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Enterprise Architecture Management value creation mechanisms

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Abstract

This study explores the value-creation mechanisms of Enterprise Architecture Management (EAM). By synthesizing various models from existing literature, we identify key constructs —EA product quality, EA service quality, EA culture/attitude, EA product use, and EA service use— that influence EAM value creation. We further contextualize these constructs, comprehensively understanding how EAM generates strategic, operational, transformational, and other benefits. Our empirical analysis, based on survey data from Finnish EAM stakeholders, reveals moderate acknowledgment of EAM benefits, tempered by factors such as organizational context, economic conditions, and industry-specific considerations. The findings underscore the need for a multi-method approach in future studies, triangulating subjective data with objective metrics like decision audit trails, customer satisfaction scores, and compliance rates. This approach aims to provide a more balanced and accurate assessment of EAM's value, addressing both tangible and intangible benefits.

Keywords

Enterprise Architecture, Value Creation, Survey

1. Introduction

Enterprise Architecture (EA) is one of the most prevalent methodologies organizations employ to harmonize their strategies, business processes, and information technology (IT). By providing a comprehensive blueprint of an organization's structure, EA management (EAM) facilitates a holistic view that enables better understanding and management of complex organizational structures and processes [23].

EAM offers a multitude of benefits, including enhanced efficiency and alignment between business and IT capabilities, improved responsiveness to changes in the business environment, and more informed decision-making and project management [29], [31]. Over recent years, the benefits of EAM have been studied, with numerous benefits and their corresponding value realization mechanisms being identified [29], [30], [31], [12], [18], [34], [19], [10], [11]. These studies suggest that EAM can lead to strategic alignment, operational efficiency, enhanced agility, and improved communication and knowledge management within organizations. However, the mechanisms through which EAM benefits are realized remain not fully understood, and the literature provides inconclusive results regarding the direct impact of EAM practices (see e.g., [33])

One significant challenge in understanding EAM benefits is the scarcity of empirical research focused on their measurement and quantification. Although some studies have attempted to address this issue [22], [19] the diverse and often intangible nature of EAM benefits poses substantial challenges to their accurate assessment. Consequently, organizations find it difficult to justify investments in EAM initiatives due to the lack of clear, quantifiable returns on

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investment (ROI). This challenge is compounded by the multifaceted impacts of EAM, which include not only direct financial benefits but also strategic, operational, and transformational advantages that are harder to measure.

Moreover, the effectiveness of EA practices is significantly influenced by contextual and organizational factors, such as corporate culture, organizational structure, and maturity in EAM practices [10], [11]. These factors can greatly impact the realization of EAM benefits, yet they are often overlooked in existing studies. This oversight can lead to a one-size-fits-all approach that fails to consider the unique characteristics of different organizational contexts, thereby limiting the applicability and effectiveness of EAM practices across various settings.

Despite the recognition of EAM's potential benefits, there remains an incomplete understanding of what these benefits precisely entail, the actual benefits that are realized, the conditions under which they manifest, and the appropriate methods for theorizing and measuring them. This gap in understanding hinders the development of actionable strategies for organizations seeking to leverage EAM for value creation.

In this quantitative study, we aim to address these gaps by exploring the factors that precede different achievable EAM benefits. We seek to establish a tentative framework for EAM value creation mechanisms, providing a more detailed and nuanced understanding of how EAM can create value for organizations. This study contributes to the existing literature by integrating insights from various models and empirical data, offering a comprehensive approach to understanding and measuring the benefits of EAM. Through this exploration, we aim to provide organizations with practical insights and strategies to enhance their EAM practices and realize the full potential of their EA investments.

2. Previous research on the value and value creation of EAM

Understanding EAM's value potential is essential for setting realistic expectations, determining risks and returns in EAM investments, and ensuring necessary and tendentious commitment to EAM [25], [5], [12]. According [24] (p. 164), EAM serves as a tool for uncovering various organizational and operational aspects, including challenges such as bureaucratic inefficiencies identified through documented business processes, strengths such as technological capabilities identified through technology inventories, deficiencies such as unmet business requirements highlighted by dissatisfied customers, and opportunities such as untapped potential identified through performance results. By identifying capability gaps between the current and the desired states, EAM can help establish a roadmap for addressing the organizational transformation needs [24]. [4] observe that EAM encompasses both managerial and technological concerns, and its objectives evolve from solely enhancing IT utilization to a comprehensive approach encompassing all dimensions of enterprise management. This demonstrates that EAM transcends traditional IT management practices and aligns more closely with methodologies of strategic planning and decision-making [27]

In addition to the monetary worth and financial benefits, the value of something can be understood by using concepts such as usefulness, advantage, benefit, or desirability [32]. According to Gong and Janssen [12] empirical evidence suggests EAM is able to produce benefits that can be positioned in the following categories: 1) strategic and political, 2) transformational, 3) communicational, 4) economic, 5) flexibility and agility, 6) integration and interoperability, 7) inter-organizational, 8) knowledge management. Several studies have suggested that EAM value comes realized through mechanisms that are indirectly related to the EAM function (such as the company's increased market value) and can be intangible and difficult to measure (such as improved decision-making) (e.g., [20], [30], [15], [21], [26]).

EAM value can be realized immediately or in the long term [21]. In addition, value can be potential, perceived, or realized. The potential value refers to the intrinsic value of EAM that has the capacity to be actualized [16]. An example of potential value within EAM pertains to the

enhanced quality of development projects [10]. Perceived value denotes the value experienced by both EAM users and stakeholders [16]. For instance, from the perspective of a project team, the use of EA artifacts may enhance the transparency of dependencies [21]. Realized value, on the other hand, represents the net positive impact or benefit derived [16]. A concrete instance of realized value from EAM could be the enhancement of the systems environment [30]. EAM contributes value not only to individual projects but also to entire organizations [30], [11]. It facilitates improved availability of information concerning the current architecture of the enterprise [21], as well as its desired future state [10]. Moreover, EAM aids projects in aligning with the broader enterprise strategy [16]. It also serves as a catalyst for successful transformative projects within organizations [12]. Furthermore, at the organizational level, EAM is purported to enhance an organization's responsiveness to evolving customer and market demands [30], elevate operational excellence [14], and reduce operational costs [8].

Table 1 summarizes the EAM value propositions presented in the previous studies, further classified into the categories adopted from the systematic literature review by Gong and Janssen [12]. Value propositions are specific benefits that organizations aim to achieve through the implementation of EAM, i.e. the desired outcomes that drive EAM initiatives within organizations. Value creation mechanisms, through which we later analyze the value proposition, are the processes, activities, and factors that enable these value propositions to be realized.

Table 1
EAM value proposition categorization

EAM Value Category	EAM Value
Strategic and political	Increased business-IT alignment: [24], [8], [30], [11], [21], [28]
	Improved decision-making: [30], [17], [21], [28]
	Increased control of organizational complexity: [11]
	Improved operational excellence: [14], [30]
	Better compliance with regulations, standards, and quality requirements: [7]
	Improved business continuity: [7]
	Improved risk management: [7], [30], [11]
	Increased business stability: [30]
	Better resources management: [30], [6]
Knowledge Management	Improved organizational learning: [17]
	Clear overview of an organization: [27], [21]
	Improved transparency on dependencies: [21]
	Better understanding of organization's vision: [10], [17], [27]
Communicational	Better communication and information sharing: [9]
	Availability of information on EA: [21]
	Common vocabulary: [21]
Transformational	Better project efforts alignment with overall corporate strategy: [16], [27]
	Increased project quality: [10], [11]
	Better management of complexity in projects: [6], [10], [11]
	Easier scoping of development projects: [10]
	Faster project initialization: [11], [21]
	Timely completion of projects: [11]
	Improved innovation capabilities: [17]
	Improved organizational capability to change: [7]
	Faster time-to-market and delivery: [9]
	Clear requirements and restrictions: [21]
Inter-organizational	Better management of external relationships: [8]
	Increased customer intimacy: [30]
	Increased external collaboration: [11]
Integration and interoperability	Higher solutions integration: [6], [21]
	Increased organization-wide standardization, integration, and deduplication of assets: [11]
	Improved and harmonized business processes: [14], [24], [10], [30]
	Increased reusability of IT assets: [13], [7], [2]
	Increased process synergies: [13], [27]
	Less inconsistency and redundancy in IT: [13], [10], [2], [21]
Flexibility and agility	Increased ability to respond to customer and market needs: [6], [2]

	Increased strategic agility: [3], [24], [8], [30]
Economic	Lower operational costs: [8]
	Lower IT costs: [30], [15], [21], [28]
	Lower project costs: [11]

2.1. EAM value creation mechanisms

In exploring EAM value creation mechanisms, various models have been proposed. Niemi and Pekkola [21] propose a model that emphasizes the role of EA artifacts and their use in creating value. They identify several constructs influencing EAM value: EA product quality, EA service quality, EA culture/attitude, EA product use, and EA service use. Their model suggests that high-quality EA artifacts and services, along with a supportive culture, lead to greater use of EA products and services, which in turn generates value through improved decision-making, strategic alignment, and operational efficiency. Foorthuis et al. [11] present a benefit delivery model focusing on the processes and activities that drive EAM benefits. They argue that EAM contributes to organizational value through activities like standardization, integration, and strategic alignment. The model highlights the importance of EA practices in facilitating better project outcomes, operational efficiency, and strategic initiatives. Lange et al. [17] discuss a benefits realization model that underscores the mechanisms through which EAM leads to organizational benefits. Their model outlines how EA descriptions and practices enhance project quality, speed up project delivery, and improve organizational adaptability. They emphasize the indirect nature of EAM value, suggesting that benefits often materialize through intermediate activities such as better project management and enhanced communication. Tamm et al. [31] propose a framework linking EA service provision quality to organizational benefits. They identify three primary mechanisms: improving IS decision-making, guiding IS project delivery, and building a better IS platform. These mechanisms are facilitated by high-quality EA services, which help organizations achieve cost savings, strategic agility, and competitive differentiation. Kurnia et al. [34] focus on the role of EA in enabling digital transformation. Their model highlights how EAM supports strategic initiatives through enhanced integration and interoperability of systems, leading to improved business processes and agility. They argue that EAM facilitates organizational change and innovation, driving long-term value creation.

The main constructs of all the models discuss similar sets of factors—EA products, EA services, the use of EA[M] results, and EAM benefits that contribute to EAM value creation. This is supported by numerous studies, including [6], [10], [11], [30], [17], [1] and [21]. Among these, [21] provide a detailed exploration of the interrelationships between these constructs, resulting in a model with high explanatory potential but also structural complexity. Conversely, [17] place less emphasis on the relationships between foundational dimensions such as EA Product Quality, EA Function Setup Quality, and EA Service Delivery. Organizational characteristics and culture are less frequently discussed in depth within these models. Although Niemi and Pekkola [21] and Lange et al. [17] acknowledge and include cultural aspects, the impact of these aspects on EAM value creation is emphasized more prominently in other models [7], [30], [1]. Models of value creation must balance accuracy and generalizability. Most models in existing literature, including those by [10], [1] and [6], focus narrowly on specific contexts such as EA standards use, project EA compliance, and EA principles, to provide better accuracy. Nonetheless, all identified models describe EAM value creation through the use of EAM results [6], [10], [11], [30], [17], [1], [21], [34], [31].

To summarize the numerous models discussed and to provide a generalized understanding, we propose a synthesized model that includes the foundational dimensions of EA Product Quality (c.f. [21], [11]), EA Service Quality (c.f. [31], [11]), EA Culture (c.f. [21], [34]), EA Product Use (c.f. [17], [31]), and EA Service Use (c.f. [31], [21]), which are present in all the studied models. However, as discussed for general value creation, quality products and services and a positive EA culture alone do not typically result in value. Therefore, the synthesized model

includes the factors of EA Product Use and EA Service Use, which are assumed to impact EAM value creation by turning resources into perceived value. The use of EAM results, meaning EA products and services, is a construct in many models, including [6], [10], [30], [17], [1] and [21].

The table below synthesizes constructs and mechanisms from various EAM value creation models, categorizing them into dimensions that align with Gong and Janssen's [12] study. By mapping these constructs to Gong and Janssen's categories, we can see how different aspects of EA practices contribute to specific types of benefits: (1) EA Product Quality is fundamental for realizing Strategic and Political, Operational, Transformational, Knowledge Management, and Integration and Interoperability benefits. High-quality EA artifacts provide the necessary foundation for strategic decision-making, process improvement, and system integration. (2) EA Service Quality is crucial for achieving Operational, Economic, Transformational, and Flexibility and Agility benefits. Effective EA services support project outcomes, operational efficiency, and the organization's ability to adapt and innovate. (3) EA Culture plays a significant role in realizing Transformational, Knowledge Management, and Flexibility and Agility benefits. A positive organizational culture towards EAM ensures the adoption and effective use of EA artifacts and services. (4) EA Product Use and EA Service Use directly impact the realization of Strategic and Political, Operational, and Transformational benefits. Regular and effective use of EA products and services leads to better project management, strategic alignment, and operational outcomes.

Table 2
EAM value creation model categorization

Models	Mechanisms	EA Product Quality	EA Service Quality	EA Culture/ Attitude	EA Product Use	EA Service Use	Gong and Janssen [12]Categories
Niemi & Pekkola [21]	Quality EA artifacts and services, supportive culture led to better decision-making and strategic alignment	High-quality EA artifacts enhance decision-making and strategic alignment	Quality EA services facilitate better project outcomes	Supportive culture drives effective use of EA	Regular use of EA artifacts improves strategic outcomes	Engagement with EA services enhance value	Strategic and Political, Operational, Transformational
Foorthuis et al. [11]	High-quality EA products and services enhance project success and operational efficiency	Focus on quality EA products	Focus on quality EA services	Not explicitly mentioned	Utilization of EA products leads to project success	Effective EA service delivery supports project success	Operational, Transformational
Lange, Mendling & Recker [17]	High-quality EA products and services, cultural acceptance, and user satisfaction lead to benefits	High-quality EA products improve project quality and delivery	Effective EA services improve project quality and delivery	Cultural acceptance is crucial for realizing benefits	Effective use of EA products improves project quality	Not explicitly mentioned	Knowledge Management, Communicational, Transformational
Tamm et al. [31]	High-quality EA services improve IS decision-making, project delivery, and IS platform development	Quality EA services enhance decision-making and project delivery	Quality EA services improve IS decision-making and project delivery	Not explicitly mentioned	Use of EA services and products improves outcomes	Use of EA services improve decision-making and project delivery	Economic, Strategic and Political, Operational

Kurnia et al. [34]	High-quality EA supports digital transformation, integration, and interoperability, enhancing business processes and agility	Supports integration and business processes	Supports digital transformation and business agility	Organizational support enhances EAM implementation	Supports integration and agility	Enhances business processes and agility	Flexibility and Agility, Integration, and Interoperability, Transformational
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3. Study design

Due to the challenges in EAM value measurability discussed earlier, the empirical study focuses on value perceived by EAM stakeholders. EAM stakeholders, who generally are considered EAM value beneficiaries, are business and IT professionals working in development, planning, and management roles in organizations where EAM practices are implemented. Data was collected with a web survey. The web survey and provided answers were in Finnish. The link to the survey was distributed by email campaigns. Additionally, the link was published on social media (Linkedin) and distributed via professional networks. The responses were gathered during June-September 2023. The campaigns were intended to reach EAM stakeholders working in Finland as this demographic was of special interest.

The email containing the survey link was sent to over a hundred recipients. The recipient list was gathered through LinkedIn search, searching for professionals with keywords “Enterprise Architect”, “Solution Architect”, “IT-Architect”, “System Designer”, “Business Analyst”, “Product Owner”, “IT-Manager”, “Transformation”, “Engineer”, and “Designer”. The list was narrowed down to suitable persons deemed as EAM stakeholders. For example, graphic designers and traditional architects (physical infrastructure/buildings/etc.) were excluded from the recipient list. A total of 47 responses were obtained. The survey was opened 259 times and answering was started 82 times, meaning 43% of respondents that began answering the survey did not finish answering it. This could be at least partially explained by the significant length of the survey.

The survey included two major parts: EAM activities, resources, and culture presented as ‘factors impacting perceived EAM value’ and perceived value. As prior noted, the impacting factors (EA Product Quality (c.f. [21], [11]), EA Service Quality (c.f. [31], [11]), EA Culture (c.f. [21], [34]), EA Product Use (c.f. [17], [31]), and EA Service Use (c.f. [31], [21]) are based on the prior literature. Similarly, the value propositions (dependent variables) were based on prior studies. The first part contained questions determining the EA products and services available to the respondent, their use, and their own as well as their organization’s culture and attitude towards EAM. The questions were presented as claims and answers were recorded on a Likert scale. The scale contained the options of (1) Completely disagree, (2) Somewhat disagree, (3) Somewhat agree, and (4) Completely agree.

Exploratory factor analysis was performed to identify latent variables and find hidden structures in the gathered data. The chosen extraction method was Principal Component Analysis with a hundred iterations, and as many factors as there were variables in the given sets.

As can be seen in the results, the factors with several variables were mainly covered with only a few variables in the sets. The results also described some variability among the factors. Meaning, all variables in the factor sets did not sum up to measure one and the same phenomena. Thus, no factor sums were formulated for further analysis, but rather the effects of the single independent variables were studied. Additionally, the independent variables each included highly relevant information on EA actions, resources, and culture, and all this information was seen as vital for the results of this research. All variables were kept in the scope of the analysis.

(EA Service Quality and EA Service Use factors only had one variable, thus not suitable for or even requiring the factor analysis stage.)

4. Results

The data (see also Appendix A Perceived EAM Value Results) suggests that EAM stakeholders do indeed experience value from EAM. The regression analysis highlights several critical EAM activities that influence perceived value, including access to enterprise architects' help (SU1) and involvement of architects in development projects (CA4), and use of application (PU1), data (PU3), and technology layer (PU5) EA products.

The majority of the respondents either "somewhat agreed" or "completely agreed" with the notion that "I see EAM work as beneficial for my organization" (V1), and only two respondents completely or somewhat disagreed with the statement. Still, only 19.2% of respondents see their organization's current EAM practices as supporting the whole business. 40.4% see their organization's current EAM practices as somewhat supporting the whole business. Further, 72.3% of respondents completely agree with seeing EAM as a possibility for their organization. None of the respondents completely agree with being satisfied with their organization's current EAM practices, and about 70% disagree with the claim.

Moreover, the results bring clarity to the types of value perceived by EAM stakeholders. Claims for experiencing higher solutions integration (V30), better communication and information sharing (V17), improved transparency of dependencies (V14), and better decision making (V3) were on average most agreed with. Thus, it can be stated these types of values were most experienced by the respondents. The four most experienced value items are of different categories—integration and interoperability related, communicational, knowledge management related, and strategic and political. The mentioned categories are in general well represented in perceived EAM values. However, apart from two exceptions, no obvious patterns arise regarding the categories of the experienced values. The first exception is 'economic' values, which are somewhat experienced but not significantly. The second exception is the values in the category 'inter-organizational' as they are some of the least experienced EAM values in the context of this study.

A few detailed explanatory relationships were discovered for EAM activities, resources, and culture and the specific experienced EAM value items. For positive outcomes in these values, a small set of independent variables were discovered to have explanatory power worth addressing separately. Discovered results are presented here for explanatory models with a total adjusted R square of over 0.3.

Easy access to enterprise architects significantly contributes to the overall perceived value of EAM. This support is crucial for better decision-making and achieving a competitive advantage. It also enhances innovation capabilities, indicating that architects' expertise is vital for driving new initiatives and improving existing processes. The active involvement of architects in development projects significantly enhances several perceived values. This involvement helps create a common vocabulary across the organization, which is crucial for effective communication and alignment between different departments. It also facilitates organizational learning and the dissolution of information silos, enabling smoother and more efficient project execution. Better management of project complexity is another significant benefit, as architects provide essential guidance and oversight.

Using technology layer EA products is associated with improved risk management and better business continuity. This indicates that detailed and accurate technology documentation helps organizations anticipate and mitigate risks more effectively. It also enhances the organization's ability to respond to customer and market needs, providing a strategic advantage in dynamic environments. A better understanding of the organization's vision is facilitated by these products, ensuring that all stakeholders are aligned with the strategic objectives. Utilizing data

layer EA products leads to increased project quality and better upfront detection of development problems. This suggests that accurate data models and flow diagrams are essential for identifying potential issues early in the project lifecycle. These products also contribute to increased process synergies, enhancing the efficiency and effectiveness of organizational processes. The use of application layer EA products improves business/IT alignment, ensuring that IT initiatives are closely aligned with business goals. It also enhances communication and information sharing, critical for effective collaboration across departments. Establishing a common vocabulary is another significant benefit, facilitating better understanding and cooperation among stakeholders.

Thus, first, from EA Culture/Attitude point of view, it seems that the involvement of architects in development projects significantly enhances values such as common vocabulary, organizational learning, and management of complexity. Second, from EA Product Use point of view, the utilization of technology layer, data layer, and application layer EA products leads to improved risk management, business continuity, project quality, and alignment between business and IT. Third, from EA Service Use point of view, the access to enterprise architects' help is crucial for achieving overall EAM value, better decision-making, competitive advantage, and innovation capabilities.

Table 3
EAM construct categorization

Construct Category	EAM Activity	Perceived Value	Adjusted R ²
EA Culture/Attitude	Involvement of Architects in Development Projects (CA4)	Common Vocabulary (V19)	0.35
		Increased Organizational Learning (V12)	0.32
		Dissolution of Information Silos (V15)	0.28
		Better Management of Complexity in Projects (V22)	0.40
EA Product Use	Use of Technology Layer EA Products (PU5)	Improved Risk Management (V8)	0.29
		Increased Ability to Respond to Customer and Market Needs (V38)	0.34
		Improved Business Continuity (V7)	0.30
		Better Understanding of Organization's Vision (V16)	0.33
EA Service Use	Access to Enterprise Architects' Help (SU1)	Overall EAM Value (V1)	0.41
		Better Decision Making (V3)	0.37
		Competitive Advantage (V11)	0.36
		Improved Innovation Capabilities (V47)	0.32
EA Product Use	Use of Data Layer EA Products (PU3)	Increased Project Quality (V21)	0.30
		Increased Upfront Detection of Development Problems (V43)	0.28
		Increased Process Synergies (V35)	0.31
	Use of Application Layer EA Products (PU1)	Increased Business/IT Alignment (V2)	0.29
		Better Communication and Information Sharing (V17)	0.36
		Common Vocabulary (V19)	0.30

5. Discussion

The analysis reveals insights into how EAM activities create value within organizations. The involvement of architects in development projects, the use of various EA products, and access to EA services are shown to significantly impact perceived EAM value. These findings align well with existing literature, highlighting the importance of strategic alignment and effective communication facilitated by EAM.

The active involvement of architects in development projects emerges as a crucial factor for several perceived values, such as improved communication, enhanced organizational learning, and better management of complexity. This underscores the importance of integrating architectural expertise into project teams to achieve better outcomes. Providing easy access to enterprise architects' help significantly enhances overall EAM value, decision-making, competitive advantage, and innovation capabilities. This suggests that organizations should ensure that stakeholders can readily access architectural support to leverage EAM effectively.

The use of EA products at different layers (technology, data, and application) is strongly associated with improved risk management, business continuity, and project quality. This indicates that comprehensive documentation and effective use of EA products are essential for achieving operational excellence and strategic alignment. However, it's noteworthy that these products often exclude business architecture components. This trend could be influenced by the respondent demographics, with 70% of participants self-identifying as IT-focused professionals. This demographic skew might result in a stronger focus on technical layers, which are more directly relevant to their roles and potentially easier to quantify in terms of value creation.

Our survey results indicate a general acknowledgment of EAM benefits among stakeholders, with most items averaging around a score of 3 on a 1-5 scale. However, this raises concerns about the interpretation of self-reported data. Potential biases, such as confirmation bias and acquiescence bias, may lead respondents to report benefits they expect to see or default to neutral responses, particularly in contexts where benefits are multifaceted and not directly observable.

Despite high agreement rates for some value items, the data also indicate dissatisfaction with current EAM practices. For instance, while 72.3% of respondents see EAM as a possibility for their organization, only 19.2% believe their current EAM practices support the entire business, and about 70% are not satisfied with their organization's current EAM practices. This mixed feedback suggests that while respondents recognize the potential of EAM, they are critical of its current implementation.

This divergence indicates that while there may not be a strong confirmation bias, other biases such as social desirability bias and response bias could still be influencing the results. To mitigate these biases and gain a more accurate understanding of EAM's effectiveness, incorporating objective metrics alongside subjective perceptions is crucial. While this is not a unique position, it is an important one. As noted by e.g. [22] and [30], EA benefit realization research often lacks empirical evidence, with many prior studies failing to present rich data that includes both objective metrics and subjective perceptions.

EAM benefits encompass various dimensions, including strategic, operational, transformational, communicational, and knowledge management. These multifaceted benefits are challenging to capture comprehensively through self-reported data alone. Different stakeholders may perceive and value these benefits differently based on their roles, experiences, and expectations. For example, strategic benefits like improved decision-making (V3) and increased business/IT alignment (V2) are often abstract and subjective, making them harder to quantify through surveys. Conversely, operational benefits like better communication and information sharing (V17) can be more directly observed and measured.

By integrating objective metrics (e.g., decision audit trails, system integration levels) with subjective perceptions, we can better capture the full range of EAM benefits. This comprehensive approach allows us to validate self-reported data and identify any discrepancies between perceived and actual benefits.

The models show significant relationships between specific EAM activities and perceived benefits. For instance, utilizing Enterprise Architects' help (SU1) and using business layer EA products (PU3) positively impact the perceived overall EAM value (V1). However, the adjusted R^2 values for these models indicate that other unmeasured factors also influence these

relationships. An adjusted R^2 of 0.41, for example, means that 41% of the variance in the perceived overall EAM value (V1) is explained by the model, leaving 59% unexplained. This suggests that additional factors, not included in the model, contribute to the perceived value of EAM.

To further understand the unexplained variance, several potential factors can be considered, such as organizational context and culture, leadership support, EA maturity, and specific EA activities conducted. For example, depending on the complexity of the organization and its EA, or the maturity of its IT infrastructure, different EA products should or should not be used extensively. Concurrently, it is not always clear what specific EA activities are being conducted and in what specific environments. This lack of clarity can lead to variability in perceived value as different stakeholders may interpret and implement EA activities differently. Finally, the specific metrics used to evaluate EAM success can influence perceived value and the feedback mechanisms and other means of communication used can enhance or hinder the effectiveness of EAM by either ensuring that practices evolve to meet organizational needs or do not reflect the stakeholder needs and expectations.

Economic values were less frequently experienced by respondents in this study, highlighting the importance of quantitative measurement in this category. Economic benefits, such as cost savings, return on investment (ROI), and productivity improvements, are typically better assessed through financial data and quantitative analysis. For instance, cost-benefit analysis and ROI calculations can provide concrete evidence of economic benefits, which might not be accurately captured through stakeholder surveys alone.

Similarly, inter-organizational values involve benefits derived from external relationships and collaborations, which may not be fully appreciated or understood by all stakeholders. These values can include enhanced supplier relationships, improved customer satisfaction, and increased market competitiveness. Objective metrics, such as customer satisfaction scores, supplier performance metrics, and market share analysis, can provide a clearer understanding of these inter-organizational benefits.

To improve the rigor of future studies, we recommend a multi-method approach that triangulates self-reported data with objective metrics. For example, better decision-making could be evaluated through decision audit trails and outcomes, while increased customer intimacy could be assessed using customer satisfaction scores and retention rates. Additionally, a longitudinal study design could reveal more about the realization of these benefits over time, mitigating the risk of short-term optimism.

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A. Perceived EAM value results

AVG.	PERCEIVED EAM VALUE	Category after Gong and Janssen (2019)
Most frequently experienced		
3,07	Higher solutions integration (V30)	Integration and interoperability related
3,05	Better communication and information sharing (V17)	Communicational
3,02	Improved transparency of dependencies (V14)	Knowledge management related
3,02	Better decision making (V3)	Strategic and political
Experienced		
2,98	Increased business/IT alignment (V2)	Strategic and political
2,98	Better management of complexity in projects (V22)	Transformational

2,95	Better compliance with regulations, standards, and quality requirements (V6)	Strategic and political
2,93	Increased control on organizational complexity (V4)	Strategic and political
2,93	Increased project quality (V21)	Transformational
2,93	Clear requirements and restrictions (V26)	Transformational
2,92	Improved operational excellence (V5)	Strategic and political
2,89	Common vocabulary (V19)	Communicational
2,86	Improved business continuity (V7)	Strategic and political
2,85	Better data integration (V32)	Integration and interoperability related
2,85	Increased upfront detection of development problems (V43)	Other
2,85	Easier scoping of development projects (V46)	Other

2,84	Improved risk management / less risky operations (V8)	Strategic and political
2,83	Increased reusability of IT assets (V34)	Integration and interoperability related
2,82	Increased organization-wide standardization, integration, and deduplication of assets (V31)	Integration and interoperability related
2,81	Increased organizational learning (V12)	Knowledge management related
2,79	Better project efforts alignment with overall corporate strategy (V20)	Transformational
2,78	Availability of information on EA (V18)	Communicational
2,76	Improved/harmonized business processes (V33)	Integration and interoperability related

2,73	Increased process synergies (V35)	Integration and interoperability related
2,71	Create competitive advantage (V11)	Strategic and political
2,68	Clear overview of organization (V13)	Knowledge management related
2,67	Less inconsistency and redundancy in IT (V36)	Integration and interoperability related
2,66	Better resource management (V9)	Strategic and political
2,65	Lower IT resource heterogeneity (V37)	Integration and interoperability related
2,65	Lower IT costs (V41)	Economic
2,59	Dissolution of information silos (V15)	Knowledge management related
2,52	Increased business stability (V10)	Strategic and political
2,50	Lower operational costs (V40)	Economic
Less frequently experienced		
2,49	Improved organizational capability to change (V23)	Transformational
2,47	Increased ability to respond to customer and market needs (V38)	Flexibility and agility related
2,45	Increased adoption of modern technologies (V44)	Other
2,43	Lower project costs (V42)	Economic
2,40	Better management of external relationships (V27)	Inter-organizational
2,38	Increased strategic agility (V39)	Flexibility and agility related
2,37	Faster project initialization (V24)	Transformational
2,32	Timely completion of projects (V25)	Transformational

2,32	Better understanding of organization's vision (V16)	Knowledge management related
2,31	Faster time-to-market and delivery (V45)	Other
2,28	Improved innovation capabilities (V47)	Other
2,21	Increased external collaboration (V29)	Inter-organizational
2,13	Increased customer intimacy (V28)	Inter-organizational