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ENTERPRISE ARCHITECTURE VALUE MEASUREMENT AND
RELEVANT SUCCESS METRICS

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ABSTRACT

With Enterprise Architecture implementations ultimately being a business investment for these organizations, it is imperative for enterprise architects to effectively communicate the value of their program in order to ensure continued support. Although past research has established the need for proper value measurement, there has yet to be a proposal that encompasses internal EA program value, organizational value, and external value. The survey, that is the basis for this thesis, served to provide insight into the measurements currently used by various organizations in measuring the effectiveness of their Enterprise Architecture program from these three areas. Categories of metrics utilized by this survey include Financial, IT, Customer, Business/Strategy, EA Internal Program, Growth/Innovation, and Compliance/Regulatory categories. For each of these categories companies were asked to provide the relevant metrics used by their EA programs, the overall satisfaction with the reliability of the category, the success each category has had in achieving organizational goals, and finally the importance of each metric category to their respective EA program. In terms of the overall satisfaction with the reliability, success in achieving organizational goals, and the importance of each metric category, the results across each of the seven categories yielded similar results.

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Defining Enterprise Architecture

Since the publication of the Zachman Framework in 1987, the concept of Enterprise Architecture has received an increasing amount of attention from both the academic and the business world. Despite these constant attempts to understand, develop, and improve Enterprise Architecture, there has yet to be a single, accepted definition for the concept of Enterprise Architecture. In fact, there are a number of definitions publicized to this day. Anne Lapkin *et al* in their Gartner article define Enterprise Architecture as:

“Enterprise architecture is the process of translating business vision and strategy into effective enterprise change by creating, communicating and improving the key requirements, principles and models that describe the enterprise's future state and enable its evolution. The scope of the enterprise architecture includes the people, processes, information and technology of the enterprise, and their relationships to one another and to the external environment. Enterprise architects compose holistic solutions that address the business challenges of the enterprise and support the governance needed to implement them.” (Lapkin, 2008)

An important part of this definition is that Enterprise Architecture is seen more as a process instead of a noun. On the other hand, in an ACM article published in 2004, Carla Pereira *et al* stated the following definition for Enterprise Architecture: “Enterprise Architecture is a framework or “blueprint” for how the organization achieves the current and future business objectives” (Pereira, 2004). This definition views Enterprise Architecture from the perspective of a noun instead of a business process. A third way to describe Enterprise Architecture is as IBM does in their executive brief: “Plan, control, streamline-and innovate”. In this brief, IBM uses the term “approach” instead of “process” or “blueprint” to label Enterprise Architecture.

IBM describes this approach as being a discipline that can be used to turn a current business vision into a change. In IBM's approach, EA enables this change through communicating a desired future state effectively in order to facilitate a smooth evolution of the business. The advantage of IBM's EA approach is that it "allows you to visualize and represent all of your operative components as variables. So you can see how your company might be affected by changes" (IBM, 2009).

Finally, in Economic Benefits of Enterprise Architecture, Jaap Schekkerman sites the Enterprise Architecture definition used by the USA Federal CIO Council as the following:

"Enterprise Architecture is a strategic information asset base, which defines the business mission, the information necessary to perform the mission. The technologies necessary to perform the mission and the transitional processes for implementing new technologies in response to changing mission needs" (Schekkerman, 2005).

As it can be seen with these different definitions, defining the term "Enterprise Architecture" is a difficult task in itself. Despite these differences, the one commonality each definition has with one another is that Enterprise Architecture is a valuable asset to companies and organizations today.

The Need for Enterprise Architecture

Although agreeing upon a single definition of EA is difficult, the need for an EA program is much easier to agree upon. It is true that not all stakeholders are able to put a definition to the term Enterprise Architecture but the need for an EA implementation can be apparent for a number of reasons. In order to be successful and make proper decisions, organizations need to have access to accurate information and the ability to communicate these elements throughout the enterprise (Schekkerman, 2005). Enterprise Architecture is the mechanism that allows organizations to achieve this. By enabling high-quality and reliable information, Enterprise Architecture allows organizations to respond to business needs and change more efficiently. By the same notion, this communication allows for businesses to plan across its various divisions (most of the time between the IT division and business division) (Robertson, 2009) This allows for business stakeholders to understand the impact of complex IT projects on the business and what benefits will be realized. Also, Enterprise Architecture will allow for the standardization of terms for this collaboration between business and IT (Robertson, 2009). An example area in which EA is needed would be mergers and acquisitions. By using the standard language that EA brings to an organization, mergers and acquisitions would be able to assist in integrating the incoming IT and business systems with those of the host company (Cameron, 2011c). By implementing EA as an enabler for an organization, a number of benefits can be realized.

The Benefits of Enterprise Architecture

With Enterprise Architecture having roots in the IT field, the benefits an EA program brings to an organization may not always be apparent to business stakeholders today.

In the past, EA was mainly used to reduce costs and complexity of IT systems thus making them more manageable. Today, EA's

historic cost reduction has moved from an IT infrastructure level to the business process level of the EA "stack" (Fehskens, 2010).

The EA stack is the layers of a business that EA programs effect. According to Len Fehskens, the four layers of the EA stack, starting from the bottom, include Hardware and Software Infrastructure, Applications, Business Information, ending with Business Processes (Fehskens, 2010).

To compliment this cost reduction benefit, EA provides a number of other advantages to an organization as well. First and foremost, an EA implementation will enable an organization to be responsive to change. In other words, EA is a way

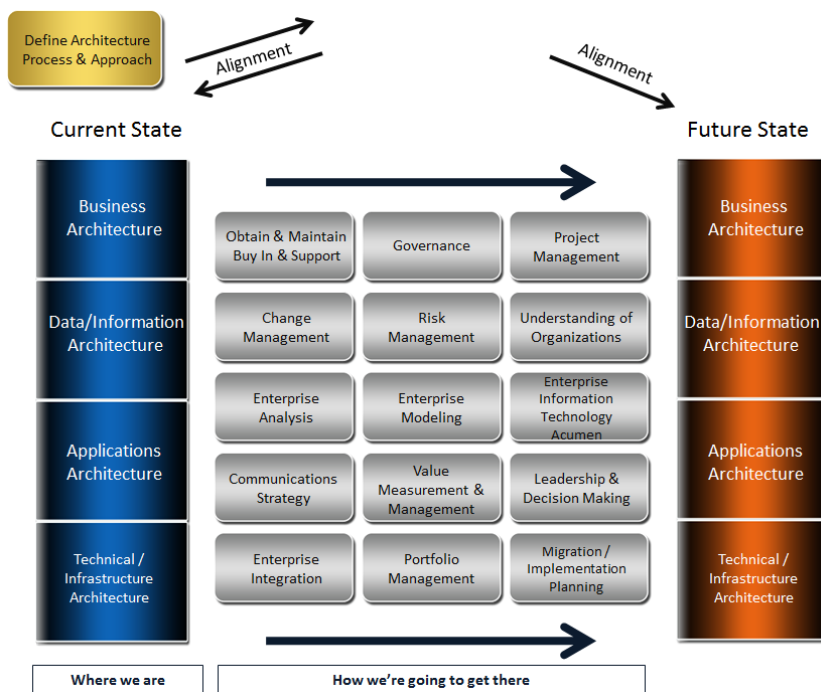


Figure 1: The Enterprise Architecture Stack (Cameron, 2011b)

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for an organization to become agile. Also, EA allows for the business unit and the IT department to operate together without conflicting with one another (Schekkerman, 2005). This is achieved through the standardization of terms and using a common language. Through this communication, an enterprise is able to align its business and IT goals and communicate their benefits to all stakeholders. This in turn allows for a comprehensive future state model that reflects an organization's overall business strategy and its IT enablers (Shekkerman, 2005). With a combination of communication and business agility, a company can reduce the risk of encountering unexpected problems and gain an edge on their competition through their responsiveness to the changing market. Ultimately, EA will influence and drive change for an organization (Cullen, 2005). Although the benefits of EA cannot always be quantified or receive credit for an improvement, the benefits of EA can be felt throughout every aspect of an organization.

The Fundamentals of Enterprise Architecture

In order to fully comprehend Enterprise Architecture, it is important that one understand the fundamental parts of a typical EA program. Although approaches will vary to fit the needs of an organization, the following components are essential to an EA program.

Enterprise Architecture Frameworks and Methodologies

In general, a framework helps establish the architecture of a given system (Grigoriu, 2006). Enterprise Architecture Frameworks serve as a tool to help build an EA program that is flexible, adaptable, and efficient (Song, 2010). For each

framework, there are a set of models, principles, services, approaches, standards, design concepts, components, visualizations, and configurations that help build the target Enterprise Architecture (Schekkerman, 2006). An EA framework serves as a starting point for developing an EA program. Typically, when a framework is implemented, two versions are created: a current state and a target state the framework is to migrate towards (Cameron, 2011a). As a rough starting point, an EA framework will need to be refined from case to case.

When choosing a framework or methodology, the two primary concerns that need to be addressed are the domain and the stakeholders (Schekkerman, 2006). Similar to a framework, a methodology is defined as a structured approach to solving a problem (Session, 2010). There are a number of predefined frameworks and methodologies utilized by EA programs today. The four of the most popular include the Zachman Framework, TOGAF, FEA, and Gartner Methodology. The first framework is the Zachman Framework. The Zachman Framework was the first EA framework and was designed in 1987 (Session, 2010). A definition of the Zachman Framework would be a framework that “takes into account both who an artifact targets and what particular issue is being addressed” (Session, 2010). Due to this definition, the Zachman Framework is sometimes seen as a taxonomy instead of a framework. On the other hand, The Open Group Architecture Framework (TOGAF) focuses more on performance. This framework focuses on determining the business need for an EA program (Song, 2010). The primary characteristic of TOGAF is the Architecture Development Method which is the process to create architecture

(SESSION, 2010). FEA or the Federal Enterprise Architecture is the most complete framework because it combines the approach of the Zachman Framework and TOGAF. Though FEA, the government utilizes an architectural process like Gartner's Architecture Development Method as well as providing an taxonomy approach like that of the Zachman Framework (Session, 2010). Finally, the Gartner methodology provides organizations with a logical approach to developing an EA (Bittler & Kreizman, 2005). Instead of being based off of a given taxonomy or method, the Gartner methodology was developed through the application of Gartner's extensive knowledge base and research (Bittler & Kreizman, 2005). Due to this fact, the Gartner approach can be seen more as a best practice.

The Enterprise Architecture Process

The process of developing an Enterprise Architecture requires a number of steps to be followed. Collectively, these steps are known as the EA Process. According to the lecture given by Doctor Brian Cameron, the EA process can be broken down into a number of steps. The process typically starts with the realization of an organization's goal, strategy, and operating model. Areas that are assessed include the business, hardware and applications, and data (Cameron, 2011a). The first step of the process is to assess the current state of the business and its supporting technology. After accomplishing the current state, the next step is to define appropriate business goals and objectives for which EA will influence. The third step would be to determine the future state architecture and a plan to achieve it (Cameron, 2011a). Now that a current state, future state, and method of

change have been developed, the business case can now be created for the EA program. The final step of this process would be to properly manage the created EA portfolio. The portfolio, although IT based, should be seen as potential financial investments (Cameron, 2011a).

Enterprise Architecture Success Factors

Success Factors are used to determine the value of an EA program. In a sense, success factors serve as a way to benchmark an EA program's competency in delivering upon its many benefits. As mentioned in a lecture prepared by Doctor Brian Cameron, some of the success factors for Enterprise Architecture include benefits such as responsiveness to business process change, agility to accommodate changes in business, organization, and markets, and internal and external interoperability with existing systems (Cameron, 2011a). In order to achieve success, the business vision, needs, and goals need to be taken into account as well. To satisfy this requirement, a number of other requirements, known as critical success factors need to be taken into account. First, success factors must be influenced by all key stakeholders in an EA program (Schekkweman, 2005). A senior management team that is included in the EA program will allow EA programs to adjust to budgeting issues and communicate its value effectively. Therefore, the involvement of the senior management is linked directly to EA effectiveness (Critical, 2007). Another critical success factor would be EA's scope and objectives. The goals and objectives of an EA program must remain realistic and have a reasonably high probability of being realized by the organization (Critical, 2007). It

would be unrealistic for an EA program to prescribe implementations because that is not within the scope of EA (Schekkerman, 2005). Other factors include the communication of process definitions, process implementations. By being able to communicate how to develop EA and influence projects, as well as illustrate the steps an EA program takes to reach a given deliverable, an EA program will be able to show that it is alignment driven and maintain a satisfactory level of business participation (Schekkerman, 2005). Through the understanding of critical success factors, such as the ones mentioned, one will be able to control their EA program more efficiently. In order to maintain this efficiency, it must also be understood that even these factors are subject to change; therefore an EA program must frequently measure each critical success factor to see if it still aligns with the needs of the program as well as the organization ("Critical. 2007).

Value Measurement and Metrics

Just as other business initiatives are evaluated, Enterprise Architecture is no exception. With Enterprise Architecture being business related, it is imperative to show the value EA projects can provide to the organization. In order to do this, a value measurement program is implemented using values known as metrics. Metrics are a way for EA programs to illustrate their level of success relevant to the goals of the organization it is supporting. Without these metrics, it would be impossible to gauge the progress an EA program is making. For Enterprise Architecture, measurement programs are a way of communicating this progress to others (Weiss & Rosser, 2008). With a stable group of metrics, an EA program will be able to create a business case for resources such as funding, personnel etc. (Robertson, 2010).

The pitfall with many value measurements is that organizations expect Enterprise Architecture to deliver immediate value, which is not the case. With a vague understanding of what EA is, businesses will decide to fund an EA implementation and then become dissatisfied with lack of instant returns on their investment (Boster & *et al*, 2000). Organizations need to understand that EA is a stepping stone for creating value within an enterprise. Although measurements such as return on investment can be estimated for an EA program, it is not the best way to determine the value of the program (Rosser, 2006). EA value will not always be something that can be quantified into a business measurement. It is because of

this fact that, in order to properly measure the value of an EA program, a mixture of quantitative and qualitative measurements needs to be used (Weiss, 2008b).

There are many things that can be used as metric data for Enterprise Architecture which is inherently part of the problem of determining how to properly measure value. In the Enterprise Architecture Good Practices Guide, there are a number of criteria that a measurement/metric should meet:

- Relevant-truly important measurements whose outcome ultimately affects overarching goals
 - Valid-Measures what it is supposed to
 - Reliable-easy to measure, not susceptible to gross systematic errors
 - Simple- Easy to explain and understand
 - Can be influence/permit accountability-the relevant division, department, or individual exerts large degrees of influence over and can be held accountable for the measure.
- (Schekkerman, 2008)

When determining what to measure, it is important also to consider both IT and business perspectives. However, typical EA programs focus more on the technical and neglect the business aspect of value measurement (Boster & *et al*, 2000). Also, measurements will rarely be identical between different projects. Due to this, value measurement must start from defining clear objectives on a project level.

In the end, EA will be able to provide much value to an organization. The difference between EA and other business processes/investments is that the value of EA cannot be credited to EA alone. Instead of being the cause of a given business improvement, it is more practical to see EA as a probable cause or catalyst for the change and determine its value accordingly (Weiss & Rosser, 2008). Due to this, the value of an EA implementation can be seen through a combination of metrics and

baselines (Carbone, 2004). This baseline approach starts with the improvements a project realizes while an EA program is being used by measuring the same metrics over a set period of time (yearly, monthly, etc.). Once the data has been collected, the rate of change can be determined while an EA program is being used. At the same time, show the project's performance without EA over the same timeframe will be calculated as well to show the apparent value EA has brought a project (Weiss & Rosser, 2008).

The Importance of Value Measurement

Value Measurement is an important concept for any business process to survive. Enterprise Architecture is no exception. The concept of value measurement within the context of Enterprise Architecture has received an increasing amount of attention recently. Despite this increase in research and practice, the idea of value measurement is not an easy task to accomplish. With the current state of the economy, many organizations are abandoning their Enterprise Architecture programs due to the difficulty of realizing the value of the program. In the article “Metrics Boost EA Effectiveness You Can’t Improve What You Don’t Measure”, Alex Cullen makes the argument that Enterprise Architecture will not directly deliver on business goals but instead influence them indirectly (Cullen, 2005). The benefits of enterprise architecture will then amount over time and will be realized. From an Information Technology standpoint, value measurement must have the capability to report effectively on their own activities but the results must be seen through their programs (Cullen, 2005). This article written by Alex Cullen focused on Enterprise Architecture solely from an IT standpoint.

According to an extended abstract presented by Luis Silva Rodrigues and Luis Amaral in 2010, approximately 55% of Enterprise Architecture programs that are discontinued fall under this category (Rodrigues, 2010). Reasons for this lack of realization include the complexity of value measurement itself, the vague definition of the term value, the lack of agreement concerning what needs to be measured, and the acceptance of these value measurements by the appropriate stakeholders

(Rodrigues, 2010). To back this claim, in 2009 Jeff Scott wrote “The Five Essential Metrics For Managing EA” in which Mr. Scott addressed the problem of finding meaningful metrics for enterprise architecture to report on. According to this article, enterprise architects are reporting metrics that are relevant to their specific program however; they are not reporting the correct metrics in order to obtain business support. Instead of reporting on metrics that resonate with stakeholders, architects focus on metrics that are easy to measure, such as project reviews, standards compliance, consulting hours, and other metrics of similar nature (Scott, 2009). Due to this fact, the business is not properly recognizing the growth and benefits of enterprise architecture. Ultimately, it will be the presentation of proper measurements and metrics that will enable EA to succeed within an organization (Hoppermann *et al*, 2007).

Review of Past Enterprise Architecture Value Measurement Research

In the case of Enterprise Architecture, value measurement has been a popular topic in recent years. There have been a number of past articles that analyze the overall current state of value measurement within the field of Enterprise Architecture. Through research methods such as case studies and white papers, these articles have provided vast coverage of value measurement has in past years recent years. The first area that has been covered is why organizations are unsatisfied with their EA value measurement programs.

In terms of identifying the current problem with EA value measurement, the first article encountered that covers this topic was a publication by Forrester in 2007. In the article “EA Groups in Europe: The Metrics Challenge”, Jost Hoppermann *et al* discuss why defining meaningful metrics is difficult for organizations today. Through the survey they had conducted, the team had discovered that the majority of EA groups are not adequately defined in terms of measureable results (Hoppermann, 2007). Some reasons cited for this include issues such as not having clearly defined objectives, lacking regular review and approval of goals is not common practice, and measurability is a challenge (Hoppermann, 2007). The difficulty in measuring value of these EA programs stems from the lack of measurable goals. In order to establish measurable value, clearly defined goals are a necessity. To compliment this, it is also important for EA programs to prove its relevance to stakeholders through clearly defined metrics that are used when communicating with stakeholders because numbers will resonate

compared to “vague talk” (Hoppermann, 2008). This last point of using clearly defined metrics can be rather difficult to accomplish for organizations and is addressed in the next article.

In 2007, Ken Vollmer *et al* published another research article entitled: “EA and Metrics: For Maximum Impact, Measure the Business Value” which sought to shed light on some of Jost Hoppermann’s findings from a business perspective. In order to remedy the problem of poorly defined metrics, Vollmer suggests starting with business metrics in order to reinforce stakeholder support. This process is difficult because there are a number of variables that change given the situation. Also, Enterprise Architects are historically trained to interact with IT stakeholders and are not familiar with the needs of business stakeholders (Vollmer, 2007). After providing an extensive list of business metrics, the author uses the connection between EA and business process management to highlight some of the benefits the business side of an organization can realize through EA. For such benefits as “increasing throughput and productivity”, examples are given based on past case studies (Vollmer, 2007).

Another article that illustrated the problem space for EA value measurement was an extended abstract published in 2010. In “Enterprise Architecture Value Analysis Based on Value Drivers”, Luis Silva Rodrigues and Luis Amaral look to define the current problem with Enterprise Architecture value, articulate their research question, and discuss expected results of their ongoing study (Rodrigues,2010). In the problem definition, the research shows that EA programs

are being shut down because of a combination of the current economic situation and the difficulty of measuring the program's value. A number of reasons for this difficulty include the complexity of the value analysis process, the vagueness of the term "value", the lack of agreement on what should be measured, and the acceptance of EA stakeholders with what is being presented (Rodrigues, 2010). Through researching this problem, Rodrigues looks to propose a new value model and methodology to assist with analyzing the value of a given EA program as well as determine the key value drivers for various EA stakeholders (Rodrigues, 2010). With these publications articulating the problem with EA value, there have also been a few case studies that have illustrated the weakness of current EA value measurement techniques in past years as well.

In "How to Realise Corporate Value from Enterprise Architecture", Christian Kluge, *et al* analyzed two similar enterprise architectures and reported on the effects the few differences had on their respective programs (Kluge). Through conducting their research, the authors discovered that there is not sufficient literature concerning the actual value realization of an enterprise architecture program. Because of this deficit, the authors decided to base their research on these two different enterprise architecture programs (Kluge). In one instance, the company had decided to display their Enterprise Architecture results to stakeholders through established guidelines from project to project. By adhering to these guidelines, business stakeholders are presented with enterprise artifacts that

are relevant to the EA project but have limited impact on the company's strategic planning (Kluge).

The second EA project that was investigated was designed to be service oriented. This program was strongly aligned with the need of all stakeholders involved. This not only allowed new architecture layers to be introduced as needed but it also allowed for the project's impact on the business's strategic planning to be realized. From these two different programs, a number of conclusions were made. The first was that a stakeholder oriented approach is necessary to realize the value of an EA program. This approach alone is not sufficient but it is a necessity. From this conclusion and its reasoning, the authors followed with proposing their own model of the established Delone and McLean Information Systems model to help realize the value of an EA program (Kluge).

Another article published in 2010 thoroughly investigated the current state of EA value measurement and its role in achieving an organization's goals. In writing "The Contribution of Enterprise Architecture to the achievement of Organizational Goals: A Review of the Evidence", Boucharas, *et al* stated "Curiously enough, to date, there exists no single comprehensive view of the ways EA might add value to an organization" (Boucharas, 2010). This lack can lead to such repercussions such as hindering the development of a common understanding between researchers and practitioners in terms of how EA can add value to an organization and hindering the development of the business case for EA by not having the ability to demonstrate the business value of an EA implementation

(Boucharas, 2010). The literature explored in this study demonstrates the many benefits that EA has to offer an organization but the literature does not create a direct relationship between these benefits and the good of an organization (Boucharas, 2010). In conclusion of this research, the authors discovered a number of categories in which EA has been found to have value, EA mechanisms that produce outcomes, and organizational outcomes that can be credited to EA. Some areas in which EA has proven value include categories such as Organizational Design, Project Portfolio Management, Regulatory Compliance, and others. As for the areas of EA that generate outcomes, specific areas such as EA standards, frameworks, and models were cited. Finally, in exploring the organizational outcomes that can be credited to EA, the authors discussed the various metric categories that had a direct relationship with an EA program. Learning and Growth metrics, Internal Perspectives, and Financial Perspective metrics were the three top categories of metrics.

A final study conducted was used to illustrate the value EA brings to an organization through the business metrics of return on assets (ROA) and compound rate of change of sales (CAGR). In "Enterprise Architecture Creates Business Value" Takaaki Kamogawa and Hitoshi Okada first analyze the current use of EA and how EA can improve business value. The hypothesis that was being researched was "that the variable, ROA which indicates the efficiency of asset control is positively related to both sales factors for both ROS and CAGR concerning companies that would implement EA" (Kamogawa & Okada, 2009). When analyzing the results of the

survey conducted a number of observations were made. For those that did not have an EA program, there was no significant relation between ROA and return on sales (ROS). The same could be said for ROA and CAGR. However, for those surveyed organizations that utilized EA, a relation between ROA and ROS as well as ROA and CAGR was found (Kamogawa & Okada, 2009). As a follow up of this correlative analysis, a factor analysis was performed as well. This analysis revealed that recognition of EA was accredited to two factors: 1) Coherence of information presented and 2) clearness of return on investment regarding IT (Kamogawa & Okada, 2009). Based on these two analyses, it was concluded that EA had a direct effect on the financial metrics ROA, ROS, and CAGR (Kamogawa & Okada, 2009).

To compliment these case studies, a number of different articles have been published that have been dedicated to analyzing various approaches to achieving an efficient value measurement program. In a Gartner Research paper entitled “Three Dimensions of Enterprise Architecture Process Metrics”; Deborah Weiss discusses defining EA value through proper metrics. This paper focuses more on technical metrics by dividing them into three different categories: EA process performance, Organizational coverage, and Component content utility (Weiss, 2008). EA process performance metrics are considered internal measure of EA activities, Organizational coverage metrics are used in conjunction with interactions of the EA team with other sections of the company, and Component content utility metrics illustrate the usefulness of deliverables created by a given EA program (Weiss, 2008). Although it is not covered in this paper, the author notes the importance of

business metrics and suggests that they make up a fourth metric category. After elaborating on the purpose of each of the three original categories, Weiss goes on to state that the goal of metrics is to assist in refining a given process and at the same time allow upper management to understand the situation. In closing, it is suggested that metrics and value measurements grow in sync with the EA program. Providing too many metrics is just as much of an error as providing too few metrics. To avoid this, architects need to understand that the metrics they report are a qualitative reflection of the EA program itself. Therefore, only a select number of critical metrics should be presented to stakeholders (Weiss, 2008).

The technical approach to value measurement programs has been used in a number of other essays. In “Develop Enterprise Technical Architecture Metrics to Demonstrate Enterprise Architecture Value”, Bruce Robertson establishes and reviews a number of EA specific metrics that can be used to prove EA value. The article begins by stating the importance of metrics in the growth of any process and suggests that organizations first develop a basic set of metrics and then expand upon them with time. In this case, the best place to start the defining of metrics would be cost savings. Since this metric is recognizable by business stakeholders, it serves as a good starting point. The stance that the author takes is that metrics should not be too detailed early on and be allowed to develop to the needs of the EA program. An example provided would be to measure percentage of compliance on a project basis. Although every project may not achieve 100% compliance, it is important to note progress and improvements. For an IT practice, these compliance

metrics can also serve as a base for more advanced metrics specifically those dealing with reuse. This category of reuse may contain irrelevant metrics from project to project but, common metrics cited include: number of products supported in all implementations or solutions, a measure to highlight reduction in complexity in the technical environment (Robertson, 2010). With this being a specific use for metrics, it is also important to use metrics to assess the standards themselves. With metrics comparing projects to standards, it is also important to check if a standard is appropriate per project. Ultimately, a metric must prove value to all stakeholders involved, including business stakeholders. Although not every metric will have an intrinsic business value, they can serve as a way to show the influence of a program (Robertson, 2010).

In another article written by Alex Cullen *et al*, an IT perspective is taken once again. However, the proposed metric-based reporting technique is used to illustrate the benefits achieved by the IT team. In “Metrics Boost EA Effectiveness”, EA is defined as an IT function that doesn’t necessarily deliver upon IT goals but influences the direction of an IT department instead. Due to this, the benefits of an EA program are only felt when the IT organization follows the direction of the EA team. In order to ensure this, the proper metrics must be utilized to increase the effectiveness of EA. Metrics-base reporting assists with this by showing that EA objectives align with IT objectives, directing discussions of goals and outcomes to critical areas, and serving as a self-diagnosis tool that can be used to evaluate the EA program’s performance. With this in mind, many EA programs are reporting the

wrong metrics. Based on a survey conducted by Forrester, it was determined that many EA organizations are providing data that illustrates how busy an EA team has been but these measurements show neither progress nor value. For those few companies that reported value measurements, it is imperative to link them directly with a business goal or else the value may not be evident (Cullen, 2005). This point also serves as a starting point for identifying proper metrics to report. By starting with the organizational goals, it will be easier to develop metrics that are meaningful to stakeholders. A technique that can be used to accomplish this is known as the Goal-Question-Metric-Method. This method starts by identifying questions that identify how well the organization is achieving this goal, and finally determine which metrics can be used to answer these questions (Cullen, 2005). These metrics could then be used in conjunction with a scorecard to accurately deliver the value of EA to the proper stakeholders (Cullen, 2005).

The need to deliver the proper results to appropriate stakeholders was also part of “Measuring the Value of Enterprise Architecture: Metrics and ROI” by Bill Rosser. Unlike previous articles, this publication incorporates a separate business metrics category along with IT metrics to illustrate the value of an EA program or its return on investment. The first major difference between these two metric categories is that IT metrics tend to be more quantitative (Product support costs) whereas business metrics tend towards qualitative (Alignment with business strategy) (Rosser, 2006). Whether it is qualitative or quantitative results, these metrics are used to prove the worth of EA. Contrary to what many wish, converting

these metrics into a single return on investment is impractical because it would be even harder to accredit a single change to EA alone. Although EA may have played a part, the improvement may have come from somewhere else. Instead of using an ROI model, the author proposes to compare baselines starting from when EA was first implemented to yearly results that illustrate the benefits of an EA program (Rosser, 2006). Instead of using these results to prove causality, the author suggests using them only to show a relationship between these improvements and the EA program. This is primarily because causality cannot be proven for an EA program. Through this practice, EA must push to gain support from a wide range of stakeholders in order to achieve stronger results. The author proposes a value measurement life cycle that can help improve upon the value delivered by EA. Ultimately, the most important factor for realizing EA value is communication.

The next article builds upon the importance of communicating EA value as well as the relationship between an EA program and business value. “Focus Enterprise Architecture Metrics on Business Value” starts by defining the business categories of run-the-business, grow-the-business, and transform-the-business. Although these categories are not measures of value, they are a business perspective that is required to understand since they serve as a precursor for proper value measurement (Weiss & Rosser, 2008). Metrics and value EA will bring to an organization will fall under one of these strategic categories. Depending on which strategy an EA program falls under for an organization, the categories of metrics will change as well. Typically, an EA will have the most value when used in the grow-

the-business and transform-the-business categories but is typically utilized in the run-the-business category. Although the relevant metrics for each category will differ, the process of utilizing these metrics to show EA contributed value to an organization remains the same. Instead of trying to establish a direct relationship with metrics and EA, a baseline approach is suggested. Since the start of an EA program, compare the value of the baseline metrics to that of consecutive years. At the same time, show the business's performance without EA for a proper comparison (Weiss & Rosser, 2008). This will serve to show the relationship between EA and the realized improvement over time but it will not credit EA with the change directly.

In a follow-up article, Deborah Weiss proposes the use of the Gartner Business Value Model as a method to improve upon the points mentioned in "Focus Enterprise Architecture Metrics on Business Value". In "Enterprise Architecture Measurement Examples: Run the Business" builds upon the aforementioned categories of run-the-business, grow-the-business, and transform-the-business. After determining the proper area in which EA will make an impact, the Gartner Business Value Model will serve to assist in proving value. When choosing the proper metrics for this value model, Weiss suggests using a mixture of hard/quantitative and soft qualitative metrics. The sample implementation of the Gartner Business Value Model is for a run-the-business case. The value model separates things further into business aspects. In this case, the three business aspects are Demand Management, Supply Management, and Support Services.

Support Services was then divided between IT Support and Financial Support. For each of these categories Weiss provided an example prime and an example of an EA metric that can be associated with it. Under Demand Management, a relevant prime would be Cost-of-Sales Index with a related EA metric being Reduction in IT costs per product /service. Under Supply Management an example prime is Conversion Cost and a sample EA metric is the ability to report the accuracy of material cost. In terms of Financial Support Service a sample EA metric would be number of financial processes documented or optimized which correlates with an Accuracy Index. Finally, from a IT Support Services perspective, an area of concern would be IT Total Cost Index which aligns with an EA metric of Increase reuse of IT assets that support only one product or service line (Weiss, 2008b). After this sample usage of the value model, the author addresses the problem of lag between when EA work is completed and when the value is measured. Typically, this lag time can vary between 12 and 18 months. In order to account for this, EA metrics need to be recorded before and after to show the effectiveness of the program.

After reviewing various approaches that come from a technical and business perspective, Gene Leganza's metric classifications of "active metrics" and "value metrics" was a third approach. Active metrics are defined as "those that characterize the workload of the architecture group" and value metrics are "those that show the Enterprise Architecture's value to the enterprise" (Leganza, 2002). Examples of active metrics include number of designs reviewed, consulting hours booked, and technology research metrics. Value metrics include time to market

improvements, support cost savings, and overall cost and quality metrics (Leganza, 2002). Although the possible metrics that an organization can use for either category is quite long, it is important to collect the metrics and report them diligently. Although presented under different categories (active and value), the metrics discussed in this report can be categorized as IT metrics and business metrics.

One of the most comprehensive approaches proposed was written by Jeff Scott entitled "The Five Essential Metrics for Managing EA". In this article, the author, Jeff Scott, proposes five metrics that are essential in communicating the value of an Enterprise Architecture program to a business. These metrics are: strategy momentum, financial impact, customer satisfaction, skills and capability growth, and process improvement (Scott, 2009). These metric categories were based off the Kaplan and Norton's Balanced Scorecard Approach which serves as a framework for CIOs to evaluate their IT organizations (Scott, 2009). For each of these metrics, Scott provides a brief definition as well as ideal areas of impact. Strategy momentum metrics should be able to answer the question: "How committed is the organization to our long-term goals?" and can be assessed through an index that compares opportunities to support a strategy versus opportunities not taken. This index model should be able to clearly show an EA's strategic process and help show the momentum being realized towards a given strategy (Scott, 2009). Unlike past research, Scott takes the stance that a simple profit and loss statement would be able to reach business stakeholders instead of attempting to quantify

numbers such as ROI and ROA that, as seen from past articles, are difficult to determine for a strategic function like EA. Customer Satisfaction is important because the relationship between users and the benefits they receive from EA is an important factor to consider when looking at the future success of the EA program. Along with this relationship, other customer satisfaction categories would include quality of service and timeliness. In terms of EA Skills and Capability Growth, architects will constantly be asked to solve complex problems and utilize cutting edge technologies. Due to this, skill development and growth are paramount for success. Therefore, this metric will focus on things such as acquiring new skills, and aligning with IT and business goals (Scott, 2009). The final proposed metric is the EA process improvement metric which is related to process development and its results. Some metrics that fall under this category include process definition and process maturity. This metric makes continuous process improvement possible (Scott, 2009). In closing Scott recommends that EA programs start with a small set of metrics and gradually expand. Developing the proper metrics is difficult but capturing each of these metrics is just as difficult.

The Case for this Study

Although there has been a plethora of research into the Enterprise Architecture value measurement, these attempts have been limited. The problem with current metrics and value measurement programs has been clearly defined and various approaches have proposed to remedy the problem. There are some solutions that propose to solve the problem through IT means whereas others have

suggested taking a business approach to proving an EA program's value. A few of the articles such as "The Five Essential Metrics for Managing EA" make the case for both IT metrics and business metrics be used in determining the value of an EA program. Although these approaches serve to improve upon the current state of measuring EA value, there is still room for improvement. This publication looks to expand upon past research and facilitate the further evolution of value measurement programs. The survey used to support this research is the first publication of its kind. This research looks to not only comprehend commercial organizational goals but also Federal EA programs as well. With its breadth across a number of different industries, the research has also given a comprehensive view of current value measurement programs, a depth past research has not reached. Although there is some overlap with past research (such as proposed metric categories), there has not been a publication that has received support from the same number of EA industry associations as this survey. With its inherent influence and unrivaled depth, the results of this survey will serve to improve upon EA value measurement approaches.

Survey Summary

Method

The primary method for data gathering used for this paper was a survey administered by the EA at IST group at The Pennsylvania State University named “Survey on Enterprise Architecture- Current State of Practice”. The purpose of this survey was to gain an understanding of how enterprise architecture is practiced and how its value is currently measured from a broad cross-section of organizations based on expert’s opinion. The survey was supported by a number of EA industry associations and researching that included: The Open Group, The Association of Open Group Enterprise Architects (AOGEA), The Association for Enterprise Integration (AFEI), The Industry Advisory Council (IAC) - Enterprise Architecture Shared Interest Group (SIG), The Object Management Group (OMG), The National Association of State Chief Information Officers (NASCIO), and Gartner. The survey focused on three areas of interest:

- 1) EA Framework Usage – a profile of how the popular EA frameworks and methodologies are used in a large cross-section of organizations and industries and how these frameworks have been adapted and modified into “hybrid” approaches
- 2) EA Value Measurement – a profile of how the value of enterprise architecture is measured in a large cross-section of organizations and industries
- 3) Demographic of People that Lead EA Functions – a profile of the people in leadership roles in enterprise architecture

What made this survey unique were the number of participants and the diversity of their backgrounds. It was from this survey that the following results concerning

today's metrics and valuation techniques were discovered and subsequently quantified.

Survey Design

The survey tool used to gather this data was designed to capture a wide array of information around an organization's current EA program. The three main areas investigated in this survey include EA framework usage, EA value measurement, and the demographics surrounding the leader(s) of an organization's EA program. For the purpose of this white paper, only the EA value measurement section will be utilized. Participants were chosen from around the globe and from a wide arrangement of industries. These industries ranged from IT organizations and financial establishments, to various levels of government.

With the support of associations mentioned above, the survey underwent approximately eight pilot tests and was critiqued by a panel of experts from these associations. The final product was designed to be an online survey that was administered during the timeframe of April 2010 to June 2010. Typically, this survey would take no more than a half-hour depending on the complexity of open-ended responses.

Results and Discussion

Profile of Respondents

When considering the positions held by the representatives taking the EA survey, job titles ranged from professors and consultants to Chief Officers of an organization. Of the 296 participants that answered this question, approximately 36% of respondents were an Enterprise Architecture, Senior Enterprise Architect, or a Chief Enterprise Architect. Also, a similar 36% of respondents fell under the category of IT Architect, Sol Architect, Tech, Technology Architect, or another architect that was not listed. 23% of the same population fell under the category of being a Director, Vice President, holding a Managerial Role in EA and Architect (Manager, Project Manager, or Program Manager). Finally, Chief Officers such as CEOs, CTOs, and CIOs made up 2%, 1%, and 2% of the sample respectively. For more information concerning the makeup of the survey respondents, please see Figure 2 in Appendix A.

Metrics Used to Construct EA Business Case

When looking at the business case to construct the current EA implementation for a given organization, the first question that needed to be asked was if the organization utilized any value metrics to help make the business case for enterprise architecture?

From this question it can be seen that the majority of the people interviewed did not use or did not know if metrics and valuation measurements were used when constructing the initial business case for their organization's current Enterprise

Architecture Program. For the 33% of respondents that use metrics to construct the business case for Enterprise Architecture, the three most commonly used metrics were Business/Strategy metrics, financial metrics, and IT metrics respectively. Even though financial, business/strategy, and IT metrics were the most commonly used, Figure 4 below shows that all eight metric categories were used in developing the business case for Enterprise Architecture. For more information concerning the role value measurement played in constructing the EA business case, please also see Figure 3 in Appendix A.

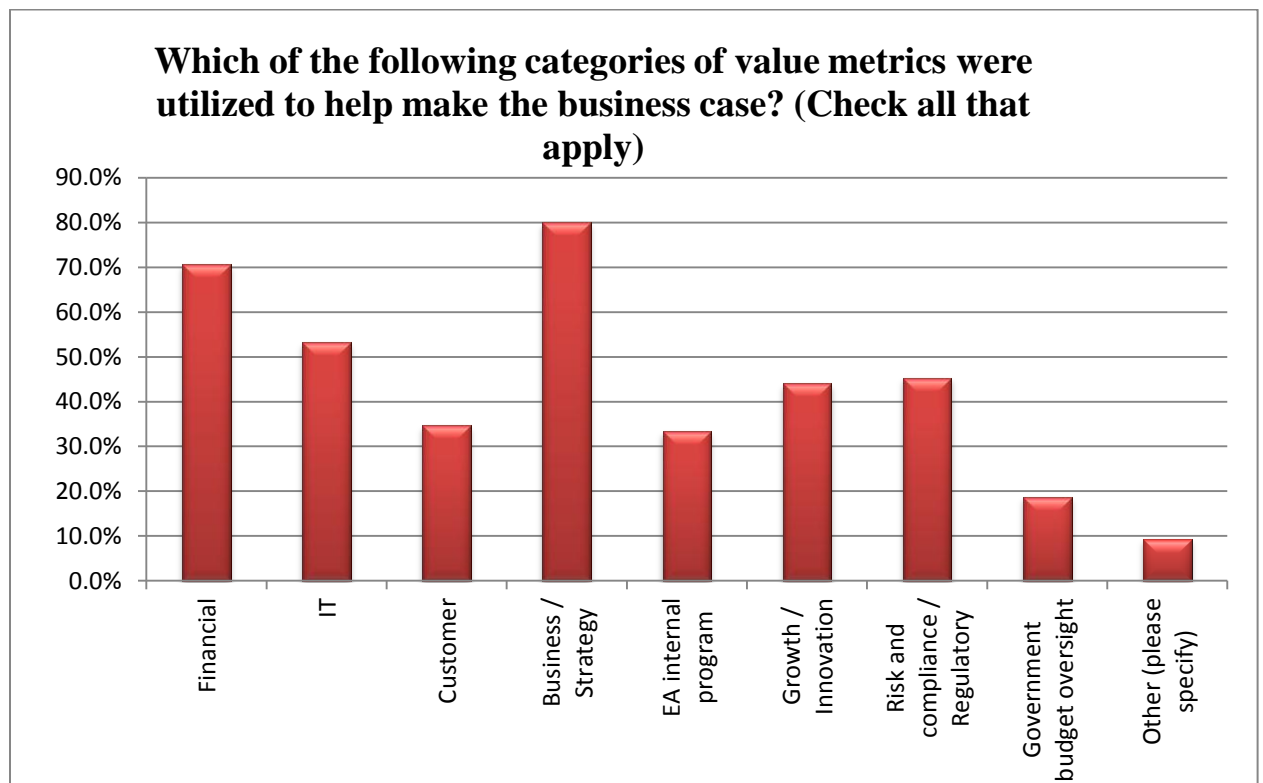


Figure 4: Metrics used to Construct the Business Case

Current Enterprise Architecture Metrics and Valuation Indicators

Current/Future State of the Value Measurement Program

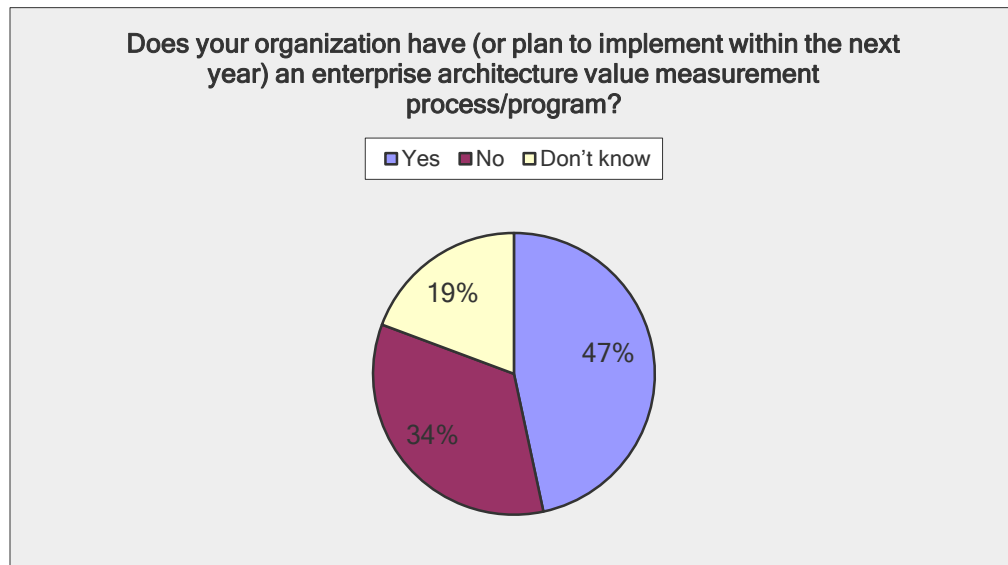


Figure 5: State of EA Value Measurement Program

When asked if their respective organizations currently have, or plan to implement within the next year, an Enterprise Architecture Value Measurement Process/Program, the majority of respondents stated that they have or will have an Enterprise Architecture Value Measurement Process/Program. Of the respondents, approximately a fifth of those that answered this question did not know of their organizations value measurement current state or future plans. For those that stated that their organization does not have and does not plan to have a value measurement process/program, a number of reasons were given. Some of the common reasons for responding negatively to this question include it is too early in the EA program to implement a value measurement program or a lack of maturity, value measurement is not seen as a priority for a number of reasons, or a lack of resources.

Measurements to Determine Value of Current EA Program

After looking at the original business case for their Enterprise Architecture implementation, the representatives were then asked about their methods used to determine the value of their organization's current EA program. This question was broken down in accordance to the seven categories of metrics: Financial, Business/Strategy, IT, Customer, EA Internal Program, Growth/Innovation, and Risk and Compliance/ Regulatory metrics.

Financial Metrics

Metric	Percentage of Respondents	Number of Respondents
Return on Investment (ROI): used to evaluate the efficiency of EA investment	55.6%	60
Benefit-to-cost ratio (B/CR): ratio of EA benefits to EA costs	35.2%	38
Total investment in new applications (bought or built) over time	30.6%	33

For this survey, financial metrics are concerned with the overall impact an EA implementation will have on the financials of an organization (Scott, 2009). These metrics include measurements such as return on investment (ROI), benefit-to-cost ratio (B/CR), and total investment in new applications. In this case, return on investment is used to evaluate the efficiency of the investment in EA, the benefit to cost ratio is used to determine the ratio of EA costs to EA benefits, and the total investment is used to track the costs incurred from when the EA program was bought through to when it was built.

When gathering financial metrics, there were a number of issues encountered. The top three issues encountered by the participants of this survey include Difficulty in consolidating data from existing disparate systems, Poor data quality and low data consistency due to inefficient reporting tools, and No standard business architecture documentation respectively.

From a financial metrics standpoint, the majority of people are somewhat satisfied with the financial metrics used to evaluate their EA program. For a few of these organizations, more work needs to be done before financial metrics can be of more use. Some of these programs are still at an early stage of implementation making it hard to quantify financial metrics. Another problem faced is that different metrics are needed to be able to produce concrete numbers from a financial standpoint.

Based on the responses from those that currently use financial metrics to achieve organizational goals set to measure their EA implementation, the majority of financial metrics used have been partially successful or, the EA program is still too immature to adequately assess the various financial metrics. Some of the common reasons for this include being in the early stages of EA implementation, having just started to define metrics, or the company is having trouble quantifying financial returns from its IT investments. All of these reasons can stem from the relative maturity of the organization's EA implementation.

Out of the organizations that utilize financial metrics, the majority of the respondents see this category of metrics to be of moderate or high importance.

Financial metrics are seen this way because they are seen as one of the simplest ways to display the impact an implementation is having on their clients. Also, if an EA implementation cannot show any type of value from a financial perspective, the prospect of a long-term EA implementation is highly unlikely.

IT Metrics

Metric	Percentage of Respondents	Number of Respondents
IT Total Cost of ownership: this measures the overall total cost of ownership (TCO) for technology owned, operated or supported by the organization	56.6%	56
Percentage reuse of architectural components including services	41.4%	41
Cost savings through reuse of software components, standardized purchase agreements and common product sets	41.4%	41

IT metrics include numbers such as IT total cost of ownership, cost savings through reuse of software components, and the percentage reuse of architectural components. The total cost of ownership is the measure of overall cost incurred by an organization for the technology it owns, operates, or supports.

When gathering IT metrics for a given EA implementation, a wide variety of problems have been encountered. The three most common issues include the silo nature of the various departments, a lack of integrated technology or inefficient reporting, and poor data quality and low data consistency respectively. With two of the three issues being major points many EA implementations look to address, it would be logical to assume that these issues are arising due to the relative immaturity of the EA program itself.

The majority of organizations that answered this question are somewhat satisfied, somewhat dissatisfied, or neutral concerning the reliability of their current IT metrics. In some cases, the metrics that are currently being used are not providing the right information or any measureable information. For those

that are neutral towards their IT metrics reliability, some are too early in their implementation to have gathered information from their designated IT metrics.

Out of all of the organizations that answered this question, over 70% of respondents are either partially successful or too early in the process to adequately assess the success of their IT metrics. In these cases, many have not started measuring their IT metrics or have just started to gather the information.

Of the same sample that measure the success of their IT metrics, the majority said that IT metrics are of moderate or high importance to the evaluation of their EA program's performance. Some of these companies see IT as being an essential part of their business or a major management metric. Others view IT metrics as being an integral part of their EA program but less important to their overall organization.

Customer Metrics

Metric	Percentage of Respondents	Number of Respondents
On-Time Delivery: shows the ability of the organization to meet customer expectations with respect to the time it takes to satisfy a specific order or service request	29.9%	26
Customer Service Performance: measures the organization's ability to complete customer requests within agreed performance objectives	24.1%	21
Customer Care Performance: measures critical aspects of customer service including time-to-respond and time-to-resolve. It also shows the ability of the customer care function to complete requests within agreed service-level agreements	21.8%	19

Customer metrics, as they sound, revolve around the relationship with a customer. Things such as customer satisfaction are imperative for any organization therefore, for an EA implementation to have longevity; customer needs are of equal importance (Scott, 2009). Some customer oriented metrics include On-Time Delivery, Customer Service Performance, and Customer Care Performance. The on time delivery metric measures the organization's ability to meet customer expectations in terms of time required to fulfill a given request. Customer Service Performance is used to show the organization's ability to meet customer needs within agreed performance objectives.

When gathering customer metrics, the three most commonly encountered issues include many of the customer metrics like customer satisfaction are unobservable or perceptual, ensuring metrics are continually evaluated for relevance and identification of new metrics as necessary and, poor data quality and low data consistency due to inefficient reporting tools.

In terms of customer metrics, the majority of organizations were either somewhat satisfied or neutral towards their reliability in terms of measuring EA value. Some of these programs are having difficulty with getting customer cooperation while other programs are not required to deliver customer metrics in all cases to have a measurable return.

When determining the success of customer metrics in achieving organizational goals, over half of the people that responded to this question indicated that their current metrics were only partially successful. Another third of

the respondents indicated that it was too early to adequately assess the success of their customer metrics.

Unlike financial and IT metrics, the importance of customer metrics are more spread between very high, high, and moderate importance. For some of the respondents, customer satisfaction is paramount for their program. Some are dependent on customer satisfaction due to their size whereas others see customer support as an essential for continued support.

Business/Strategy Metrics

Metric	Percentage of Respondents	Number of Respondents
Increase in the ability of EA team to respond effectively to new business opportunities	35.3%	30
Decrease in time-to-market for new products and the revenue generated	27.1%	23
Percentage of applications used by more than one business / Product mix offerings	25.9%	22

Strategy metrics are defined as metrics that are related to the gauging the relationship between business and IT. These metrics are designed to assist in determining strategies and then pushing them forward (Scott, 2009). Some business/Strategy metrics include the ability of the EA team to respond to new business opportunities, a measurable decrease in time-to market of new products and the revenue generated, and the percentage of applications used by more than one business or product mix offerings.

When gathering business/strategy metrics, a number of issues were encountered. The most commonly encountered issues include that the metrics in the business/strategy category are relative to their silo and are not relative to the

overall organization, a lack of common business processes to common value streams, and that the goals for an organization are arbitrarily set and are unrealistic.

The majority of organizations are either somewhat satisfied or neutral towards their business/strategy metrics currently in place. Some of these organizations are in the early stages of their program therefore more progress is to be made before the business/strategy metrics can be reliable.

As with the previously defined metrics, the majority of the organizations are either partially successful at achieving the organizational goals or are too early in the process to adequately the success of the business/strategy metrics. In the case of business/strategy metrics, organizations are still growing and adapting their metrics with their program.

Business/Strategy metrics have been deemed of moderate to high importance. While some organizations are still defining their business/strategy metrics, others utilize them in conjunction with other metrics such as IT or with their EA implementation itself.

EA Internal Program Metrics

Metric	Percentage of Respondents	Number of Respondents
Amount of architect time per project	35.3%	30
Percentage of successful projects in which EA team participated	31.8%	27
Number of projects that leverage EA repository for future-state designs	31.8%	27

Internal program metrics deal with the processes within an EA program. These metrics deal with developing and defining current EA processes in order to

drive efficiency and produce high-quality products (Scott, 2009). Since the internal EA program supports various business functions, EA program metrics such as amount of architect time per project, deal with time spent on a project. Other metrics such as number of projects that leverage EA repository for future-state designs and the percentage of successful projects in which EA team participated are also important metrics used to evaluate an EA program.

For internal EA metrics, the most commonly encountered issues include the lack of business standards to define said EA metrics, poor data quality and low data consistency due to inefficient reporting tools, and an equal number of occurrences of a lack of management sponsorship and ensuring that the internal metrics are continually evaluated for their relevance with new metrics being identified as needed. For some cases, organizations find it difficult to gather meaningful metrics because of the resources available to allocate to this task.

For those organizations that use internal EA metrics, the majority of them were either somewhat satisfied or neither satisfied nor dissatisfied with the reliability of their current set of metrics. Just as with previous metrics, one of the common reasons for not being fully satisfied with an organization's internal program metrics' reliability is that it is too early to tell if the metrics are successful. Other organizations lack the proper resources to accurately evaluate the success of their metrics.

To correspond with the reliability of the metrics that are related to internal EA metrics, the majority of organizations are only partially successful at

achieving their organizational goals set for their internal EA program. Organizations are running into similar problems with their success measurement as they did with the reliability of the metrics themselves.

Overall, internal program metrics are of moderate to high importance to an organization's EA program. The metrics are seen as only being important to the EA program and not to other aspects of the business (unlike other metrics). At times EA program metrics are a secondary concern to other metrics such as customer or business/strategy metrics.

Growth/Innovation Metrics

Metric	Percentage of Respondents	Number of Respondents
Percentage of ideas implemented, trends and patterns	22.0%	18
Percentage of ideas relevant to business objectives, relevant to innovation focus	22.0%	18
Innovation funding as a percentage of IT spending	15.9%	13

With business problems arising constantly and technology constantly changing, an EA program needs to be able to adapt with its surroundings. More importantly, architects need to provide innovative solutions for business problems. It is from this need to be on the cutting edge of business technology strategy that growth metrics are derived (Scott, 2009). However, growth and innovation metrics are not as common as other metrics. Organizations that use this category of metrics look at numbers such as the percentage of ideas implemented and corresponding trends and patterns, the percentage of ideas relevant to business objectives that are

relevant to innovation, and the amount of innovation funding as a percentage of IT spending.

For growth/innovation metrics, two of the most common problems encountered when gathering information about these measurements include a lack of integrated technology or inefficient tools used to capture the metric information and the intangible nature of the metrics themselves. Once again, a common reason for these problems can be traced back to the immaturity of the overall program. Also, some organizations do not see growth/innovation metrics as a primary focus currently or they are just irrelevant to their EA function.

To correspond with the previous answer concerning the relevance of growth/innovation metrics, the majority of respondents mostly neutral or somewhat satisfied with the reliability of said metrics. Some organizations find these metrics to not be applicable to their EA program while others have little confidence in the metrics. Despite this lack of interest and confidence in growth/innovation metrics, nearly half of the respondents have seen partial success in meeting the organizational goals set for this set of metrics.

In relation to the overall evaluation of the EA program, growth/innovation metrics are seen to be moderately important. Growth/innovation metrics are not seen as a primary concern for many of the respondents since many have stated they are not applicable to their program. Others have also agreed that these metrics are a secondary concern to other things such as strategic values.

Compliance/Regulatory Metrics

Metric	Percentage of Respondents	Number of Respondents
Number of internal/external audit filings	32.1%	26
Accuracy and completeness of documentation	29.6%	24
Percentage of projects that follow clearly defined governance	28.4%	23

Just as with growth and innovation metrics, compliance/regulatory metrics are not as utilized as other metrics. Organizations that use these metrics for their EA program focus on things such as the number of internal/external audit filings, the accuracy and completeness of these types of documentation, and the percentage of projects that follow clearly defined governance.

The top four issues encountered when gathering compliance/regulatory metrics include the silo mentality that lacks the ability to see interdependency of risks within the organization, redundancy and inconsistency in the development of a given capability, varying regulations with time, and a lack of documentation as to how compliant areas are addressed internally. There was very little further explanation provided concerning these points.

Organizations are mostly somewhat satisfied or neither satisfied nor dissatisfied with their current compliance/regulatory metrics. Very little explanation has been provided toward this point.

Discussion

Metric Category	Satisfaction in the reliability of metric category: 1- Very Satisfied 2- Somewhat Satisfied 3- Neither Satisfied nor Dissatisfied 4- Somewhat Dissatisfied 5- Very Dissatisfied	Success in achieving organizational goals 1- Very Successful 2- Partially Successful 3- Unsuccessful 4- Too early in the process to adequately assess 5- We have the goals set but don't measure against them	Overall Importance to EA program: 1- Very High Importance 2- High Importance 3- Moderately Important 4- Low Importance 5- Very Low Importance
Financial	2.75	2.71	2.40
IT	2.84	2.77	2.58
Customer	2.76	2.63	2.35
Business/ Strategy	2.71	2.62	2.21
EA Internal Program	2.45	2.51	2.29
Growth/ Innovation	2.73	2.73	2.64
Compliance/ Regulatory	2.57	2.47	2.36

Table 1: Most Common Responses Regarding Metric Categories

From the results gathered concerning the various forms of metrics, it is apparent that the majority of organizations did not use metrics to construct the business case for their EA program. Instead, organizations focused more on post implementation metrics that were related to their EA programs. As it can be seen in Table 1, the main metric categories have produced similar responses across the various organizations. In terms of satisfaction in reliability of the various metrics categories, the average result for each metric category was favorable towards being very satisfied. In terms of the success in achieving organizational goals through

each metric category, the resulting average was once again in favor of being very successful. Finally, the average overall importance for each of the seven metric categories was favorable towards being of very high importance. Some reoccurring reasons for these similarities include immaturity of the EA program and the lack of ability to collect relevant information. Also, some metrics do not have a quantifiable return for an organization. An example for this would be growth/innovation metrics. Some organizations may find it hard to quantify a metric such as “Improvement in frontier analysis and response to environmental change”.

Demographic Profile of Respondents

Demographic Category	Most Common Response	Percentage of Respondents	Number of Respondents
Primary Degree Level	Master’s Degree	46.6%	97
Field of Study	Computer Science	28.8%	59
Secondary Field of Study	Business and Engineering	40.9%	27
Gender	Male	90.3%	187
Age Group	36 – 55years	71.2%	42
Experience within EA	3 years to less than 10 years	44.5%	48
Industry	Government – State and Local, Federal Defense and Intelligence, and Federal Civilian Agencies	27.1%	25
Organization Employees	More than 10000	41.7%	86
Number of IT Employees	More than 1000	27.7%	56
Location of Organization Headquarters	North America	51.7%	105
Annual Revenue or Operational Budget	\$1 billion to less than \$100 billion	43.3%	44

Table 2: Most Frequent Demographic Responses

The last section of the survey was based around the various demographics of the respondents and their organizations. For each of the

demographic groups seen in Table 2, respondents were asked to provide information about themselves and their organizations. For each question, the respondents were given ranges or categories of possible answers. Of these options, each respondent was asked to choose the range that best suited their person or organization.

From a demographic standpoint, the professionals that participated in this survey come from diverse backgrounds. The age of participants ranged from 21 years old, to over 60 years old. Although ages were distributed across this range, over 70% of the respondents fell between the range of 36-55 years old and 90% of the same sample was predominantly male. From an educational perspective, approximately 47% of those involved with this survey received a Master's degree. Some respondents also mentioned work in both Master's programs and Doctorate programs during the time this survey was being conducted. Doctorate degrees and Associate degrees had been achieved by some but they were a minority. For those that followed a different form of education, most provided the English equivalent. These degrees were primarily in fields such as Computer Science, IT, or Business. To compliment these degrees, many of the participants have obtained a number of different certifications such as TOGAF, PMP, and Six Sigma certifications. Finally, in terms of experience within the field of EA, the range of experience was between less than three years and more than 30 years. Approximately 44.5% of respondents have between 3 to 10 years of experience.

From an organizational perspective, respondents were also asked to provide information concerning the organization they represented. For the overall size of the organization, respondents stated that their organizations ranged from less than 100 employees to more than 10,000 employees. The most common response was that the organization in question was comprised of more than 10,000 employees; which amounted to approximately 41.7% of the sample. From that response, the respondents were then asked about the number of IT specific employees that work for their organization. Responses ranged from less than 25 employees to more than 1,000 employees with 27.7% of the answers being more than 1,000. After determining the size of an organization, the revenue or operational budget was assessed. The revenues or operational budgets of these organizations ranged from less than \$1 million to more than \$100 billion. It was most common for organizations to be within the range of \$1 billion to less than \$100 billion. This range encompassed approximately 43.3% of the responses given. After discussing the size of the organization, the respondents were asked where the organization is headquartered. The regions included the six continents as well as the Middle East, and the Asia Pacific. Although there were organizations based in all of these regions, over half of the companies were headquartered was North America.

Future Work

This research was conducted to investigate the need for a value management program across the various implementations of EA. From this survey, we were able to make important observations concerning the current state of EA programs. The results show that there is much confusion concerning which metrics are meaningful to performance goals. A question that can potentially be investigated is “Is there a correlation between business performance metrics and EA metrics? Does this vary between industries?”. Also, over half of the organizations surveyed do not have an EA measurement practice, and those that do are in the early stages and relatively immature. Are there factors to developing an EA measurement program that will ensure long-term success? Finally, once value is measured effectively, will EA teams be able to communicate this value across the organization? Although this survey has served as a positive starting point for value measurement research, there is clearly much more that needs to be done.

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Appendix A

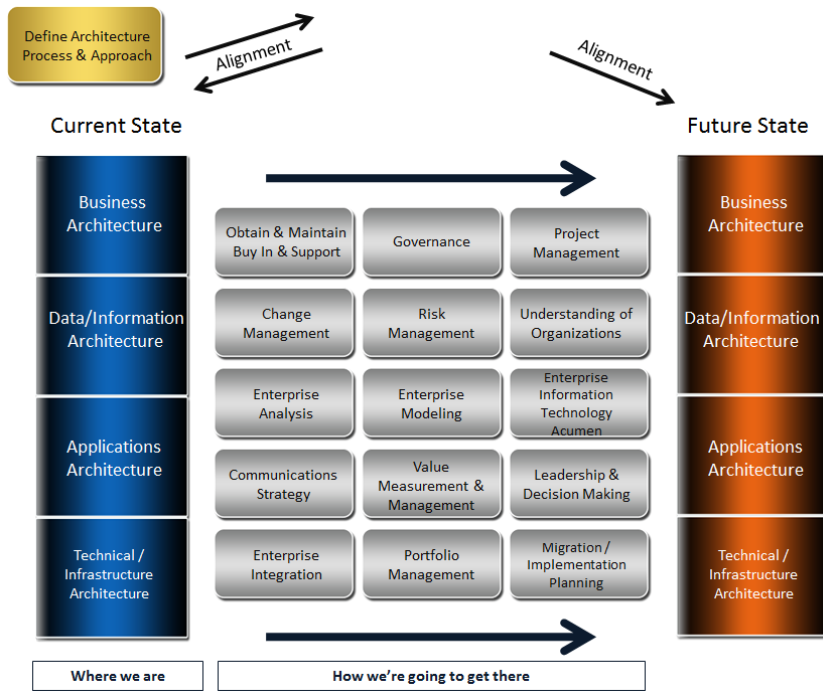


Figure 2: The Enterprise Architecture Stack

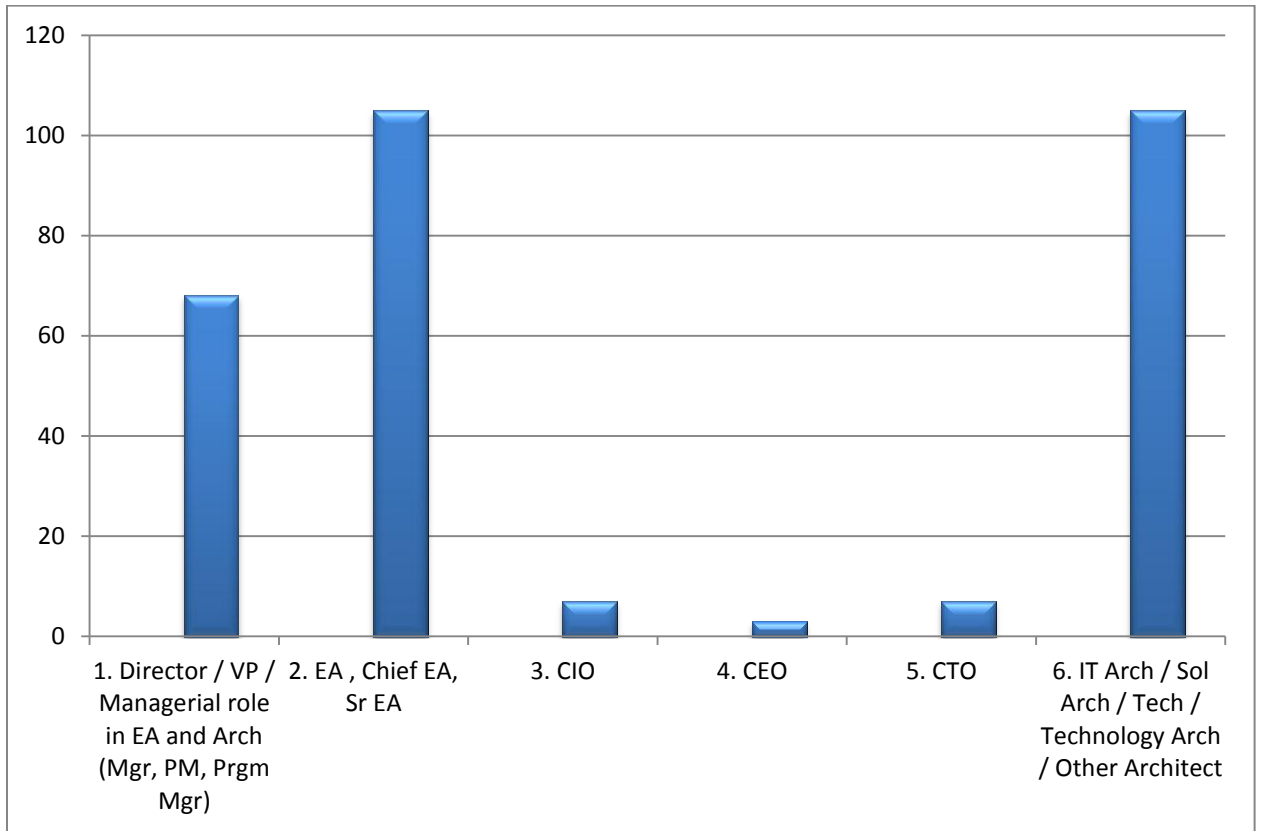


Figure 2: Positions Held by Respondents

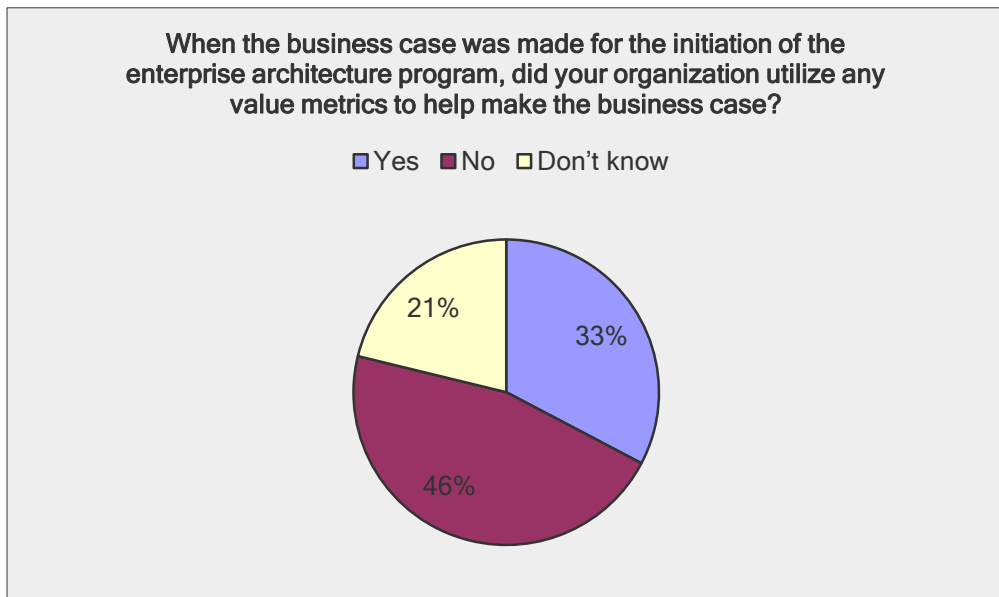


Figure 3: Are Metrics used to construct the Business Case for EA?

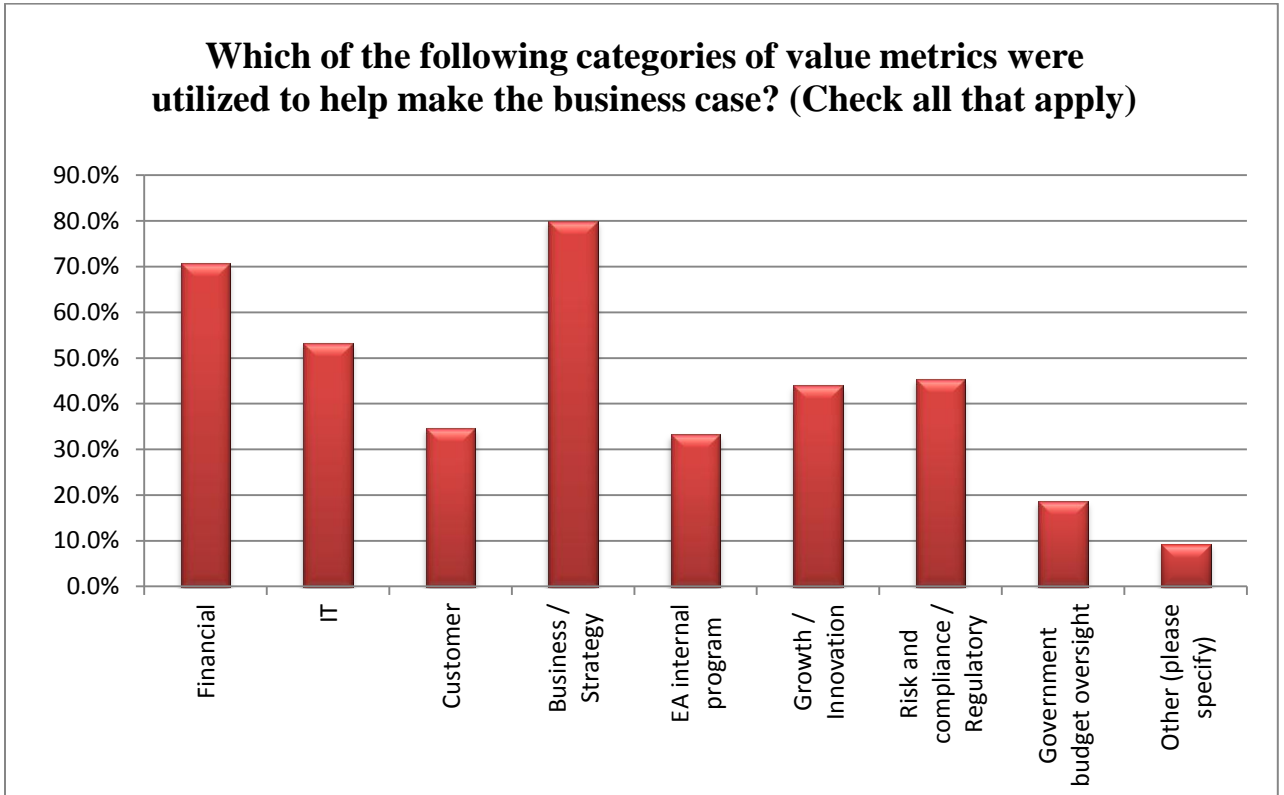


Figure 4: Metrics used to Construct the Business Case

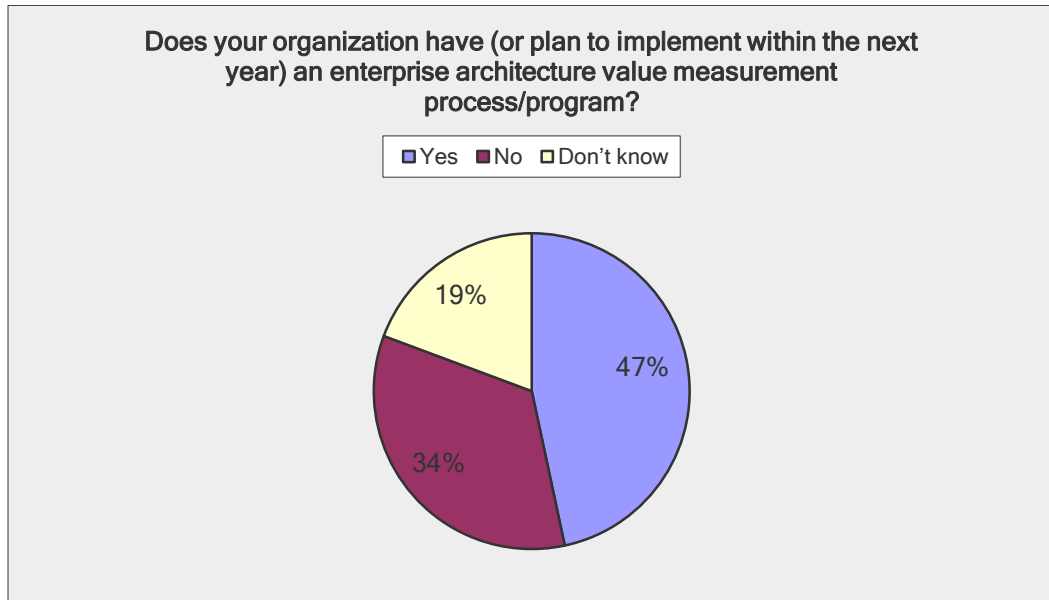


Figure 5: State of EA Value Measurement Program

Metric Category	Satisfaction in the reliability of metric category	Success in achieving organizational goals	Overall Importance to EA program
Financial	3.25	3.29	3.60
IT	3.16	3.23	3.42
Customer	3.24	3.37	3.66
Business/Strategy	3.29	3.38	3.79
EA Internal Program	3.55	3.49	3.71
Growth/Innovation	3.27	3.27	3.36
Compliance/Regulatory	3.43	3.53	3.64

Table 1: Most Common Responses Regarding Metric Categories

Demographic Category	Most Common Response	Percentage of Respondents	Number of Respondents
Primary Degree Level	Master's Degree	46.6%	97
Primary Degree	Computer Science	28.8%	59
Secondary Degree	Business and Engineering	40.9%	27
Gender	Male	90.3%	187
Age Group	36 – 40 years	20.2%	42
Experience within EA	3 years to less than 6 years	23.0%	48
Industry	Government – State and Local	13.0%	25
Organization Employees	More than 10000	41.7%	86
Number of IT Employees	More than 1000	27.7%	56
Location of Organization Headquarters	North America	51.7%	105
Annual Revenue or Operational Budget	\$1 billion to less than \$10 billion	21.9%	44

Table 2: Most Frequent Demographic Responses

Financial Metrics	Percentage of Respondents	Number of Respondents
Return on Investment (ROI): used to evaluate the efficiency of EA investment	55.6%	60
Return on Shareholders' Equity (ROE): Measures the rate of return the company has earned on its equity investment.	3.7%	4
Return on Total Assets (ROA): Measures the effectiveness of the company's assets to generate net profits	13.0%	14
Internal Rate of Return (IRR): used to calculate and assess the financial attractiveness/ viability of capital intensive projects or investments	20.4%	22
Benefit-to-cost ratio (B/CR): ratio of EA benefits to EA costs	35.2%	38
Net Present Value (NPV): is the net amount of all the discounted cash flows	18.5%	20
Breakeven point (BEP): point when benefits exceed costs of EA	11.1%	12
Total investment in new applications (bought or built) over time	30.6%	33

Table 3: Financial Metrics

IT Metrics	Percentage of Respondents	Number of Respondents
IT Total Cost of ownership: this measures the overall total cost of ownership (TCO) for technology related activities that an organization owns, operates or supports	56.6%	56
Percentage of IT initiatives that are aligned, as identified through EA process	38.4%	38
IT cost per employee per year	17.2%	17
Total cost of application development (AD) staff and tools to modify those applications over time	24.2%	24
Percentage reuse of architectural components including services	41.4%	41
Reduction in number of manual interfaces	24.2%	24

Cost savings through reuse of software components, standardized purchase agreements and common product sets	41.4%	41
Cutover costs for upgrades/conversions	12.1%	12
Time taken to complete specific phases of the software development life cycle (SDLC)	25.3%	25
Comparing project completion times and performance improvement (in terms of deliverable success) of architecture aligned and non-compliant projects	23.2%	23
Percentage reuse and repeat of common designs that speed decision making with less time to complete design	34.3%	34
Number of outages (downtime) reported	23.2%	23
Improvement in downtime or availability measures / Amount of downtime during “go live” phases of projects	13.1%	13
Number of projects, design artifacts reviewed, at what level they are reviewed and the number of rejections per project reviewed	26.3%	26
Number of new products licensed vs. existing licenses leveraged	12.1%	12
Number of infrastructure change management requests	18.2%	18
Percentage of capacity used or volume of unused capacity	10.1%	10
Number of cases where new technology was not adopted	10.1%	10
Number of new IT-enabled business capabilities in line of release within a given budget, time and value objectives and the revenue generated	17.2%	17
Partnership Ratio: measures how much the IT function is involved with strategic business initiatives. And percentage of business stakeholders that view IT as a trusted advisor and strategic partner	14.1%	14
Reduction in the rate of urgent infrastructure projects and number of support products	15.2%	15
Number of projects to raise EA exemption	27.3%	27
Number of IT trends planned for in the future-state architecture	17.2%	17
Sigma Value: identifying the critical-to-quality (CTQ) characteristics and assessing the failed CTQ as a fraction of the total for any given batch of products/services	7.1%	7
To-Complete Performance Index (TCPI): this metric focuses on future work by indicating what performance levels the project must achieve on the remaining work in order to meet its financial commitment to management	6.1%	6

Systems Performance: is indicated by the percentage of time that the IT organizational systems & applications and infrastructure (both hardware & software) supported by the IT unit and its service providers are performing well within their specified objectives	21.2%	21
IT Support Performance: measures how well the IT team supports its users with IT support activities (time-to-respond and time-to-resolve)	18.2%	18
Service-Level Effectiveness: measures the effectiveness of the expected service levels in place in an organization with all its IT users	28.3%	28

Table 4: IT Metrics

Customer Metrics	Percentage of Respondents	Number of Respondents
Cost-of-Sales Index: shows how cost-efficiently the sales team can turn prospects to customers	9.2%	8
Customer Acquisition and the cost involved	10.3%	9
Customer Lifetime Value: is the present value of all future profits obtained from a customer over the life of his relationship with a firm	12.6%	11
Customer Equity: defined as the lifetime value of current and future customers	8.0%	7
Customer Retention: shows how well existing customer needs are being identified and satisfied	19.5%	17
Cross Selling: attempting to sell related products to current customers	9.2%	8
On-Time Delivery: this shows the ability of the organization to meet its customer expectations. This is measured as the time taken to satisfy a specific order or service request.	29.9%	26
Sales Opportunity Index: shows how successfully the organization can cultivate prospects for its products and services	9.2%	8
Sales Cycle Index: shows the ability of the sales function to manage the duration of the sales process (tracking process to record when initial contacts with prospects are made and sales close date (successful or unsuccessful))	8.0%	7
Sales Close Index: shows how successfully the sales function can turn prospects into customers	6.9%	6

Sales Price Index: shows how successfully the sales function can complete a particular business without reducing price and, therefore, margin	3.4%	3
Customer Service Accuracy: measures the availability and accuracy of information needed to complete a specific order	13.8%	12
Customer Service Performance: measures the organization's ability to fulfill customer requests as per agreed performance guidelines.	24.1%	21
Customer Care Performance: this measures critical aspects of customer service: time-to-respond and time-to-resolve. It also measures the efficiency of the customer care team to handle and close requests within agreed service-level agreements	21.8%	19
Order Fill-rate: the organization's ability to meet customer expectations with respect to a specific order or an agreed service	11.5%	10
Material Quality: measures the overall quality of the materials supplied to the customer based on the condition of the materials supplied (whether there were any damaged or defective materials) on receipt	6.9%	6
Agreement Effectiveness of SLAs: measures the overall effectiveness of service-level agreements (SLAs) in place with the organization's customers. This data can be obtained through quarterly surveys	16.1%	14
Forecast Accuracy: shows the ability of the sales function to make accurate predictions regarding the demand for the organization's products and services	11.5%	10
Transformation Ratio: indicator of organization's ability to structure SLAs that are "win-win" for both the organization and its customers	10.3%	9
Number of identifiable lead customers and percentage of their participation level	5.7%	5
Average customer waiting time, customer handling time and wrap-up time	17.2%	15
Labor cost per call	5.7%	5
Number of calls handled per agent per hour / Number of calls handled per team per shift	10.3%	9
Percentage of calls that were "one and done" versus handed off/escalated and number of agent touches until case was resolved	6.9%	6
Customer satisfaction with agent knowledge/attitude	11.5%	10

Workforce utilization rate (correct number of agents per shift)	9.2%	8
Feedback through customer surveys	19.5%	17

Table 5: Customer Metrics

Business/Strategy Metrics	Percentage of Respondents	Number of Respondents
Improved market target index (reflects the organization's decisions regarding the size and growth rates of the markets it participates in)	16.5%	14
Increased market coverage index (shows the reach of sales to generate revenue in countries where market demand exists)	10.6%	9
Opportunity/Threat Index: shows the potential to grow or shrink market share based on the level of competition in the industries in which the organization participates	7.1%	6
Product portfolio index: identifies and validates current and projected customer needs in existing and targeted markets	15.3%	13
Improved channel profitability index (identify and evaluate alternative methods to reach and serve customers in current and targeted markets)	12.9%	11
Increase in the ability of EA team to respond effectively to new business opportunities	10.6%	9
Percentage increase in the level and extent of changes found in new products and services offered	35.3%	30
Decrease in time-to-market for new products and the revenue generated	15.3%	13
Ratio of opportunities to support a strategy adopted vs. not adopted	27.1%	23
Improved R&D success index (ability of the product development function to bring new products and services to market)	11.8%	10
Percentage of applications used by more than one business / Product mix offerings	18.8%	16
Number of environmental/industry trends articulated in future-state architecture	25.9%	22
Measuring productivity through resource management	17.6%	15
Time from strategy announcement until a prioritized project pipeline is presented to review and funding bodies	17.6%	15

Time from identification of enterprise business strategy (EBS) to implementation and the number of EBS implemented	12.9%	11
Time required to complete key business to business tasks	16.5%	14
Number of identified emerging technologies implemented	17.6%	15
Number of ideas generated through communities, crowd sourcing	15.3%	13
Number of business strategies that do not map to a funded initiative	11.8%	10
Number of business strategies that map to multiple funded initiatives	20.0%	17

Table 6: Business/Strategy Metrics

EA Internal Program Metrics	Percentage of Respondents	Number of Respondents
Number of certified architects per project and vice versa	23.5%	20
Amount of architect time per project	35.3%	30
Number of full time equivalents (FTEs) * project IT spending, as a measure of influence	27.1%	23
Percentage of time each EA role is in strategic and business planning process	29.4%	25
Amount of time EA group spends supporting critical business planning activity and decision making	27.1%	23
Percentage reduction in the number of compliance waivers issued	14.1%	12
Percentage of EA compliance waivers due to future-state architecture not meeting business needs	11.8%	10
Percentage of projects identified through EA process compared to ad hoc identification	20.0%	17
Number of projects funded and implemented as identified by EA process	24.7%	21
Number of business lines that consult EA team / number of times EA teams are consulted for advice and guidance	23.5%	20
Number of new projects that trigger a change in EA	22.4%	19
Percentage of successful projects in which EA team participated	31.8%	27
Number of projects progressed with EA review required	23.5%	20
Amount of customization (includes fit to build, customize, configure, install and reuse)	10.6%	9

Number of new business processes identified and improved	22.4%	19
Number of business processes documented and optimized	18.8%	16
Number of authoritative sources for critical information assets	11.8%	10
Number of to-be architectures defined	23.5%	20
Number of domains (business, information, technical and application) that have future states defined	24.7%	21
Number of projects that leverage EA repository for future-state designs	31.8%	27
Extent to which projects have been able to leverage EA information (determined through survey results)	23.5%	20
Rate of business to business innovation EA process enables by improved anecdotal documentation	10.6%	9
Number of EA artifacts used in budget and program planning activities	25.9%	22
Number of EA artifacts produced and circulated yearly and replaced/refreshed annually.	25.9%	22
Extent to which EA website is used by business and others (number of EA website visitors)	17.6%	15
Number of attendees at EA initiated meetings over time	16.5%	14
Amount of time (engagement) EA team spends with outsourcing team	2.4%	2
Employee awareness regarding EA team activities (obtained through survey)	12.9%	11

Table 7: EA Internal Program Metrics

Growth/Innovation Metrics	Percentage of Respondents	Number of Respondents
Percentage of ideas implemented, trends and patterns	22.0%	18
Percentage of ideas relevant to business objectives, relevant to innovation focus	22.0%	18
Percentage of business-initiated ideas and percentage of IT-initiated ideas	14.6%	12
Percentage of ideas from internal collaboration	12.2%	10
Percentage of ideas sourced externally	3.7%	3
Size of the innovation team	7.3%	6

Improvement (over time) in the time for report products and accuracy of information	6.1%	5
Improvement in “anytime, anywhere, anyway” access to information	14.6%	12
Improvement in frontier analysis and response to environmental change	3.7%	3
Innovation funding as a percentage of revenue	13.4%	11
Innovation funding as a percentage of IT spending	15.9%	13
Percentage of teams participating in defining and usage of metrics	7.3%	6
No. of innovation events or campaigns conducted	8.5%	7
Regional or geographic , demographic comparisons of customers	3.7%	3
Cost of customer innovation vs. internal	7.3%	6
Cost of customer innovation vs. partner networks	4.9%	4
Average ideas per month for top 10 most active customers	3.7%	3
Trends in customers (increase/decline) for top 10 most active customers	6.1%	5
Number of micro networks and connections made to other communities	2.4%	2

Table 8: Growth/Innovation Metrics

Compliance/Regulatory Metrics	Percentage of Respondents	Number of Respondents
Number of internal/external audit filings	32.1%	26
Number of overdue regulatory filings	6.2%	5
Number of censures, fines and warning by local regulators	4.9%	4
Accuracy and completeness of documentation	29.6%	24
Percentage of software lacking license documentation	11.1%	9
Count and percentage of unauthorized software	14.8%	12
Number of designs / projects that are 100% compliant with EA standards	24.7%	20
Of those that are not 100% compliant, the number that would have achieved compliance at or above a given level	4.9%	4

Percentage of transactions that adhere to master data standards	11.1%	9
Percentage of projects that follow clearly defined governance	28.4%	23
Number of backlogged projects waiting for architecture governance	11.1%	9
Number of projects that comply with risk management guidelines	16.0%	13
Reduction in number of risk management issues recorded in projects	13.6%	11
Number of projects that complete self-certification in all stages	7.4%	6
Number of new regulations implemented within the permitted timeframe	4.9%	4
Number of internal audit raisings and assessing the management of the regulatory finding	4.9%	4
Number of unauthorized accesses and changes to process, information and technology (including applications)	9.9%	8
Number of lawsuits filed	6.2%	5
Compliance Index: shows the ability of finance and regulatory functions to comply with laws and regulations to carry out smooth business operations.	7.4%	6
Accuracy Index: shows the ability of the finance and regulatory functions to provide accurate and timely information internally	6.2%	5
Advisory Index: measures how much finance and/or regulatory functions are involved with strategic business initiatives	1.2%	1
Cost-of-Service Index: measures the overall cost to provide finance and regulatory support and advisory services to the organization	4.9%	4

Table 9: Compliance/Regulatory Metrics

Appendix B

1. Do you consent to take part in this research?

- I agree
- I do not agree

2. Your email address. (Note: Your email address will be used for the purpose of acknowledgement and to provide a summary of the results of the study only. All email/surveys will be treated in confidence and the results will be totally anonymous)

Participant Information

- 1) Please indicate your current job title.

Section 1 – Enterprise Architecture Usage

This section captures information regarding EA program, EA framework and its usage in your organization. Please answer in terms of the organization where you have primary EA responsibility.

- 2) Does your organization utilize (or plan to utilize within the next year) an enterprise architecture (EA) program?
 - a) Yes
 - b) No
 - c) Don't know

- 3) If you answered 'No' to Question 2, please explain why an EA program is not employed in your organization and the future plans (if any) for enterprise architecture in your organization.

----- End Survey -----

If answered 'Don't know', end survey; If answered 'Yes' to Question 2, continue survey.

1.1 EA program

4) How long has your organization had a formal Enterprise Architecture program?
(Please select only one)

- a) Less than 1 year
- b) 1 year to less than 3 years
- c) 3 years to less than 6 years
- d) 6 years to less than 10 years
- e) 10 years to less than 15 years
- f) More than 15 years
- g) Don't know

1.2 EA organization structure

5) Where in the organization does the EA program report directly? (Please select only one)

- a) Chief Information Officer (CIO)
- b) Chief Technical Officer (CTO)
- c) Chief Executive Officer (CEO)
- d) Chief Operating Officer (COO)
- e) Chief Financial Officer (CFO)
- f) Head of IT planning
- g) Head of application development
- h) Head of infrastructure/operations
- i) Head of corporate strategy/planning
- j) Other (please specify)

1.3 EA program budget

6) Please indicate the overall budget for enterprise architecture in your organization?
(in US dollars)

1.4 Size of EA program

- 7) How many people are employed in the EA program in your organization? **(Please select only one)**
- a) 1 – 3
 - b) 4 – 6
 - c) 7 – 9
 - d) 10 – 14
 - e) 15 – 19
 - f) 20 – 29
 - g) 30 – 39
 - h) 40 – 49
 - i) 50 – 99
 - j) 100 or more
 - k) Don't know

1.7 Metrics used to construct the EA Business Case

- 8) When the business case was made for the initiation of the enterprise architecture program, did your organization utilize any value metrics to help make the business case?
- a) Yes
 - b) No
 - c) Don't know

If answered 'Yes' to Question #19, answer question #20 and move on to Question #22. If answered 'Don't know' move on to question #24

- 9) Which of the following categories of value metrics were utilized to help make the business case? (Check all that apply)
- a) Financial
 - b) IT

- c) Customer
- d) Business / Strategy
- e) EA internal program
- f) Growth / Innovation
- g) Risk and compliance / Regulatory
- h) Government budget oversight
- i) Other (Please specify)

10) If you answered 'No' to question #19, please tell us how the business case was constructed and then move on to question #24

11) Please indicate the most senior person in your organization who approved the business case for the EA program.

12) Please provide any additional information on the construction of the EA business case.

13) Does your organization have (or plan to implement within the next year) an enterprise architecture value measurement process/program?

- a) Yes
- b) No
- c) Don't know

If you answered 'Yes' to Question 24 please proceed to Section 2.

14) If you answered 'No' to question 24 please explain why an EA value measurement program is not utilized in your organization. Also discuss future plans (if any) for enterprise architecture value measurement in your organization.

----- Move on to question #71-----

If the answer to # 24 is 'don't know' ----- Move on to question #71-----

Section 2: EA Value Measurement - Metrics

This section provides information on the categories of metrics, specific metrics under each category and subsequent questions related to each of these categories of metrics used to measure the value of your EA program.

2.1 Financial Metrics

15) Please identify the **financial** metrics used with the EA value measurement program in your organization **(Check all that apply)**

- a) Return on Investment (ROI) - used to evaluate the efficiency of EA investment
- b) Return on Shareholders' Equity (ROE): Measures the rate of return the company has earned on its equity investment.
- c) Return on Total Assets (ROA): Measures the effectiveness of the company's assets to generate net profits.
- d) Internal Rate of Return (IRR): used to calculate and assess the financial attractiveness/ viability of capital intensive projects or investments
- e) Benefit-to-cost ratio (B/CR): ratio of EA benefits to EA costs
- f) Net Present Value (NPV): is the net amount of all the discounted cash flows
- g) Breakeven point (BEP): point when benefits exceed costs of EA.
- h) Total investment in new applications (bought or built) over time
- i) No financial metrics are used in our organization
- j) Other (please specify other financial metrics used)

If item "i" is selected go to question 31

16) What issues are typically encountered when gathering information on the metrics utilized in the financial category? **(Check all that apply)**

- a) Difficulty in consolidating data from existing disparate systems
- b) Lack of management sponsorship/support/ proper guidelines
- c) No standard business architecture documentation
- d) Poor data quality and low data consistency due to inefficient reporting tools
- e) Degree of dependence on external systems

- f) Lack of resources (may include hardware, software or human resource)
- g) Legal/political barriers/Cultural barriers
- h) Defining target state first – room for bias
- i) Ensuring metrics are continually evaluated for relevance and identification of new metrics as necessary
- j) Other (please specify)

17) Please indicate your level of **satisfaction** in the **reliability** of the financial metrics that your organization utilizes to measure EA value

- a) Very satisfied
- b) Somewhat satisfied
- c) Neither satisfied nor dissatisfied
- d) Somewhat dissatisfied
- e) Very dissatisfied

Please explain the main reason for your answer.

18) How successful has your organization been at achieving the organizational goals set for the financial metrics used to measure EA value?

- a) Very successful
- b) Partially successful
- c) Unsuccessful
- d) Too early in the process to adequately assess
- e) We have the goals set but don't measure against them

Please explain the main reason for your answer.

19) How important are the financial metrics in the overall performance evaluation of your EA program?

- a) Very high importance
- b) High Importance
- c) Moderately important
- d) Low importance
- e) Very low importance

Please explain the main reason for your answer.

2.2 IT Metrics

20) Please identify the IT metrics used with the EA value measurement program in your organization (**Check all that apply**)

- a) IT Total Cost of ownership: this measures the overall total cost of ownership (TCO) for technology owned, operated or supported by the organization.
- b) Percentage of IT initiatives that are aligned, as identified through EA process
- c) IT cost per employee per year
- d) Total cost of application development (AD) staff and tools to modify those applications over time
- e) Percentage reuse of architectural components including services
- f) Reduction in number of manual interfaces
- g) Cost savings through reuse of software components, standardized purchase agreements and common product sets
- h) Cutover costs for upgrades/conversions
- i) Time taken to complete specific phases of the software development life cycle (SDLC)
- j) Comparing project completion times and performance improvement (in terms of deliverable success) of architecture aligned and non-compliant projects.
- k) Percentage reuse and repeat of common designs that speed decision making with less time to complete design
- l) Number of outages (downtime) reported

- m) Improvement in downtime or availability measures / Amount of downtime during “go live” phases of projects
- n) Number of projects, design artifacts reviewed, at what level they are reviewed and the number of rejections per project reviewed
- o) Number of new products licensed vs. existing licenses leveraged
- p) Number of infrastructure change management requests
- q) Percentage of capacity used or volume of unused capacity
- r) Number of cases where new technology was *not* adopted
- s) Number of new IT-enabled business capabilities in line of release within a given budget, time and value objectives and the revenue generated.
- t) Partnership Ratio: measures how much the IT function is involved with strategic business initiatives. And percentage of business stakeholders that view IT as a trusted advisor and strategic partner
- u) Reduction in the rate of urgent infrastructure projects and number of support products
- v) Number of projects to raise EA exemption
- w) Number of IT trends planned for in the future-state architecture
- x) Sigma Value: identifying the critical-to-quality (CTQ) characteristics and assessing the failed CTQ as a fraction of the total for any given batch of products/services
- y) To-Complete Performance Index (TCPI): this metric focuses on future work by indicating what performance levels the project must achieve on the remaining work in order to meet its financial commitment to management.
- z) Systems Performance: is indicated by the percentage of time that applications, systems and infrastructure supported by the IT organization and its service providers are operating within their performance objectives.
- aa) IT Support Performance: measures the ability of IT support functions to provide users with support (time-to-respond and time-to-resolve).
- bb) Service-Level Effectiveness: measures the effectiveness of the expected service levels in place with all the users of IT.

- cc) No IT metrics are used in our organization
- dd) Other (please specify other IT metrics used)

If item 'cc' is selected go to question 36

21) What issues are typically encountered when gathering information on the metrics utilized in the IT category? **(Check all that apply)**

- a) Silo nature of the departments
- b) Lack of management sponsorship/support/ proper guidelines
- c) No standard business architecture documentation
- d) Poor data quality and low data consistency
- e) Lack of integrated technology or inefficient reporting tools
- f) Legal/political barriers
- g) Too many metrics reported and are often inconsistent across different business units
- h) Identifying metrics that are leading and lagging indicators of performance is trivial
- i) Ensuring metrics are continually evaluated for relevance and identification of new metrics as necessary
- j) Defining target state first – room for bias
- k) Other (please specify)

22) Please indicate your level of **satisfaction** in the **reliability** of the IT metrics that your organization utilizes to measure EA value

- a) Very satisfied
- b) Somewhat satisfied
- c) Neither satisfied nor dissatisfied
- d) Somewhat dissatisfied
- e) Very dissatisfied

Please explain the main reason for your answer.

23) How successful has your organization been at achieving the organizational goals set for the IT metrics used to measure EA value?

- a) Very successful
- b) Partially successful
- c) Unsuccessful
- d) Too early in the process to adequately assess
- e) We have the goals set but don't measure against them

Please explain the main reason for your answer.

24) How important are the IT metrics in the overall performance evaluation of your EA program?

- a) Very high importance
- b) High Importance
- c) Moderately important
- d) Low importance
- e) Very low importance

Please explain the main reason for your answer.

2.3 Customer Metrics

25) Please identify the **customer** metrics used with the EA value measurement program in your organization (**Check all that apply**)

- a) Cost-of-Sales Index: shows how cost-efficiently the sales function can turn prospects into customers.
- b) Customer Acquisition and the cost involved

- c) Customer Lifetime Value: is the present value of all future profits obtained from a customer over the life of his relationship with a firm.
- d) Customer Equity: defined as the lifetime value of current and future customers
- e) Customer Retention: shows how well existing customer needs are being identified and satisfied.
- f) Cross Selling: attempting to sell related products to current customers
- g) On-Time Delivery: shows the ability of the organization to meet customer expectations with respect to the time it takes to satisfy a specific order or service request.
- h) Sales Opportunity Index: shows how successfully the organization can cultivate prospects for its products and services.
- i) Sales Cycle Index: shows the ability of the sales function to manage the duration of the sales process (tracking process to record when initial contacts with prospects are made and sales close date (successful or unsuccessful))
- j) Sales Close Index: shows how successfully the sales function can turn prospects into customers.
- k) Sales Price Index: shows how successfully the sales function can close business without dropping price and, therefore, margin.
- l) Customer Service Accuracy: measures the availability and accuracy of the information needed to complete a specific order.
- m) Customer Service Performance: measures the organization's ability to complete customer requests within agreed performance objectives.
- n) Customer Care Performance: measures critical aspects of customer service including time-to-respond and time-to-resolve. It also shows the ability of the customer care function to complete requests within agreed service-level agreements.
- o) Order Fill-rate: the organization's ability to meet customer expectations with respect to the quantity of a specific order.
- p) Material Quality: measures the overall quality of the materials supplied to the customer based on whether the materials were either damaged or defective on receipt.

- q) Agreement Effectiveness of SLAs: measures the overall effectiveness of service-level agreements (SLAs) in place with the organization's customers obtained through quarterly surveys
- r) Forecast Accuracy: shows the ability of the sales function to predict accurately the demand for the organization's products and services.
- s) Transformation Ratio: indicator of organization's ability to structure SLAs that are "win-win" for both the organization and its customers.
- t) Number of identifiable lead customers and percentage of their participation level
- u) Average customer waiting time, customer handling time and wrap-up time
- v) Labor cost per call
- w) Number of calls handled per agent per hour / Number of calls handled per team per shift
- x) Percentage of calls that were "one and done" versus handed off/escalated and number of agent touches until case was resolved
- y) Customer satisfaction with agent knowledge/attitude
- z) Workforce utilization rate (correct number of agents per shift)
- aa) Feedback through customer surveys
- bb) No customer metrics are used in our organization
- cc) Other (please specify other customer metrics used)

If item 'bb' is selected go to question 41

- 26) What issues are typically encountered when gathering information on the metrics utilized in customer category? **(Check all that apply)**
- a) Many of the customer metrics like customer satisfaction are unobservable or perceptual
 - b) Accounting for network effects is complicated (basic assumption is the value of a customer is independent of other customers)
 - c) Customer lifetime is difficult to predict

- d) Accounting for competition is not direct
- e) Lack of management sponsorship/support/ proper guidelines
- f) No standard business architecture documentation
- g) Poor data quality and low data consistency due to inefficient reporting tools
- h) Ensuring metrics are continually evaluated for relevance and identification of new metrics as necessary
- i) Other (please specify)

27) Please indicate your level of **satisfaction** in the **reliability** of the customer metrics that your organization utilizes to measure EA value

- a) Very satisfied
- b) Somewhat satisfied
- c) Neither satisfied nor dissatisfied
- d) Somewhat dissatisfied
- e) Very dissatisfied

Please explain the main reason for your answer.

28) How successful has your organization been at achieving the organizational goals set for the customer metrics used to measure EA value?

- a) Very successful
- b) Partially successful
- c) Unsuccessful
- d) Too early in the process to adequately assess
- e) We have the goals set but don't measure against them

Please explain the main reason for your answer.

29) How important are the customer metrics in the overall performance evaluation of your EA program?

- a) Very high importance
- b) High Importance
- c) Moderately important
- d) Low importance
- e) Very low importance

Please explain the main reason for your answer.

2.4 Business/Strategy Metrics

30) Please identify the **Business/Strategy** metrics used with the EA value measurement program in your organization. **(Check all that apply)**

- a) Percentage increase in market capitalization or market share
- b) Improved market target index (reflects the organization's decisions regarding the size and growth rates of the markets it participates in)
- c) Increased market coverage index (shows the reach of sales to generate revenue in countries where market demand exists)
- d) Opportunity/Threat Index: shows the potential to grow or shrink market share based on the level of competition in the industries in which the organization participates
- e) Product portfolio index: identifies and validates current and projected customer needs in existing and targeted markets
- f) Improved channel profitability index (identify and evaluate alternative methods to reach and serve customers in current and targeted markets)
- g) Increase in the ability of EA team to respond effectively to new business opportunities
- h) Percentage increase in the level and extent of changes found in new products and services offered
- i) Decrease in time-to-market for new products and the revenue generated
- j) Ratio of opportunities to support a strategy adopted vs. not adopted

- k) Improved R&D success index (ability of the product development function to bring new products and services to market)
- l) Percentage of applications used by more than one business / Product mix offerings
- m) Number of environmental/industry trends articulated in future-state architecture
- n) Measuring productivity through resource management
- o) Time from strategy announcement until a prioritized project pipeline is presented to review and funding bodies
- p) Time from identification of enterprise business strategy (EBS) to implementation and the number of EBS implemented
- q) Time required to complete key business to business tasks
- r) Number of identified emerging technologies implemented
- s) Number of ideas generated through communities, crowd sourcing
- t) Number of business strategies that do not map to a funded initiative
- u) Number of business strategies that map to multiple funded initiatives
- v) No business/strategy metrics are used in our organization
- w) Other (please specify other business/strategy metrics used)

If item 't' is selected go to question 46

- 31) What issues are typically encountered when gathering information on the metrics utilized in Business/Strategy category? **(Check all that apply)**
- a) Metrics created in this category are silo metrics that are not orchestrated relative to big picture corporate needs.
 - b) Lack of management sponsorship/support/ proper guidelines
 - c) No standard business architecture documentation
 - d) No common business process modeling notation deployed
 - e) No aggregation of common business processes to common value streams

- f) Poor data quality and low data consistency due to inefficient reporting tools
- g) Goals for an organization are arbitrarily set and sometimes unrealistic
- h) Metrics created are not long lasting and are subject to economic and leadership changes.
- i) Defining target state first – room for bias
- j) Ensuring metrics are continually evaluated for relevance and identification of new metrics as necessary
- k) Other (please specify)

32) Please indicate your level of **satisfaction** in the **reliability** of the Business/Strategy metrics that your organization utilizes to measure EA value

- a) Very satisfied
- b) Somewhat satisfied
- c) Neither satisfied nor dissatisfied
- d) Somewhat dissatisfied
- e) Very dissatisfied

Please explain the main reason for your answer.

33) How successful has your organization been at achieving the organizational goals set for the Business/ Strategy metrics used to measure EA value?

- a) Very successful
- b) Partially successful
- c) Unsuccessful
- d) Too early in the process to adequately assess
- e) We have the goals set but don't measure against them

Please explain the main reason for your answer.

34) How important are the Business/ Strategy metrics in the overall performance evaluation of your EA program?

- a) Very high importance
- b) High Importance
- c) Moderately important
- d) Low importance
- e) Very low importance

Please explain the main reason for your answer.

2.5 EA internal program metrics

35) Please identify **EA internal program** metrics used with the EA value measurement program in your organization (**Check all that apply**)

- a) Number of certified architects per project and vice versa
- b) Amount of architect time per project
- c) Number of full time equivalents (FTEs) * project IT spending, as a measure of influence
- d) Percentage of time each EA role is in strategic and business planning process
- e) Amount of time EA group spends supporting critical business planning activity and decision making
- f) Percentage reduction in the number of compliance waivers issued
- g) Percentage of EA compliance waivers due to future-state architecture not meeting business needs
- h) Percentage of projects identified through EA process compared to ad hoc identification
- i) Number of projects funded and implemented as identified by EA process
- j) Number of business lines that consult EA team / number of times EA teams are consulted for advice and guidance

- k) Number of new projects that trigger a change in EA
- l) Percentage of successful projects in which EA team participated
- m) Number of projects progressed with EA review required
- n) Amount of customization (includes fit to build, customize, configure, install and reuse)
- o) Number of new business processes identified and improved
- p) Number of business processes documented and optimized
- q) Number of authoritative sources for critical information assets
- r) Number of to-be architectures defined
- s) Number of domains (business, information, technical and application) that have future states defined
- t) Number of projects that leverage EA repository for future-state designs
- u) Extent to which projects have been able to leverage EA information (determined through survey results)s
- v) Rate of business to business innovation EA process enables by improved anecdotal documentation
- w) Number of EA artifacts used in budget and program planning activities
- x) Number of EA artifacts produced and circulated yearly and replaced/refreshed annually.
- y) Extent to which EA website is used by business and others (number of EA website visitors)
- z) Number of attendees at EA initiated meetings over time
- aa) Amount of time (engagement) EA team spends with outsourcing team
- bb) Employee awareness regarding EA team activities (obtained through survey)
- cc) No EA internal metrics are used in our organization
- dd) Other (please specify other EA internal metrics used)

If item 'cc' is selected go to question 51

36) What issues are typically encountered when gathering information on the metrics utilized in EA internal program metrics category? **(Check all that apply)**

- a) Lack of management sponsorship/support/ proper guidelines
- b) Lack of business standards to define EA internal metrics
- c) Poor data quality and low data consistency due to inefficient reporting tools used
- d) Goals for an organization are arbitrarily set and sometimes unrealistic
- e) Defining target state first – room for bias
- f) Ensuring metrics are continually evaluated for relevance and identification of new metrics as necessary
- g) Other (please specify)

37) Please indicate your level of **satisfaction** in the **reliability** of the EA internal program metrics that your organization utilizes to measure EA value

- a) Very satisfied
- b) Somewhat satisfied
- c) Neither satisfied nor dissatisfied
- d) Somewhat dissatisfied
- e) Very dissatisfied

Please explain the main reason for your answer.

38) How successful has your organization been at achieving the organizational goals set for the EA internal program metrics used to measure EA value?

- a) Very successful
- b) Partially successful
- c) Unsuccessful

- d) Too early in the process to adequately assess
- e) We have the goals set but don't measure against them

Please explain the main reason for your answer.

39) How important are the EA internal program metrics in the overall performance evaluation of your EA program?

- a) Very high importance
- b) High Importance
- c) Moderately important
- d) Low importance
- e) Very low importance

Please explain the main reason for your answer.

2.6 Growth / Innovation metrics

40) Please identify **growth/innovation** metrics used with the EA value measurement program in your organization (**Check all that apply**)

- a) Percentage of ideas implemented, trends and patterns
- b) Percentage of ideas relevant to business objectives, relevant to innovation focus
- c) Percentage of business-initiated ideas and percentage of IT-initiated ideas
- d) Percentage of ideas from internal collaboration
- e) Percentage of ideas sourced externally
- f) Size of the innovation team
- g) Improvement (over time) in the time for report products and accuracy of information
- h) Improvement in "anytime, anywhere, anyway" access to information
- i) Improvement in frontier analysis and response to environmental change

- j) Innovation funding as a percentage of revenue
- k) Innovation funding as a percentage of IT spending
- l) Percentage of teams participating in defining and usage of metrics
- m) No. of innovation events or campaigns conducted
- n) Regional or geographic , demographic comparisons of customers
- o) Cost of customer innovation vs. internal
- p) Cost of customer innovation vs. partner networks
- q) Average ideas per month for top 10 most active customers
- r) Trends in customers (increase/decline) for top 10 most active customers
- s) Number of micro networks and connections made to other communities
- t) No growth/innovation metrics are used in our organization
- u) Other (please specify other growth/innovation metrics used)

If item 't' is selected go to question 56

- 41) What issues are typically encountered when gathering information on the metrics utilized in growth/innovation category? **(Check all that apply)**
- a) Intangible nature of metrics makes it hard to capture
 - b) Lack of management sponsorship/support/ proper guidelines
 - c) No standard business architecture documentation
 - d) Lack of integrated technology or inefficient tools used to capture the metrics data
 - e) Legal/political barriers
 - f) Defining target state first – room for bias
 - g) Other (please specify)
- 42) Please indicate your level of **satisfaction** in the **reliability** of the growth/innovation metrics that your organization utilizes to measure EA value

- a) Very satisfied
- b) Somewhat satisfied
- c) Neither satisfied nor dissatisfied
- d) Somewhat dissatisfied
- e) Very dissatisfied

Please explain the main reason for your answer.

43) How successful has your organization been at achieving the organizational goals set for the growth/innovation metrics used to measure EA value?

- a) Very successful
- b) Partially successful
- c) Unsuccessful
- d) Too early in the process to adequately assess
- e) We have the goals set but don't measure against them

Please explain the main reason for your answer.

44) How important are the growth/innovation metrics in the overall performance evaluation of your EA program?

- a) Very high importance
- b) High Importance
- c) Moderately important
- d) Low importance
- e) Very low importance

Please explain the main reason for your answer.

2.7 Compliance/Regulatory Metrics

- 45) Please identify the **compliance/regulatory** metrics used with the EA value measurement program in your organization **(Check all that apply)**
- a) Number of internal/external audit filings
 - b) Number of overdue regulatory filings
 - c) Number of censures, fines and warning by local regulators
 - d) Accuracy and completeness of documentation
 - e) Percentage of software lacking license documentation
 - f) Count and percentage of unauthorized software
 - g) Number of designs / projects that are 100% compliant with EA standards
 - h) Of those that are not 100% compliant, the number that would have achieved compliance at or above a given level
 - i) Percentage of transactions that adhere to master data standards
 - j) Percentage of projects that follow clearly defined governance
 - k) Number of backlogged projects waiting for architecture governance.
 - l) Number of projects that comply with risk management guidelines
 - m) Reduction in number of risk management issues recorded in projects
 - n) Number of projects that complete self-certification in all stages
 - o) Number of new regulations implemented within the permitted timeframe
 - p) Number of internal audit raisings and assessing the management of the regulatory finding
 - q) Number of unauthorized accesses and changes to process, information and technology (including applications)
 - r) Number of lawsuits filed
 - s) Compliance Index: shows the ability of finance and regulatory functions to comply with laws and regulations to carry out smooth business operations.
 - t) Accuracy Index: shows the ability of the finance and regulatory functions to provide accurate and timely information internally.

- u) Advisory Index: measures how much finance and/or regulatory functions are involved with strategic business initiatives
- v) Cost-of-Service Index: measures the overall cost to provide finance and regulatory support and advisory services to the organization.
- w) No compliance/regulatory metrics are used in our organization
- x) Other (please specify other compliance/regulatory metrics used)

If item 'w' is selected go to question 61

46) What issues are typically encountered when gathering information on the metrics utilized in compliance/regulatory category? **(Check all that apply)**

- a) Silo mentality lacking vision of interdependency of risks within organization
- b) Lack of management sponsorship/support/ proper guidelines
- c) Varying regulations with time
- d) Redundancy and inconsistency in the deployment of a given capability
- e) Lack of documentation as to how compliant areas are addressed internally
- f) Lack of documentation as to how compliant areas are addressed through outsourced business capabilities
- g) Legal/political barriers
- h) Inability to meet regulatory requirements within a given time frame
- i) Under funding / budget shortfall
- j) Other (please specify)

47) Please indicate your level of **satisfaction** in the **reliability** of the compliance/regulatory metrics that your organization utilizes to measure EA value

- a) Very satisfied
- b) Somewhat satisfied
- c) Neither satisfied nor dissatisfied
- d) Somewhat dissatisfied

e) Very dissatisfied

Please explain the main reason for your answer.

48) How successful has your organization been at achieving the organizational goals set for the compliance/regulatory metrics used to measure EA value?

a) Very successful

b) Partially successful

c) Unsuccessful

d) Too early in the process to adequately assess

e) We have the goals set but don't measure against them

Please explain the main reason for your answer.

49) How important are the compliance/regulatory metrics in the overall performance evaluation of your EA program?

a) Very high importance

b) High Importance

c) Moderately important

d) Low importance

e) Very low importance

Please explain the main reason for your answer.

2.8 Other metrics

50) Does your organization utilize metrics that have not been listed to this point for measuring the value of EA program?

a) Yes

b) No

If answered 'Yes', please continue else proceed to question 67

51) Please specify the metrics that your organization utilizes for measuring the value of EA program that have not been listed so far

52) What issues are typically encountered when gathering information on each of the metrics specified above? (Please explain this for each of the metrics listed to question 62)

53) Please indicate your level of **satisfaction** in the **reliability** of each of the metrics listed above (Please use the following likert scale: **very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, very dissatisfied**)

54) How **successful** has your organization been at achieving the organizational goals set for each of the metrics listed in Question 62 in measuring EA value? (Please use the following likert scale: **very successful, partially successful, unsuccessful, too early in the process to assess, we don't measure against set goals**) for each of the metrics listed in question 83

55) How **important** are the metrics listed in Question 62 in the overall performance evaluation of your EA program? (Please use the following likert scale: **very high importance, high importance, moderately important, low importance, very low importance**) for each of the metrics listed

2.9 Review procedure for metrics

56) Please explain how often the metrics utilized for EA value measurement program are collected and reviewed (**Please select only one**)

a) Weekly

- b) Monthly
- c) Quarterly
- d) Annually
- e) We don't have a formal review process
- f) Other (please specify)

57) Please explain for what purposes the metrics collected are used?

2.10 Other

58) Please provide any additional comments you have on the EA value measurement program of your organization that might be useful

59) What are the other areas/topics of interest within enterprise architecture where you would like to see future research conducted?

Section 3 – Individual demographic information

3.1 Education

60) What is your highest level of formal education? **(Please select only one)**

- a) Associates degree
- b) Bachelors degree
- c) Masters degree
- d) Doctorate
- e) Other (Please specify)

61) In what field is this degree? **(Please select only one)**

- a) Business

- b) Computer Science
- c) Engineering
- d) Information Technology
- e) Public administration / Public policy
- f) Other (please specify)

62) Do you hold degrees in other fields?

- a) Yes
- b) No

If yes, check all that apply:

- a) Business
- b) Computer Science
- c) Engineering
- d) Information Technology
- e) Public administration / Public policy
- f) Other (please specify)

63) Please indicate any professional certifications that you hold

3.2 Gender

64) Please specify your gender. **(Please select only one)**

- a) Male
- b) Female
- c) Decline to answer

3.3 Age

65) What is your age group? **(Please select only one)**

- a) 18 – 20 years

- b) 21 – 25 years
- c) 26 – 30 years
- d) 31 – 35 years
- e) 36 – 40 years
- f) 41 – 45 years
- g) 46 – 50 years
- h) 51 – 55 years
- i) 56 – 60 years
- j) > 60 years
- k) Decline to answer

3.4 EA Experience

66) Please indicate your total years of experience in enterprise architecture related roles
(Please select only one)

- a) Less than 3 years
- b) 3 years to less than 6 years
- c) 6 years to less than 10 years
- d) 10 years to less than 15 years
- e) 15 years to less than 20 years
- f) 20 years to less than 30 years
- g) 30 years or more

Section 4 – Questions about your Organization

Please answer in terms of the organization where you have primary EA responsibility

4.1 Industry

67) Which of the following is your primary industry of operation? **(Please select only one)**

- a) Automotive

- b) Banking & Financial services
- c) Biotechnology & Pharmaceuticals
- d) Chemicals
- e) Construction & Engineering
- f) Consulting & Business Services
- g) Consumer Goods
- h) Distribution
- i) Education
- j) Electronics
- k) Energy & Utilities
- l) Food & Beverage Processing
- m) Government – State and Local
- n) Government – Federal defense and intelligence agencies
- o) Government – Federal civilian agencies
- p) Health Care & Medical
- q) Hospitality & Travel
- r) Information Technology
- s) Insurance
- t) Logistics & Transportation
- u) Manufacturing
- v) Media & Entertainment
- w) Metals & Natural Resources
- x) Non-Profit (Non-Government)
- y) Professional services
- z) Retail

- aa) Telecommunications
- bb) Other (please specify)

4.2 Size

68) For the organization being described, please indicate the number of employees
(Please select only one)

- a) Less than 100
- b) 100 - 249
- c) 250 - 499
- d) 500 – 999
- e) 1000 - 2499
- f) 2500 – 4999
- g) 5000 – 9999
- h) More than 10000
- i) Don't know

69) For the organization being described, please indicate the number of IT employees
(Please select only one)

- a) Less than 25
- b) 26 - 50
- c) 51 - 75
- d) 76 - 100
- e) 101 - 200
- f) 201 – 500
- g) 501 – 1000
- h) More than 1000
- i) Don't know

4.3 Geographic Distribution

70) In which part of the world is your organization headquartered? **(Please select only one)**

- a) North America
- b) Central America
- c) South America
- d) Europe
- e) Middle East
- f) Africa
- g) Asia Pacific
- h) Other (please specify)

4.4 Annual Revenue/Sales/Operating Budget in US dollars

71) What is your organization's Annual Revenue (if a company) or Operating Budget (if Government or Non-Profit Organization)? **(Please select only one)**

- a) Less than \$1 million
- b) \$1 million to less than \$5 million
- c) \$5 million to less than \$10 million
- d) \$10 million to less than \$25 million
- e) \$25 million to less than \$50 million
- f) \$50 million to less than \$100 million
- g) \$100 million to less than \$250 million
- h) \$250 million to less than \$500 million
- i) \$500 million to less than \$1 billion
- j) \$1 billion to less than \$10 billion
- k) \$10 billion to less than \$100 billion
- l) More than \$100 billion
- m) Don't know

Academic Vita of Timothy C. Giliberti

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Education: Bachelor of Science Degree in Information Sciences and Technology,
Penn State University, Spring 2011 University Park, PA
Minor in Security and Risk Analysis
Honors in Information Sciences and Technology
Thesis Title: Enterprise Architecture Value Measurement and
Relevant Success Metrics
Thesis Supervisor: Doctor Brian Cameron

Related Experience:

Internship with Deloitte & Touche LLP as an Enterprise Risk Services
Technology Risk Intern
Supervisor: Eliza Warring
Summer 2010

Internship with Deloitte Services LLP as an Information Technology
Intern
Supervisor: Antoinette Johnson
Summer 2009

Awards:

Dean's List
Phi Kappa Phi Honors Society
Bunton-Waller Merit Award

Presentation/Activities:

Mobile Health Solutions in Emerging Markets presentation to Johnson
and Johnson
Enterprise Architecture Club member