



Past, current and future trends in enterprise architecture—A view beyond the horizon



Fabian Gampfer^a, Andreas Jürgens^a, Markus Müller^b, Rüdiger Buchkremer^{a,*}

^aInstitute of IT Management and Digitization, FOM University of Applied Sciences, Düsseldorf, Germany

^bABB Information Systems Ltd., Zürich, Switzerland

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ABSTRACT

Since its introduction in the late nineteen eighties, the discipline of Enterprise Architecture (EA) has evolved into a well-known practice of managing information systems in alignment with business interests. The evolution of the discipline is reflected in the many available scientific publications. Within a timeframe of three decades, we identify approximately 4000 journal articles and conference papers of which enterprise architecture is a major topic. We conduct a holistic, systematic literature review using artificial intelligence technologies such as information retrieval, text mining and supervised learning, side-by-side with manually reading of many relevant articles. For the first time, we present a holistic historical overview of the scientific development of the discipline. We describe the current focus of enterprise architecture and make suggestions for future publications and conferences using predictive analytics.

As a major result of our analysis, we find that the focus of EA research has shifted from understanding EA in the early years to managing EA today. Furthermore, we identify and investigate several current EA trend topics: We find Cloud Computing to be the trend with the strongest impact on EA and predict that this will be the case until 2020. According to our forecast, the Internet of Things will be the trend with the strongest growth in its impact on EA. Moreover, based on a comparison with the Gartner Hype Cycle, we observe a discrepancy between EA trends in academic work versus practical experiences, which presents a starting point for future research.

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* Corresponding author at: FOM University of Applied Sciences, Toulouser Allee 53, 40211 Düsseldorf, Germany.

E-mail addresses: fabian.gampfer@fom-net.de (F. Gampfer), andreas.juergens@fom-net.de (A. Jürgens), markus.h.mueller@ch.abb.com (M. Müller), ruediger.buchkremer@fom.de (R. Buchkremer).

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1. Introduction

Since the late nineteen eighties, the concept of Enterprise Architecture (EA) has evolved as a discipline and as a method for coping with the management of information systems and the corresponding business elements within complex organisations [1, 2]. Today, a variety of practices and frameworks are available that help manage existing architectures of enterprises and support the transition from a current to a future state [3–5].

EA has been and still is a constantly evolving discipline, which is shaped by social progress, technological advances and learning outcomes [6]. Three decades of research on the subject have resulted in many scientific contributions that cover a broad thematic spectrum. Although there are multiple state-of-the-art reviews on EA [3,7–15] that describe and assess the current state of research, none of them comprehensively cover the enormous number of available publications. To address this research gap, it was necessary to conduct the analysis that is presented in this article. We hereby illustrate how related research aspects have changed over time and may change in the near future. We consider our results to be relevant for both EA scientists, who can leverage our findings to design future studies, and EA practitioners, who can consult our analysis to better understand how academic EA trends relate to practice.

Our methodology combines artificial intelligence technologies such as text mining and natural language processing with traditional full-text reading approaches. We apply state-of-the-art text mining techniques to systematically address multiple questions on the past, present and, to some extent, future of scientific research on EA. This approach enables us to comprehensively review the vast number of publications (approximately 4000 journal articles and conference proceedings) that emphasize enterprise architecture. Consequently, this article presents the

first holistic literature review that covers EA from its beginning until today. Fig. 1 presents a summary of the publications we identified and analysed.

The results that are described in this article address the following two research questions:

- 1) What is the current focus of Enterprise Architecture research and how did it change over time?
The first question considers subtopics that are related to EA since it was introduced in the 1980s. We apply a semi-supervised approach in which we use classification schemes and related search queries that have been selected according to earlier reviewers to obtain a holistic view and to evaluate how the focus of EA research has changed over time.
- 2) What are the current and future Enterprise Architecture research trends?

Question two focusses on today's EA research trends. We identify current trends that appear to be having a major impact on the discipline of EA. We analyse how they have developed in recent years and predict how they will evolve in the future. In addition, we identify similarities and differences between findings from our analysis and the Gartner hype cycle for enterprise architecture.

The remainder of this article is structured as follows: In Section 2, we present the background of our research. In particular, we describe EA as a discipline and present the foundations of the text mining technologies that we implement for subsequent analysis. Section 3 describes the methodology and process that we apply to conduct our literature review. Sections 4 and 5 address the aforementioned questions and present our findings. Finally, the conclusions of our findings and proposal for further research are presented in Section 6.

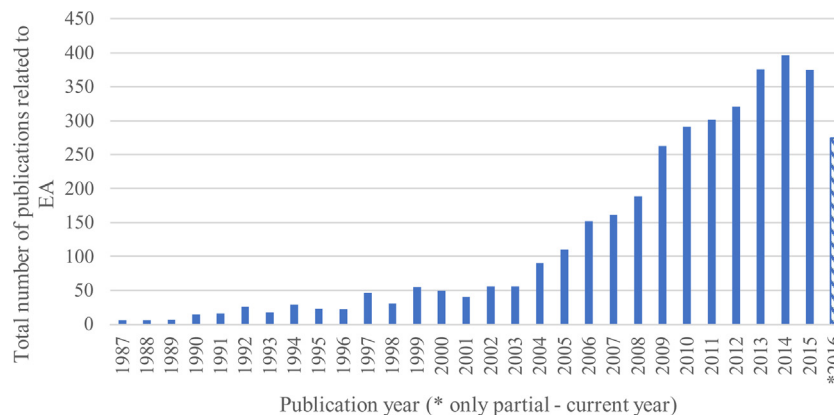


Fig. 1. Overview of publications related to Enterprise Architecture by publication year.

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