Transitioning Towards Enterprise Architecture Management in a Software and Service Mobility Company: A Case Study

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Abstract. In the face of disruptions, increasing complexity and intensifying competitive pressure, organizations must adapt their structures and operations. In this context, Enterprise Architecture Management (EAM) is considered a promising approach to address these challenges by enabling holistic organizational overview, breaking down silos, and reducing complexity. However, the organizational implementation of EAM remains challenging, with little established methodological guidance available for context-specific realization. The research presented in this paper aims to support the organizational introduction of EAM. To this end, we present a practical evaluation approach to guide the selection of appropriate EAM implementation strategies. Through a single-case study conducted in collaboration with ETAS GmbH, this research explores a potential implementation of EAM. By conducting expert workshops and semi-structured interviews, an assessment approach and a decision-supporting "fitting matrix" were developed. The matrix evaluates twelve EAM implementation variants using seven collaboratively defined success criteria. The results indicate that a federated EAM model led by the CIO is considered the most suitable for this case.

Keywords: Enterprise Architecture Management, Enterprise Architecture Implementation Methodology (EAIM), Business-IT Alignment, Enterprise Architecture Frameworks, Change Management

1 Introduction

Organizations across various industries face increasingly volatile economic, technological, and regulatory conditions, requiring continuous adaptation [1, 2]. This also affects the automotive sector, which is currently experiencing a period of unprecedented change driven by electromobility, the software-defined vehicle, and intensified global competition [3]. As a result, the way how companies operate and create value is fundamentally changing, yet such transformations come with significant challenges [1]. Moreover, traditional management approaches are proving inadequate to address the rising complexity and pace of change. In this context, Enterprise Architecture Management (EAM) has become a widely recognized approach for addressing these challenges. EAM enables the development of a holistic understanding of the organization [4],

promotes the breakdown of silos, and helps organizations to manage increasing complexity [5]. Moreover, authors from industry and academia emphasize that there is no one-size-fits-all approach for organizational EAM implementations, as organizational context strongly influences individual success [1, 2, 6]. Additionally, Buckl et al. [2] highlight the absence of established methodologies or practical guidance for context-specific EAM implementations. This paper addresses this gap through a single-case study in collaboration with ETAS GmbH, a company transforming from a hardware-focused to a software- and service-driven organization. To this end, we contribute a case study, in which we developed a contextual assessment approach and a corresponding "fitting matrix" to support the evaluation and selection of suitable EAM implementations.

Several prior studies have investigated the organizational implementation of EAM. For instance, Haki et al. [7] presented four EAM archetypes intended as organizational blueprints. Buckl et al. [2] proposed a design theory framework for situational EAM design. The results are rather abstract and lack elaboration on operational details such as artefacts and assessment steps. Other publication such as Schmidt and Buxmann [5] outline general principles, whereas Drews et al. [8] provide detailed insights into an agile EAM function but without providing a systematic assessment approach. Overall, the literature reveals an absence of structured evaluation approaches, which this study aims to address. A comprehensive overview of background and related work can be found in Flaisch [9]. This paper presents a condensed version of the case study, with a more comprehensive version available on Figshare[1].

2 Research Design

This research follows the case study approach from Yin [10] and adopts the research design proposed by Runeson et al. [11]. We propose the following research questions:

RQ1: *How can different organizational EAM approaches be evaluated to select the most beneficial option?* **RQ2:** *What are suitable options to establish EAM at the case company, and which is the most promising one?*

This case study examined ETAS GmbH, a subsidiary of the Bosch Group that provides embedded software, engineering solutions and services to the automotive industry. The company is currently undergoing a strategic transformation into a software and service mobility company. In this context, ETAS considers EAM a promising approach to manage its transformation. Consequently, an explorative single-case study design was chosen, as it allows to investigate real-world phenomena [11]. The primary objective was to explore the potential implementation of EAM within the case company.

To address **RQ1**, two expert workshops were conducted with two ETAS practitioners, one enterprise architect and one senior manager with experience in organizational transformation and a solid understanding of Enterprise Architecture (EA). The objective was to validate findings from a prior literature review [9] and develop an evaluation approach for different organizational EAM implementations. For **RQ2**, the developed

[1] Figshare Link: https://figshare.com/s/407677525a27d2011ab7

approach was applied and validated in the context of ETAS through 13 semi-structured expert interviews with experts from four different companies. The expert selection encompassed architects from the case company, along with external consultants specialized in the domain of EAM. Prior, an interview guide was structured according to the fitting matrix and distributed in advance. Their responses were collected via Likert-type scales and analyzed followed Schuster and Liesen [12], providing a quantitative basis for comparing different implementations.

3 Results

Assessment Approach. In the workshops to answer **RQ1**, different EAM options were scored against success criteria that are considered essential by the experts, resulting in a scoring matrix, referred to as "fitting matrix". Overall, the approach and the associated artefact consist of three main components: ***I) Success criteria for EAM introduction; II) Adapted organizational EAM approaches; III) Organizational anchoring points.***

I) Success Criteria. In the initial phase, potential evaluation dimensions were identified based on the literature review by Flaisch [9] and discussed in the first workshop. Throughout a multi-stage process involving two expert workshops, recurring patterns and thematic overlaps across EAM challenges, best practices and success factors were synthesized and seven key success criteria were identified, that serve as the evaluation dimensions for comparing different organizational EAM options: *1) Organizational Penetration and Effectiveness Reach of EAM, 2) Top Management Mandate and Governance, 3) Visibility and Lighthouse Character, 4) Suitability for EAM Work, 5) Ability to Function as an Architecture Guild, 6) Adaptability and Scalability of EAM, 7) Effort and Risk for Change.*

II) EAM approaches. Based on the literature review by Flaisch [9] and practitioner workshops, three approaches were identified: ***Virtual EAM, Central Operative EAM, Governance EAM, and Supportive EAM.*** They differ in their degree of centralization, governance structures, and role of embedded architects, e.g. in the ***Virtual EAM*** model, there is no central EAM organization but architects work within a virtual community [6, 13]. In contrast, the ***Central Operative EAM*** consolidates all architects and architectural activities into a single centralized function [6, 13]. It is typically led by a Chief Enterprise Architect and follows hierarchical structures to cover all relevant domain regions [14]. The ***Governance EAM*** model combines central structure of a dedicated EAM department supervising EAM by formulating EA strategy, establishing enterprise-wide standards, while being complemented by a decentralized network of embedded architects operating within business domains [6, 13]. The ***Supportive EAM*** approach similarly integrates central and decentralized components, but with primary architectural work conducted highly autonomous within individual domains and teams, while the EAM function operates primarily in a supportive and advisory capacity [8].

III) Organizational anchoring points. Furthermore, according to the workshop experts, selecting an appropriate organizational anchoring is essential to achieve the defined success criteria, overcome challenges, and leverage the benefits of EAM, a view supported by authors from both academia and industry [6, 15]. However, there is no

universal solution, as appropriate positioning depends heavily on the organizational structure, operating model, and culture [6]. Based on these insights, organizational anchoring was included as an additional dimension to the assessment approach, considering three generic roles to avoid bias and strengthen the adaptability and reusability [16]: The ***Chief Information Officer (CIO)***, responsible for overseeing and managing all resources within an organization's IT; the **C*hief Operating Officer (COO)***, responsible for daily business operations and optimizing internal efficiency and staff coordination; and the ***Chief Executive Officer (CEO)***, who holds the highest-ranking position and is responsible for major strategic decisions, overall leadership, and supervision of the executive team.

Fitting Matrix. Fig. 1 shows the final version of the "fitting matrix", which incorporates the pre-defined success criteria, four adapted EAM approaches and three potential organizational anchoring points among C-suite roles, as well as a transparent evaluation mechanism. The X-axis lists the four EAM approaches, each subdivided into three variants reflecting its anchoring under one of the three C-Suite roles and Y-axis contains the seven success criteria, which serve as the evaluation dimensions for assessing each approach, forming the evaluation logic of the matrix.

Approach Evaluation. To answer **RQ2**, the "fitting matrix" was applied using semi-structured interviews. Details can be found in the extended version of this paper. As previously outlined, the use of consistent Likert-type statements and their systematic mapping to numerical values enabled a comparable assessment across all variants [12]. Fig. 1 illustrates the completed matrix for the case company, ETAS.

Success Criteria	Virtual EAM			Central Operative EAM			Governance EAM			Supportive EAM		
	CIO	COO	CEO	CIO	COO	CEO	CIO	COO	CEO	CIO	COO	CEO
Organizational penetration and effectiveness reach of EAM within organization	36	36	35	42	39	44	55	51	55	35	36	36
Top Management mandate and governance	30	31	39	48	48	59	51	48	57	34	34	36
Visibility and lighthouse character	34	37	39	48	48	50	51	52	54	34	36	39
Suitability for EAM work	45	42	42	47	46	49	56	51	51	34	36	36
Ability to function as architecture guild	40	40	37	49	49	48	53	53	49	32	33	33
Adaptability and scalability of EAM within the approach	40	39	42	49	49	50	50	49	49	31	32	32
Effort and risk for change	36	37	37	38	37	39	44	44	43	40	42	41
Summary - Final Score	261	262	271	321	316	339	360	348	358	240	249	253
Most suitable - Ranking	**9**	**8**	**7**	**5**	**6**	**4**	**1**	**3**	**2**	**12**	**11**	**10**

Fig. 1. Completed Artefact "fitting matrix" for the case company

Overall, the most suitable approach for ETAS based on the evaluation is the federated "Governance EAM". However, minimal variance between C-suite roles suggests that there is no significant difference between them in the case of ETAS. Next in the ranking is the centralized "Central Operative EAM" approach, where the CEO variant trails with 339 points, relatively close to the EAM Governance variant, but still 6% lower than the top option. The decisive difference lies in the "Organizational Penetration and Effectiveness Reach of EAM" criterion which was rated lower for a central function due to the challenge of "ivory tower syndrome," consistent with prior literature [6]. While a central function may be detached from business, the federated approach fosters

proximity to stakeholders through its embedded architects in relevant areas (e.g., business domains). Another interviewee insight is the preference for centralized over decentralized approaches, stating that EAM requires a clear mandate and strong authority to be implemented effectively, especially to fulfill its governance responsibilities, which is reflected in higher scores on e.g. "Top Management Mandate and Governance." Consequently, decentralized approaches are ranked last, with "virtual EAM" and "supportive EAM" receiving the lowest scores.

4 Conclusion and Outlook

This paper presents a case study conducted in collaboration with ETAS GmbH, exploring the potential implementation of Enterprise Architecture Management. Based on insights from the literature and expert workshops, a structured assessment approach and a supporting artefact, the "fitting matrix," were developed to evaluate and compare organizational EAM implementation options. Through semi-structured expert interviews, the approach was applied and validated in the context of the case company, providing a methodological foundation and decision-making support for assessing suitable organizational EAM designs. The results indicate that a federated "Governance EAM" model anchored with the CIO represents the most suitable option for ETAS. To assess the validity and reliability of the results, the framework proposed by Yin [10] was applied.

Construct validity was strengthened by communicating workshop and interview objectives in advance, clarifying terminology, and using semi-structured interviews to mitigate misunderstandings. ***Internal validity*** may be affected by the accuracy of participants' knowledge; this was addressed by selecting experienced experts and discussing differing viewpoints until consensus was reached. Internal validity was not further considered for the interviews, as no causal relationships were examined. ***External validity*** is limited due to the single-case design, restricting the generalizability of the findings. While the results may offer indicative insights for organizations in comparable contexts, they are not directly transferable without further research. ***Reliability*** may be constrained by the subjective perceptions of participants and potential company-specific bias, which was mitigated by validating selected findings with a broader expert group. As the approach has not yet been implemented or longitudinally validated, it represents a preliminary framework requiring further investigation. Additionally, the results of this paper can serve as a foundation for further academic research and practical applications. Further research should validate the preliminary approach across different organizational contexts, e.g. by introducing weighting, and quantitative studies with EAM practitioners could further substantiate and enrich the findings. Beyond validation, the identified success criteria could enrich an EAM maturity model, helping companies assess their current EAM level. Based on this study's results, ETAS has decided to establish a dedicated EAM function to systematically manage, develop and evolve the company's EA. In the long term, ETAS aims to further professionalize its EAM function, and the emerging initiative is expected to provide various benefits and may also serve as a pilot for other organizations facing similar environments and challenges.

References

1. Niemi, E., Pekkola, S.: The benefits of enterprise architecture in organizational transformation. Business & Information Systems Engineering **62**, 585–597 (2020).
2. Buckl, S., Schweda, C.M., Matthes, F.: A design theory nexus for situational enterprise architecture management. In: 2010 14th IEEE International Enterprise Distributed Object Computing Conference Workshops, pp. 3–8. IEEE (2010).
3. Gräf, H., Topuria, S.: The impact of the Covid-19 pandemic on industrial policy in Germany and the European Union - the case of the automotive industry. European Journal of Economics and Economic Policies **22**, 118–134 (2025).
4. Lange, M., Mendling, J., Recker, J.: Measuring the realization of benefits from enterprise architecture management. Journal of Enterprise Architecture **8**, 30–44 (2012).
5. Schmidt, C., Buxmann, P.: Outcomes and success factors of enterprise IT architecture management: empirical insight from the international financial services industry. European Journal of Information Systems **20**, 168–185 (2011).
6. Mittendorf, F., Thome, A., Zeeb, S., Peters, P.: Digital Architecture Study 2024. Capgemini Website, https://www.capgemini.com/de-de/wp-content/uploads/sites/8/2024/11/Digital-Architecture-Study-2024_vF.pdf (2024), Accessed 2025/05/27.
7. Haki, M.K., Legner, C., Ahlemann, F.: Beyond EA frameworks: Towards an understanding of the adoption of enterprise architecture management. In: European Conference on Information Systems (ECIS) 2012 Proceedings (2012).
8. Drews, P., Schirmer, I., Horlach, B., Tekaat, C.: Bimodal Enterprise Architecture Management: The Emergence of a New EAM Function for a BizDevOps-Based Fast IT. In: 2017 IEEE 21st International Enterprise Distributed Object Computing Workshop (EDOCW), pp. 57–64 (2017).
9. Simon Flaisch: Relevance and Realization of Enterprise Architecture Management in a Software and Service Mobility Company: An Organizational Case Study, Bachelor Thesis, Unpublished, https://doi.org/10.13140/RG.2.2.31410.52163 (2025).
10. Yin, R.K.: Case study research: Design and methods, vol. 3. sage (2003).
11. Runeson, P., Host, M., Rainer, A., Regnell, B.: Case study research in software engineering: Guidelines and examples. John Wiley & Sons (2012).
12. Schuster, T., Liesen, A.: Einführung - Messniveaus. In: Statistik für Wirtschaftswissenschaftler. Springer Gabler Berlin, Heidelber (2017).
13. Thome, A., Feheregyhazy, M.: Enterprise architecture in an Agile World, https://www.pwc.de/de/strategie-organisation-prozesse-systeme/enterprise-architecture-in-an-agile-world.pdf (2021), Accessed 2025/02/06.
14. Bente, S., Bombosch, U., Langade, S.: Chapter 3 - What Enterprise Architects Do: Core Activities of EA. In: Collaborative Enterprise Architecture, pp. 39–104. Morgan Kaufmann (2012).
15. Radeke, F.: Toward understanding enterprise architecture management's role in strategic change: antecedents, processes, outcomes. In: 10th International Conference on Wirtschaftsinformatik Proceedings 2011 (2011).
16. Woollacott, E.: What is the C-suite? executive roles and Responsibilities. Forbes Magazine. Forbes, https://www.forbes.com/sites/emmawoollacott/article/what-is-c-suite/ (2025).