of EA. Among other conclusions discussed in detail in the next sections, this critical review revealed a rather sharp contrast between prescriptive EA publications based on anecdotal evidence and descriptive EA publications

based on actual empirical evidence from organizations. These publications can be loosely grouped into two different non-overlapping subsets of EA literature: speculative and evidence-based. The comparison between the speculative and evidence-based subsets of EA literature is summarized in Table 2.

Table 2 - Comparison Between the Speculative and Evidence-Based Subsets of EA Literature

Aspect	Speculative subset	Evidence-based subset
Evidence	Anecdotal evidence or no evidence at all	Empirical evidence from real organizations
Attitude	Mostly prescriptive in nature	More descriptive in nature
Authors	Typically consultants and industry experts, not researchers	Typically researchers
Examples	Zachman (1987), Schekkerman (2008), TOGAF (2011) and Bernard (2012)	Ross et al. (2006), Murer et al. (2011), Ahlemann et al. (2012) and Tamm et al. (2015)

The separation of the whole body of EA literature on the speculative and evidence-based subsets often contradicting each other represents arguably the most important general critical conclusion regarding the available EA literature. Many specific problems with the current concept of EA ensue directly from this general conclusion.

The Current Concept of EA

As explained earlier, the current concept of EA is defined largely by the most highly cited EA publications (Mykhashchuk et al., 2011; Simon et al., 2013), including the four most popular EA frameworks (DoDAF, 2009; FEAF, 1999; Sowa and Zachman, 1992; TOGAF, 2011) and other popular EA books (Lankhorst, 2013; Schekkerman, 2004; Spewak and Hill, 1992). However, in order to offer a more comprehensive review, the description of the current concept of EA provided above is based on the primary set of these highly cited sources as well as on the additional broader set of closely related publications, e.g. EA publications based on the primary sources (Sessions, 2007; Tamm et al., 2011) or derived from these sources (Armour et al., 1999b; GAO, 2010), other publications of the same authors (Schekkerman, 2006, 2008) and publications of other authors proposing highly similar or even equivalent ideas

(Bernard, 2012; Boar, 1999; Finkelstein, 2006; van't Wout et al., 2010). The resulting rich description of the current concept of EA is provided in the subsequent paragraphs.

Some authors (Greefhorst and Proper, 2011; Harrell and Sage, 2010; Rivera, 2013) argue that the concept of EA originated from the PRISM architecture framework (PRISM, 1986), while others (Bernard, 2012; Finkelstein, 2006; Sessions, 2007; Tamm et al., 2011) state that the concept of EA was introduced with the publication of the Zachman Framework (Zachman, 1987). Both these seminal frameworks (PRISM, 1986; Zachman, 1987) conceptualized EA as a collection of documents, typically called EA artifacts, comprehensively describing an enterprise from an integrated business and IT perspective and proposed logical structures for organizing EA artifacts, thereby, suggesting how EA should be described and what information is necessary for a logically complete description. Later many other EA frameworks (Bernard, 2012; Schekkerman, 2006; Sowa and Zachman, 1992; TOGAF, 2011; van't Wout et al., 2010) proposed different structures for classifying and organizing EA artifacts suggesting what information is necessary for a holistic description of enterprises. An overview of the popular EA frameworks is summarized in Table 3.

Table 3 - Overview of the Popular EA Frameworks		
Framework	Reference	Brief description
PRISM	PRISM (1986)	PRISM organizes EA artifacts into 16 categories according to four domains (infrastructure, data, application and organization) and four types (inventory, principles, models and standards)
Zachman Framework (Original)	Zachman (1987)	Zachman Framework (Original) organizes EA artifacts into 15 categories according to five abstraction levels (planner, owner, designer, builder and subcontractor) and three perspectives (data, function and network)
Zachman Framework (Extended)	Sowa and Zachman (1992)	Zachman Framework (Extended) organizes EA artifacts into 30 categories according to five abstraction levels (planner, owner, designer, builder and subcontractor) and six interrogatives (what, how, where, who, when and why)
E2AF	Schekkerman (2006)	E2AF organizes EA artifacts into 27 categories according to four domains (business, information, information systems and technology infrastructure), six interrogatives (why, with who, what, how, with what and when) and three crosscutting areas (security, governance and privacy)
IAF	van't Wout et al. (2010)	IAF organizes EA artifacts into 15 categories according to three interrogatives (what, how and with what), four domains (business, information, information systems and technology infrastructure), one additional category (why) and two crosscutting areas (security and governance)
TOGAF	TOGAF (2011)	TOGAF organizes EA artifacts according to four major domains (business, data, applications and technology) and proposes a metamodel providing more detailed technical classification of these domains
EA^{3}Cube	Bernard (2012)	EA^{3}Cube organizes EA artifacts according to five domains (goals & initiatives, products & services, data & information, systems & applications and network & infrastructure), corresponding lines-of-business and three crosscutting areas (security, standards and skills)

The existing EA frameworks conceptualize EA as a holistic description covering an enterprise from the perspectives of different domains (Bernard, 2012; PRISM, 1986; Schekkerman, 2006; TOGAF, 2011; van't Wout et al., 2010), abstraction levels (Sowa and Zachman, 1992; Zachman, 1987) or interrogatives (Schekkerman, 2006; Sowa and Zachman, 1992; van't Wout et al., 2010) and organize EA artifacts accordingly. Since most frameworks (Bernard, 2012; PRISM, 1986; Schekkerman, 2006; TOGAF, 2011; van't Wout et al., 2010) suggest that EA should describe the four essential domains (business, data, applications and technology), it is generally accepted that EA consists of four separate components (or layers): business architecture, data architecture, applications architecture and technology architecture.

The current EA literature pays much attention to EA frameworks (Simon et al., 2013) and states that using EA frameworks is essential for EA practice or is even a necessary condition for success with EA (Armour et al., 1999b; Bernard, 2012; Finkelstein, 2006). It is recommended to start EA programs with a choice of an appropriate EA framework (Armour et al., 1999a, 1999b; Bernard, 2012; Boar, 1999). Taxonomy completeness is recognized as an important desirable factor when choosing EA frameworks (Sessions, 2007). Therefore, the current EA literature suggests logically complete, holistic and comprehensive EA documentation organized according to a certain framework (Kappelman, 2010). Moreover, the current literature argues that EA artifacts should be accurate and formal (Bernard, 2009), possibly even described according to strict blueprinting notations (Boar, 1999). The current literature also argues that EA can be considered complete only if all the cells of the chosen EA framework are filled with artifacts and describes many different EA artifacts that can be used to fill these cells (Bernard, 2012; Boar, 1999; Sowa and Zachman, 1992; Spewak and Hill, 1992; van't Wout et al., 2010).

The current literature argues that EA should necessarily describe an enterprise in its current (as-is, baseline) and desired future (to-be, target) states (Bernard, 2012) as well as a roadmap (transition plan)

describing how to migrate from the current state to the future state. Documenting both the current and future states and developing roadmaps is considered essential for EA practice and recommended by the majority of the existing EA methodologies (Armour et al., 1999b; Bernard, 2012; Boar, 1999; FEAF, 1999; Niemann, 2006; Schekkerman, 2008; Spewak and Hill, 1992; TAFIM, 1996; TOGAF, 2011). The current literature suggests that EA is based on a business strategy (Bernard, 2012; Niemann, 2006; Spewak and Hill, 1992) and developed according to these methodologies by enterprise architects. At first, after interviewing all the relevant stakeholders and collecting all the necessary data, enterprise architects develop all the necessary EA artifacts (Bernard, 2012; Boar, 1999; Spewak and Hill, 1992; TOGAF, 2011). The purpose of these EA artifacts is to describe an enterprise and its various aspects comprehensively (Lankhorst, 2013; Schekkerman, 2006; Sowa and Zachman, 1992; van't Wout et al., 2010). After being developed, EA is used by IT staff since it provides an actionable guidance for implementing the necessary information systems and transforming an enterprise

into the desired target state (Bernard, 2012; Spewak and Hill, 1992; TOGAF, 2011). However, EA can also be used for communication, analysis and decision-making by executives, managers and other stakeholders (Armour et al., 1999a; Bernard, 2012; Lankhorst, 2013; TOGAF, 2011). This evolution of EA practice from the initial development of EA artifacts to their eventual usage by all stakeholders is reflected in a number of EA maturity models intended to assess and measure the progression of this process (DoC, 2007; GAO, 2010; TOGAF, 2011).

The current EA literature (Bernard, 2012; Perks and Beveridge, 2003; Tamm et al., 2011) argues that the application of EA and its artifacts is to support the execution of a business strategy by providing ready-to-implement descriptions of the necessary business processes, information systems and technologies. The current EA literature (Bernard, 2012; Boar, 1999; Sowa and Zachman, 1992; Spewak and Hill, 1992; TOGAF, 2011) pays most attention to proper development and description of EA emphasizing these issues as the essence of an EA practice. The analysis of the current concept of EA is summarized in Table 4.

Table 4 - Summary of the Current Concept of EA	
Aspect	The current concept of EA
What are the main components of EA?	Business, data, applications and technology architectures
What is described in EA?	Current state, future state and roadmap
What domains are described in EA?	Business, data, applications and technology
How is EA described?	Collection of EA artifacts describing different domains separately
What are the desired qualities of EA documentation?	Logical completeness and comprehensiveness
What are the desired qualities of EA artifacts?	Formality and accuracy
How are EA artifacts organized?	According to a certain framework
What EA artifacts are necessary?	Artifacts that are necessary to develop a logically complete description according to the chosen framework, i.e. to fill all the cells of the framework
How are EA artifacts classified?	According to their domains, interrogatives and abstraction levels
What is the basis for EA artifacts development?	Business strategy
Who develops EA artifacts?	Enterprise architects
Who uses EA artifacts?	IT staff, executives, managers and other stakeholders
How are EA artifacts used?	Information systems implementation, communication, analysis and decision-making
What are the applications of EA artifacts?	Execution of a business strategy
What is the purpose of EA artifacts?	Describe various aspects of an enterprise
What is the essence of EA practice?	Describing an enterprise comprehensively and using this description
How does EA practice evolve?	At first all EA artifacts are developed and then used

Problems with the Current Concept of EA

In the previous section I discussed the current concept of EA and its various aspects (see Table 4). This discussion was based on the suggestions of the most highly cited publications and other works of their authors (Mykhashchuk et al., 2011; Simon et al., 2013), and arguably represents the mainstream, commonly accepted view of EA. The current concept of EA looks solid, complete and is widely supported by the popular EA literature.

However, a number of facts question the validity of the current concept of EA. These facts, for the most part, ensue from the juxtaposition and comparison between the speculative and evidence-based subsets of EA literature (see Table 2) and arguably present a systematic, comprehensive and unbiased analysis of the available EA literature. These facts demonstrate a number of significant problems with the current concept of EA and even question the empirical validity of this concept.

The Current Concept of EA Has Non-Empirical Origins

The underlying supporting evidence, attitudes and origins of the top 10 highly cited EA publications (according to the citation analyses of Mykhashchuk et al. (2011) and Simon et al. (2013)) defining the current concept of EA are presented in Table 5.

Publication(s)	Evidence	Attitude	Origin
Table 5 - Evidence, Attitudes and Origins of the Publications Defining the Current Concept of EA			
TOGAF (2011)	Anecdotal	Prescriptive	Industry consortium (The Open Group)
Zachman (1987), Sowa and Zachman (1992)	Conceptual	Prescriptive	Consulting company (IBM)
FEAF (1999)	No evidence	Prescriptive	Industry experts and consultants
Spewak and Hill (1992)	Anecdotal	Prescriptive	Industry experts and consultants
Schekkerman (2004)	No evidence	Descriptive	International recognized thought leader
Niemann (2006)	Anecdotal	Prescriptive	Industry expert and consultant
Bernard (2012)	Anecdotal	Prescriptive	Industry expert and consultant
Boar (1999)	Anecdotal	Prescriptive	Independent consultant
Perks and Beveridge (2003)	Anecdotal	Prescriptive	Industry experts and consultants

Table 5 demonstrates that all the most influential EA publications defining the current concept of EA are purely prescriptive (expect Schekkerman (2004), which describes existing EA frameworks), not peer reviewed (probably except Zachman (1987) and Sowa and Zachman (1992), which were published in IBM Systems Journal and might have been reviewed internally in IBM) and none of them is supported by any empirical evidence. Moreover, all these publications originate from fashion-setting networks (consultancies, experts, gurus, marketing specialists, etc.) (Abrahamson, 1991, 1996; Miller et al., 2004), none of them is based on academic research. Unsurprisingly, Khoury and Simoff (2004, p. 65) argue that "contemporary approaches to [EA] have been largely hijacked by the consulting classes".

These conclusions are also supported by previous EA literature reviews. For instance, the review of early EA publications by Langenberg and Wegmann (2004) concludes that the EA discipline lacks basic research and is driven largely by consulting companies. The EA literature review by Radeke (2010) demonstrates that EA publications are predominantly prescriptive in nature and of questionable empirical validity. Kotusev (2017c) demonstrates that 54.2% of all EA research is purely conceptual, 45.1% of all EA research is purely prescriptive, while 70.1% of all prescriptive EA research is non-empirical. Moreover, during its early formative period the EA discipline was dominated by non-empirical prescriptive

publications, which constitute 67.4% of all EA publications issued before 2002 (Kotusev, 2017c). The analysis provided in Table 5 and supported by the conclusions of the previous literature reviews (Kotusev, 2017c; Langenberg and Wegmann, 2004; Radeke, 2010) suggests that the current concept of EA is based largely on non-empirical foundations of a prescriptive nature, i.e. shaped predominantly by the speculative subset of EA literature (see Table 2).

Interestingly, all the publications referenced in the previous section to describe the current concept of EA essentially appeal only to anecdotal evidence and most of them are purely prescriptive. Consequently, *the current concept of EA describes only desirable behavior and outcomes, rather than the actual ones*, while most aspects of the current concept of EA (see Table 4) are not substantiated empirically. Therefore, the current concept of EA might be a *management fad*, which is promoted by fashion-setters, but is not substantiated by any empirical evidence and rigorous research.

Empirical Validation of EA Frameworks Is Missing

TOGAF (TOGAF, 2011), Zachman Framework (Sowa and Zachman, 1992; Zachman, 1987), FEAF (FEAF, 1999) and DoDAF (DoDAF, 2007) are the four most influential and widely discussed EA frameworks (Simon et al., 2013) essentially providing the basis for the

current concept of EA. However, during the comprehensive analysis of available EA publications (see Table 1) *I was not able to find any publications describing how exactly any EA framework was successfully used in real organizations without critical modifications*. Therefore, the widespread claims of the high utility and importance of EA frameworks made in the speculative subset of EA literature have no empirical substantiation in the evidence-based subset of EA literature (see Table 2). On the contrary, the evidence-based subset of EA literature suggests that the popular EA frameworks were either never used in any real sense or used unsuccessfully. The following subsections analyze in detail the situation around the most popular EA frameworks including Zachman, FEAF, DoDAF and TOGAF.

The Zachman Framework

The Zachman Framework, which is considered as a seminal EA publication by virtually hundreds of authors, is based only on observations of manufacturing industry, but not on any scientific foundations (Beznosov, 1998). The original paper indeed "defines information systems architecture by creating a descriptive framework from disciplines quite independent of information systems, then by analogy specifies information systems architecture" (Zachman, 1987, p. 276). The *only* provided justification for the Zachman Framework is that "there appear to be conceptual equivalents in the manufacturing industry for the architectural representations of the construction industry. This equivalency would strengthen the argument that an analogous set of architectural representations is likely to be produced during the process of building any complex engineering product, including an information system" (Zachman, 1987, p. 281). However, the early feedback from EA practitioners suggests that the idea of describing an entire organization like "any complex engineering product" as recommended by the Zachman Framework is unrealistic (Kim and Everest, 1994). Gaver (2010, p. 72) argues that the

analogy to classical architecture conceptually underpinning the Zachman Framework should be reexamined and corrected because it is "faulty and incomplete". "The problem here is that the enterprise isn't an ordinary system like a machine or a building, and can't be architected or engineered as such" (Bloomberg, 2014b, p. 1).

In line with my own conclusions, Ylimaki and Halttunen (2006) argue that there are no documented cases demonstrating how exactly the Zachman Framework was used in any real organizations. Moreover, in the action research study by Ylimaki and Halttunen (2006) the Zachman Framework was found virtually unusable and its rules inapplicable in practice without significant simplifications. EA practitioners report that "the Zachman framework is too complex to support communication [...] it is too abstract to capture our architectural problems" (Janssen and Hjort-Madsen, 2007, p. 6). Buckl et al. (2009) report that EA practitioners find the Zachman Framework helpful only for "selling" the idea of EA to top management. After the EA initiative had been approved, the Zachman Framework was "pinned on walls in many rooms without far-reaching consequences" (Buckl et al., 2009, p. 15).

Khoury and Simoff (2004) argue that the Zachman Framework is only a conceptual taxonomy that does not provide any real actionable guidance for EA practice. Interestingly, even John Zachman admits that his framework has never been implemented. "If you ask who is successfully implementing the whole framework, the answer is nobody that we know of yet" (Zachman and Ruby, 2004, p. 2). After being asked to "tell us about two or three major success stories in applying the Zachman Framework", he replies that "this is another hard question for me to answer" (Zachman and Sessions, 2007, p. 9).

FEAF

FEAF was initiated in 1998 to be an underlying framework for the prospective Federal Enterprise Architecture (FEA)

program motivated by the enactment of the Clinger-Cohen Act in 1996 (FEAF, 1999). However, the resultant FEAF-based FEA program initiated in 1999 cannot be considered particularly successful (Gaver, 2010). Maturity assessments of the FEA program consistently demonstrated that the vast majority of federal agencies did not mature higher than Stage 2 ("Building the EA Management Foundation"), while only a very small number of agencies matured to Stage 4 ("Completing the EA") and almost no agencies matured to Stage 5 ("Leveraging the EA to Manage Change"). The official report on the status of the FEA program to the Congress concluded that "the federal government's state of enterprise architecture management remains less than satisfactory, with little progress being made over the last 2 years" (GAO, 2003, p. 52).

Eventually, the FEA program had largely failed and experienced a "hangover" (Gaver, 2010; Reynolds, 2010) resulting in more than a billion dollars of wasted taxpayers' money (Gaver, 2010). "Enterprise Architecture within the federal government hasn't been working, and far more often than not hasn't delivered useful results. Moreover, significant parts of the federal EA program have been complete and utter failures" (Gaver, 2010, p. 6). "Most departments and agencies reported they expect to realize the benefits from their respective enterprise architecture programs [...] sometime in the future. What this suggests is that the real value in the federal government from developing and using enterprise architectures remains largely unrealized" (GAO, 2011, p. 64). "Look at all the efforts that have been launched under the idea of architecture and all the money that has been spent under the umbrella of architecture that has all resulted in unusable shelfware", commented Paul Brubaker, one of the principal authors of the Clinger-Cohen Act (Perera, 2005, p. 1).

DoDAF

DoDAF was initially developed in 2003 (DoDAF, 2007) based on the previous C4ISR framework to guide the EA development efforts in the Department of Defense. However, the resultant DoDAF-based EA program cannot be considered particularly successful. For instance, in 2004 it was reported that "despite 3 years of effort and over $203 million in reported obligations, DOD's architecture remains insufficiently defined, and the way in which the department makes business systems investments decisions remains largely unchanged" (GAO, 2004, p. 19). In 2005 it was reported that "despite spending almost 4 years and about $318 million, DOD does not have an effective architecture program" (GAO, 2005, p. ii). "The department has spent almost 4 years and approximately $318 million in obligations to develop an architecture that is incomplete, inconsistent, and not integrated and, thus, has limited utility" (GAO, 2005, p. 42). In 2013 it was reported that "even though DOD has spent more than 10 years and at least $379 million on its business enterprise architecture, its ability to use the architecture to guide and constrain investments has been limited" (GAO, 2013, p. ii).

Finally, in 2015 it was concluded that (1) "the architecture was not effective in constraining system investments or enabling DOD to produce reliable and timely information for decision-making purposes" (GAO, 2015, p. ii), (2) "the architecture has produced limited value" (GAO, 2015, p. ii), (3) "[the architecture] was generally not effective in achieving its intended outcomes and that its usefulness in achieving benefits, such as reducing the number of applications, was limited" (GAO, 2015, p. 16), (4) "the business enterprise architecture has not been effective in meeting its intended outcomes" (GAO, 2015, p. 17), (5) "the usefulness of DOD's business enterprise architecture in achieving various potential benefits is limited" (GAO, 2015, p. 18) and (6) "the architecture does not enable DOD to produce reliable and timely information for decision-making purposes" (GAO, 2015, p. 28).

TOGAF

TOGAF, which is considered as a current de facto industry standard in EA practice by many authors (Brown and Obitz, 2011; Lankhorst et al., 2010; Sobczak, 2013), is based on the Technical Architecture Framework for Information Management (TAFIM) and is conceptually similar to it (TAFIM, 1996; TOGAF, 2011). However, TAFIM was previously retired as unsuccessful: (1) "TAFIM most certainly required a large investment of both time and money", (2) "the elapsed time required to produce the architecture makes it close to obsolete before completion", (3) "the end result is normally incomprehensible to a business-oriented audience and is harder to trace to the business strategy" and (4) "due to some of these flaws, the TAFIM was abruptly cancelled" (Perks and Beveridge, 2003, p. 79).

Unsurprisingly, EA practitioners report that TOGAF is found excessively complex: "After an intensive phase of familiarization and an initial workshop, where TOGAF was presented to the involved stakeholders, we decided: Thanks, too complicated for us" (Buckl et al., 2009). In line with my own conclusions, Anderson et al. (2009) report that real examples demonstrating the use of TOGAF in practice cannot be found: "There is a pressing need for some detailed worked examples and use cases. Although these were requested, they were not forthcoming from TOGAF trainers or The Open Group" (Anderson et al., 2009, p. 66). The case studies of the successful TOGAF-based EA practices (Kotusev, 2018b; Smith et al., 2012) suggests that *none* of the core TOGAF recommendations, including architecture development method and architecture content framework, were actually adopted in practice. Moreover, Kotusev (2016a) and Kotusev (2018a) report that main TOGAF recommendations are not followed even in the organizations included in the list of TOGAF users provided by The Open Group itself.

Architecture development method (ADM), "a step-by-step approach to developing an enterprise architecture", is considered to be "the core of TOGAF" (TOGAF, 2011, p. xxiii). However, EA practitioners report that their "views on TOGAF inevitably changed as the project progressed. Working sequentially through the TOGAF [ADM] cycle ceased to make sense" (Anderson et al., 2009, p. 48). "Our initial assumptions about TOGAF were that it would be a sort of 'methodology' that we could follow to produce our EA, however this turned out not to be the case" (Anderson et al., 2009, p. 63). Anderson et al. (2009) argue that following TOGAF recommendations step-by-step cannot lead to successful EA practice. Instead, it should be tailored and adapted to particular organizations, however, any specific recommendations describing how exactly to adapt it cannot be found. Anderson et al. (2009) conclude that TOGAF can be useful only as a toolkit, broad framework or vocabulary.

TOGAF experts also suggest that TOGAF should not be taken "too literally" and followed end to end, but rather should be adapted to organizations and treated as a toolkit (Bloomberg, 2014a). "There's very few people who use the whole ADM but typically people will align their architecture practice at their level of maturity with the relevant aspects of the ADM", reports an EA consultant (Alwadain et al., 2014, p. 220). Winter et al. (2010, p. 6) notice that TOGAF "only states that the ADM should be adapted without specifying how". Internationally recognized enterprise architecture consultant, trainer, advisor and implementation program manager gives the following cryptic explanation of the value of TOGAF: "Organizations start with an open framework like the TOGAF framework, but as it gets customized and tailored, it adapts to an organization's culture to become their own "personalized" enterprise architecture model. As enterprise architecture matures in an organization, the TOGAF framework is still inside and powering their enterprise architecture but no longer very visible" (Viswanathan, 2015, p. 16).

Consequently, (1) TOGAF is based on TAFIM, which proved ineffective, (2) working examples of TOGAF can be

neither provided by The Open Group nor found in the organizations from the "official" list of TOGAF users, (3) TOGAF recommendations cannot be followed directly, (4) there is no explanation of how exactly TOGAF should be adapted and (5) descriptions of its value are very vague. Unsurprisingly, Bloomberg (2014a, p. 1) argues that "for many organizations, TOGAF has gained traction simply because it's better than doing nothing".

EA Frameworks in General

Generally, the strict following of EA frameworks is recognized as one of the worst EA practices (Burton, 2009). Full implementation of EA frameworks is typically found impractical and rejected (Gerber et al., 2007). "Most EA methods and frameworks claim that [their prescriptions] can be applied to the development of an EA for an entire organization, but attempts to develop architecture on this scope routinely fail" (Trionfi, 2016, p. 40). EA practitioners report that EA frameworks are "far away from the possibilities we have in our enterprise to implement them" (Buckl et al., 2009, p. 15). "[EA] frameworks have been suggested as guidelines to [EA] implementation, but our experience indicates that very few companies follow the steps prescribed by such frameworks" (Haki et al., 2012, p. 1).

Molnar and Proper (2013) argue that EA frameworks are too rigid and complex to be used in some companies even after appropriate tailoring. Buckl et al. (2009, p. 15) argue that EA frameworks "appear theoretical and impossible to implement". "Many practitioners see frameworks as theoretical or conceptual rather than a highly practical everyday device for managing and thinking about architectures" (Evernden, 2015, p. 29). EA practitioners argue that working with frameworks only wastes their efforts and does not solve any real problems (Bloomberg, 2014b). Vivek Kundra, the federal chief information officer of the United States, reportedly argued that EA frameworks "are worse than useless" (Tucci, 2011, p. 1). "Frameworks are cocaine for executives - they give them a

huge rush and then they move to the next framework", comments a practicing senior enterprise architect (Bloomberg, 2014b, p. 1).

Conclusions on the Validity of EA Frameworks

The evidence regarding the usage of the four most popular EA frameworks providing the basis for the current concept of EA analyzed above suggests that these frameworks never proved useful in any real sense. Firstly, Zachman and TOGAF are heavily criticized for impracticality of their suggestions. Secondly, FEAF-based and DoDAF-based EA programs failed. Thirdly, EA frameworks are criticized in general and none of the four most popular EA frameworks has any documented "positive" examples supporting their practical utility and value. Consequently, recommendations embodied in EA frameworks are hardly feasible, let alone represent the best practice in EA.

Empirical Validation of the Current Concept of EA Is Missing

Despite that the current concept of EA is widely supported by the current EA literature, during the comprehensive analysis of available EA publications (see Table 1) *I was not able to find any publications describing how exactly the current concept of EA was successfully implemented in real organizations without critical modifications.* In other words, there is no evidence demonstrating that any organization of a considerable size was ever able to document its current state in detail, develop a comprehensive description of its desired future state after several years, analyze the gaps between them, prepare a transition plan and completely implement it. Therefore, the widespread claims that the current concept of EA represents the proper way to use EA or even the best practice in EA made in the speculative subset of EA literature have no empirical substantiation in the evidence-based subset of EA literature (see Table 2).

On the contrary, the evidence-based subset of EA literature suggests that

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successful EA practices barely resemble the ideas embodied in the current concept of EA. For instance, the study of successful EA practices by Ross et al. (2006), which is based on 68 case studies, surveys of 183 companies and on additional data from previous studies (Ross et al., 2006, pp. ix-xi), never mentions the use of any comprehensive descriptions of current or future states, transition plans and frameworks by the companies successfully practicing EA, but describes a significantly different approach instead. Moreover, Ross et al. (2006, p. vii) argue about the historical ineffectiveness of the detailed planning advocated by the current concept of EA and criticize it for "remoteness from the reality of the business and [its] heavy reliance on mind-numbing detail represented in charts that look more like circuit diagrams than business descriptions and that are useful as little more than doorstops".

The study of 8 successful EA practices by Ahlemann et al. (2012) describes EA practice as a complex set of EA-related management processes that do not correlate with the recommendations of the current concept of EA. Other case studies of the companies successfully practicing EA (Erder and Pureur, 2006; Gerber et al., 2007; Haki et al., 2012; Holst and Steensen, 2011; Kotusev, 2018a, 2018b; Kotusev et al., 2016; Murer et al., 2011; Smith et al., 2012) also suggest that the actual activities of these companies barely correlate with the recommendations of the current concept of EA: "The empirical findings confirmed this with an absence of the mechanistic concept of a large formalized documentation framework, and the lack of any theoretically-based concept of gap analysis or detailed as-is and to-be architecture" (Holst and Steensen, 2011, p. 20). Holst and Steensen (2011, p. 21) argue that "in the rapidly changing environment [...] it is impossible to plan and document to pre-emptively solve all of the future challenges". Beeson et al. (2002, p. 320) argue that business and IT alignment in practice results not from an overarching plan or model, but rather "from a

continuous process of adjustment and readjustment of plans and goals, in which local and relatively short-term plans are formulated and weighed against current understanding of the business's key interests". Essentially, *all available qualitative case studies demonstrate that successful EA practices barely resemble the current concept of EA.*

At the same time, attempts to organize an EA practice according to the prescriptions of the current concept of EA result in three problems (Kotusev et al., 2015b; Lohe and Legner, 2014): (1) unreasonable efforts are needed to develop and maintain the EA documentation due to high organizational complexity, large scope and vibrant environment, (2) low utilization of the EA documentation due to its poor quality, obsolescence, wrong level of detail and mismatch with real information needs and (3) poor acceptance of EA practice in an organization due to its isolated nature and its poor integration with normal organizational processes. For these reasons Kemp and McManus (2009) question the adequacy of the current concept of EA. "We're not sure we've yet seen an EA strategy that is anything other than impractical, unachievable and, even if it could be achieved, unsustainable" (Kemp and McManus, 2009, p. 20).

Bloomberg (2014b, p. 1) argues that the current concept of EA has achieved "a surprisingly paltry level of success". "[Enterprise architects] focus on documenting the current state or what the future state should be. By the time they are done with their architectural artifact, a new technology has already killed whatever they are working on", comments Vivek Kundra (Tucci, 2011, p. 1). The first-hand participant of the FEA program argues that the current concept of EA "often doesn't work well *anywhere* because the problems with Enterprise Architecture are fundamental in nature" (Gaver, 2010, p. 10). Interestingly, even Spewak and Hill (1992, p. 19), pioneers of the current concept of EA, admit that "the vast majority of enterprises that undertake Enterprise Architecture Planning are not successful".

Consequently, the current concept of EA is hardly feasible, lacks any documented examples of its practical implementation and does not define the proper way to use EA, let alone represents the best practice in EA.

Reported Gaps Between EA Theory and Practice

Many authors (Haki et al., 2012; Holst and Steensen, 2011; Niemi and Pekkola, 2017; Tanigawa, 2004; Ylimaki and Halttunen, 2006) have consistently noticed significant gaps between the theoretical EA literature advocating the current concept of EA and the actual real-world EA practices in organizations. Moreover, these gaps between EA theory and practice were noticed in multiple different aspects of EA practice.

For example, after a series of interviews with practicing enterprise architects Tanigawa (2004, p. 155) reports that "the answers showed the gaps between how [enterprise architects] ought to function and how [enterprise architects] function in practice. The researcher often needed to ask the participants whether they were talking about their EA practice (descriptive view) or an idealization (normative view)". Unsurprisingly, Tanigawa (2004, p. 157) concludes that he "observed the considerable gaps between architects' normative views and descriptive views. Architects typically have firm opinions regarding what enterprise architecture ought to be, but they recognize that the reality is significantly different".

After studying the usage of EA artifacts in a real organization Niemi and Pekkola (2017, p. 13) conclude that "the analysis of EA products was much simpler in practice than suggested by the myriad of complex technical analysis methods presented in the literature". "Although the findings support some of the earlier views on possible EA artifact use situations, the coverage of the situations identified in the literature is limited in both extent and level of detail" (Niemi and Pekkola, 2017).

After analyzing four successful EA practices Holst and Steensen (2011, p. 18)

argue that "it seems contradictory that the three EA theories were found to have a predominantly mechanistic focus, when the opposite was determined to be true for the case studies, which were characterized by a more organic EA approach. Most noticeable was the absence of formalized EA documentation work of as-is based on a framework, as recommended in a large part of the EA literature. Another example of the difference between the mechanistic theory and the organic practice of EA was the total lack of value measurement of EA in the case enterprises. While it figured prominently as something important in the literature, the cases viewed it as being either impossible or irrelevant". Unsurprisingly, Holst and Steensen (2011, p. 19) conclude that "successful EA is difficult to create based on a large part of the established and commonly accepted mechanistic inspired EA literature".

Consequently, significant gaps between the theoretical EA literature advocating the current concept of EA and the real practical use of EA have always existed in numerous aspects of EA practice, including the work and behavior of enterprise architects, the usage and analysis of EA artifacts, the measurement of EA value and even the general nature of EA practice.

Empirical Evidence Demonstrated the Ineffectiveness of BSP

EA is not a completely novel approach to information systems planning, but rather "has its roots in IBM's BSP" (Spewak and Hill, 1992, p. 53). Business Systems Planning (BSP) methodology was initiated by IBM in the 1960s and became a widely known approach to information systems planning (BSP, 1975; Harrell and Sage, 2010). BSP was conceptually similar to the current concept of EA (Kotusev, 2016b, 2017b). For instance, (1) BSP suggested that the information systems planning for the whole organization is carried out by a dedicated group of experts called BSP study team (prototype of enterprise architects), (2) BSP introduced the notion of architecture for describing the

relationship between business and IT (prototype of EA), (3) BSP recommended to describe business, data and information systems domains (prototype of EA domains), (4) BSP proposed various techniques to model processes, systems and data in a formal way (prototype of EA diagrams), (5) BSP advocated a formal step-wise process for architecture planning including the analysis of the current state, description of the desired future state and development of the action plan (prototype of EA methodologies) (BSP, 1984). Essentially, BSP advocated a very similar approach to planning and served as a prototype for modern EA methodologies representing the current concept of EA (Bernard, 2012; Spewak and Hill, 1992; TOGAF, 2011).

However, *BSP proved to be an ineffective approach to information systems planning* and a number of studies (Goodhue et al., 1992; Goodhue et al., 1988; Lederer and Sethi, 1988) even questioned the very utility of BSP-like methodologies. For instance, Goodhue et al. (1988, p. 383) concluded that "for many firms, the [BSP] approach is too expensive, its benefits are too uncertain, and it is organizationally difficult to implement". Lederer and Sethi (1988, p. 455) concluded that "given their great expense and time consumption, [...] findings seriously challenge the utility of the planning methodologies represented

in this study [BSP]". Goodhue et al. (1992) concluded that this approach may not be the best way to plan information systems given the necessary investments of time and money, required level of commitment of high-qualified experts, high probability of analysis errors and very abstract nature of the planning outcomes. They state that BSP and similar methodologies bring more problems than benefits despite their conceptual justifications. Moreover, they argue than "the evidence [...] presented here strongly supports the need for a fundamental rethinking of IS planning methodologies" (Goodhue et al., 1992, p. 28).

Consequently, the BSP methodology, which is a conceptually similar predecessor and prototype of the current concept of EA, long ago proved to be an ineffective approach to information systems planning.

Conclusion on the Current Concept of EA

The analysis of the problems with the current concept of EA demonstrates that despite being widely accepted in the existing EA literature, this concept is highly questionable and speculative in nature. The analysis of the current concept of EA from different perspectives provided above is summarized in Table 6.

Table 6 - Summary of the Analysis of the Current Concept of EA from Different Perspectives		
Perspective	Fact	Conclusion
Origin of the current concept of EA	Most highly cited publications defining the current concept of EA are non-empirical, purely prescriptive and authored by fashion-setters (see Table 5)	The current concept of EA is likely to be an actively promoted management fad
Empirical validity of EA frameworks	EA frameworks are heavily criticized and some of them have explicitly documented failures, but none of the popular EA frameworks has any "positive" examples justifying their value	EA frameworks provide little or no practical value and do not offer a sound basis for conceptualizing EA
Empirical validity of the current concept of EA	The current concept of EA has no examples of its successful practical implementation, while all the attempts to implement it are associated with significant practical problems	The current concept of EA is infeasible from the practical perspective and exists only "on paper"
Relationship between EA theory and practice	Considerable gaps between the current EA theory and practice are consistently reported in various aspects and areas	Actual EA practice is significantly different from the established EA theory
Historical roots of the current concept of EA	The current concept of EA historically descends from the BSP methodology, but BSP proved ineffective long ago	The current concept of EA cannot be effective since very similar ideas already proved ineffective earlier

The facts discussed above resulting from the juxtaposition between the speculative and evidence-based subsets of EA literature (see Table 2) suggest that *the current concept of EA defined in the speculative subset of EA literature (1) is only a management fad successfully promoted by fashion-setters, (2) was never based on any empirical evidence or research, (3) has no demonstrated examples of successful implementation, (4) is not practiced in real-world companies and (5) is based on flawed ideas previously advocated by the BSP methodology that proved ineffective.*

Albert Einstein famously noted that "the greatest obstacle to discovery is not ignorance - it is the illusion of knowledge". The analysis provided above demonstrates that the current concept of EA creates only the illusion of knowledge and, thereby, is the greatest obstacle to understanding real-world EA practices.

The Real Practical Use of EA in Organizations

In the previous section I demonstrated that the current concept of EA defined in the speculative subset of EA literature is likely to be a management fad that is based on flawed ideas and not supported by any empirical evidence (see Table 6). However, EA is widely used in real organizations. How is EA practiced there?

Some ideas inspired by management fads are occasionally found useful and get partially incorporated into practice (Miller and Hartwick, 2002; Miller et al., 2004). Likewise, the idea of using architecture (now EA), as a formal description of the relationship between different aspects of business and IT, first introduced by the BSP methodology (BSP, 1975) was found useful in practice and adopted in many organizations, especially large ones, however, with significant deviations from the original BSP prescriptions (Periasamy, 1993; Periasamy and Feeny, 1997). For instance, corporate data models were largely useless for planning, irrelevant to business stakeholders, too complex and

"many people withdrew in horror when [corporate data model] was presented to them" (Periasamy and Feeny, 1997, p. 201). The usability of relationship matrices as tools for planning was also limited because executives could hardly understand them. At the same time, business system models, easy-to-understand high-level graphical descriptions of business and its information systems, were found very useful for integrated business and IT planning and communication with top managers. Simplified versions of application models including only the essential elements were also useful for collaborative information systems planning and relevant to senior management. Therefore, pragmatic, simple and business-oriented architectures were effective instruments for planning, while comprehensive, detailed and technical architectures recommended by BSP-like methodologies were useless in practice (Periasamy, 1993; Periasamy and Feeny, 1997).

Currently, the effectiveness of EA practice is substantiated empirically (Bradley et al., 2012; Bradley et al., 2011; Ross et al., 2006; Schmidt and Buxmann, 2011) and EA is widely used in many organizations (van der Raadt et al., 2007). For instance, the survey by Ambler (2010) shows that 63% of large organizations practice EA. However, as it was demonstrated above (see Table 6), these organizations are unlikely to practice EA according to the prescriptions of the current concept of EA, but rather in some other ways (Ahlemann et al., 2012; Erder and Pureur, 2006; Gerber et al., 2007; Haki et al., 2012; Holst and Steensen, 2011; Kotusev, 2018b; Kotusev et al., 2016; Murer et al., 2011; Ross et al., 2006; Smith et al., 2012). Unsurprisingly, organizations practicing EA either do not use EA frameworks embodying the current concept of EA at all or, if use, simplify them for their needs or use them only as idea contributors (Anderson et al., 2009; Aziz and Obitz, 2007; Bloomberg, 2014a; Buckl et al., 2009; Kotusev, 2018a, 2018b; Obitz and Babu, 2009; Smith et al., 2012; Winter et al., 2010). For instance, the

survey of 18 organizations by Buckl et al. (2009) shows that none of these organizations used EA frameworks strictly without adaptation.

Now I will discuss which exactly suggestions of the current concept of EA did not prove useful in real practice or contradict empirical experience and, thereby, compare the current concept of EA with the real practical use of EA in organizations. In other words, I will contrast the claims of the speculative subset of EA literature with the facts from the evidence-based subset of EA literature (see Table 2).

Comprehensive EA Documentation Is Unnecessary and Unrealistic

The current concept of EA suggests that EA should necessarily be a comprehensive and logically complete description of an enterprise. However, empirical evidence had consistently demonstrated that comprehensive and complete descriptions are unnecessary, impractical or even unachievable. For instance, Kim and Everest (1994) report that the attempts to develop comprehensive descriptions require unreasonable efforts and seem unrealistic. Beeson et al. (2002, p. 320) argue that "the complexity and volatility of the business environment, and of the internal IS development context, [...] make a stable or fully articulated business model and IS architecture impossible to achieve". Similarly, Erder and Pureur (2006) argue that detailed future state documentations and transition plans are a wasted effort due to the dynamic environment. Schmidt and Buxmann (2011, p. 174) argue that "while some authors have stressed the necessity for a complete set of architectural descriptions (e.g., Zachman, 1987), this has generally not been feasible in practice due to the high efforts associated with the creation and maintenance of such models". The study of EA modeling best practices by Basten and Brons (2012, p. 225) concludes that "the focus should be firmly fixed on value-added documentation and a pragmatic 80/20 approach should be chosen". Lohe

and Legner (2014, p. 115) report that the studied companies "initially focused on a modeling-driven EAM approach, as proposed by many EA frameworks. [...] The companies recognized that complete EA documentation was not feasible due to the many different stakeholders, the overall organizational complexity, and the too large scope".

Frameworks for Organizing EA Artifacts Are Not Necessary

The current concept of EA suggests that EA documentation should necessarily be organized according to a certain EA framework. However, empirical evidence shows no necessity of using EA frameworks for organizing EA documentation. For instance, the study of 4 organizations practicing EA by Fallmyr and Bygstad (2014, p. 3795) concludes that "none of them has followed a specific EA methodology or framework". The study of 8 organizations by Basten and Brons (2012) shows that 5 of these organizations did not use any EA frameworks. The study of 2 organizations by Molnar and Proper (2013, p. 76) concludes that "contemporary EA frameworks are too rigid to be applied or appropriately tailored in some business environments". The study of 21 organizations by de Vries and van Rensburg (2009) shows that 8 of these organizations did not use any EA frameworks. The surveys show that at least 26% (Obitz and Babu, 2009), 31% (Aziz and Obitz, 2007), 36% (Buckl et al., 2009) and 39% (Ambler, 2010) of organizations did not use any EA frameworks. Therefore, using EA frameworks for organizing EA documentation is optional.

Moreover, even if a certain EA framework is "used" by an organization, it is unclear whether this framework actually organizes EA documentation according to its cells or is merely "pinned on walls in many rooms without far-reaching consequences" (Buckl et al., 2009, p. 15). Taking into account that EA frameworks "appear theoretical and impossible to implement" (Buckl et al., 2009, p. 15), that the strict usage of EA frameworks proved

ineffective (Burton, 2009) and that the EA literature provides no practical examples showing how the cells of any EA framework were actually filled with real EA artifacts, it can be hypothesized that even organizations using EA frameworks as the basis for their EA practices do not actually organize their EA documentation as these EA frameworks recommend.

It Is Not Necessary to Separately Describe Strictly the Four Typical Domains

The current concept of EA suggests that EA should necessarily consist of separate business, data, applications and technology architectures. However, individual EA artifacts useful in practice often contain information relevant to more than one domain. For instance, the core diagrams discussed by Ross et al. (2006) and the models discussed by Lankhorst (2013) describe several different domains at the same time. On the other hand, empirical evidence shows that each of the four typical EA domains is not described in about 20% of companies (Roeleven, 2010; Scholtz et al., 2013), while other domains, for instance security, can also be described in EA as well (de Vries and van Rensburg, 2009; Roeleven, 2010). Therefore, the four typical domains are the most common EA domains, but they are not the only possible domains and none of them is absolutely necessary.

It Is Not Always Beneficial to Describe Both Current and Future States

The current concept of EA suggests that EA should necessarily describe both current and future states of an enterprise. However, the surveys (Roth et al., 2013; Schneider et al., 2015; Winter et al., 2010) show that real companies document all possible combinations of current, short-term and long-term future states. For instance, only 45.1% of companies document both current and future states, while 37.3% of companies document only their current state and 9.9% of companies document only their future state (Winter et

al., 2010). Other empirical evidence from the companies practicing EA (Holst and Steensen, 2011) also demonstrates that far from all of them document both current and future states.

It Is Not Always Beneficial to Develop Roadmaps

The current concept of EA suggests that EA should necessarily include a roadmap describing how to migrate from the current state to the future state. However, the surveys show that only 60% (Aziz and Obitz, 2005), 71% (Aziz and Obitz, 2007), 58% and 71% (Obitz and Babu, 2009) of companies develop roadmaps as EA deliverables.

EA Is Rarely Developed Based on a Business Strategy Alone

The current concept of EA suggests that EA is always developed on the basis of a business strategy. However, a business strategy alone rarely provides an adequate basis for EA. A business strategy has a number of disadvantages as a basis for IS planning (Kotusev, 2017b; Ross, 2005; Ross et al., 2006; Weill and Ross, 2008): (1) a business strategy is often not known or absent, (2) a business strategy is often not clear enough to be actionable for IT, (3) a business strategy is often not steady enough to be taken as a basis for planning, (4) chasing the latest business strategies often results in a number of separate IT solutions implemented differently and (5) when IT is always reacting to the latest business strategies, it becomes a persistent bottleneck rather than a strategic asset supporting future opportunities. Consequently, a business strategy as a general direction of the business can rarely be used alone as a good basis for EA and should be supplemented with other information.

On the one hand, other general business considerations often provide the basis for EA development. For instance, an operating model, defined as the necessary level of business process integration and standardization for delivering goods and

services to customers, provides a more clear, actionable and stable basis for EA development than a business strategy (de Vries and van Rensburg, 2009; Fallmyr and Bygstad, 2014; Ross, 2005; Ross et al., 2006; Weill and Ross, 2008, 2009). Organizational capabilities resonate well with the thought processes of business executives and provide the necessary stability and right abstraction level to be used as a basis for EA development (Scott, 2009). Business components also provide general considerations suitable as a basis for EA (Murer et al., 2011). On the other hand, concrete strategic initiatives proposed by the top management also provide a basis for EA development (Radeke and Legner, 2012). Therefore, EA is typically based on an overall business vision combining a complex mix of concrete strategic initiatives and general business considerations, including a business strategy, operating model and organizational capabilities.

EA Is Rarely Developed by Enterprise Architects Alone

The current concept of EA suggests that the entire EA is developed only by enterprise architects after interviewing relevant stakeholders and collecting necessary data. However, for some EA artifacts they are not the sole or even not the principal developers. Principles, maxims, visions and core diagrams (Broadbent and Weill, 1997; Radeke and Legner, 2012; Ross et al., 2006) require an active involvement of business executives in the development process sometimes even leaving only a secondary role of facilitators to enterprise architects (Ross et al., 2006). For example, development of the architectural vision described by Ross (2004) required about sixty meetings of the executive team.

Applications of EA Are Not Limited Only to Strategic Initiatives

The current concept of EA suggests that the application of EA is to support the execution of a business strategy by providing detailed descriptions of the necessary business processes and information systems. However, both internal and external organizational environments are unpredictable, dynamic and change quickly (Beeson et al., 2002; Sauer and Willcocks, 2002). Therefore, EA is also typically applied to local requirements, unforeseen demands and unplanned deviations in order to align them with the established strategic business and IT directions (Fonstad and Robertson, 2006; Legner and Lohe, 2012; Radeke and Legner, 2012).

Essence of EA Practice is Not Merely Describing Enterprises

The current concept of EA suggests that EA practice is largely a planning exercise resulting in a holistic description of an enterprise. However, successful EA practice is a complex set of EA-related management processes aimed at improving business and IT alignment and integrated with other organizational processes (Ahlemann et al., 2012), for instance, strategic management (Radeke and Legner, 2012), project management (Lux and Ahlemann, 2012) and operations management (Legner and Lohe, 2012).

EA Artifacts Are Rarely Developed and Used at Once

The current concept of EA suggests that at first all EA artifacts are developed and then used. However, empirical observations show that EA practice usually evolves gradually over time from simple tactical activities, for instance, formulating principles, establishing standards and enforcing them, towards more sophisticated strategic activities, for instance, future state planning and roadmaps development (Hobbs, 2012, p. 88). Moreover, the realization of benefits from EA practices requires intensive organizational learning (Ross et al., 2006). Companies typically learn in stages by mastering different EA artifacts and related management practices (Ross et al., 2006) and, thereby, evolve slowly through four EA maturity stages: business silos, standardized technology, optimized core and business modularity (Bradley et al.,

2012; Bradley et al., 2011; Weill and Ross, 2009).

The Current Concept of EA and the Real Practical Use of EA

The analysis of various aspects of the real practical use of EA provided above shows that most suggestions of the current concept of EA, including its key aspects, did not prove useful in real EA practice or contradict empirical experience. However,

it is not surprising taking into account that the current concept of EA is defined only in the speculative subset of EA literature, originates from fashion-setters and does not reflect genuine best practice in EA (see Table 5). The comparison of the current concept of EA and the real practical use of EA in organizations, as well as possible resolutions of corresponding discrepancies, are summarized in Table 7.

Table 7 - Comparison of the Current Concept of EA and the Real Practical Use of EA			
Aspect of EA	The current concept of EA	The real practical use of EA	Possible resolution
Desirable qualities of EA	EA should be logically complete and comprehensive	EA should be pragmatic and value-adding	Only EA artifacts having specific use cases and purposes are developed
The role of EA frameworks	EA frameworks are essential	EA frameworks are unnecessary	EA artifacts may be not organized according to any special logical structures
EA domains	Separately describing strictly business, data, applications and technology domains in EA is essential	Usually business, data, applications, technology and sometimes other domains are described in EA, not necessarily separately	Separate EA artifacts may describe any combinations of EA domains together
Current and future states	Describing both current and future states in EA is essential	All possible combinations of current, short-term and long-term future states can be described in EA	EA artifacts may describe different states depending on their practical purposes
EA roadmaps	EA roadmaps are essential	EA roadmaps are optional	Roadmaps are only one of many possible types of EA artifacts that may be used
Basis for EA	EA is based on a business strategy alone	EA is based on a complex mix of various considerations including, among others, business strategy, operating model and concrete strategic initiatives	EA artifacts reflect various business considerations depending on their scope
Developers of EA	EA is developed by enterprise architects alone	EA is developed by collaboratively enterprise architects and business executives	Some or most EA artifacts are developed in a dialog between business and IT
The application of EA	The application of EA is to support the execution of a business strategy	Applications of EA include strategic initiatives, emergent initiatives and operational demands	EA artifacts are developed for the whole organization and for every initiative
The meaning of an EA practice	The essence of an EA practice is describing enterprises and then using these descriptions	EA practice is a complex set of EA-related management processes integrated with other organizational processes	EA artifacts are used to support decision-making at different organizational levels
The evolution of an EA practice	At first all EA artifacts are developed and then used	EA practice evolves gradually, EA artifacts are developed and used when necessary	Separate EA artifacts are valuable and can be used independently from each other

The comparison between various aspects of the current concept of EA and empirical evidence on the actual use of EA (see

Table 7) suggests that the current concept of EA significantly deviates from the practical realities of EA in organizations.

Most importantly, the current concept of EA suggests that a documentation of the current state, a description of the desired future state and a transition roadmap are the essential components of EA, however, in the real practical use of EA all these components are optional and may be missing.

An Illustrative Case Study

In order to illustrate the problems of the current concept of EA on a real-life example of an EA practice, I will discuss the recent case study of a spectacularly successful EA practice (Tamm et al., 2015) and contrast this description with the current concept of EA. Although the case study described by Tamm et al. (2015) does not provide enough detail to thoroughly compare all the aspects of the current concept of EA with empirical realities (see Table 7), it provides sufficient information to demonstrate the general inadequacy of the current concept of EA. Empirical evidence from the selected case study supported by the quotes where appropriate and contrasted with the suggestions of the current concept of EA is summarized in Table 8.

Table 8 - Contrast Between the Current Concept of EA and an Illustrative Case Study (Tamm et al., 2015)		
Aspect of EA	Empirical evidence from the case study (Tamm et al., 2015)	Contrast
Desirable qualities of EA	No comprehensive and complete EA is produced, but rather a set of pragmatic EA artifacts including one-page baseline and vision, seven IT principles and some other EA artifacts	Directly contradicts the current concept of EA and aligns with the suggestions in Table 7
The role of EA frameworks	No specific frameworks or taxonomies are used to organize EA artifacts	Directly contradicts the current concept of EA and aligns with the suggestions in Table 7
EA domains	Both the baseline and vision diagrams mix all the four EA domains at a high level on a single page (see Figure 2 in Tamm et al. (2015)), no evidence of the strict alignment of EA artifacts to the four typical EA domains is reported	Deviates from the current concept of EA and aligns with the suggestions in Table 7
Current and future states	Both current and long-term future states are described, but only as one-page diagrams, while short-term and mid-term future states are also described in more detail: "Many of the finer-level architectural details were defined later, on an as-needed basis, as the transformation program unfolded. It was difficult to foresee the organization's specific IT needs five years into the future, and this approach gave RetailCo the flexibility to identify and accommodate changes in circumstances" (Tamm et al., 2015, p. 185), "We had a lot of high-level vision. But we didn't have it all broken down into the minor details. The board bought into the vision, but then the detailed strategies kept changing, kept growing" (Tamm et al., 2015, p. 185)	Deviates from the current concept of EA and aligns with the suggestions in Table 7
EA roadmaps	Roadmaps are developed	Aligns with the current concept of EA, but does not contradict the suggestions in Table 7 as well
Basis for EA	Business strategy is only one of the inputs for EA, but the process standardization and data sharing requirements across business units, i.e. an operating model (Ross, 2005; Ross et al., 2006), also provide a major input for the EA development	Deviates from the current concept of EA and aligns with the suggestions in Table 7
Developers of EA	Core EA artifacts are developed collaboratively: "The EA planning process involved close collaboration and dialogue within the EA team and with stakeholders in business units and the broader IT organization" (Tamm et al., 2015, p. 185)	Deviates from the current concept of EA and aligns with the suggestions in Table 7
The application	EA is both proactive and reactive, pursues a long-term strategy	Deviates from the

of EA	while addressing immediate needs along the way: "I think the key success factor was that I didn't ask for a lot of time to go and do my EA to be ready to engage. I had to do bottom-up and top-down planning at the same time" (Tamm et al., 2015, pp. 189-190), "RetailCo's concurrent bottom-up, top-down planning approach ensured that while projects were given considerable flexibility when appropriate (bottom-up), the big picture was always taken into account (top-down)" (Tamm et al., 2015, p. 190)	current concept of EA and aligns with the suggestions in Table 7
The meaning of an EA practice	The EA practice is closely integrated with both strategic planning and project delivery processes, EA artifacts are used as instruments of communication between architects and diverse stakeholders: "The EA team also actively encouraged and facilitated dialogue between business units. The EA principles, rooted in RetailCo's strategic objectives and architectural best practices, and the better understanding of the existing platform, provided the facts to ground these dialogues and decisions" (Tamm et al., 2015, p. 187), "Solution architects reporting to the EA Manager were "planted" in every major project and worked in close collaboration with project managers. Their role was to advise projects on architectural decisions and to monitor adherence to the EA guidelines" (Tamm et al., 2015, p. 184)	Deviates from the current concept of EA and aligns with the suggestions in Table 7
The evolution of an EA practice	EA artifacts are developed on an as-necessary basis with a high degree of flexibility: "While a high-level EA vision was created upfront and approved by RetailCo's board, the finer-level architectural details were defined on an as-needed basis during the transformation program. These details were flexibly fine-tuned based on unfolding business priorities and available technologies" (Tamm et al., 2015, p. 190)	Directly contradicts the current concept of EA and aligns with the suggestions in Table 7

As Table 8 demonstrates, a significant contrast manifested either in direct contradictions or in considerable deviations between the current concept of EA (see Table 4) and the description of the successful EA practice provided by Tamm et al. (2015) is observed in almost every aspect of EA, with the exception of the use of roadmaps. Most importantly, in the exemplary case study: (1) there is no clear separation on business, data, applications and technology architectures, (2) current and future states are described only as one-page diagrams, rather than in detail, (3) complete and comprehensive EA documentation is absent, (4) no frameworks (taxonomies) are used to structure and organize EA artifacts, (5) no step-wise "develop and then use" processes are followed and (6) the fact that "a high-level EA vision was created upfront", but "the finer-level architectural details were defined on an as-needed basis during the transformation program" (Tamm et al., 2015, p. 190) is inconsistent even with the general idea of the current concept of EA to develop a detailed description of the desired future state upfront. Therefore, the current concept of

EA is unable to describe successful EA practices in any real sense, except for suggesting that some EA artifacts are indeed developed and used.

Moreover, another evident shortcoming of the current concept of EA is its inability to explain the stakeholders, usage and purpose of different types of EA artifacts constituting EA. As the illustrative EA case study (Tamm et al., 2015) clearly demonstrates, different EA artifacts are intended for different audiences and fulfill different roles in the context of an EA practice. For example, in the discussed EA practice the architectural vision and principles support executive-level communication and decision-making, while other technical EA artifacts facilitate implementation-level activities. However, the current concept of EA describes EA largely as a "black box" full of information useful for everyone without explaining the difference in the intent and users of different elements of this information. For instance, none of the core EA publications defining the current concept of EA (DoDAF, 2009; FEAF, 1999; Lankhorst, 2013; Sowa and Zachman, 1992; Spewak and Hill, 1992; TOGAF, 2011) clearly

explains the stakeholders, use cases and practical purposes of individual EA components.

At the same time, all the propositions regarding the real practical use of EA in organizations formulated earlier (see Table 7) highly correlate with the description of the case study (Tamm et al., 2015). For instance, (1) a rather small set of pragmatic EA artifacts is used instead of a comprehensive EA, (2) EA artifacts are not structured in any specific manner and even not aligned to different EA domains, (3) EA artifacts describe a mix of different states ranging from the current state to the long-term future state with varying granularity, (4) main EA artifacts are developed collaboratively by architects and business leaders based on various input considerations, (5) the EA practice combines proactive and reactive features and is closely integrated with both strategic planning and project management processes and (6) EA artifacts are developed dynamically when they are necessary, rather than upfront. These observations confirm that the propositions on the real practical use of EA in organizations derived from the available EA literature and summarized in Table 7 are generally correct.

Discussion

This paper demonstrated that the current concept of EA, despite being widely supported by the mainstream EA literature, is not based on any empirically substantiated foundations (see Table 6) and significantly differs from the real practical use of EA in organizations (see Table 7). Most importantly, the current concept of EA distinguishes business, data, applications and technology architectures as well as comprehensive descriptions of the current and future states as the essential conceptual components of EA. However, a detailed analysis of the real practical use of EA and the discussed illustrative case study (see Table 8) demonstrate that clear-cut domain architectures as well as detailed current and future states are missing in

practice. They cannot be distinguished as separate entities and, therefore, cannot be considered as real "components" of EA. Taking into account that even these core prescriptions of the current concept of EA did not prove useful in real EA practice, it is not clear how exactly the real practical use of EA can be described. In other words, it is not clear what components then are essential for real EA practices and constitute EA. This understanding has significant implications for the entire EA discipline.

Contribution to the EA Discipline

Current EA research is largely defined by the current concept of EA and revolves around EA frameworks (Simon et al., 2013). However, as demonstrated by this comprehensive EA literature review, *any demonstrated examples of the practical use of any elements of existing EA frameworks are missing*, while their evidence-based criticism is abundant. Moreover, the detailed analysis of a spectacularly successful EA practice (Tamm et al., 2015) demonstrates that successful EA practices do not use any significant elements advocated by the existing EA frameworks, i.e. do not fill the cells of the Zachman Framework, do not follow TOGAF ADM steps and even do not develop any detailed descriptions of the desired future state upfront as recommended by all EA frameworks. For this reason the current concept of EA represented largely by the popular EA frameworks essentially has no empirical validity.

This conclusion suggests that after 30 years of active EA research we still have no empirically valid conceptual models accurately describing what EA is and how EA works in successful EA practices. At the same time, the lack of a basic model realistically describing EA makes many attempts to study EA troublesome or even impossible. For instance, due to the lack of any empirically substantiated models numerous authors (Barateiro et al., 2012; Bischoff et al., 2014; Gill, 2015; Hanschke et al., 2015; Lucke et al., 2010; Mueller et al., 2013; Nakakawa et al., 2013; Taleb

and Cherkaoui, 2012; Zadeh et al., 2012) use TOGAF as a conceptual representation of an EA practice for their studies, while the EA literature does not provide any empirical examples of the actual TOGAF implementation and even shows that successful EA practices do not resemble the recommendations of TOGAF, thereby, questioning the results of all TOGAF-based studies of an EA practice.

Therefore, this paper contributes to the EA literature by means of questioning the current status quo in the EA discipline. In particular, this paper demonstrates that the entire EA discipline is seemingly based on unproven concepts provided by fashion-setters and supported only by anecdotal evidence, but having no demonstrated examples of their successful practical implementation. This paper essentially invalidates the current frameworks-based concept of EA and demonstrates that this idealistic concept, as well as the underpinning EA frameworks, cannot be used as the basis for further research. Consequently, it makes a significant non-theoretical contribution to the EA discipline by critically evaluating the current state of EA research, provoking new thoughts and stimulating future research that will substantially alter the EA theory (Avison and Malaurent, 2014; Hambrick, 2007).

Directions for Future Research

EA is widely practiced and highly beneficial to organizations (Bradley et al., 2011; Schmidt and Buxmann, 2011). However, the current concept of EA explaining what exactly EA is and how exactly EA is used barely correlates with the practical realities (see Table 7). Moreover, EA literature arguably does not provide any other articulate conceptualizations of EA except for the current concept of EA (see Table 4). Consequently, *at this moment it is essentially impossible to explain clearly and realistically what exactly EA is and how exactly EA is used in real organizations*.

In line with the earlier calls for reconceptualization (Holst and Steensen,

2011; Janssen, 2012), the analysis of the current situation in the EA discipline provided in this paper clearly suggests that new, evidence-based, more adequate models of EA are desperately needed. Specifically, the very notion of EA should be reconceptualized and aligned with genuine industry best practices described in the evidence-based subset of EA literature (see Table 2). Due to the poor empirical foundations of the EA discipline (Kotusev, 2017c; Langenberg and Wegmann, 2004; Radeke, 2010), this paper calls for further empirical studies aimed at analyzing basic EA-related topics, e.g. EA artifacts, their organization, properties, lifecycles and usage, and encourages the EA research community to develop new realistic models describing EA instead of the current flawed concept of EA (see Table 4). As a starting point for these studies, this paper describes in general terms how exactly the current concept of EA differs from the real practical use of EA (see Table 7).

Limitations of This Study

This study has two evident limitations. Firstly, the paper is wholly based on the secondary empirical data provided by the available EA literature. While the broad review of the EA literature allowed analyzing a much larger volume of data than could have been collected directly by the researcher and tracing the historical origins of the current concept of EA, secondary empirical data is inevitably distorted by the biases introduced by the authors of respective EA publications.

Secondly, despite criticizing the current concept of EA, this paper does not propose any alternative ready-to-use concepts in order to substitute it. Essentially, this paper represents only the first step of a long journey towards a realistic and "fads-free" understanding of the essence of EA and an EA practice in general. I call for further research in the EA discipline to better understand the very notion of EA, address the limitations of this study discussed above and eventually develop a more detailed evidence-based conceptual model of EA.

Conclusion

EA is an important organizational instrument for improving business and IT alignment. EA is used in the majority of large companies and makes a significant contribution to their success. However, the concept of EA, as it is presented in the current EA literature, is likely to be a management fad that is based on flawed ideas and not supported by any empirical evidence. Unsurprisingly, the real practical use of EA differs significantly from the current concept of EA. Therefore, the notion of EA needs to be reconceptualized.

In this paper I analyzed the problems of the current concept of EA and demonstrated its key inconsistencies with the practical realities of EA. Firstly, I described the current concept of EA and its various aspects (see Table 4). Secondly, I discussed a number of facts questioning the current concept of EA (see Table 6). Then, I described how exactly the current concept of EA differs from the real practical use of EA in organizations (see Table 7). Finally, I illustrated the inadequacy of the current concept of EA based on a recent case study of a successful EA practice (see Table 8).

This paper makes a significant non-theoretical contribution to the EA literature. In particular, this paper (1) shows that the current concept of EA is based only on unproven ideas provided by fashion-setters and has no demonstrated examples of its successful practical implementation, (2) proves that the current concept of EA and EA frameworks cannot be used as a basis for further research and (3) demonstrates that new, evidence-based models of EA are desperately needed for the EA discipline.

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