The Organizational Impact of Enterprise Architecture: A Research Framework

J. Alberto Espinosa
Kogod School of Business
American University
alberto@american.edu

Wai Fong Boh
Nanyang Business School
Nanyang Technological University
awfboh@ntu.edu.sg

William DeLone
Kogod School of Business
American University
wdelone@american.edu

Abstract

Many organizations have adopted an Enterprise Architecture (EA) approach because of the potential benefits resulting from a more standardized and coordinated approach to systems development and management, and because of the tighter alignment of business and information technology in support of business strategy execution. At the same time, experience shows that having an effective EA practice is easier said than done and the coordination and implementation efforts can be daunting. While nobody disputes the potential benefits of well architected systems, there is no empirical evidence showing whether the organizational benefits of EA outweigh the coordination and management costs associated with the architecting process. Furthermore, most practitioners we have interviewed can provide technical metrics for internal EA efficiency and effectiveness, but none of our participants were able to provide concrete metrics or evidence about the bottom line impact that EA has on the organization as a whole. In this article we raise key issues associated with the evaluation of the organizational impact of EA and propose a framework for empirical research in this area.

1. Introduction

EA is "the explicit description and documentation of the current and desired relationships among business and management processes and information technology" [18]. EA provides a general "blueprint for creating enterprise-wide information systems" [3] that can help support an organization's strategy execution in a coordinated manner [26] by aligning business processes with the data and technologies that support them. While there are different EA frameworks, they typically incorporate four main layers: business, data, applications and technology infrastructure [2]. It is claimed that EA helps organizations cope with rapidly changing business and technological environments because systems can be developed with fewer redundancies amongst one another and better integration of data and applications [5]. However, organizational benefits of EA have yet to be empirically demonstrated. Part of the problem is that a clear linkage has not been drawn between the effective use of EA and the organizational benefits that result from it. There are no metrics, measures, methods or frameworks to evaluate the impact of EA on organizational success in the research literature. This is a significant gap because it hinders our ability to learn how and whether EA helps organizations, and it prevents EA practitioners from substantiating their claims to management. In this paper we take the first steps towards filling this gap, by raising several key issues and introducing a research framework to evaluate the organizational impact of EA.

In the remainder of this paper we propose a framework that can be used as a reference to build a structural model to evaluate the organizational impact of EA. The main objective of EA is to align data, applications and technology with business processes to support business operations, goals and strategy [26]. This objective serves as the foundation for our model. Our framework thus proposes that the link from effective EA usage to organizational success is through three progressive groups of benefits: (1) a necessary pre-condition for EA to yield organizational benefits is for EA to be done right and to yield internal technical efficiencies that will make systems implementations and management more agile and less costly, thus providing data management benefits, application benefits and technical infrastructure benefits; (2) another pre-condition for EA to yield organizational benefits is for the technical benefits we just discussed to translate into business process benefits; and finally (3) these business process benefits would eventually translate into organizational benefits. These benefits and their relationship to the typical EA layers are illustrated in Figure 1.

While an EA is not a system per se, but documentation about the various systems of the organization, our approach is somewhat consistent with traditional IS success models and the respective

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system performance categories they propose – i.e., system quality, information quality, service quality, system use, user satisfaction, individual impact and organizational impact [10, 11]. The structural framework we propose takes all of this into account and is illustrated in Figure 2. We now elaborate on the specifics of the framework.

2. Research motivation

Several months ago a number of influential IT managers, CIOs and academics gathered at a workshop sponsored by a research center of a private university in Northeastern United Sates to identify the most critical areas of IT that need research attention. EA was identified as the most important topic for this influential group of IT practitioners. As a result, we programmed a special workshop on EA in which there were 29 participants, including senior IT managers, system architects and CIOs (from the private sector, financial sector, government, and educational and international institutions). Workshop participants identified several key EA research areas that would have the most relevance for practice. The three main themes that emerged were: EA generation of business value; developing measures for EA outcomes; and shifting from silo based systems to an integrated enterprise IT organization. The first two areas of research can be studied empirically, but only if we have an appropriate framework and method to evaluate the business impact of EA.

Because of the strong interest that this workshop generated, a subsequent workshop was held about one year later in which 26 participants gathered for more specific roundtable discussions on these themes. Three roundtable groups were formed, one for each of the themes, and participants seated voluntarily in the roundtable of their choice to develop a priority research agenda for the center and key subtopics around these themes. A roughly equal number of members gathered at each roundtable.

The three subtopics were then discussed and analyzed at each roundtable and a summary analysis was then shared with all participants. A very long list of individual issues for further research emerged for each of the themes. These issues were then re-categorized into three overarching research themes, aimed at learning: (1) the best processes and practices leading to an effective EA; (2) the organizational outcomes of using EA; and (3) how to measure EA outcomes. Once again, these three themes are tightly associated to our ability to evaluate organizational EA outcomes empirically.

In a related study [13] we interviewed several CIO's, chief enterprise architects, technical architects, IT staff, business stakeholders and EA consultants to better understand how an architecting effort is coordinated (30 participants interviewed to date). We took advantage of this opportunity and included an additional two-part question in our interview instruments to elicit information about how

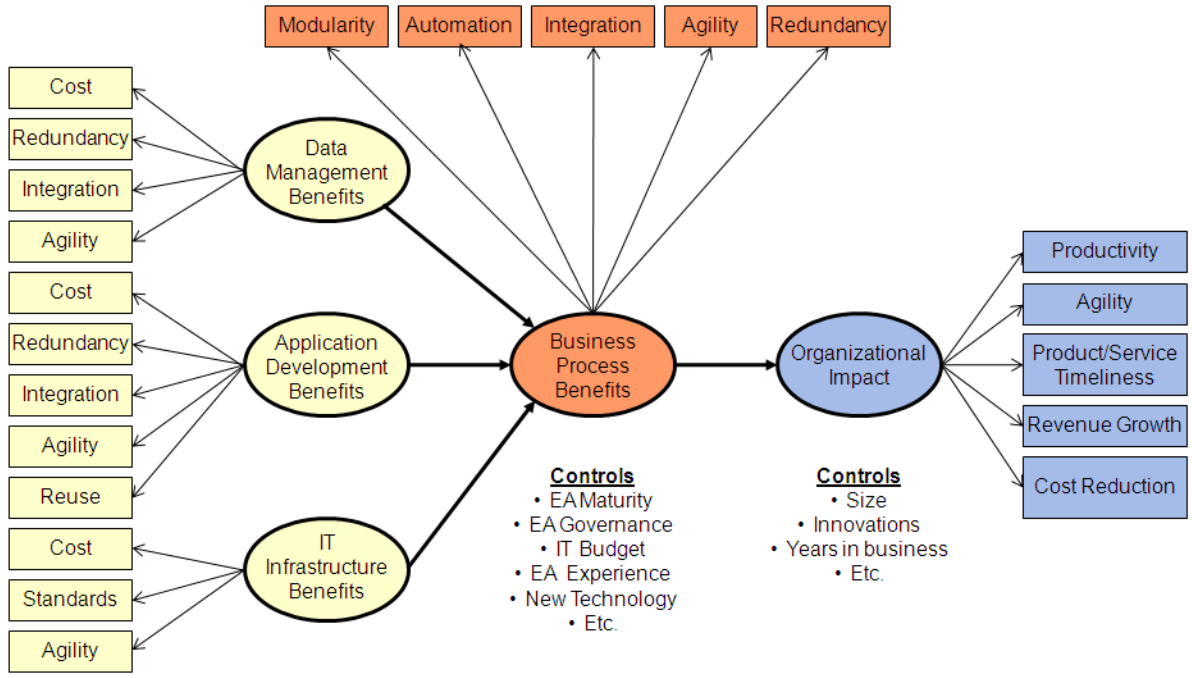

Figure 2

EA success is evaluated in practice ("Has the EA been successful in making IT implementations and change more efficient and effective in your organization?; How do you know if the EA has been successful"). We provide more specific quotes later on from responses to these questions but, without exception, nobody could provide concrete examples of organizational success attributable to the EA. Some participants suggested possible metrics and approaches, which we discuss below, but these were primarily internal – i.e., to evaluate if EA was yielding technical, not organizational benefits.

The lack of effective metrics to evaluate the organizational impact of EA as evidenced by responses to our prior interviews is what motivates this research. Our prior research [13] shows that commitment from the top and buy-in from key business stakeholders is critical to achieving high EA maturity levels and having successful EA programs. But getting such commitment from the top is very difficult when EA proponents cannot provide objective metrics demonstrating EA's organizational impact. Our research aims at filling this gap.

3. EA goals and frameworks

As we discussed above, the main reason to have an EA is to align what the business needs with the data, applications and technologies that support it. But the idea is also to do it in such a way that individual system implementations are more efficient by maximizing reuse and minimizing redundancies. Alignment with business can be evaluated by analyzing to what extent the technical aspects of the architecture meet the needs of the business aspects of the architecture. Internal efficiency can be evaluated by looking within each aspect of the EA and evaluating to what extent they minimize redundancies while fostering reuse, development speed, agility to adapt to change, etc. Various EA frameworks have been proposed by academics and practitioners to help architects implement their EA plans. We refer to these frameworks to begin to build our EA organizational impact framework.

Some of the most popular EA frameworks used by practitioners include the Federal EA Framework (FEAF), the Zachman Framework, and the Open Group Architecural Framework (TOGAF) [3]. While there are differences among these frameworks, most include at least four different views or model layers: business, data, applications, and technology (see Figure 1). The business layer describes the key business processes that support enterprise activities and organizational mission. The data layer describes the various data entities and relationships necessary to support the business processes. The application layer describes the functionality and structure of applications necessary to support the processes. Finally, the technology layer describes the standards and structure of the technology infrastructure – e.g., hardware, software, networking and communication platforms, which are necessary to support the applications and data management needs. These four layers in turn support the organizational goals and strategies.

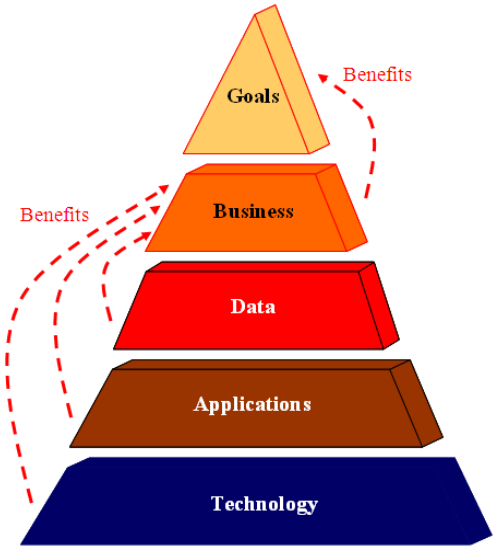

Figure 1: EA Layers

The framework we propose is grounded on this basic EA framework. That is, the data, application and technology layers support the business layer, and the business layer in turn supports business operations and strategy. Consequently, the technical benefits derived from EA in terms of data management, as well as the development and use of applications and technology infrastructure have to be present as a pre-condition for EA to have any impact in business. However, this is a necessary but insufficient condition. Because the goal of EA is to support business processes, the internal technical benefits must translate into improvements for the business processes, in terms of better adaptability, modularity, reusability, and reduced overlap and duplication (both, across business segments and within each process).

For example, if an organization with multiple business units has payroll processes in each of the units, the implementation of an EA would enable those processes to be standardized and reused across units, thus resulting in business process improvement benefits. Also, by consolidating various processes into repeatable ones, improvements are likely to be identified within each process. Finally, business process improvement is also a necessary but

insufficient condition in that these benefits need to translate into bottom line organizational benefits (e.g., reduced costs, improved profits, higher product or service quality, improved competitiveness, effective strategy execution, etc.). We now further elaborate on these concepts.

4. IS success frameworks

Prior research suggests that information systems project performance consists of two different dimensions: process performance and product performance [8, 20, 30]. Process performance has to do with how well the project process was conducted, assessed with metrics like on-time project completion, on-budget, team member satisfaction, etc [9, 20, 24]. Product performance refers to the outcomes and benefits derived from the final system – e.g., system quality, system functionality, system impact, user adoption, and user satisfaction with the system. The benefits we discuss later on in this paper are informed by these outcomes and measures.

In their seminal paper [10] and their follow up 10-year review [11], DeLone and McLean [11] suggested measures of system success, including: system quality, information quality, service quality, system use, user satisfaction, individual impact and organizational impact [10, 11]. The DeLone & McLean IS Success Model reports on the numerous measures that have been studied under each of these success dimensions. Organizational impact measures include such measures as improved organizational productivity, operating cost reductions, sales growth and increased profits. These measures can serve as a guide to identify potential EA organizational impacts for further study.

EA researchers have suggested that these models can be adapted to measure success in EA by focusing on processes, products, outcomes and impacts [21]. As we discussed early, EA is not a system per se, but the models and other artifacts that describe how processes, data, applications and technologies interrelate, and the methods and processes to help develop systems in a coordinated manner, rather than as stovepipes. Therefore, we only use these IS success models to inform our framework where applicable.

5. EA technical benefits

We now discuss the technical benefits of EA in terms of improved data, application and technology infrastructure implementation, use and management (see Table 1). It is important to note that we are not proposing that these are the only benefits; rather, we identify these as potential benefits suggested by EA proponents and practitioners [2].

Benefit Type	Benefits
Data Management Benefits	Redundancy Integration Cost Agility
Application Development Benefits	Redundancy Integration Reuse Cost Agility
IT Infrastructure Benefits	Standardization Cost Agility

Table 1: EA Technical Benefits

5.1. Data management benefits.

The data management benefits of an EA are focused on reducing the silos of common information that have organically emerged across the organization. Traditionally, individual applications have stored data in independent, unrelated databases. Data is highly redundant, in multiple formats. This leads to data duplication and inconsistency, resulting in difficulties in consolidating, comparing and sharing data across units, and inefficiencies in enforcing the security and integrity of the data [29]. It also becomes costly to develop new applications, as data models have to be repeatedly developed and the proliferation of the same data in different formats and databases leads to high maintenance costs.

An Enterprise Architecture attempts to address these challenges by describing, at an enterprise level, the common information used by an organization and the relationships among collections of data. The EA documents, across organizational and application boundaries, the major kinds and interrelationships of data and information needed by the organization. The EA also captures the corporate data model and data dictionary. This serves as a common conceptual scheme used regardless of data sources, ensuring that data have the same meaning across time, users and systems [15]. This cannot be achieved overnight, but with the use of EA, organizations would move from functional data models, to data warehouses, and then to an enterprise data view.

The development and use of an enterprise data architecture brings four benefits:

(1) *Reduced Data Redundancy:* One of the most immediate benefits is data management efficiencies – something that is appealing to both technical and business people alike. In one study

it was documented that EA delivered dramatic reductions in data redundancies and that these were so obvious to business stakeholders that they became advocates of the EA program [14]. As one interviewee commented: "we went around and asked the technical people, 'how much time are you spending moving data around, wasting time with bad data, etc?' … that's my most direct measure of the benefit that EA has to the area that I'm in."

(2) *Improved Integration:* With data having the same meaning and use across time and users, data can be more effectively integrated across business units and data sources. This generates meaningful comparisons and a more consolidated view of important business events, business partners (e.g. customers and suppliers), etc., thus providing better information to support decision makers [6].

(3) *Reduced Cost:* With the availability of a common data model, the cost of developing applications and new reports is lower as the data models are not repeatedly developed but are reused. Maintenance of data is also less costly due to a more streamlined data set with little data redundancies.

(4) *Greater Agility:* With a common data model and awareness of the structure and interrelationships of the most important data elements in the organization, organizations can make use of their information in a more flexible manner. This increases the agility of the organization in generating data and utilizing the data in novel ways. Changes can also be made more easily to data components – changing a data definition can take effect across multiple data sources; new data components and their interrelations with existing data components can be easily added.

5.2. Application benefits.

In previous decades, organizations were plagued with problems of standalone legacy systems that were not integrated with one another. Most information systems were islands of functionality and information. Applications were isolated, incompatible, and not very interoperable. Proprietary architectures were prevalent and the applications were not scalable [19]. The complexity of the application landscape had become overwhelming. While many organizations began to adopt enterprise resource planning (ERP) systems to solve the integration problems, organizations soon realized that ERP systems are not the complete solutions as organizations often do not adopt one single ERP system to replace all their applications.

Enterprise Architecture is not concerned with applications systems design. The goal is to define the current application landscape and then determine what kinds of application systems are relevant to the enterprise. This allows the organization to view the overall portfolio of applications, providing an enterprise application blueprint for mapping existing and proposed applications onto real-world business requirements, thereby supporting making strategic IT decision making [22].

We identify five application benefits that EA provides:

(1) *Reduced Application Redundancy:* An organization's enterprise application architecture maps out the functionalities and purposes of key application, thus allowing organizations to identify applications that may be accomplishing the same functionalities, and slowly phase out redundant applications. This facilitates strategic planning by streamlining the number of components that organizations have to manage and allow them to focus maintenance efforts on the most critical applications and plan for investments in the most strategic areas.

(2) *Improved Integration:* By mapping out the key enterprise applications and their interrelationships with one another, the key points of interface and connections between applications are identified, created or reinforced, thus resulting in improved integration across applications [16].

(3) *Increased Reuse:* An enterprise application architecture entails an inventory of the key applications, often decomposed into individual functional components, with specifications of their key functionality. This facilitates reuse in new application development requests, when they can identify existing components to either fulfill new requests, or when they can build upon existing components by adding new functionality that will satisfy the requirements of users.

(4) *Reduced Cost:* The ability to eliminate or at least reduce redundant applications decreases their overall maintenance costs and allows organizations to rationalize their investments into the most strategic domains. The costs of new application development are also reduced with the ability to reuse application components.

(5) *Greater Agility:* The better integration across applications and the ability to reuse application components, together with the reduced redundancy of applications, results in faster response time in application development and maintenance tasks, thus improving the agility of

organizations in terms of responding to requests for application development and change. As applications are modularized with more reusable patterns and components, system reliability also improves. As one chief architect we interviewed commented: "our mean time between failure … has doubled [with the EA] … we used to have systems fail and need maintenance every year. Now it's every two years. That's phenomenal right?"

5.3. Technology infrastructure benefits.

Infrastructure components refer to the information communication and technology and platforms that form the generic resource layer of IT applications. These include computers, networks, peripherals, operating systems, database management systems, user-interface frameworks, system services, middleware, etc. that are used as the platform for the construction of the system for the enterprise [2].

Vendor and product proliferation, incompatible systems and general uncertainty about how to evaluate technology choices contribute to a state of confusion in IT use within enterprises. An enterprise architecture attempts to provide a sense of structure and order into the constantly changing environment for organizations [25]. The enterprise architecture for technology infrastructure is, therefore, a mechanism for identifying and resolving conflicts and building consensus on technology directions and strategies.

Consequently, the technology infrastructure EA tends to focus on standardizing and coordinating the types of infrastructure components and services that can be used within an enterprise can help to ensure greater compatibility and connectivity within the enterprise [7]. Connectivity is the ability of a component of the IS infrastructure to link to any other components inside and outside the organizational environment [12]. Compatibility is the ability of the IS infrastructure to share any type of information across any technology components (Duncan 1995). Overall, a well architected technology infrastructure should result in fewer more standardized platforms, reduced costs from shared services and reduced number of components performing similar functions [26].

We identify three benefits for technological infrastructure management that EA provides:

(1) *Standardization:* A key EA goal is typically to introduce a standards-based approach to reduce technology complexity across the organization. This reduces the number of technology components to be managed, and ensures easier connectivity and compatibility across technological components.

(2) *Reduced Cost:* An EA helps to reduce technology costs by creating a less complex and more homogenous technical environment, which is easier to support and results in faster repairs. The EA standardization benefits include reducing the number of technology components and thereby reducing system maintenance and operation costs, and simplifying staff training. Since EA focuses on the organizational level, it provides technology benefits that include increased economies of scale in purchasing of technology, reduced enterprise training requirements, fewer support staff and simpler upgrades [27].

(3) *Greater Agility:* By standardizing the infrastructure components, the focus on similar infrastructure components over a period of time may lead to incremental improvements in skills and processes that improve the reliability of the components and the ability of the organization to better manage and utilize the infrastructure component. The improved ability to manage infrastructure components and the reduced complexity allows organizations greater agility in responding to business needs because IT services and new IT applications can be supported from a shared base of infrastructure components, and organizations do not have to spend the time evaluating IT infrastructure purchase decisions for each new project. The inventory of infrastructure components also facilitates project feasibility analysis.

6. Business process benefits

The technical benefits discussed above are important pre-conditions for the EA to deliver organizational benefits. That is, if EA does not deliver technical benefits and introduce efficiencies in the implementation and management of individual applications, systems and the technology infrastructure, then it would be hard to make a case that EA delivers organizational benefits. At the same time, they are insufficient unless they lead to tangible business process benefits. Research is beginning to show evidence that EA implementations driven by business needs are better coordinated and more effective than those driven by technical needs or improvements [13]. This is because the ultimate goal of EA is to support business processes. Therefore if business process benefits cannot be demonstrated EA expenditures cannot be justified.

Benefit Type	Benefits
Business Processes Benefits	Automation Integration Redundancy Modularity Agility

Table 2: EA Business Process Benefits

Knowledge of the business processes is a pre-requisite for architecture work in any of the other layers (Data, Applications, and Technology). A key goal of the business process EA layer is to bridge the gap between high-level business drivers, business strategy, and goals with the specific requirements associated with the more technical aspects of the architecture development effort.

The EA needs to define and describe core business processes, common data elements, cross-cutting applications, and standard system platforms. But the EA also needs to identify common system needs that span multiple business processes and facilitate enhanced communication between the business process stakeholders and technical staff to define requirements for individual system applications that will fulfill the needs of the business.

The EA should also ensure that technology implemented at the enterprise is aligned with business requirements. As part of the EA process, enterprise architects need to capture facts about the organization's goals, business functions, workflows for business rules and processes in an understandable manner to promote better planning and decision making [17]. The EA should help improve communication among the business organizations and IT organizations within the enterprise through a standardized vocabulary that enhances common ground in communication among the various people involved in the architecting process. The EA provides a common language that links technology with the organization's strategic objectives and core business processes and provides executive-level staff with a strategic, enterprise view of the IT portfolio.

We identified five business process benefits resulting from effective data, application and technological infrastructure management from EA:

(1) Increased Automation: With adequate technical support, business processes can be automated, eliminating the need for manual interventions. Data is also automatically captured by the system and subsequently used for reporting purposes.

(2) Increased Integration: With the mapping of business processes and workflow, business processes can be redesigned with a better alignment and integration of processes across business segments. A common data model and an integrated application architecture eliminates coordination difficulties across business processes, ensuring a smooth workflow [31].

(3) Reduced Redundancy: The streamlining of business processes and workflow will reduce redundancies in activities and inefficiencies in the business process.

(4) Increased Modularity: Adopting an EA approach enables organizations to modularize the design and management of business processes. Modularity is a very general set of principles for managing complexity. By breaking up a complex system into discrete pieces or modules that are functionally cohesive internally, but minimally dependent on other modules – which can then communicate with one another as needed – one can eliminate what would otherwise be an unmanageable spaghetti tangle of systemic interconnections [1].

(5) Greater Agility: The benefit of modularity is that it provides organizations with the ability to add, modify and remove business processes with little or no widespread effects (Byrd et al. 2001). The modular architecture is flexible because business processes can be reused and recombined in various ways to increase the agility and versatility of organizations (Sanchez et al. 1996). With the integration of business processes with the data, application and infrastructure layers of the EA, the reuse of business processes meant the ability to also readily reuse the supporting data models, applications and technical infrastructure. Today, businesses and organizations rely more on their underlying applications for "stay-in-business" support. IS must respond quickly to business change by translating increasingly complex business requirements into adaptive information systems.

In sum, having well architected data, application and technical EA layers that fosters less redundancy, better integration, lower cost, greater agility, enhanced ability to reuse components and more standardization will enhance the organization's ability to have business processes that are more automated, better integrated, less redundant, more modular and more agile. We now discuss other variables that may also affect these outcomes.

7. Control variables for business process benefits

Since there are factors other than the data, application and technology EA layer benefits that could yield business process improvement benefits,

any proposed framework intended to evaluate such benefits needs to incorporate these factors as control variables. For example, agility in business processes may be influenced by new technologies introduced or by more heavy investments in sophisticated IT.

The first factor is EA maturity. Ross et al. have observed that as organizations move along an EA maturity hierarchy from business silos, to standardized technology, to optimized core, to business modularity [26]. The higher the EA maturity of the organization the stronger the observable benefits from EA. While one may argue that EA maturity will translate into data, application and technology benefits, and therefore it doesn't need to be modeled as a control variable, we argue that the EA maturity level will also have a direct effect on business process benefits, as suggested by Ross and colleagues [26].

Another important factor influencing business process benefits is EA governance. Prior research has identified various structures and processes to effectively govern and manage the EA [4, 23]. These structures refer to key architecture roles and the structure of IT decision making. IT governance applies principles similar to those for financial governance to IT management [26]. A key aspect of EA governance is to define the roles that provide specific individuals with authority and responsibility for various EA tasks and projects [28], which are important for the effective management of EA activities ranging from technology purchases to application development project initiation. Even the best designed EA can be rendered useless when there is no compliance with the EA. EA governance therefore not only specifies roles and responsibilities, but also structures, processes, performance monitoring and EA compliance [23] and having criteria to grant exceptions when needed (e.g., legacy system modifications). As with EA maturity, a more effective EA governance will not only be associated with stronger data, applications and technology benefits, but also with business process benefits more directly.

Other factors that may influence the extent to which EA yields more or less business process benefits are: the IT function budget – i.e., an excellent EA with little funding to implement it will yield less benefits than an EA fully supported financially; the time and experience the organization has running the EA program – i.e., regardless of EA maturity level, the longer an organization has been using EA and the longer they have been at a given level, the more experience the organization will have to derive business process benefits from the EA; and new technologies aimed at improving business processes that are unrelated to the EA.

8. Organizational impact

Just about any traditional variable of organizational success and performance could be used to evaluate the organizational impact of EA, provided that adequate control variables that may influence organizational impact are taken into account. Our focus is on identifying organizational success factors that are more likely to benefit from improved business processes. While it is too early in this research to suggest specific organizational impact metrics, we provide some examples below for discussion purposes.

Research suggests that as organizations implement EA programs and mature along the EA hierarchy, they fundamentally change the way they do business, creating synergies among EA components and business processes, which yield business value [26]. Some of the organizational benefits argued derive from effective EA programs include things like better organizational coordination resulting from having a much clearer high level view of how the organization functions [13], which is likely to yield productivity gains due to the reduced number of steps needed for key business processes. There are a number of organizational productivity metrics that can be used, depending on the type of organization. For technology organizations that depend on innovation, reduced time-to-market would be one example of a useful metric to consider. For production companies (e.g., oil extraction, manufacturing), reduced production costs per unit would be an example of productivity metrics.

Another benefit is organizational agility resulting from business modularity, which provides the organization with the ability to adapt quickly as the conditions in the business environment change. One example of metric for organizational agility would be time-to-implementation of a strategic change. Enhanced competitiveness is another organizational benefit that may result from improved business processes, which may manifest in the form of higher productivity and greater agility when responding to changes in the market and the competitive environment.

Improved business processes will also lead to product and service quality improvements resulting from more effective and efficient use of information and more customer-oriented processes, which will manifest as revenue growth. Examples of quality metrics include traditional indicators like customer

satisfaction, reduced error and defect rates, and time to failure.

Similarly, product and service timeliness is likely to improve with streamlined business processes affecting product manufacturing and service delivery. These benefits can be easily measured with production times.

The clearer the articulation and enhanced understanding of the company's operating model, the better the process integration across business segments. An enhanced understanding of how IT supports integration across business segments can enable managers to identify leverage points for operating efficiencies, resulting in cost reductions and revenue growth (i.e., improved profits). In sum, organizational benefits include higher productivity, enhanced agility or ability to adapt to changing market conditions, improved product/service timeliness, revenue growth and cost reduction.

Benefit Type	Benefits
Organizational Impact	Increased productivity Better organizational agility Improved process timeliness Cost reduction Revenue growth

Table 3: EA Organizational Impact

9. Control variables for organizational impact

We use as control variables for organizational impact any factors unrelated to the EA that may influence organizational performance. Two obvious control variables to include are company size – measured by things like total revenue, total assets and number of employees – and the introduction of innovations. Organizations that invest heavily in research and development to innovate may experience strong organizational benefits that are not necessarily associated with the EA. Finally, the number of years in business may affect organizational success factors.

10. Concluding remarks

We have proposed a research framework to evaluate the organizational impact of EA, which is shown in Figure 2. This model is by no means final or complete, but we believe that it is an important first step towards filling the large gap in the research literature that can help academics and practitioners evaluate if the large amount of dollars that are being invested in EA are providing good returns. Our next steps in this research are to: (1) develop more specific metrics following the research literature on organizational impact and various IS success models; (2) conduct further interviews to refine these measures; and (3) conduct an empirical investigation to validate the framework, most likely using survey instruments.

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