

ENTERPRISE ARCHITECTURE – A SYSTEMATIC LITERATURE REVIEW ON DEFINITIONS, BENEFITS, CHALLENGES, AND EVALUATION MODELS

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ABSTRACT

Enterprise Architecture (EA) has grown from a niche technical discipline into a central pillar of strategic management, yet fundamental questions about its definition, value, and measurement remain surprisingly unresolved. This paper presents a systematic review of reviews, drawing on 32 peer-reviewed studies published from 2010 onward, to map the current state of EA scholarship and practice. Following PRISMA guidelines, the review proceeds through transparent screening, quality assessment, and thematic synthesis. Three contributions result. First, we propose a review-derived, integrative definition of EA as "a strategic approach which allows organizations to create and sustain aligned representations of business strategy and information technology," reconciling the long-standing tension between EA as a product and EA as an ongoing process. Second, we trace EA's historical arc across three phases: foundational framework-building, governance and implementation focus, and dynamic capability for digital transformation. Third, we synthesize evidence on benefits, persistent challenges, and evaluation models to produce a forward-looking research agenda. Benefits consistently reported include business–IT alignment, operational agility, and efficiency gains; however, these materialize only when governance, executive sponsorship, and adaptive oversight are in place. Challenges cluster around leadership gaps, cultural resistance, governance ambiguity, and communication failures. Evaluation approaches remain fragmented and under-validated, with notable absences of multi-stakeholder perspectives and automated data-collection tools.

KEYWORDS

Enterprise Architecture Definition, EA Historical Evolution, EA Benefits and Challenges, EA Literature Review

1. INTRODUCTION

EA is widely seen as a tool for aligning digital resources with strategic goals. It promises benefits like agility, cost control, and better service delivery across both private and public organizations (Saleem & Fakieh, 2020; Trimanadi & Sensuse, 2025). However, in practice, many managers are still unsure what EA really is (Saint-Louis et al., 2017), how to get started with it (Kotusev, 2017), and how to measure its value (Gong & Janssen, 2019). Definitions vary—from a technical blueprint to an ongoing practice, to a form of governance—which leaves both researchers and practitioners without a common language (Saint Louis et al., 2017; Kotusev, 2017). This ambiguity is not merely semantic. When architecture practitioners and business executives operate from different mental models of what EA is, they disagree on where accountability lies, how success should be measured, and what constitutes adequate evidence of value. Tamm et al. (2011) argue that the lack of a clear theoretical account of how EA leads to organizational benefits has left organizations struggling to justify their investments, and that benefit claims in the literature are "fragmented, incomplete, and not grounded in theory." Rohloff (2005) makes a complementary observation from a design perspective, noting that EA must serve heterogeneous stakeholders—from senior management to IT engineers—and that without a structured methodology spanning business, application, and infrastructure domains, the complexity of "architectures in the large" quickly becomes unmanageable. Together, these observations suggest that the definitional problem is also a governance and communication problem: the absence of shared language erodes the organizational conditions that EA needs to produce value. Furthermore, there are many frameworks available, but their theoretical foundations and benefits are often described rather than proven (Gong & Janssen, 2019). This lack of conceptual clarity makes it hard for organizations to decide whether and how to invest in EA.

Recent reviews have picked up on this concern. Gampfer and colleagues (2018) note that research has moved from defining EA to managing it. Kar and Thakurta (2021) point out that the field still lacks strong theory and clear concepts. Studies on EA evaluation list many different methods and criteria, but they are rarely tested in real settings or include input from a wide range of stakeholders (Busch & Zalewski, 2025; Tell & Henkel, 2024). Research on adoption has found useful context factors but often uses narrow viewpoints, making it hard to build a complete picture (Ahmad, 2019; Ahmad et al., 2018). Together, these findings show that EA is full of potential but still lacks the consistency needed to guide decisions in practice.

This study asks a simple but important question: What is the current state of EA research? First, it maps the range of current definitions and conceptual lenses in EA research, showing where consensus remains limited. Second, it summarizes empirical insights on evolution of EA, widely employed frameworks, critical success factors and challenges indicating where evidence is strongest and where it is still sparse. Third, it highlights directions for future study and practice, especially the need for socio-technical models that connect architecture artefacts, stakeholder engagement and measurable outcomes. The goal is to offer both researchers and practitioners a clear view of where the field stands, and what steps might be most useful moving forward.

Previous EA reviews mainly focused on studies published between 1990 and 2010, which as a period dominantly analyzed the development of foundational frameworks and definitional debates. Furthermore, given the rapid advancements in digital transformation, cloud ecosystems, and data-driven capabilities in recent years, there was a clear need to reassess the

field. Therefore, this review explicitly focuses on the publications from 2010 onward, providing an updated synthesis that captures how EA has evolved toward a dynamic, capability-based and governance-oriented discipline. As a result, this paper provides a contemporary perspective and identifies specific areas that require deeper exploration in future reviews.

2. METHODOLOGY

In order to evaluate the current state of EA scholarship we undertook a systematic review of reviews, following Snyder (2019) and vom Brocke et al. (2015). The process included four phases: planning, searching, analyzing, and writing, with the goal of synthesizing conceptual progress and practical insights across review articles. In reporting we aligned with PRISMA (Page et al., 2021). We document the key methodological decisions made - databases chosen, search-terms developed, and inclusion criteria - and provide a flow summary (Figure 1). The complete thematic analysis overview supporting this review is available on Figshare (<https://figshare.com/s/4598bf8d2fb37bf6eedf>).

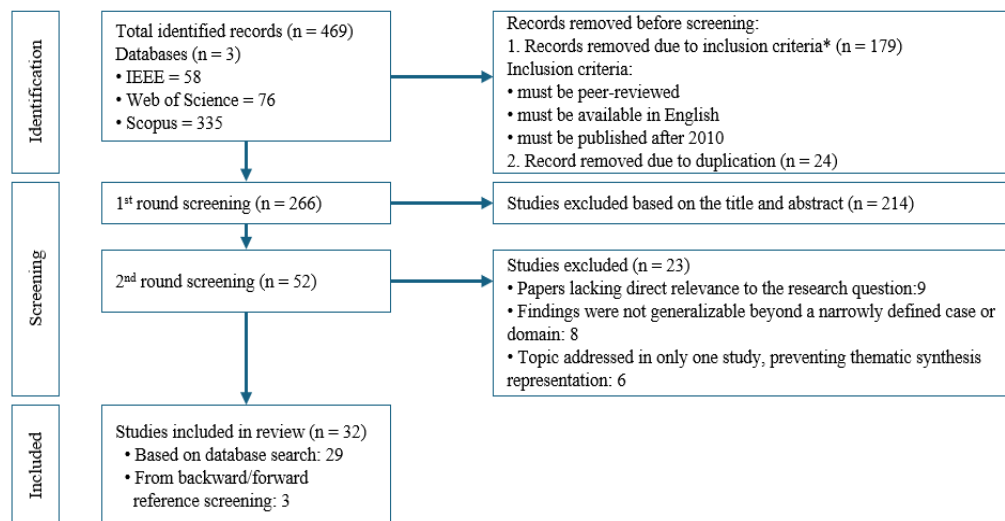


Figure 1. PRISMA flowchart

The search was conducted on Web of Science, IEEE Xplore, and Scopus. The search term was an intersection of "Enterprise Architecture" and "systematic review" or "literature review." We specifically focused on literature reviews only because the goal was to capture consolidated knowledge rather than replicate individual case findings. Reviews provide meta-insights, reveal recurring claims and expose gaps more efficiently than analyzing hundreds of disparate primary studies (Snyder, 2019). The scope was extended for backward as well as forward tracking of citations, in order to identify relevant studies not included in the initial search. This enabled us to be more confident about the inclusion of relevant studies as suggested by vom Brocke et al. (2015). Studies were included if they were peer-reviewed, published in the English language, and published after 2010. Limiting the timeframe allows us to capture the most recent

developments from the past fifteen years, while also keeping the scope of the literature review manageable. The initial search yielded 469 records. We removed 24 duplicates. After screening the abstracts and title, 52 articles were selected for full-text consideration. The resulting pool of studies was also assessed for quality, keeping in perspective their clarity in research objectives, soundness in method, and their pertinency in the subject area of EA, as suggested by vom Brocke et al. (2015). All in all, there were 29 studies which satisfied the criteria. Three further papers were identified through backward/forward search, which brings the total number of studies to 32. The full process is outlined in the PRISMA flow diagram in Figure 1.

During the full-text review phase, we relied on the knowledge-management tool Zotero to collect, label and retrieve the selected studies. We carefully read each article, noted concepts, methods and findings, and coded them by their relevance to enterprise-architecture themes. The coding was iterative. Initial labels were adjusted as repeated ideas emerged and as gaps became more visible across the set of papers. This process allowed related studies to be grouped systematically and ensured that review topics developed from evidence in literature rather than from prior assumptions. The outcome was a thematic structure that mirrors the content and depth of the current research landscape.

3. FINDINGS

3.1 Definitions of EA

EA still lacks a common definition. A review of 145 papers found that forty two percent of authors discuss EA without defining it, while the rest rely on different explanations (Saint Louis et al., 2017). According to Saint Louis et al. (2019), there are two main views regarding how EA is defined. One treats EA as a noun, a set of documents, models and principles that describe how an organization should work. The other presents EA as a verb, an ongoing process that helps the organization adapt to change. Each view leads to different ideas about ownership, scope and value.

A deeper analysis places existing definitions into five broad groups: EA as a deliverable, a tool, a process, a way of thinking or a discipline. Many authors blend these groups in the same sentence, making several definitions incomplete or hard to apply (Saint Louis et al., 2019). According to Rohloff (2005), the roots of this definitional struggle run deep because EA must simultaneously address strategic orientation, transparency of complex IT landscapes, communication between business and technical communities, planning, synergy exploitation, and adaptability to market change. The breadth of this list illustrates why a single, parsimonious definition has proved so elusive: practitioners need EA to mean different things depending on the problem they are trying to solve at a given moment. The challenge, as Wacker (2004) and Suddaby (2010) make clear from definitional theory, is that a construct simultaneously serving too many purposes tends to lose its explanatory precision entirely. This confusion spills over into work on architecture principles. Because principles are meant to guide the object they refer to, the lack of an agreed object makes it difficult to build sound frameworks or test design rules (Stelzer, 2010). Niemi's (2006) practitioner-oriented study adds an important layer to this picture. Drawing on both literature and focus-group interviews with EA professionals, Niemi found that EA benefits were perceived very differently by different stakeholder groups, partly

because they were working from different implicit definitions of the discipline. This suggests that the definitional problem is not merely academic: it produces real fragmentation in organizational EA programs, where senior managers, enterprise architects, and IT engineers each construct their own understanding of what EA is supposed to deliver, leading to misaligned expectations and contested priorities (Niemi, 2007). Niemi's (2007) subsequent stakeholder mapping further demonstrated that the range of EA stakeholders extends well beyond the architecture team itself, encompassing business owners, project managers, compliance officers, and external partners. Table 1 gives a summary of representative definitions and the associated clarity difficulties.

A thorough analysis of existing EA definitions indicates an expansive and changing conceptual landscape, which reflects both changes in organizational antecedent and a lack of theoretical consistency. The earliest definitions, such as those from FEAF (CIO Council, 2001) and TOGAF (The Open Group, 2009), described EA as a lattice of components that are organized according to design principles. TOGAF describes EA as related components arranged and developed through time, reflecting a traditional notion of architecture. FEAF includes a spatial perspective on EA by including strategic elements, such as mission focus, information assets, and transitional planning, and thus indicate that EA adaptations to changing business needs was an early consideration. However, while FEAF and TOGAF provide a spatial view on the EA lattice, they use ambiguous terms that include terms like "strategic information asset base" and unidentified architecture elements, and each definition runs circularity by using "architecture" to define "enterprise architecture". The ambiguous and overly broad nature of their terms limits their precise conceptual framing of EA, with the definitions conflicting with established conventions and protocols of definitional clarity, including formal primitives and parsimony (Wacker, 2004; Suddaby, 2010).

In moving forward in the literature, recent definitions demonstrate a clear departure from static and structural views of EA and into dynamic and instrumental interpretations. Kotusev (2017) defined EA as a descriptive construction focused on enhancing business and IT alignment, suggesting a more intentional interpretation of architecture as EA intended purpose. The blurring between what is EA as concept and EA as an impact is evident in Kotusev's use of "alignment", where alignment is both purpose or goal and is also a characteristic. Similarly, Rouhani et al. (2019) and Saleem and Fakieh (2020) define EA as either a strategy or framework that creates alignment, but again this blurs the concept with its prescriptive use. While these definitions recognize EA as making an active contribution to business-IT relations, they also import potential hypotheses, e.g., competitiveness or improved alignment, dangerously as a component within its definition, which transgresses the conceptual norm that definitions cannot subsume claims that require empirical assessment (Wacker, 2004).

Table 1. Definitions of EA

Authors	Definition	Clarity challenges as per Wacker (2004) and Suddaby (2010)
FEAF (Chief Information Officer Council, 2001)	“Enterprise Architecture – a strategic information asset base, which defines the mission, the information necessary to perform the mission and the technologies necessary to perform the mission, and the transitional processes for implementing new technologies in response to the changing mission needs. An enterprise architecture includes baseline architecture, target architecture, and a sequencing plan”	Unclear term: “strategic information asset base” Circularity (“architecture”) Lack of parsimony
TOGAF (The Open Group, 2009)	“The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.”	Unclear term: “evolution”
Kotusev (2017)	“EA is a description of an enterprise from an integrated business and IT perspective intended to improve business and IT alignment.”	Conflation between the concept and its impacts. Circularity (“enterprise”)
Rouhani et al. (2019)	“EA is a strategy to attain alignment between an enterprise's business and Information Technology (IT) to increase the competitiveness of an enterprise.”	Conflation between the concept and its impacts
Saleem and Fakieh (2020)	“EA is a framework that consists of multiple processes to align business strategies with information technology (IT) architecture.”	Unclear term: “multiple processes”
Mahendra et al. (2023)	“EA is a solution to build alignment between business strategy and information technology in dealing with digital transformation.”	Unclear term: “digital transformation”
Busch and Zalewski (2025)	“EA is a systematic and holistic approach to designing and managing an organization's information systems components, aiding in optimizing resources, managing risk, and facilitating change.”	Conflation between the concept and its impacts Unclear term: “information system”

Mahendra et al. (2023) and Busch and Zalewski (2025) indicate the most current state of EA understanding. Mahendra et al. (2023) even further framed EA as a solution to organization's digital transformation challenges and as such, proposed a practical rather than structure-based definition of EA. Busch and Zalewski expand even more by defining EA as a holistic perspective to organizing and managing an organization's information systems in a way that produces results, such as managing resources efficiently and managing risk appropriately. While this definition is certainly relevant to a manager, it risks overwhelming the definition such that it loses its' substance and lacks specificity by possibly including too many goals without identifying critical properties. Collectively the definitions assessed seem to lack clarity of describing EA, clarity, consistency, and theoretical validity. Many definitions also seem to conflate EA with the outcomes that EA is purported to achieve, or use meaning or terminology that is vague and undefined, resulting in no cohesive conceptual basis for EA. Thus, we present a review-derived integrative definition of EA: “a strategic approach which allows organizations to create and sustain aligned representations of business strategy and information technology.”

This formulation makes it clear that both the process aspect (ongoing strategic way of working) and the product aspect (the representations which emerge) are included, thus resolving the noun/verb dilemma without equating EA per se with its products. This definition highlights the essential aim of EA, emphasizing the accomplishment and maintenance of strategic alignment that it is intended to facilitate, rather than the achievements of which it may be capable. It provides conceptual clarification and is consistent with current organizational practice.

3.2 Evolution of EA

EA first emerged as an attempt to give a single, integrated account of business and information technology. Early work catalogued definitions, frameworks and goals, yet agreement proved elusive. Schneider et al. (2013) showed that authors differed even on what a goal meant, while Rasti et al. (2015) reported that between 2005 and 2014 most studies stayed within technical modelling or usage and rarely asked who should own results. Kotusev (2017) confirmed the imbalance with a review of more than one thousand papers: many themes were saturated on blueprints and artefacts, but practice-oriented topics remained thin. As these debates unfolded, research began to measure value. Gong and Janssen (2019) challenged five widespread myths, including the belief that architecture alone creates value, and urged scholars to study the context dependent mechanisms that turn models into outcomes.

Since 2010 the focus has moved from describing architecture to managing it in a turbulent digital landscape. Furthermore, Gampfer et al. (2018) found the center of gravity shifting toward governance questions, with cloud computing dominating impact and the Internet of Things growing fastest. Mahendra et al. (2023) linked this shift to the demands of digital transformation and mapped nine architectural components that must work together, while Kar and Thakurta (2021) noted conceptual gaps in foundations, processes and stakeholder roles that still hamper coherent practice. Taken together, the trajectory moves from seeking definitions to refining frameworks, then to integrating governance, technology trends and organizational capability. Ongoing work must therefore bridge the remaining divide between artefact design and sustained use, ensuring that future research explains not only what EA is but how it evolves with emerging technologies and continues to yield measurable value in diverse settings.

Academics generally appear to agree on the contention that Zachman's Framework was the first piece of work to substantially raise the profile of the idea of EA (Trimanadi & Sensuse, 2025; Zhou et al., 2020; Kar & Thakurta, 2021). However, Kotusev (2016) provides a controversial and important counterargument in claiming that Business Systems Planning (BSP), conceived by IBM, is the real conceptual entry point for EA. While he admits that Zachman's Framework quickly became part of the conversation and certainly made EA more popular, Kotusev argues that there was nothing novel in Zachman's Framework that hadn't already come from BSP. Based on Kotusev's position (2016), the BSP process (developed in the 1960s) was the earlier effort to explicitly architect the description of an organization and the architectural foundation of what could come to be EA. In 1987, Zachman's Framework was formally defined, and is often referenced as a foundational reference that brought EA to the forefront of general industry attention (Trimanadi & Sensuse, 2025; Zhou et al., 2020; Kar & Thakurta, 2021). In keeping with his earlier argument, Kotusev (2016) argues that although Zachman's Framework raised the profile of EA, it did not change the conceptual bounding of the initial BSP.

In the 1990s two prominent frameworks were founded in the public sector, the Open Group Architecture Framework (TOGAF) released its first version in 1995 (The Open Group, 2009), and the United States Federal Enterprise Architecture Framework (FEAF), launched in 1999. Both of these two frameworks represent significant reference points in the EA literature and, were among the frameworks most commonly referenced in studies reviewed in this examination of EA, demonstrating their ongoing impact in practice and progressive research. EA continued to be developed through the fields of scholarship and practice in the 2000s and 2010s, wherein increasingly less attention was paid to conceptual definitions and more interest in practical implementation. Considerable literature coming out in this period focused largely on either just how EA could help organizational agility within public sector organizations, introducing big data into public sectors, and how EA could assist in a sustainable way of IT (Gampfer et al., 2018). In just the most recent studies, since 2020, expanded research continues to develop frameworks for EA, but with a focus increasingly on how EA could assist and support digital transformation and navigate rapid technological change. Topics such as artificial intelligence, blockchain, and platform-based ecosystems are within the EA conversation, and these themes continue to point to EA being considered a key enabler of strategic digital outcomes (Brée & Karger, 2022). More recent works emphasize EA's role as a management capability for monitoring and guiding digital transformation (Muhaemin et al., 2024). Therefore, we begin to see an evolving literature showing that EA is moving from being a framework-based, rather static and descriptive approach to a more dynamic, responsive, and data-oriented capability that must continue to adapt to recent trends in digital innovation and disruption on a high-speed continuum.

3.3 Benefits

The scholarly record repeatedly links EA to a set of concrete organizational gains. Schneider et al. (2013) emphasize three of those factors as most frequently mentioned: stronger alignment between business and IT, lower operating costs, and faster responses to environmental change. Saleem and Fakieh (2020) condense the advantages into greater agility, a sharper competitive edge, and higher overall firm value. Taken together, the evidence implies that a well-structured EA helps an organization stay adaptive while exploiting its IT resources more strategically. Mahendra et al. (2023) reach comparable conclusions, showing that EA initiatives typically streamline routine operations and ensure that IT spending backs the wider business plan. These observations match practitioner expectations: when thoughtfully designed, an EA blueprint standardizes key processes and shortens decision-making cycles. It is important, however, to temper expectations. Gong and Janssen (2019) warn that EA does not automatically create value; rather, it provides a foundation that enables value creation mechanisms. They identify this as a “myth” of EA: claiming that EA itself produces benefits oversimplifies reality. Indeed, studies find that realizing EA's potential requires active governance and use of architecture. In practice, organizations that have succeeded with EA report concrete outcomes such as better interoperability, governance, and project alignment. For example, Trimanadi and Sensuse (2025) catalogue EA benefits like improved service quality, efficiency, and collaboration. In sum, literature suggests that EA can yield significant agility and alignment benefits (Mahendra et al., 2023; Saleem & Fakieh, 2020), but only when combined with effective implementation practices (Gong & Janssen, 2019).

Niemi (2006) provides an important complementary perspective from practice. His literature review and focus-group study categorized EA benefits into five groups: organizational, informational, business and IT alignment, architecture management, and system development. Practitioners in the focus groups confirmed the alignment and efficiency benefits documented in academic sources, but they also emphasized benefits that academic literature had underreported at the time—particularly the role of EA in improving decision-making quality at the enterprise level and in providing a shared language across business and technical communities. This observation echoes the communication dimension of Rohloff's (2005) framework and anticipates the stakeholder engagement concerns that would later become prominent in evaluation research (Tell & Henkel, 2024). Together, these perspectives suggest that EA's benefit profile is broader than alignment and cost reduction alone, encompassing organizational communication, governance quality, and the reduction of decision-making friction at scale.

3.4 Challenges & Critical Success Factors

While there is considerable literature on EA, the path from planning to operationalizing EA is complex. A common theme among the articles is that EA is more than a technical initiative but an organizational change management process that is influenced by context. Ahmad et al. (2019) reviewed sixteen empirical studies and identified nineteen barriers to EA adoption, including weak leadership, ambiguous roles and accountabilities, poor communication, organizational silos, regulatory overlap, and misalignment between business and IT. They also identified fifteen contextual factors that influenced EA adoption, including management support, governance, employee skills, and organizational culture. However, the majority of empirical studies referenced by Ahmad et al. (2019) were qualitative studies from developed economies, raising concerns about generalizing the results to resource-constrained or institutionally distinct contexts. This concern is specifically noted by the authors when they suggest that future empirical designs, specifically quantitative research, may provide further explication and understanding of the interaction of technological, organizational, environmental, and political factors. In a similar vein, Ahmad et al. (2018) examined the models for EA adoption. Of the thirteen empirically based models, eleven addressed issues of post-adoption with two outlining the decision-making process leading to EA adoption. Importantly, none addressed EA adoption intentions or the conditions leading to an initial interest in EA. Additionally, almost all frameworks approach EA from a singular theoretical viewpoint and address just technological, social or political factors separately, making them weak explanatory models that do not account for or predict the multidimensional forces at work in EA adoption. Collectively, both reviews identified a critical gap in the literature: the absence of integrative, empirically derived stories for organizations to justify not only how EA should be adopted through implementation, but also when or why it should be adopted or engaged with in the first place.

Moreover, the obstacles identified in the EA adoption literature share a reciprocal relationship with what are referred to as critical success factors. Many of the same elements related to governance, communication, leadership, and technological readiness can operate as obstacles or enablers through how they are dealt with. For example, while prescriptive methods such as TOGAF may provide some clarity and an unambiguous approach in the early stages, Gong and Janssen (2020) find that they are often perceived as too rigid in the face of changing conditions. Also, while Brée and Karger (2022) report that EA tools may support implicit

modelling only and not provide means of working collaboratively to develop shared decisions, Al-Kharusi et al. (2016) distinguish between EA engagement factors through technical (skills, depth of modelling, effort in tasks), organizational (culture, governance, politics), and personal (communication, participation, stakeholder awareness) lenses. In particular, if organizations can align depth of modelling with stakeholder capability and honesty in the informal power structures at play, tools that are perceived as obstacles may become affordances for context-relevant practice under flexible conditions. Niemi (2006) notes the possibility for architectural language to alienate business stakeholders, and Gong and Janssen (2020) connect this dissimilarity to disengagement by executives. Brée and Karger (2022) suggest that if EA is seen as an imposed or isolated initiative, it may create cultural barriers to engagement. When organizations promote and invest in initial awareness building and business-catalyzed design sprints, they are able to make technical language understandable, executives curious, and a shared vocabulary emerged organically. Governance is also contingent. Ahmad et al. (2018) cite ambiguous accountability as a significant challenge related to implementation drift, while Khairina et al. (2024b) report that the failure to jointly make decisions deprived EA of strategic influence. Al-Kharusi et al. (2016) further contextualizes this variability by demonstrating how governance is subject to cultural and political influences. When leadership formalized check-in structures but concurrently held openness to recognition of shifting priorities, governance shifted from constraint to adaptive influence. Leadership provides the only constant in EA adoption and scalability: all other dimensions amplify a robust EA, and effective leadership is a strategic anchor. Rouhani et al. (2019) indicate that executive sponsors must be visible champions for EA and cannot be passive actors whereby financial approval is enough. Khairina et al. (2024a) connected this engagement to measurable improvements in EA efficiency, while Al-Kharusi et al. (2016) connect the dots. Technical readiness rounds out the understanding. Lange et al. (2016) warn that the best architectural plan will have little use unless it is internally tied to lived projects. Al-Kharusi et al.'s (2016) technical lens illustrates one reason why this is true. Nevertheless, if an organization aligns the scope and decisions to model against internal capacity and recognizes depth of modelling as a constraint, it may develop advantages. Ansyori et al. (2018) provides further possibilities for impact when he suggests that clarity of roles, tasks, and supervision are critical for EA to maintain alignment with business strategy. If all aspects are considered, it can be seen that the adoption and the success of EA are mutually causative. Al-Kharusi et al. (2016) established the foundation as three lenses through which engagement or resistance can be understood: technical capacity, organizational, and individual engagement.

3.5 Evaluation Models of EA

Busch and Zalewski (2025) show that evaluation now sits at the heart of EA, yet they describe a landscape that is still scattered. Their review uncovers dozens of distinct methods, criteria and notations, but notes that practical validation is rare. Tell and Henkel (2024) reach a similar conclusion and trace the weakness to limited stakeholder involvement. They observe that most empirical work relies on architects and technically oriented staff, while business voices are largely absent, which leaves open whose interests are being measured. Busch and Zalewski call for stronger automation to ease data collection, whereas Tell and Henkel argue for richer accounts of how architecture information is used in day-to-day work. Taken together, the studies suggest that credible evaluation will require both smarter tooling and fuller engagement with the people who rely on architecture outputs.

Attention then turns to what should be assessed and how. Hadaya, Leshob and Marchildon (2020) criticize existing checklists for being selective and subjective and respond with an artefact that defines fourteen criteria and provides objective measures for each. Khairina, Purwanto and Nugraheni (2024a) extend the discussion by mapping recent studies and showing that most favor case evidence over theory, often drawing on ideas from effectiveness research or IT governance. Muhaemin, Budiardjo and Suryono (2024) add that nearly half of current models focus on organizational benefits, while areas such as risk and agility receive far less attention. When these findings are viewed together a clear agenda emerges. The field now needs integrative frameworks that combine the rigorous metrics proposed by Hadaya and colleagues (2020) with the multi factor constructs and stakeholder perspectives as identified by Tell and Henkel (2024), and that are supported by automated data collection as urged by Busch and Zalewski (2025). Only by weaving criteria, actors and technology into a coherent whole can evaluation realize its promise of guiding architecture toward demonstrable value.

4. DISCUSSION

4.1 Towards an Integrative Definition of EA

A central contribution of this study is its proposal of a review-derived, integrative definition. The findings indicate that the research landscape for EA is fragmented; some authors present EA as artifacts or deliverables, while others treat it as a process, a strategy or discipline (Saint Louis et al., 2017; Rouhani et al., 2019; Busch & Zalewski, 2025). This variation reflects EA's richness, but it also creates conceptual confusion that undermines research and practice. For example, the lack of an agreed upon object makes it challenging to assess EA's principles (i.e., Stelzer, 2010), or to consistently measure EA's benefits (i.e., Gong & Janssen, 2019). We have proposed an integrative definition as a solution that consists of the advantages of earlier definitions while not replicating their shortcomings. We define EA as: "a strategic approach which allows organizations to create and sustain aligned representations of business strategy and information technology." The definition reflects EA's dual nature. It captures the process dimension, by presenting EA as a strategic approach which is dynamic and ongoing, as well as the product dimension by expressing the representations and models that EA produces. It made explicit EA's final object, balancing business strategy and IT in such a way that alignment can endure even as conditions change. Unlike definitions of EA that confuse EA with its impacts or use vague wording, this formulation emphasizes alignment as the means EA does its work and leaves outcomes (e.g., agility or efficiency) as empirical aspects to be tested. Intellectually, this integrative definition presents EA as both a discipline and a practice; it depicts EA as an organizational capability—based in artifacts but enacted through processes—which join strategy and technology. This model better supports our epistemological aims for cumulative knowledge development and attends to definitional ambiguity that has impacted research in the area.

The proposed integrative definition also has practical design implications. Rohloff (2005) demonstrated, from within a major enterprise context, that effective EA requires structured methodologies capable of describing interdependence across business, application, and infrastructure architecture simultaneously. Definitions that reduce EA to either a set of

documents or a technical planning methodology cannot adequately support such a methodology—because they either bracket out the process dimension (treating EA as a static deliverable) or strip out the representational dimension (treating EA as pure management activity). The definition proposed here—EA as a strategic approach which allows organizations to create and sustain aligned representations of business strategy and information technology — preserves both dimensions and therefore offers a more suitable conceptual anchor for methodological development.

4.2 Historical Development of EA

The second contribution of this review is a summary of how EA developed from its origins through to today. The historical research literature also indicates competing narratives of where the area originated. While some mention Zachman as the first contribution (Trimanadi & Sensuse, 2025; Zhou et al., 2020; Kar & Thakurta, 2021), Kotusev (2016) points to IBM's BSP most notably during the 1960s offered most of the relevant ideas. Regardless of the specific origin, it is clear that EA began as an initiative to help organizations depict an integrated view of both business and IT, and has grown into a large and complex area of research. Our synthesis shows roughly three phases. The first phase: defining EA in the first place and creating frameworks such as TOGAF and FEAF beginning in the 1990s primarily concentrating on structure and standardization reflecting their start in a technical or defense orientation. The second phase during the 2000s and 2010s shifted attention to implementation with a focus on how EA could be used to create agility, cost efficiency, sustainability, and so on (Schneider et al., 2013; Gampfer et al., 2018). The third phase, since 2020 depicts EA with digital transformation and disruptive technologies (artificial intelligence, blockchain, the Internet of Things and so on) (Brée & Karger, 2022; Muhaemin et al., 2024). Developmental history illustrates how EA has transitioned from being described as a static blueprint to being responsive to conditions. In other words, the field tends toward asking less about "what EA is", and more about "how EA is managed in environments of turbulence" (Gampfer et al., 2018). Importantly, this review pointed out a disconnect between current academic and practitioner concerns. Practitioners are experimenting with DevOps, design thinking etc. in the current EA work, while academic work has remained largely focused on governance and evaluation (Gampfer et al., 2018). The disconnect suggests that future research should focus practically more on how EA is practiced in quickly changing digital organizations. By reviewing historical shifts, our contribution was able to place current debates within a past trajectory realizing that definitional ambiguity, framework instantiation, and practice are not discrete issues, but simply distinct levels aligning with the maturation of a field.

4.3 Benefits, Challenges, and Evaluation: Emerging Future Research Directions

The third contribution was an integrated discussion of EA benefits, challenges, and evaluation, with consideration for future research opportunities. Benefits. There is consistent evidence that links EA and positive organizational outcomes, such as business–IT alignment, agility, efficiency, and competitive advantage (Saleem & Fakieh, 2020; Mahendra et al., 2023). Much of the public sector benefits that are documented also refer to service quality, and collaboration (Trimanadi & Sensuse, 2025). While this establishes a baseline of evidence for the area of

research, authors have warned others of overly simplistic assumptions. Gong and Janssen (2019) highlight that EA in and of itself does not create value naturally but only allows for value to find its natural order embedded in a governance and decision-making paradigm. This divergence between what is expected as benefits, and what value actually materializes remains under-theorized as an area of research. As a result, future work should not just catalogue the "benefits" of EA, but also to begin to query unpack the barriers, enablers, and conditions in which EA could produce measurable outcomes. Challenges and Success Factors. Studies in adoption have consistently highlighted barriers in areas such as leadership gaps, cultural resistance, ineffective communication, and unclear governance of EA (Ahmad et al., 2019). Conversely, several papers have identified critical success factors such as executive sponsorship, organizational culture, and strong governance structure (Rouhani et al., 2019; Khairina et al., 2024b) to the extent, they are nearly hallmarks of standing conjectures. Our synthesis has shown that these factors are not mutually exclusive; considerably barriers can also be enablers. Poor communication is a barrier; however, an inclusive communications dialogue may lead to success. Rigid governance may be an obstacle in successful EA, however measured, adaptable governance can lead EA to actions of change. From a socio-technical standpoint, this means that not individual intervention, but holistic consideration of organizational governance, leadership, culture and technical capacities are required for EA to be successful. One significant gap in research is the pre-adoption phase. Most existing EA models center on post-adoption enactment or implementation, hence the process for triggering EA, the initiation of EA adoption, and how organizations make judgements about commitment levels remain unanswered (Ahmad et al., 2018). Closing this gap is essential in order for the empirical research community to provide guidance for organizations that are contemplating whether or how they might proceed with EA initiatives.

The literature has now produced a reasonably long list of critical success factors for EA, including governance, communication, leadership, team capability, and organizational culture. However, listing these factors is not the same as understanding them. What is still missing is a model that explains how these factors relate to one another, which ones matter most at different stages of an EA programme, and under what organizational conditions they are likely to hold. Without such a model, practitioners are left with checklists that offer limited guidance on where to focus first or what to do when things start to go wrong.

One notable exception is the work of Lange et al. (2016), who developed a comprehensive EAM success model grounded in empirical data from practicing EA professionals. Their model demonstrated that organizational anchoring, defined as the degree to which EA is genuinely embedded in organizational decision making processes, acts as the central mediating condition through which other success factors become effective. This was a significant contribution at the time, and the model remains one of the more theoretically coherent accounts of EA success in the literature. However, it was developed nearly a decade ago, and the organizational and technological landscape has shifted considerably since then. The widespread adoption of cloud platforms, the integration of artificial intelligence into enterprise systems, the acceleration of digital transformation programs, and the growing complexity of multi organizational and platform based operating models have all introduced new pressures that existing models were not designed to accommodate. For this reason, the next logical step is to revisit the Lange et al. (2016) model directly, to examine which of its structural relationships remain empirically defensible and which require updating in light of the technological and organizational developments of the past decade. Which dependency relationships between governance, organizational anchoring, team capability, and communication have held stable? Which have

been disrupted or reweighted by the rise of cloud-based enterprise systems, AI integration, and increasingly distributed organizational structures? And how does the relevant factor profile shift as an organization moves from the pre-adoption phase, through implementation, to the longer-term challenge of sustaining architectural value over time?

Moreover, there is an increasing amount of literature on evaluation of EA, however consensus remains elusive. Reviews of evaluation studies have identified an enormous number of evaluation methods and criteria, there are limited examples of validation of the studies in practice (Busch & Zalewski, 2025). The literature has three consistent weaknesses; the use of an architect's perspective but disregards business perspectives (Tell & Henkel, 2024), insufficient integrative frameworks that include both qualitative and quantitative evaluation measures (Hadaya et al., 2020), and lack of tool support sufficient enough to automate evaluation (Busch & Zalewski, 2025). Consequently, future research should prioritize multi-stakeholder, multi-method evaluation approaches that consider balancing rigor with practicability. For example, while collecting meaningful metrics to represent objective measures, stakeholder satisfaction could also be collected contemporaneously, or use of embedded data collection techniques may make EA evaluation robust as empirical evidence and goal-oriented (i.e., if the ideal measure indicates that they are running at 75%). Future Research Agenda. Our synthesis highlights three directions for future EA research: (i) refine definition and theory to support cumulative knowledge; (ii) examine the adoption lifecycle, especially pre-adoption triggers and readiness across technology, organization, and politics; and (iii) strengthen evaluation and impact. Continuing work should shift from individual and intrinsic measures to integrated frameworks that include multiple stakeholders and recognized standards. Studies should also link EA outcomes to business indicators and metrics to clarify how architectural maturity relates to organizational value. Additionally, we find that EA in practice is evolving continuously (e.g. from rigid models to dynamic data-driven capabilities; the incorporation of new technologies like AI or cloud platforms). These new facets of EA should also govern research. Through the three contributions of the paper: clarifying its purpose, historical development, and the extemporization of EA benefits, challenges and measure, it is our hope that we have adequately advanced both academic comprehension and practical articulation of EA. The pathway specified here urges us to shift EA research to producing fewer new frameworks and focus on better integrating existing frameworks and concepts that explain or describe how EA generates value in multiple contexts.

5. CONCLUSION

This systematic review evaluated the current state of EA in research and presents three contributions. First, it proposes an integrative definition that considers EA as a strategic way for organizations to create and maintain aligned models of a) their business strategies, and b) how information technology can help them achieve these strategies. This definition combines process and product views and places alignment at the core of EA without the assumption that simply having an aligned model or representation yields operational improvements. Second, it develops a historical view of EA to show that the field has developed from initial building frameworks to governance and enterprise-wide management, and more recently to digital transformation and data-centric contexts. Third, this review synthesizes documented benefits, persistent obstacles, and evaluation models – and from this synthesis we derive a useful agenda for future research.

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The conclusions of the review offer clear ramifications. In terms of theory, the integrative definition provides a more stable unit of interest for research and encourages cumulative research because it distinguishes mechanisms from outcomes. Theoretical development now must explain how EA enables, or creates opportunities for value to be realized, in specific conditions, rather than assuming. Furthermore, the evidence suggests that if you are using (or developing) EA as a living capability, you will benefit from business alignment, agile improvement programs, and operational efficiency. However, business/enterprise architecture work needs to be embedded within organizational governance, decision-making pathways, and organization-wide change making programs as part of organizations' business architecture work to create then sustain these benefits. There are repeated conditions that help turn models into action / results, these are executive sponsorship; clear accountability roles; open channels of communication; and adaptive oversight. In terms of evaluation, your organization should consider whether the evaluation, however narrow purposefully monitors EA compliance or is purely evaluative. Integrated evaluation frameworks that combine objective indicators with stakeholder views (business, technology) must be adopted. Tool support for framing evaluations and selective automation of data collection is critical to reduce the effort and make evaluation timely and usable. This review has limitations. The search parameters only covered peer reviewed published articles in English and a specified stream of academic sources, which potentially leaves out the important grey literature, or relevant studies published elsewhere. The range of available evidence is still primarily qualitative, which might limit generalizability.

The recommendations that follow intend to fill these gaps. First, it would be useful to evaluate and refine the proposed integrative definition in different organizational settings and contexts to facilitate a collective reference point for conceptualizing it. Second, to build research in the adoption lifecycle - pre- adoption particularly in understanding triggers of adoption, readiness for adoption and decision processes, as well as modelling technology, organization, and political factors, as an integrated model. Third, in designing and testing evaluation frameworks, use multiple objective approaches to link advisory views of stakeholders and make use of automation for data collection. Aim to develop frameworks to link architectural capability and use to more tangible outcomes such as speed of delivery; cost control; strategically relevant innovation; risk posture. Fourth, observe local, regional, national, or international studies with larger samples and longitudinal designs to establish the causal pathways through which EA mechanisms relate to organization outcomes. Lastly, the empirical evidence could be extended to include comparison of organizations; compare sectors and public versus private setting; and examine how architects develop or change their architectural practice e.g., artificial intelligence systems; cloud-based technology ecosystem; and businesses with platform-based business model. Broadly, the review aggregates a body of knowledge that was fragmented and overlaps with diverse anticipation to convey a clearer understanding of what EA is and how it has emerged to deliver value within such an organization context to operational behaviors. The review also suggests a reasonable research agenda that prioritizes conceptual refinements, adopting lifecycle aware adoption models, and rigorous evaluations. By following this agenda, researchers and practitioners can together mature the discipline and improve the impact of EA on enterprise change and performance.

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