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# From Enterprise Architecture Management to Organizational Agility: The Mediating Role of IT Capabilities

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# From Enterprise Architecture Management to Organizational Agility: The Mediating Role of IT Capabilities

MAURICE PATTIJ, ROGIER VAN DE WETERING & ROB J. KUSTERS

**Abstract** Enterprise architecture (EA) has claimed to provide several benefits for organizations including improving organizational agility. Becoming more agile is an essential capability for organizations and a necessity to respond to the rapidly changing environment. The way these EA benefits are established is seen as complex and involves interconnections of multiple organizational facets. However, currently, there is a lack of empirical studies on EA and how it contributes to benefit realization. Moreover, empirically validated work on EA processes is even more scarce. This research addresses this gap and investigates the effect of an EA management approach on organizational agility. A conceptual model was developed proposing a mediation effect of IT capabilities on the relationship between enterprise architecture management and agility. A survey was performed among key EA stakeholders. Based on a sample of 110 responses, a partial least squares structural equation modeling analysis was performed to test the mediation model. The results indicate that the effect of enterprise architecture management on organizational agility is indeed mediated by IT capabilities. Finally, the present study discusses the implications of this research and provides suggestions for future research.

**Keywords:** • Enterprise Architecture • Enterprise Architecture Management • IT Capabilities • Organizational Agility • Mediating Role •

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# 1 Introduction

The environment in which organizations operate is becoming more complex and volatile. Organizations themselves are complex socio-technical systems. As such, interdependent people and information technology (IT) resources are required to interact with each other and with their environment to meet a common goal. At present, with the rapid technological and environmental changes, it is crucial to be proactive and agile in identifying and responding to threats and opportunities (Hoogervorst, 2004; Lu & Ramamurthy, 2011).

Enterprise architecture (EA) is a practice and an emerging field intended to improve the management of complex enterprises and their information systems. Extant literature argues that EA enhances an organization's IT capabilities and is regarded as an essential factor in improving organizational agility (Hoogervorst, 2004; Lapalme et al., 2016; Schmidt & Buxmann, 2011). Enterprise architecture management (EAM) aims to achieve optimal utilization of EA artifacts and concerns "the establishment and continuous development of EA" (Aier et al., 2011, p. 645). Although EA and EAM are widely accepted in the practical corporate context, scholars acknowledge the current lack of empirically validated research on EA and the way it contributes to the benefits for organizations (Foorthuis et al., 2016; Lapalme et al., 2016; Niemi & Pekkola, 2016; Van de Wetering, 2019). Research on EAM is even more scarce and seldom suggested as a source of benefits (Niemi & Pekkola, 2016). A possible explanation is that EA originated as a practice in an attempt to anticipated on the extension of scope and complexity of IT/IS systems (Zachman, 1987). Hence, the development of the EA field is mainly driven by input from domain experts within the practical context. Only recently, the number of academic publications related to EA is starting to increase (Gampfer et al., 2018; Lapalme et al., 2016). Nowadays, firms make significant investments to implement EA methodologies (e.g., TOGAF) to manage their IT/IS complexity within an organization (Tamm et al., 2011). Further theory development is required to get a better understanding of the mechanism behind EA benefit realization, so firms can take full advantage of EA and justify their EAM investments (Lange et al., 2016).

The goal of this research is to address this current gap and investigate the effect of EAM on the agility of an organization. Additionally, the role of IT capabilities in benefits realization is investigated. This research aims to answer the following research question:

> *How (i.e., through which path) can enterprise architecture management affect the agility of an organization?*

## 2 Theory and model development

In this section, we will review the core notions of EA and organizational agility and, subsequently, develop our model and the associated hypotheses that we test using empirical data. Figure 1 shows the conceptual research model and the conceptualization of the EAM, IT capabilities and organizational agility.

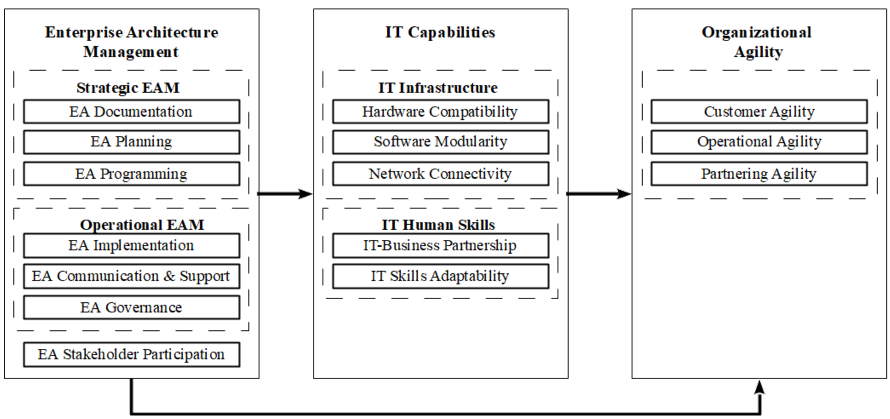


**Figure 1: Conceptual research model**

### 2.1 Enterprise architecture and organizational agility

EA provides a blueprint of the 'as-is' situation and supports its transformation to a 'to-be' situation by bridging the gap between IT and business. EAM includes a task to manage the continuous development and implementation tasks of EA and involves the planning of the migration to a future state (Aier et al., 2011). EAM activities cover both strategic- and operational issues. Strategic EAM is concerned with planning the transition from an as-is state to a to-be and providing the blueprint and rules and standards to achieve this. Operational EAM supports the implementation of EA and addresses compliance to rules and standards. Stakeholder participation is a continues activity to make sure that the requirements of the individual stakeholders are met on both a strategical- and operational level (Schmidt & Buxmann, 2011).

Organizational agility is the one of the main goals of EA (Hoogervorst, 2004) and is described as the "firm's ability to cope with rapid, relentless, and uncertain changes and thrive in a competitive environment of continually and unpredictably changing opportunities" (Lu & Ramamurthy, 2011, p. 932). Previous empirical research found a positive effect of EA on organizational agility. Evidence was found that architectural insight and EA-induced capabilities improve agility as a constituent of organizational performance (Foorthuis et al., 2016). Other researchers concluded that EA assimilation mediates a positive effect from EA strategic orientation on organizational agility (Hazen et al., 2017).

## 2.2 Enterprise architecture management and IT capabilities

The IT infrastructural capabilities often refer to the flexibility of the IT infrastructure and consists of measures to assess hardware compatibility, software modularity, and network connectivity (Schmidt & Buxmann, 2011). Architectural principles prescribe the requirements, design, and implementation of the IT in such a way that it supports the transformation to the desired state and potentially influences the ability to allocate and manage IT infrastructural resource, thus the flexibility of the IT infrastructure (Schmidt & Buxmann, 2011). However, EA itself is merely a set of artifacts that do not add value to an organization without a practice to utilize the benefits of EA (Foorthuis et al., 2016). EAM processes guide the transformation of an organization by managing the use and development of EA (Aier et al., 2011).

We now argue that EA contributes to IT human resource capabilities in two ways. First, standardization leads to a reduction of technologies. This reduction can lead to more effective and efficient allocation and utilization of human resources as a result of, e.g., reduced skill variation, simplified troubleshooting and focus on core competencies in resourcing (Tamm et al., 2011). Second, EAM helps to align stakeholders improving the overall acceptance of EA and supports stakeholders to plan and implement EA conformant projects and potentially guides CIOs and IT managers in the allocation and skills development of IT human resources (Iyamu & Mphahlele, 2014; Schmidt & Buxmann, 2011). Hence, we define the following:

> ***H1:*** *Enterprise architecture management has a positive effect on IT capabilities.*

### 2.3 IT capabilities as a mediator

Achieving organizational benefits from EA is not straightforward but highly complex and involves an interconnection between various organizational facets (Shanks et al., 2018; Van de Wetering & Bos, 2016). Although extant literature does not provide a unified theoretical foundation on EA benefit realization, previous researchers reach consensus on the distinction between benefits that are a direct result of EA processes (i.e., first level benefits) and higher-level benefits that are intermediated by first level benefits. First level EA benefit realization often targets to improve the ability to manage the complexity of the organization's IT infrastructure and business processes, to implement and establish EA in the organization and to have an insight in the complexity of the (IT/IS) organization for both business and IT stakeholders. (Foorthuis et al., 2016; Hazen et al., 2017; Niemi & Pekkola, 2016; Schmidt & Buxmann, 2011). This research aims to capture these aspects and proposes IT capabilities as a first level benefit of the EAM approach.

IT capabilities can be defined as "the ability to mobilize and deploy IT-based resources in combination with other organizational resources and capabilities (Chen et al., 2014, p. 327)". The resource-based view claims that specific combinations of firms' internal resources that are valuable, scarce and not easy to copy by others, lead to competitive advantages (Barney, 1991). IT capabilities demonstrating these properties are mentioned as an essential source to perform better than competitors (Chen et al., 2014).

A flexible IT infrastructure improves the ability to respond to changes by influencing an organization's ability to use IT or adjust the existing IT infrastructure to support business goals (Mikalef et al., 2016; Tallon, 2008; Tallon & Pinsonneault, 2011). Respond to changes in customer demands (i.e., customer agility) is improved by, e.g., the scale required resources like servers, storage, memory, CPUs or network bandwidth. Software modularity reduces software development time and simplifies combining and reconfiguring components to create new business processes. This modularity boosts process agility by decreasing response times to product launches of competitors, market expansion, product mix changes and the adoption of IT innovation (Tallon & Pinsonneault, 2011; Tallon et al., 2018). The adaptiveness of supplier networks (i.e., partnering agility) is improved if the IT infrastructure is simple to reconfigured to comply to the IT and standards of existing and new suppliers (Rai & Tang, 2010). Additionally, IT capabilities drive the synergetic effect of IT and organizational capabilities and enables innovation capabilities by, e.g., providing standardized and easily accessible real-time data that are important to provide accurate management information to decision makers (Chen et al., 2014; Mao et al., 2015; Van de Wetering et al., 2017). Organizations also use the insight and expertise of human resources to develop capabilities to increase the ability to move in different directions. From the perspective of IT skills, well-trained personnel is suggested to be easier to relocate within the organization (Tallon, 2008). Hence, we hypothesize that EAM contributes to organizational agility through a mediating effect of IT capabilities.

> ***H2:*** *IT capabilities mediates the positive effect of enterprise architecture management on organizational agility.*

# 3 Methodology

## 3.1 Data collection

A survey was developed to measure the constructs in the research model. Targeted respondents were expected to provide an insight into the coordination of an architecting effort and judgment on the EA practice, the IT and the agility of their organization. Previous research (Foorthuis et al., 2016) included the following professional positions: CIOs, enterprise architects, technical architects, IT analysts, IT/project managers, and business stakeholders. Our research targeted professionals working in similar positions.

**Table 1: Sample characteristics**

| | | Frequency | Percentage |
|---|---|---|---|
| *Industry* | Accountancy, banking and finance | 23 | 20.9% |
| | Information technology | 18 | 16.4% |
| | Energy and utilities | 13 | 11.8% |
| | Healthcare | 12 | 10.9% |
| | Transport and logistics | 12 | 10.9% |
| | Others | 32 | 29.1% |
| *Position* | IT Architect | 41 | 37.3% |
| | Business Architect | 11 | 10.0% |
| | IT Manager | 17 | 15.5% |
| | Business / Management Consultant | 24 | 21.8% |
| | IT / Software Consultant | 15 | 13.6% |
| | Business Manager | 2 | 1.8% |
| *Size* | Less than 100 employees | 13 | 11.8% |
| | Between 100 and 1000 employees | 22 | 20.0% |
| | More than 1000 employees | 75 | 68.2% |

Since no sampling frame for the targeted population (i.e., organizations that implemented the EA practice) was available, a quota sampling approach was used to improve generalizability. Industrial categories were derived from previous research (Aier et al., 2011; Foorthuis et al., 2016). In total, 481 professionals working for firms located in Belgium, the Netherlands and Luxemburg (Benelux), were personally invited online (e.g., e-mail or LinkedIn) to complete the online survey, leading to a total of 110 useful and complete responses and a response rate of 23%. Table 1 shows the sample characteristics for this research. During data collection, we kept track of which respondent from which organization completed the survey to ensure every organization completed the survey only once and assured them that the data collected would remain anonymous and only used for research purposes at an aggregate level. We performed Harman's single factor test using IBM SPSS Statistics□ v25 to control for common method bias (CMB). All relevant construct variables were loaded onto a single construct in an Exploratory Factor Analysis (EFA). The analysis showed that no single factor attributes to the majority of the variance, thus confirming our sample is not affected by CMB (Podsakoff et al., 2003).

### 3.2 Constructs and items

For all our measures, we use past empirical and validated work to increase the internal validity of the questions. The developed survey was, then, pre-tested and assessed by two practitioners and a panel of two academic experts to ensure face and content validity. We evaluated all survey items on a 7-point Likert scale.

#### Enterprise architecture management

Schmidt & Buxmann (2011) developed EAM as a type II second-order construct (first-order reflective and second-order formative). This second-order construct consists of 7 constructs:

- *EA documentation:* the process of capturing and describing the existing EA using architectural descriptions.
- *EA planning:* a goal-oriented process of developing descriptions of the target architecture based on global and long-term requirements.
- *EA programming:* the process of setting architecture rules and standards to be obeyed by change projects.
- *EA implementation:* the initiation and/or execution of system changes through the EAM function itself.
- *EA Communication & Support:* the extent of communication and support efforts undertaken by the EAM function.
- *EA Governance:* the degree to which EA-related decisions and guidelines bind to the organization and may be enacted based on formal processes.
- *EA Stakeholder Participation:* the extent to which stakeholders are involved in EAM decision making (Schmidt & Buxmann, 2011).

**Table 2: Items and descriptive statistics of EAM**

| | Item | Loading | Mean | SD |
|---|---|---|---|---|
| | *EA Documentation* | | | |
| DOC1 | Descriptions reveal the major dependencies | .751 | 4.83 | 1.560 |
| DOC2 | Descriptions are based on a common meta-model | .855 | 4.27 | 1.758 |
| DOC3 | Descriptions are stored in a repository tool | .872 | 4.06 | 1.998 |
| DOC4 | EA documentation is updated continuously | .848 | 4.09 | 1.740 |
| | *EA Planning* | | | |
| PLN1 | EA planning covers all relevant architectural domains | .860 | 4.78 | 1.692 |
| PLN2 | EA planning covers all segment of the IT landscape | .846 | 5.01 | 1.745 |
| PLN3 | EA planning covers systems engineering concepts | .860 | 4.92 | 1.602 |
| PLN4 | EA plans are frequently updated to remain up-to-date | .832 | 4.39 | 1.607 |
| | *EA Programming* | | | |
| PRG1 | Architecture principles are used in development | .847 | 5.00 | 1.629 |
| PRG2 | Standard catalogs restrict the usage of IT technologies | .779 | 4.62 | 1.624 |
| PRG3 | Reference architectures standardizes the design IS | .875 | 4.69 | 1.622 |
| PRG4 | Defined data is shared across business units | .790 | 4.46 | 1.682 |
| | *EA Implementation* | | | |
| IMP1 | Non-business-driven projects accelerate EA change | .759 | 4.47 | 1.661 |
| IMP2 | Common integration infrastructures are implemented | .858 | 4.99 | 1.665 |
| IMP3 | Shared technology services are created and operated | .861 | 5.32 | 1.433 |
| IMP4 | Reusable application services are implemented | .842 | 4.89 | 1.569 |
| | *EA Communication &Support* | | | |
| COS1 | EA plans are communicated to stakeholder groups | .865 | 4.61 | 1.668 |
| COS2 | EA documentation is easily accessible by stakeholders | .851 | 4.25 | 1.734 |
| COS3 | Stakeholders are provided with EA consulting services | .883 | 4.22 | 1.620 |
| COS4 | Architects work within projects | .820 | 4.85 | 1.798 |
| | *EA Governance* | | | |
| GOV1 | Conformance to EA plans is constantly assessed | .853 | 4.17 | 1.560 |
| GOV2 | Well-define review and approval processes are in place | .902 | 4.14 | 1.750 |
| GOV3 | Internal directives require the compliance EA | .870 | 4.32 | 1.737 |
| GOV4 | Violations of architecture are tracked and sanctioned | .870 | 3.23 | 1.571 |
| | *EA Stakeholder Participation* | | | |
| PAR1 | EA plans are approved by governance committee | .914 | 4.46 | 1.862 |
| PAR2 | Top-Management is actively involved in EA planning | .886 | 4.17 | 1.838 |
| PAR3 | Stakeholder participate in setting rules and standards Rules | .900 | 4.25 | 1.659 |
| PAR4 | and standards are set by governance committees | .923 | 3.99 | 1.750 |

## IT Capabilities

A second-order reflective-reflective construct captured the latent variable IT capabilities including capabilities concerning IT human skills and IT infrastructure capabilities. IT-business partnership items measured the extent to which IT executives are involved in business concerns. IT skills adaptability measured to what extent IT personnel can adopt and bring into practice different programming methodologies and IT infrastructural skills (Tallon, 2008). IT infrastructure capabilities focus on the flexibility of the IT infrastructure. The first-order constructs and measures were adopted from previous research (Byrd & Turner, 2000; Tallon, 2008). These are presented in the Table 3.

**Table 3: Items and descriptive statistics of IT Capabilities**

| | Item | Loading | Mean | SD |
|---|---|---|---|---|
| | *Hardware Compatibility* | | | |
| HAR1 | Transport and use of IT/IS across multiple platforms | .751 | 3.74 | 1.611 |
| HAR2 | Transparent access to all platforms and applications | .846 | 4.12 | 1.559 |
| HAR3 | Multiple interfaces or entry points for external users | .884 | 4.76 | 1.595 |
| HAR4 | Extensive use of middleware to integrate key systems | .647 | 4.79 | 1.794 |
| | *Software Modularity* | | | |
| SOF1 | Usage of reusable software modules | .844 | 3.98 | 1.618 |
| SOF2 | Impact of legacy systems on new IT development | .792 | 3.55 | 1.735 |
| SOF3 | Adjustability of critical applications based | .880 | 4.05 | 1.580 |
| SOF4 | Ability to handle variations in data formats | .867 | 4.35 | 1.575 |
| | *Network Connectivity* | | | |
| NET1 | Degree of system inter-connectivity | .825 | 4.89 | 1.580 |
| NET2 | Flexibility to add electronic links to external parties | .848 | 4.65 | 1.632 |
| NET3 | Accessibility of centralized data by remote users | .833 | 4.69 | 1.628 |
| NET4 | Real time capturing and availability of data | .684 | 3.77 | 1.677 |
| | *IT-business partnership* | | | |
| IBP1 | Involvement IT executives in shaping business strategy | .805 | 4.78 | 1.563 |
| IBP2 | Promotion of IT among business executives | .869 | 5.19 | 1.385 |
| IBP3 | Help of IT executives to solve business problems | .777 | 4.88 | 1.432 |
| IBP4 | Usage of IT resources & skills in customer processes | .743 | 4.54 | 1.599 |
| | *IT skills adaptability* | | | |
| ISA1 | Encouragement to improve technical skills | .837 | 5.18 | 1.556 |
| ISA2 | Ability to develop IT solutions to business problems | .891 | 4.66 | 1.448 |
| ISA3 | Adaption to multi-tasking | .715 | 4.70 | 1.359 |
| ISA4 | Training in variety of programming methods and tools | .863 | 4.39 | 1.635 |

### Organizational agility

We constructed organizational agility as a first-order construct measured by eight statements on the customer agility, operational agility, and partnering agility of an organization (Tallon & Pinsonneault, 2011) as shown in Table 4. Customer agility is the capability to gather market intelligence by co-opting customers. Operational agility refers to the ability to efficiently and effectively redesign business processes to exploit opportunities in a competitive environment. Partnering agility is the ability to rapidly respond to opportunities by forming alliances and partnerships with suppliers (Sambamurthy et al., 2003; Tallon & Pinsonneault, 2011).

**Table 4: Items and descriptive statistics of Organizational Agility**

| | Item | Loading | Mean | SD |
|---|---|---|---|---|
| ORA1 | Respond to changes in aggregate consumer demand | .832 | 4.14 | 1.587 |
| ORA2 | Customize a product for an individual customer | .745 | 4.04 | 1.684 |
| ORA3 | React to new product launches by competitors | .899 | 3.83 | 1.525 |
| ORA4 | Response to changes in competitors' prices | .793 | 4.34 | 1.680 |
| ORA5 | Expand into new regional or international markets | .766 | 3.82 | 1.759 |
| ORA6 | Change the variety of products available for sale | .839 | 3.89 | 1.648 |
| ORA7 | Adopt new technologies to improve production | .831 | 3.92 | 1.496 |
| ORA8 | Switch suppliers to improve costs, quality or delivery times | .748 | 3.70 | 1.643 |

Firm size was included as a control variable and was measured as the overall number of full-time employees (FTE) in the organization. FTE is a potential influencer of organizational agility (Lu & Ramamurthy, 2011). Categorical variable (i.e., dummy variables) were included as a formative latent variable (Henseler et al., 2016). Firms counting less than 100 employees were defined as small firms, between 100 employees and 1000 employees as medium-sized, and 1000 employees or more as large (Chen et al., 2014).

## 4 Analysis

This study uses partial least squares structural equation modeling (PLS-SEM) to assess our research model. PLS-SEM is a mature variance-based regression approach undergoing severe methodological and theoretical examinations (Henseler et al., 2016). We estimate our model's parameters using SmartPLS version 3.2.7. (Ringle et al., 2015) and used 5000 replications within the bootstrapping procedure to obtain stable results. As for sample size requirements, the included data exceeds all minimum requirements.

## 4.1 Analysis of the measurement model

Construct reliability was assessed on an item level and a first-order factor level. For the former, all Cronbach α values were greater than the 0.7 threshold (Henseler et al., 2016). Table 5 shows that both the α and composite reliability (CR) values exceed 0.7 for first-order factors. Convergent validity assessment showed average variance extracted (AVE) values greater than 0.5 for all constructs. The square roots of the constructs' AVE were higher than the inter-construct correlations, proofing discriminant validity (Fornell & Larcker, 1981).

**Table 5: Reliability, convergent, and discriminant validity of first-order factors**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *EA Management* | | | | | | | | | | | | | |
| 1. Planning | **.85** | | | | | | | | | | | | |
| 2. Communication & Support | .70 | **.86** | | | | | | | | | | | |
| 3. Documentation | .67 | .76 | **.83** | | | | | | | | | | |
| 4. Governance | .61 | .80 | .70 | **.87** | | | | | | | | | |
| 5. Implementation | .58 | .69 | .66 | .70 | **.83** | | | | | | | | |
| 6. Stakeholder Participation | .58 | .78 | .66 | .79 | .65 | **.91** | | | | | | | |
| 7. Programming | .69 | .78 | .75 | .78 | .78 | .70 | **.82** | | | | | | |
| *IT Capabilities* | | | | | | | | | | | | | |
| 8. Hardware Compatibility | .32 | .47 | .39 | .53 | .57 | .38 | .46 | **.79** | | | | | |
| 9. Software Modularity | .35 | .51 | .43 | .46 | .57 | .39 | .47 | .76 | **.85** | | | | |
| 10. Network Connectivity | .36 | .48 | .42 | .45 | .57 | .36 | .48 | .70 | .76 | **.80** | | | |
| 11. IT Business Partnership | .39 | .49 | .37 | .51 | .56 | .55 | .49 | .46 | .55 | .52 | **.80** | | |
| 12. Skills Adaptability | .38 | .44 | .41 | .50 | .52 | .46 | .43 | .69 | .73 | .63 | .65 | **.83** | |
| *Dependent Variable* | | | | | | | | | | | | | |
| 13. Organizational Agility | .32 | .38 | .33 | .37 | .33 | .28 | .32 | .55 | .68 | .52 | .49 | .62 | **.81** |
| AVE | .72 | .73 | .69 | .76 | .69 | .82 | .68 | .62 | .72 | .64 | .64 | .69 | .65 |
| CR | .91 | .92 | .90 | .93 | .90 | .95 | .89 | .88 | .91 | .88 | .88 | .90 | .94 |
| Cronbach α | .87 | .88 | .85 | .90 | .85 | .93 | .84 | .79 | .87 | .81 | .81 | .85 | .92 |
| VIF | 2.3 | 4.6 | 2.9 | 4.0 | 2.8 | 3.3 | 4.3 | - | - | - | - | - | - |

The variance inflation factors (VIF) for the formative first-order constructs were less than 5 as indicated in Table 5, thus multicollinear is not an issue (Hair et al., 2012). These measurement model outcomes support the appropriateness of the first-order reflective measures and suggest that all the included measures are good indicators for their respective latent constructs.

## 4.2 Analysis of the structural model

We estimated and validated the structural model and the relationship among its constructs to analyze our model's hypotheses. Our analyses of the structural model are summarized in Figure 3, where the explained variance of endogenous variables ($R^2$) and the standardized path coefficients ($\beta$) are depicted. We evaluated the structural model by assessing the coefficients of determination ($R^2$) values, Stone-Geisser's predictive relevance ($Q^2$), Cohen's effect size ($f^2$) and path coefficients (Henseler et al., 2016). Mediation was assessed in two ways. First, the Kenny approach (Baron & Kenny, 1986) was applied. Second, we analyzed mediation in PLS-SEM using Zhao et al.'s (2010) approach. Figure 2 indicates that the overall direct effect of EAM on organizational agility is both positive and significant ($\beta = .467$, $\varrho \leq 0.001$), fulfilling the first condition of Kenny approach. Evaluating the Cohen's effect size shows a moderate effect ($f^2 = .245$) of EAM on organizational agility in the direct model.

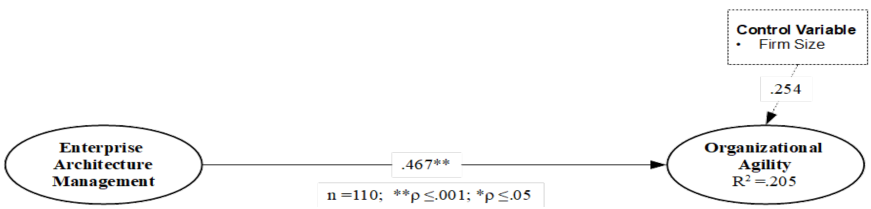


**Figure 2: Direct model**

The mediation model presented in Figure 3 confirms a positive, significant and strong effect ($\beta = .623$, $\varrho \leq 0.001$, $f^2 = .633$) of EAM on IT capabilities with an explained variance of 38.8% ($R^2 = .388$). Hence, H1 is accepted. Cohen's effect size reveals that IT capabilities have a strong effect ($f^2 = .555$) on organizational agility. This effect is both positive and significant ($\beta = .689$, $\varrho \leq 0.001$). The direct effect of EAM on organizational agility is minimal and insignificant ($\beta = .012$, $\varrho$

= .903, $f^2 < .001$). The model estimates organizational agility with an explained variance of 48.7% ($R^2 = .487$). These results imply full mediation according to the Kenny approach.

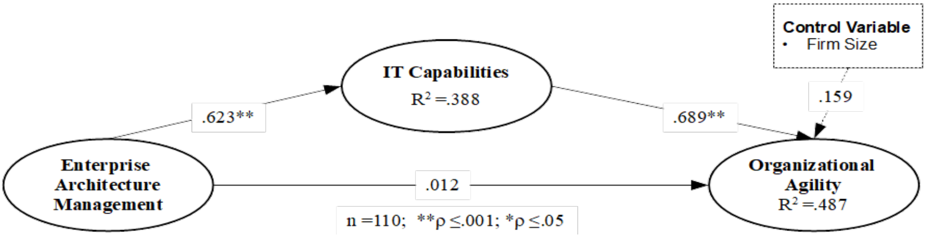


**Figure 3: Mediation model**

According to Zhao et al.'s (2010) approach we confirmed that the indirect effect of EAM on organizational agility is positive and significant ($\beta$ =.429, $\varrho \leq 0.001$). The direct effect was not significant, leading to the identification of a mediator "consistent with the hypothesized theoretical framework" (Zhao et al., 2010, p. 201). Hence, H2 is accepted. The control variable (i.e., firm size) doesn't have a significant effect ($\beta$ = .159, $\varrho$ = .083) on organizational agility.

Predictive relevance was evaluated by assessing Stone-Geisser's $Q^2$ value. We used a sample reuse technique called blindfolding to calculate $Q^2$ values for the latent variables (Hair et al., 2016). A $Q^2$ value greater than zero indicates predictive relevance for endogenous latent variables in a PLS path model. The procedure demonstrated predictive relevance for both IT capabilities ($Q^2$ = .167) and organizational agility ($Q^2$ = .278).

## 5 Discussion and conclusions

This research builds upon earlier work of Schmidt & Buxmann (2011) who developed the construct EAM approach. While their research found evidence that the EAM approach has a positive effect on IT infrastructural capabilities (i.e., IT flexibility), we focused on benefits realization on a broader conceptualized construct IT capability, including IT human capabilities. We extended previous EAM studies by looking further than first level benefits and included benefits on an organizational level, i.e., organizational agility. From a theoretical point of view, our results are relevant. We now show that EAM, mediated by IT capabilities does enhance business benefits, i.e., organizational agility. Thereby, we contribute to a much-needed empirical knowledge base on EA.

Our results are practically relevant. We show that business benefits are not a simple result of EA artifacts. Decision-makers can consider an EAM approach to enhance the organization's IT-business partnerships, IT skills adaptability and flexibility of the IT infrastructure. The EAM approach should cover the various strategic and operational tasks. Furthermore, stakeholders from both the business and IT departments must be involved as their engagement is essential for successful EA utilization and EAM acceptance. Stakeholders should also actively participate in setting architecture rules and standards (Schmidt & Buxmann, 2011). It is important to emphasize that implementing existing EA methodologies like TOGAF, is not a guarantee for successful EA benefit realization. Empirical research on the usefulness of such methods is lacking (Lapalme et al., 2016). Moreover, recent literature questions the practical use of TOGAF (Kotusev, 2018). Hence, investigating the practical use of EA methodologies and draw parallels with the theoretical foundation of EA and EAM is a valuable avenue for future research (Van de Wetering, 2019).

We also discuss some study limitations. First, a quota sampling approach was used to improve the representativeness of the dataset in non-probability sampling. Although this improves the external validity, future research should focus on identifying the population and develop a sample frame to support probability sampling.

Second, the survey was limited to the Benelux area. Extending the geographical area to collect data, might contribute to the generalizability of the findings.

Third, the survey was filled in by a single person. Several forms of self-reported bias can occur when a single source completes the survey items for all constructs (Podsakoff et al., 2003). A matched-pair survey, where the survey items for a single survey are distributed among different respondents (e.g., IT and business executives) with specific domain knowledge, is suggested in prior related research (Mao et al., 2015).

Finally, we did not analyze the combinations of causal conditions that lead to organizational benefits. To get a better understanding of the complex nature of EA benefit realization, researchers could employ set-theoretic methods like fuzzy set qualitative comparative analysis. This approach provides valuable insights into different configurations of EA-related attributes that lead to benefits like organizational agility and innovation (Fiss, 2007). Future work could also include external factors; e.g., environmental turbulence, as they can have a substantial impact on organizational capabilities including organizational agility (Chen et al., 2014; Tallon & Pinsonneault, 2011).

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