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ENTERPRISE ARCHITECTURE SUCCESS:  
ASSESSMENT CATEGORIES OF ENTERPRISE ARCHITECTURE READINESS

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## Abstract

The purpose of this thesis is to identify key success criteria of enterprise architecture (EA). Many organizations today have limited or no enterprise architecture initiative, but as forces such as globalization and equalization increase, their leaders are beginning to realize the range of potential benefits that EA brings to the table. This paper identifies key aspects that are representative of an organization's readiness for a formal EA program. Leadership, expectation and perspective of EA, resource, corporate governance, current state, corporate strategy, stakeholder involvement and support, and business domain are key domains that indicate an organization's EA readiness. Each domain is supported by both industrial and academic sources, with emphasis on industry due to EA's practical nature. Within each of the domains mentioned above, guidelines for determining the metrics are clarified in the appendix. This paper examines key domains that indicate an organization's EA probability of success, each domain's characteristics, and measurement guidelines for each characteristic.

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## Introduction

### History of Enterprise Architecture

The Digital Age is characterized by the arrival of information on every imaginable topic to the fingertips of anyone hovering over the input mechanism of an electronic device connected to the Internet. With the influx of information, the status quo way of doing things is changing at an incredible pace. People have been empowered by access to the sum of mankind's knowledge accumulated over thousands of years and have begun to evolve into new levels of existence through advancements such as the personal computer, cell phones, and the Personal Digital Assistant (PDA). These products of the Information Age were not the result of coincidence. Instead, they were engineered through the assimilation of various materials, subcomponents, connections to the external environment, and the value that it adds to users. While these entities are quite complex, the epitome of complexity that exists in civilization today, is not the product itself, rather it is the corporations that produce these products. Even though cutting edge products and services are designed, engineered, and then manufactured with meticulous detail at every step, the corporations that created them are not designed with the same level of detail.

Jay Forester in a speech entitled "Designing the Future" mused, "Organizations built by committees and intuition perform no better than an airplane built by the same methods. As in bad airplane design, which no pilot can fly successfully, such badly designed corporations lie beyond the ability of real-life

managers. Success of a pilot depends upon an aircraft designer who designed it to be a successful airplane. Who designs the corporations that a manager runs?”

## **Birth and Evolution of Enterprise Architecture**

Organizations today are riddled with problems associated with great complexity – isolation, inefficiency, and rigidity. In their response, business leaders from various organizations are turning to enterprise architecture to streamline processes, increase efficiency, and adapt to the increasingly level playing field in the global economy. The justification behind enterprise architecture is quite simple; its overarching purpose is to decompose the organization’s architecture into more easily understood pieces. Enterprise architecture can be compared to an architectural drawing containing all the details of constructing a building. Although the blueprint is useful, it can cause confusion for someone trying to locate or trace only a single aspect of the architecture such as the HVAC system. In order to simplify the blueprint, architects sketch multiple drawing of the plumbing, electrical, structural, heating, ventilating, and air conditioning sub-systems. These views are created especially for the plumbers, electricians, and the like with the information necessary to perform their specific roles. Enterprise architecture serves a similar purpose and depicts a single holistic view as well as many specialized views to provide the associated users with the information needed to complete the design (Deng, 2006).

John Zachman, the “godfather” of enterprise architecture once suggested that organization would eventually advance out of the disintegrated, discontinuous, inflexible legacy environment into an architected, coherent, flexible, dynamic, optimized Enterprise. To fulfill his vision, Zachman conceived the necessity of

engineering an enterprise in an article published in 1982 in the IBM Systems Journal. Since the birth of the term enterprise architecture, it has been surrounded by a cloud of mystery. Originally introduced as a branch under Information Systems Architecture, it was widely misunderstood that EA only applied in the domain of information technology. Today, as more and more executives within corporations understand the potential value that can be created through enterprise architecture, it has become a growing trend that EA is no longer a function within IT; rather, IT has become a function within EA.

### **Current Definition of EA**

Since the introduction of the term enterprise architecture, it has been surrounded by a veil of mystery. Depending on the issuing authority, the words describing enterprise architecture varied greatly. Its comprehensive and complex nature resulted in the acceptance of many similar but not identical definitions. November 12, 2008, a panel discussion organized by the Society for Information Management (SIM) Enterprise Architecture Working Group (SIMEAWG), in ten or less words defined EA as “the holistic set of descriptions about the enterprise over time.”

According to the IT and EA auditors in the General Accountability Office (GAO) of the U.S. federal government: “An enterprise architecture is a blueprint for organizational change defined in models using words, graphics, and other depictions that describe in both business and technology terms how the entity operates today and how it intends to operate in the future; it also includes a plan for transitioning to this future state.”



According to Gartner, “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, Allega, & Burke, Gartner Clarifies the Definition of the Term 'Enterprise Architecture', 2008).”

The Institute For Enterprise Architecture Development defined enterprise architecture as a “complete expression of the enterprise; a master plan which ‘acts as a collaboration force’ between aspects of business planning such as goals, visions, strategies and governance principles; aspects of business operations such as business terms, organization structures, processes and data; aspects of automation such as information systems and databases; and the enabling technological infrastructure of the business such as computers, operating systems and networks.” (“Enterprise architecture good practice guide first international open standard in EA,” 2009)

While the definition of enterprise architecture varies depending on which authority is answering, the gist of enterprise architecture is no longer being debated. Enterprise architecture is essentially both: the process that results in the creation of a set of holistic descriptions of an enterprise’s current state in transition to a future desired state and the end architecture of that process.

## Enterprise Architecture Theory

For the sake of clarifying the concept of enterprise architecture, the Zachman Framework is chosen to provide a comprehensive understanding of enterprise architecture in its purest form. In 1982, John Zachman coined the term Enterprise Architecture (EA) and proposed an Enterprise Architecture Framework for systems development in an IBM research publication titled, “A Framework for Information Systems Architecture.” The term was introduced to clarify a new paradigm in the field of Information Systems Architecture (ISA). Information Systems Architecture, he opined, should not be confused with Enterprise Architecture. Whereas ISA is traditionally believed to be the discipline associated with engineering an information system, enterprise architecture does not apply to ISA. EA is in an entire different level than ISA.

EA in his vision is the domain of engineering an enterprise, just as architectural engineering is the domain envisioning, designing, and building a structure, and aerospace engineering is the domain of architecting a spacecraft. In his own words, the Zachman Framework is “a theory of existence of a structured set of essential components of an object for which explicit expressions is necessary and perhaps even mandatory for creating, operating, and changing the object.” The original EA framework is a schema composed of the intersection of two historical classifications that have been in use for thousands of years. The first is the fundamentals of communication found in the primitive interrogatives: What, How, When, Who, Where, and Why. It is the integration of answers to these questions that enables the comprehensive, composite description of complex ideas. The second is

derived from reification, the transformation of an abstract idea into an instantiation that was initially postulated by ancient Greek philosophers and is labeled in the Framework: Identification, Definition, Representation, Specification, Configuration and Instantiation. The intersecting cells of the Framework correspond to models which, if documented, can provide a holistic view of the enterprise (Zachman, John Zachman's Concise Definition of the Zachman Framework, 2010). Since the Zachman Framework classification was observed empirically in the structure of the descriptive representations ... there is substantial evidence to establish that the Framework is the fundamental structure for Enterprise Architecture and thereby yields the total set of descriptive representations relevant for describing an Enterprise. The distinction that the Zachman Framework is an ontology for describing an enterprise and not implementation methodology is almost never made.

The process of doing EA and its deliverables provides leaders with a clear representation of their organizations' current state and the changes necessary to narrow the gap between the current and desired state. Much confusion still surrounds EA, specifically what EA is supposed to do for the enterprise. As Zachman brilliantly put it, the end object [of EA] is not to build and run information systems. The end object is to engineer and manufacture the enterprise (Kappelman, 2010).

## Benefits of EA

EA can generate tremendous value by optimizing and simplifying the enterprise, increasing its agility and productivity, and aligning business and technology horizontally and vertically. Each success, in turn, will win a few converts and help garner further support. This process, if sustained, eventually becomes a virtuous cycle, continuously creating value and driving innovation (Kappelman, *The SIM Guide to Enterprise Architecture*, 2010).

A successful EA program delivers significant benefits to the organization through the EA process and its deliverables. According to research by Gartner, major benefits include:

- Discover harmonization opportunities that cross business units and functional areas that will drive efficiency and reduced costs
- Understand the implications of cost optimization efforts on current and future business capabilities
- Ensure that the enterprise is prepared for growth when the global recession inevitably recedes
- Ensure that investments of time, resources, and money are made in a way that best supports the business strategy
- Take advantage of transformational opportunities that are presented by the unstable economic environment.

These momentous benefits can make the difference in an organization's survival in the turbulent economy and its prosperity in the economic expansion (Lapkin, 2009).

Between 2007 and 2008, SIMEAWG conducted a survey to determine the most widespread definition of EA as well as its perceived benefits. In the section – *The purpose/function of enterprise architecture*, the responses indicated that executives in the IT domain primarily view EA's to provide blueprint of data, applications, and technology. They also believe that EA is a tool for planning,

decision making, alignment of business and IT, and to facilitate systematic change. In another section of the survey – *Potential benefits of doing enterprise architecture*, respondents believe that EA primarily provides for: improved Information Systems interoperability, improved utilization of IT, alignment of business and IT investments, and more effective use of IT resources. Their responses also indicate that EA benefits potentially include:

- Adaptability
  - More responsive to change
  - Better situational awareness
  - Proactive instead of reactive so external environmental changes
- Optimization
  - Improved IT return on investment
  - Improved communications & information sharing
  - Improved information systems security
  - Fewer wasted resources on non-supportive projects
  - More effective at meeting business goals
  - Improved communication between organization and information systems
  - Faster information system development and implementation
  - Reduced IT complexity
  - Reduces stovepipes in organization
- Integration
  - Assists with organizational governance
  - Better collaboration within organization
  - Standardizes organizational performance measures
  - Improved communications within organization
  - Improves trust in the organization

Successful EA programs can generate great value for organizations. As Dr. Leon Kappelman posits, it “enables managers to manage ubiquitous change and increasing complexity within the strategic and tactical environments their organizations operate.”

Executive leadership across the world began paying more attention to the EA

as its touted benefits permeate both industry and academic conferences. Leaders are realizing the value of creating and maintaining a comprehensive blueprint of their organizations – a clear representation of their organizations’ current state and the changes necessary to narrow the gap between the current and desired state.

By understanding the myriads of potential benefits that EA offers, executives are either planning to or already started initiating EA programs within their organizations. Enterprises without formal EA programs may believe that they have to start from the scratch, but that is not the case. Even without formal EA programs, organizations today have already been doing activities associated with the discipline. Activities such as: defining standards and processes, documenting business drivers, technology standards, and horizontal integration even if not called EA, fall under the umbrella of EA. But before formally initiating an EA program, leaders should assess their organization’s readiness for enterprise architecture. Because implementing EA is a highly complex and broad impact process, many organizations often are met with severe challenges when diving into it. This could be due to the fact that many organizations are lacking or deficient in domains critical to the success of EA. Without the proper environment for EA initiatives, organizations face great challenges in addition to the existing issues within implementing EA.

## Top Challenges of Enterprise Architecture

As with typical enterprise-wide change initiatives, EA programs have to surmount the usual organizational problems such as parochialism, resistance to change, and obtaining the adequate funding, as well as facing the additional challenges only existent in the domain. In “Enterprise Architecture Seminar Workshop Results: Top EA Challenges”, a research publication from Gartner, people and business categories were identified as the areas with the highest number of challenges. Some of the specific challenges (not in order of significance) were (Burton, Enterprise Architecture Seminar Workshop Results: Top EA Challenges, 2010):

- Gaining and retaining executive and management support
- Communicating and marketing of EA
- Finding EA skilled people who can work with business
- Handling political and cultural issues, from lack of collaboration to infighting
- Dealing with past negative perceptions of EA
- Aligning IT and business
- Lack of unified direction of EA program
- Little understanding of the business value and impact of EA
- Unclear job descriptions
- Organization too busy with day-to-day to focus on EA
- Dealing with political issues and governance
- Defining EA for the company (scope, objectives and definitions)
- Integrating EA into existing processes

## Justification for Research

Many enterprise architecture initiatives today do not achieve the desired results, which has led various stakeholders including senior executives to question the value-add of EA to their organization. In most of these situations, it is not because

enterprise architecture cannot bring value to their organization, instead it is because their organization was severely deficient in certain aspects required for the success of enterprise architecture initiatives. It is like expecting to build a skyscraper without a solid foundation.

This paper seeks to identify those key aspects that are representative of an organization's overall health and can expose potential problems during the EA implementation. Using these assessment criteria to determine an organization's enterprise architecture readiness, organizations can make the necessary arrangements before the start of a formal EA program and ease the initiation of such a program. This would allow the smooth birth and development of EA initiatives within an organization and help foster good-will for future enterprise architecture efforts.

## **Overview of Study**

This study to determine the top success criteria of enterprise architecture initiatives is divided into two parts: the first component involves conducting an extensive literature review on the necessary elements needed for a successful EA program; the second component involves conducting interviews with the leading industry experts from both the public and private sectors.

Various sources from both academia and industry were consulted to build a preliminary set of success criteria. In academia, sources such as thesis, PhD dissertations, and professors were consulted for this project. In industry, research conducted by Gartner and Forrester were referenced as well.



## Study Methodology

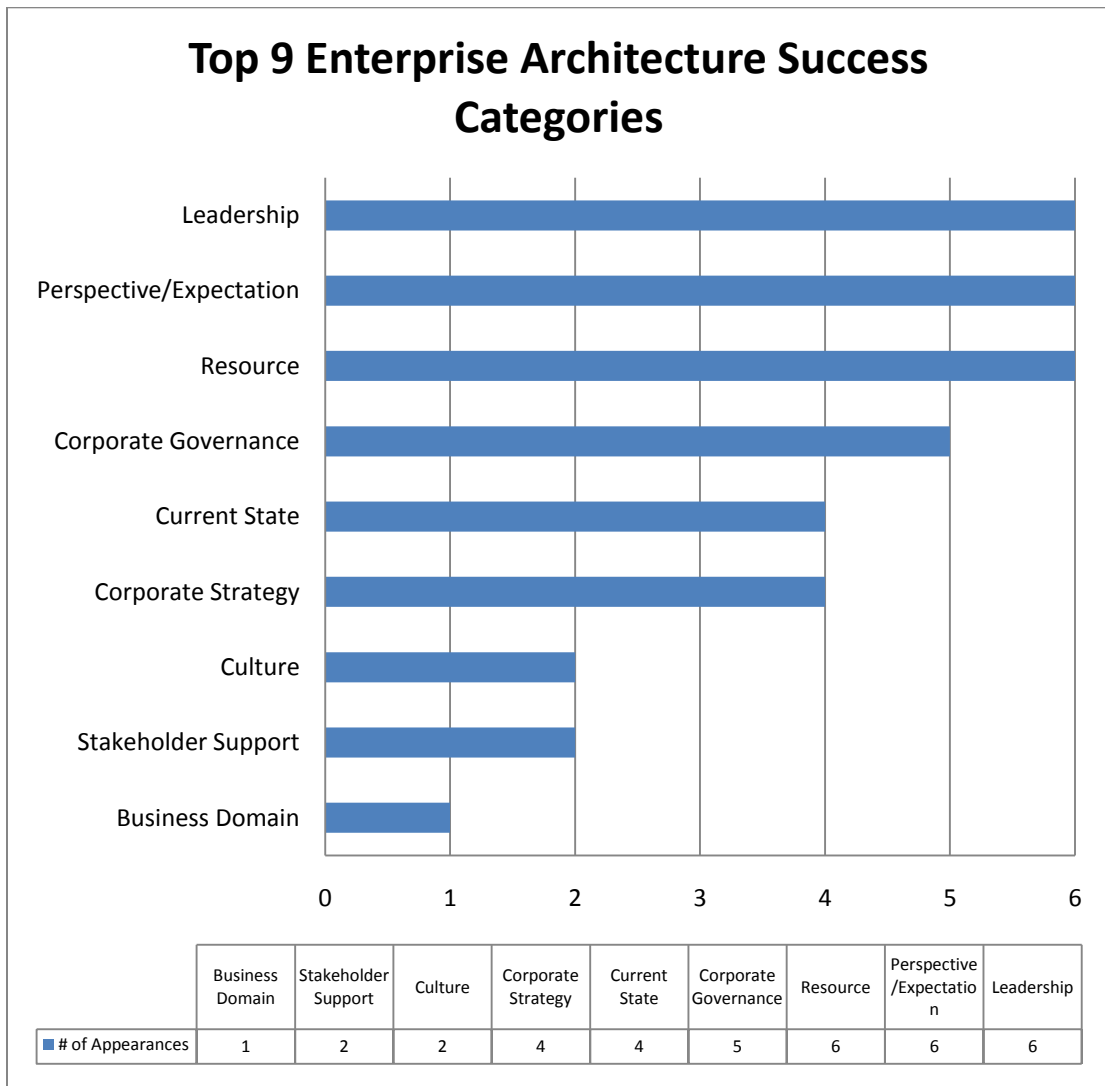
The collection instrument used in this study is a series of interviews targeted at the leading experts in the domain of enterprise architecture. It was chosen for several reasons with the primary reason that it could provide the appropriate answers to the open-ended questions used in this study. Due to the pioneering nature of this research, interviews were scheduled with willing participants and conducted over the telephone. Other materials were used to supplement the data collection process, such as the sharing of documents, tools, and books.

Most of the research conducted in this study qualifies as qualitative research, and the data collected from the interviews was analyzed through the interpretive technique of coding. Coding both organizes the data and provides a means to introduce the interpretations of it into certain quantitative methods. Since the qualitative data collected in this study is highly structured as a result of the tightly defined interview questions, the data was coded with little additional segmenting of the context. The data collected from the interviews were analyzed, demarcated, and labeled with a code, in this particular case – an enterprise architecture success category. The results of the study will be presented in a combination of ways: summarizing the number of unique occurrences of individual codes, performing meaningful statistical analyses on the codes, discussing the nine success categories and supporting them with arguments from both the interview and literature review, and highlight the relationship between the categories.

An issue typically unaddressed by researchers using the coding method of statistical analysis to investigate qualitative data is that coding potentially drains the

data of its variety, richness, and individual character when transforming qualitative data to quantitative data. This setback was avoided in this study by meticulously expediting the definitions of codes and linking those codes appropriately to the underlying data, thus returning most of the richness that may have been lost in the process.

## Study Findings



This image graph shows the top nine enterprise architecture success categories

and their corresponding number of appearance throughout the interviews.

## **Success Criteria for Enterprise Architecture**

Through the combination of completing an extensive literature review and a series of interviews with six experts from both industry and academia, public and private sector, a list of the top nine enterprise architecture success criteria have been determined. The following list of assessment categories holistically depicts an organization's enterprise architecture readiness, ranked in the order of importance:

- Leadership
- Expectation and Perspective of Enterprise Architecture
- Resource
- Corporate Governance
- Current State of the Organization
- Corporate Strategy
- Culture
- Stakeholder Support and Participation
- Business Domain

A vast majority of these problems can be attributed to the lack of a suitable environment for EA. The next chapter addresses the top nine enterprise architecture readiness assessment categories identified in this research study.

## **Assessment Categories**

While these categories are distinctly classified, they are highly correlated. For

example, leadership is closely tied with stakeholder involvement and participation, since only the top brass has the influence to garner involvement from middle level management and lower. Leadership is also closely tied with perspective; specifically, the paradigms of a leader in his/her guidance principles and objectives determine his actions. Culture is heavily associated with perspective; for example, if the organization is very result oriented, measuring every performance indicator to precision, then the perspective of short-term/vs. long-term planning will be skewed towards the short-term. Leaders are more likely to make decisions favorable to the short-term. In essence, these categories are broad characteristics of establishing groundwork for future, formal EA programs.

## **Leadership**

Leadership has been identified by many EA experts as the prerequisite of all requisites. Six out of six industry experts interviewed in this study believe that at the minimum, the availability of sponsors at the C-level must be present. Although it does not require absolute dedication of C-level executives, there needs to be a potential pool of C-level supporters. This necessary element usually works in conjunction with achieving enterprise architecture efforts high visibility in the organization. A step up from having the availability of C-level sponsors, five out of six industry experts questioned in this study recommended the requirement of senior leadership buy-in, which would ensure EA alignment with the overall executive mandate. Having this piece of the puzzle shows that the senior leaders actually believe in EA, know why they believe in EA, have reasonable expectations for EA, and also understand that some of EA's value cannot be quantified. The presence of

senior leadership also ensures that an executive will take ownership of the initiative, and not just talk about architecture. The interviewees suggested that the presence of senior leadership buy-in would support decision making, through good and bad economic environments.

Another success criteria mentioned throughout the interviews is long-term commitment from the leadership within the organization. With the support of the top brass within the organization, long-term commitment to EA would reduce the chances that the EA initiative would be cut when the organization is experiencing a bad year. Lastly, the most optimal situation is having the complete buy-in at the C-level, which would guarantee the level of commitment of time, resource, and capital needed in order for EA to be truly valuable for the organization.

Randolph C. Hite, the director of IT architecture and systems issues in the U.S. Government Accountability Office (GAO), spoke at The Pioneers of Enterprise Architecture: A Panel Discussion and argued that leadership is the key to overcoming every one of these challenges, and convinced those in executive management that EA is worthwhile and has value is critical to the success of EA (Kappelman, The Pioneers of Enterprise Architecture: A Panel Discussion, 2010). Hite opined that one of the top four reasons why EA programs fail is that “top-management literally don’t understand [EA] so they’re not backing it.” Without proper leadership to champion for EA’s cause, progress in adopting EA will be sluggish and of no substance. Mr. Con Kenney, senior research fellow in Systems Management from the National Defense University, argued that in some instances, EA initiatives would proceed without the alleged support of a C-level executive. Instead, the champion for EA may

not have a top leadership position and needs to use his/her influence to guide senior-leadership to support the project throughout its duration, and renewing the support with each little success along the way, thus slowly but surely building a good reputation and momentum in organization.

An ideal executive sponsor would be the CIO, reporting directly to the CEO, who also staunchly believes the value of EA along with the Board of Directors. Working closely with the champion for EA, the CFO potentially allows coupling attainment of resources with EA cooperation and drives explicit business rational and value into the process (Handler, 2009). In addition to having an authoritative figure striving for the adoption of EA, a champion at a C-level position brings high visibility to the issue due to his/her influence and EA will most likely not be dismissed as frivolous and unnecessary.

One report also confirmed the notion that planning enterprise architecture at the highest levels of the organization is more likely to yield an architecture compatible with the entire organization (Weiss, 2006).

While having executive support is critical to the success of EA, solely relying on executive support is not enough. Success in EA is about people, political acumen, perspective, pragmatism, and performance. A Chief Enterprise Architect working closely with the C-level champion such as the CEO, CFO, CIO, provides the directional decision support needed for EA implementation. The need for a Chief Enterprise Architect revolves around the primary responsibility for developing and evolving a useful EA. This person must be skilled in communication, relationship building, process improvement, organization change management, staff development,

and team evolution (Handler, 2009). Since it is not exclusionary and provided that there are not conflicts of interest, the executive leader of the EA initiative can also function as the Chief Enterprise Architect.

### **Expectation and Perspective of Enterprise Architecture**

One of the major aspects that exert tremendous influence on the likelihood of success of enterprise architecture programs is the organization's expectation for EA. Four out of six experts interviewed cited expectation management within enterprise architecture as a critical success factor. One aspect of expectation management is the ability to document the organization's enterprise architecture goals. Being able to explicitly outline the goals for the EA initiative allows for more structured effort and better assessment capability in the event of measuring performance. It also helps with setting realistic expectations that clearly communicate the vision and value proposition for EA. Having clear expectations also help organizations determine where to first focus enterprise architecture efforts for early success stories. It also demonstrates through its actions and words that the architecting office understands and is fully supportive of the corporate mission and vision.

Another aspect of expectation management within EA is that the various stakeholders understand the concept of holistic thinking, and depicting a holistic picture of the organization. Being able to meet the explicitly defined, realistic expectations would show success stories early on, and help build a loyal following for EA initiatives in the future.

One major factor that affects EA's success is the tradeoff between short-term/long-term goals. Closely tied with executive support, organizations, divisions,

and/or leaders with short-term goal fulfillment preference over the long-term, tend to not derive as much value from EA as their counterparts do. This issue is a little different from the rest, because it is a balancing act; while short-term goal preference can negatively impact EA, overemphasizing long-term planning might also be disastrous.

Zachman broached this topic at the panel discussion in the 2008 SIMEAWG conference and opined that short-term systems implementations that deliver quick results often hinder the enterprises long term goals. He stated that architecture is the only way that the enterprise can get organization wide integration, flexibility, interoperability, reusability, alignment, etc (Kappelman, The Pioneers of Enterprise Architecture: A Pannel Discussion, 2010). In an article Zachman wrote “Architecture is Architecture is Architecture”, he agreed that short term implementations must continue in order to meet the demand, while the elements of EA should be engineered in the meantime. He proposed that future short-term implementations must follow the requirements stipulated in the elements of EA. Over time, he suggested, enterprises “could migrate (maybe ‘evolve’) out of the disintegrated, discontinuous, inflexible legacy environment into an architected, coherent, flexible, dynamic, optimized Enterprise (Zachman, Architecture is Architecture is Architecture, 2010).” The key to overcoming this issue is to determine whether the organization can afford to divert valuable resources for long-term development and still meet short-term goals of the organization. Investing in long-term strategy and planning can help corporations to weather economic turbulences and capitalize on economic expansions.



Another issue equally important has to do with scope. According to Betsy Burton, EA analyst at Gartner, many formal EA programs lose focus of the end result of EA in the following ways:

- Strict Following of EA Frameworks
- Overstandardization
- Analysis Paralysis
- Lack of Business Focus
- Technology Driving the Architecture
- Tools Driving EA
- Focusing on the Current State First or Primarily
- We're Done

Within the field of enterprise architecture modeling, there is no standard modeling language or convention. The lack of maturity in this field leaves many organizations developing their own modeling techniques or using immature ones. This often leads to poor modeling practices which can hinder the success of enterprise architecture. Gartner recommends that details should be defined at the highest levels first and lower levels of detail should be defined only when (Weiss, 2006).

For example, many EA initiatives will essentially abdicate the responsibility of understanding and defining the appropriate process for supporting EA by simply and blindly adopting an industry or common EA framework. In these cases, they often follow a defined framework, like a cookbook recipe, to create EA artifacts, guidelines, and standards, without taking the time to determine what is needed within their organizations. Another example is Overstandardization. While reducing IT management costs, facilitating horizontal and vertical integration, are laudable goals, many EA initiatives fall into the trap of solely defining standards. As a result, those organizations have experienced a business and IT backlash against standards and may

potentially cause users to circumvent or ignore defined standards, and tarnish the reputation of EA by being perceived as doing nonstrategic activities. In essence, losing focus of EA related activities mean that the scope and direction of EA was not clearly defined in the beginning stages.

## Resource

Having the right tools for the right job is a must, especially for enterprise-wide projects such as enterprise architecture. Many EA initiatives run out of fuel in its infancy stages due to the lack of adequate people, information, and/or capital. Named extensively by industry experts and research analysts, resource poses a major problem in starting an EA initiative. According to Hite, a major challenge is the lack of resources, in particular with regards to not having the people with the knowledge, skills, and the abilities to do [EA] successfully. Over 80 percent of federal agencies identified this as significant challenge (Kappelman, *The Pioneers of Enterprise Architecture: A Panel Discussion*, 2010). Four of the six professionals interviewed believed that the availability of staff with an excellent knowledge and understanding of the business, data, application, and technology aspects of the organization is critical to the success of EA initiatives. They furthered argued their point that the organization also needs to have technologically savvy staff under their employment. Besides identifying the need to have a well-informed staff, the interviewees also agreed with the notion that the brain – the architect behind the entire effort to come from the inside of the organization. In contrast to the previous state, due to organizational dynamics, it may be better at times to have external consultants with a peripheral and more objective view to come in and make recommendations. This may

be due to the fact that external consultants do not have allegiances and may provide impartial recommendations.

Another component under the resource category is information availability in the organization. Three of six professionals cited various aspects of information under the resource tag. The first aspect deals with information availability within the organization. As one expert well-said, rarely is all the required information in explicit form; it is usually in people's heads and it is difficult for EA staff to have access to the information since they may not have much to trade for that information. The existence of simplified and accessible data architecture was also referred to by the experts as a helpful condition. In conjunction with a simplified and accessible data architecture, existing sources of information also need to be available, accurate, and timely to ensure that the EA staff can delve into the organization and understand the processes involved in data generation, collection, and reporting. Also, strong master data management and data management practices would be extremely supportive in the vertical and horizontal alignment of the organization. The state of the information reflected by areas such as data quality, accuracy, timeliness, consistency, and completeness depict an organization's data management overall health. Lastly, having the information required is not enough. The method and frequency of information sharing will also have significant impact in the individual tasks that make up the entire process of implementing enterprise architecture.

In a research article published by Gartner, Betsy Burton discusses some of the worst practices in regards to EA in the article "Thirteen Worst Enterprise Architecture Practices." Along with what Hite argued, Burton's research indicated that many

organizations often hire architects with deep technical skills in one or more area, but these people are often inclined to feel strongly about specific approaches, technologies, or processes. In addition, they may or may not have strong collaboration, communication, or facilitation skills. She opines that EA teams should include “versatile architects with deep and broad business, people, organizational and process expertise (Burton, Thirteen Worst Enterprise Architecture Practices, 2009).” Another research publication by Gartner, the authors emphasizes the importance of having candidates who possess the unique set of talents and skills to be a successful enterprise architect (James & Burke, 2005). The complexity of this issue unfolds in two ways: internally, the organization should identify candidates with the required skills and experience discussed above, and further develop those candidates to become ready for their respective roles in the EA initiative through seminars, workshops, training; externally, human resources should look for potential candidates outside the organization and hire the appropriate candidates who are deemed capable of adapting to the socio-political scene by cultivating relationships with key individuals in the organization with significant roles in EA development.

Mr. Suresh from Tata Consultancy Services emphasized the importance of having the adequate resources such as having enough spending capability, revenue, capital, and overall size in determining the readiness of EA in an organization. According to a research publication from Gartner, a common constraint of having a successful EA program is insufficient funding. Prior to initiating a formal EA program, one must make sure that the CEO and senior executives are fully committed to long-term strategic planning and realization through EA (James & Burke, 2005).

With a champion who strongly believes in the value that EA can offer and is dedicated to its success, obtaining proper funding should pose no significant challenge. Along with executive support, winning the Board of Director's approval in this issue can also greatly facilitate obtaining the appropriate resources.

## **Corporate Governance**

Five out of six experts interviewed in this study picked corporate governance as a key success criterion in the determination of the likelihood success in enterprise architecture initiatives. This section deals with the more soft aspects of management and maturity within the organization. Areas under exposition in this section include organizational structure and maturity, existence of repeatable processes and its maturity, architectural management and approval processes, and efficiency indicators such as the level of horizontal integration and standardization.

Corporate governance is the underpinning of a company. According to Microsoft Chairman, Bill Gates, corporate governance extends beyond simple compliance with legal requirements; it must provide a framework for establishing a culture of business integrity, accountability, and responsible business practices. As it is the groundwork for an organization, severe deficiencies in corporate governance can adversely affect the implementation of enterprise-wide initiatives. Assessing the current state of an organization's corporate governance can prove to be determinant in future enterprise-wide programs.

Organizational maturity plays a significant role in the process of implementing enterprise architecture. In a white paper titled "Microsoft Readiness Framework Organizational Readiness White Paper", the organizational maturity

levels were outlined from levels 0 to 5, ranging from incomplete to optimized organization. This assessment guide measures the maturity of people, process, terminology, and measurement aspects with the following scale – incomplete, performed, managed established, predictable, and optimizing. Level 3, an acceptable level of organizational maturity for EA implementation, would entail that processes are performed and managed using a defined process based upon good principles. Unique instances of processes use approved, tailored versions of standard and documented processes with the resources necessary to establish the process definition. Level 5, an optimal level of organizational maturity, would provide a strong sense of teamwork and collaboration across the organization and that almost everyone is involved in the process improvement. The performance of the process is optimized to meet current and future business needs repeatedly through defined business goals. Through obtaining quantitative feedback and analysis of the results, organizations achieve continuous improvement in by setting realistic business goals for process effectiveness and efficiency. This level of exceptional organizational maturity would greatly help structure the EA efforts within an organization.

Process maturity was also mentioned on multiple occasions throughout the interviews. Clearly defined ownership of the processes exposes decision making cycles to scrutiny and helps streamline change in the procedure by removing unnecessary complexity within the organization and helps remove time lag within processes. Mature processes should command exceptional authority and credibility and streamline change in the organization.

One of the interviewees stressed the importance of having an architectural

approval process tightly woven into the organizational structure, thus ensuring that all efforts are in alignment with the overall strategy. Besides the approval process, having the role of the traffic cop to ensure all constituents are being managed would provide for consistency and standardization throughout the organization.

The Governance Metrics International is an independent corporate governance research and rating agency and has been successfully helping institutional investors worldwide to assess the governance characteristics of individual companies for the last five years. Through extensive statistical analysis of 400 metric set of objective and consistently applied criteria, GMI has been able to establish there is a consistent relationship between governance and performance. GMI uses a six factor rating system composed of:

- Board Accountability
- Financial Disclosure and Internal Controls
- Shareholder Rights
- Market for Control
- Corporate Behavior

Based on these six categories, companies are assessed in the overall governance quality and compared against other companies in the same region, industry, or through customized portfolio coverage on a scale between one and ten (highest). Significant governance issues such as persistent problems with litigation or regulatory fines; debt/financing/refinancing problems or pending bankruptcy proceedings; or boards with no independent directors, all pose as red flags in the assessment. While this assessment is by no means fool-proof, it provides a general idea of where the organization's corporate governance stands in relation to its geographic location, and/or industry. This benchmark can serve as a supplement to the EA/IT specific

factors in determining governance quality and effectiveness.

In the IT domain, governance is defined by Gartner as the allocation of decision rights and the creation of an accountability framework that encourages desirable behavior, the mechanism to ensure that projects apply the prescriptive guidance provided by the EA process, and is critical in delivering value from an EA program (Bittler & Short, 2010 Enterprise Architecture Research Index: EA Governance, 2010). One critical prerequisite of having effective governance is obtaining the support from the highest level of senior management. While it functions to secure resources for the program, it also provides recourse if EA guidance is not followed. Another major condition having a strong and influential leader with strong clout in the organization to champion EA governance and compliance, where it's much more likely to be taken seriously (Bittler, Six Best Practices for Enterprise Architecture Governance, 2009).

The creation of governance structures with appropriate decision-making authority and well-defined disclosure, compliance and waiver processes are essential to the success of the architecture program (James & Burke, 2005). In order to add value, EA programs should support business change across multiple programs, business units, and even companies. In doing so, optimization of end-to-end processes across the extended business and the implementation of common infrastructure are required. In this regard, having effective corporate and EA/IT governance in the organization is critical to the health of the organization, as well as facilitating any enterprise-wide initiatives.



## Current State

The as-is state of an organization has tremendous weight in determining whether an EA effort would be successful. Four out of six experts interviewed named aspects within the current state of an organization as a top success criterion. The current state include aspects such as the function, reputation, and maturity of the IT department, organizational issues such as development methodologies used, existence of a scalable architecture, and overall IT infrastructure health. Lastly, the current state also describes the relationship that the organization has with its external environment, such as potential challenges that the organization may face, and the state of the economy.

A viable IT infrastructure is a necessity in EA efforts. The use of middleware such as Web/XML/SOAP solutions, service oriented architecture (SOA), and classes and object driven design makes it easier for the organization to have enterprise-wide integration. Standardized internal and external interfaces also assist integration efforts within the organization. The function of IT in the organization helps establish the justification for enterprise architecture efforts. EA efforts are better suited for organizations whose IT department enables value creation than for utility. The reputation and maturity of an IT department reflects how disciplined the IT organization is. Following upon the previous argument, the Software Development Life Cycle (SDLC) methodology used also helps establish the discipline with the IT organization. Also, the organization seeking to implement enterprise architecture should have a scalable architecture or be in the process of converting to one.

External factors such as the state of the economy play a significant role in

most EA implementations. Depending on whether the economy is expanding or shrinking, stable or turbulent, greatly hinders EA efforts especially if executive leaders are not fully committed. One aspect that can ameliorate the situation is how well adapted the organization is to the environment and whether the external stakeholders are satisfied with the organization. Understanding the environment and developing a roadmap for architecture simplification is what makes a design useful.

### **Corporate Strategy**

Two-thirds of the experts interviewed listed corporate strategy as an important consideration in the determination of an organization's EA compatibility.

Organizations should view enterprise architecture efforts as a strategic investment with a strategic focus, and treat EA as an integral part of the IT strategic planning processes. This would foster overall IT and business alignment and help the organization transition to the future desired state. Depending on the organization, the overall guiding strategy may not be suitable for the organizations in the time to market competition, since the corresponding goal of reducing IT infrastructure costs may not be well met through EA efforts.

### **Culture**

A third of the experts interviewed in this study cited culture as a top factor in determining the likelihood of success in an organization. Issues within the domain of organizational culture range from acceptance of change, parochialism, stability, staff accessibility, organizational values, and consistency of organizational behavior. The acceptance of change and new programs reveal that the organization is more likely to

adopt EA.

Parochialism and cultural resistance is among the top four challenges according to Randolph C. Hite. He claims that “over 90 percent of a hundred federal agencies identified that the notion of changing and giving up your space in the enterprise, perhaps for the benefit of others, and simply not willing to optimize the whole instead of just optimizing your part is a significant challenge with regards to enterprise architecture (Kappelman, The Pioneers of Enterprise Architecture: A Panel Discussion, 2010)”. Part of this problem stems from human nature – few people are magnanimous enough to willingly give up an area under his/her control for the sake of the greater good. The interviews verified Hite’s claim by adding that positions which frequently operate on an ad-hoc basis are likely to lose and may offer resistance. But another reason is that the perspective among professionals is not aligned with the vision of EA. About two-thirds of senior IT professionals surveyed in a study think only in terms of the implementation-oriented and IT-specific aspects as enterprise architecture, and that the larger concept of the architecture of enterprises as something completely different from EA.

Culture certainly has great influence on EA implementations, but organizations experiencing cultural resistance have a few options to turn this around. Executive leadership, combined with upper-level management support, can permeate a sphere of influence down the organizational hierarchy through communication. Creating and maintaining an EA awareness campaign can greatly ameliorate cultural resistance stemming from unwanted change/uncertainty.

## Stakeholder Involvement and Support

Involvement and support of the primary stakeholders for enterprise architecture are crucial to the program's success. These stakeholders include C-level management, key people in the various lines of business, IT managers (including those from application development, operations – in-sourced or outsourced, and technical support) and members of the wider architecture community, including business strategists, business analysts, and IT solution architects/designers.

A third of the interviewees explicitly stated the importance of having enterprise-wide support. They mentioned the value added through tight integration between marketing, sales, finance, IT and business. They also recognized the need for the rest of the stakeholders in EA efforts. A key element in fostering this support is clear and accessible communication of the architecture, with the communication tailored to meet the needs of different stakeholder groups (James & Burke, 2005). Without this broad-based stakeholder involvement and support, enterprise architecture is perceived to be:

- A technical exercise, not relevant to the business
- Unnecessary bureaucracy that should be avoided
- An ivory tower, not based in reality

One major issue associated with EA is that ideally, the chief enterprise architect reports to the CEO, but in reality, it is more common for the chief enterprise architect to report to the CIO or to an IT director (Handler, 2009). At times it may be justified, especially with an incremental departmental phasing in of EA, but most times the EA team is not located at a high-enough level in the organization to contribute

proactively to the strategy of the enterprise (Handler, 2009). In cases such as this, it is vital to obtain as much support and participation from all stakeholders, especially support from the office above the chief enterprise architect.

While having top brass support is imperative, stakeholder involvement and support involve more than just having the C-level leaders onboard the EA initiative. Line-of-business managers, with the refocus toward enterprise business, information/solution architectures, and EA strategy, away from enterprise technical architecture, play a critical role in EA. The line-of-business manager should serve on governing bodies to approve architectural decisions and to contend with waiver requests or other issues, creating more-effective governance. Along with the line-of-business managers, the line-of-business CIOs, who understand the benefits of the federated organization, decision rights, and business unit specificity, should serve on a governing body and ideally provide an enterprise collaborative architect to support EA (Handler, 2009).

An effective understanding of the corporate strategy is critical for the development of a holistic EA. With the necessity of focusing its efforts on the right activities, in the correct manner to support business success, the office of corporate strategy should be very involved to ensure that the EA team is aligning EA objectives with the organizations various objectives (Handler, 2009).

Other important offices that should be on board the EA program with full support include the head of the enterprise Program Management Office (PMO) in order to employ EA requirements, principles, and models to accelerate its projects and ensure these projects support the architecture (Handler, 2009). The role that the

head of PMO fulfills also functions as a governance mechanism for EA and provides feedback on the architecture's effectiveness. In addition, having the support of the director of application development, specifically serving on governing bodies to approve architectural decisions, creates more effective governance through increased credibility in the EA program.

In essence, the success of an EA program heavily depends on the level of support that top management passes down to middle, and onto lower management positions. Support from various stakeholder groups, namely the executive sponsor(s) and managerial positions of all levels, enables clear and accessible communication, and eases the transition of implementing a formal EA program (James & Burke, 2005). Participation from managerial positions enterprise-wide not only enhances governance, but also helps with the acceptance of the legitimacy of EA. It also functions to increase communication between the various pockets of the organization, and helps to create a well architected program with high adoption rates. It is absolutely essential to have high stakeholder involvement and strong support throughout the organization in order to have a successful EA initiative.

## **Business Domain**

Lastly, business domain was mentioned briefly as having some impact in determining the likelihood of success in EA efforts. One expert contested that certain industries have their own EA architecture, framework, and methodology, and may be more mature than other industries. For example, according to Mr. Suresh, the retail, telecom, manufacturing, banking and insurance industries are relatively disciplined in

the domain of EA, while the financial services sector is very loose. Enterprises from industries with a good track record of EA implantations indeed have a better chance at succeeding through knowledge transfer within business domains.

## Enterprise Architecture Maturity

The primary target audiences for this paper are organizations without formal EA programs but are looking to initiate a formal EA program in the near future. With a thorough understanding of enterprise architecture, one can deduce that it is very much present in every enterprise, although with varying levels of maturity. According to the National Association of State Chief Information Officers (NASIO), the levels of maturity of EA break down into a few categories:

The National Association of State CIOs (NASCIO) created the Enterprise Architecture Maturity Model (EAMM) to assess the maturity levels of enterprise architecture programs run by state governments in the U.S. The model evaluates how well each program is utilizing the tools provided by NASCIO to create an effective enterprise architecture program. Organizations use this model to benchmark their program maturity and use that as a basis for growth. The model has six levels of maturity, and for each one, users evaluate the program on its administration, planning, framework usage, documentation, communication, compliance, integration, and involvement. A summary of the six levels is given below.

0. No EA Program - There is not a documented architectural framework in place at this level of maturity. While solutions are developed and implemented, this is done with no recognized standards or base practices. The organization is completely reliant on the knowledge of independent contributors.

1. Informal Program - The base architecture framework and standards have been defined and are typically performed informally. There is general consensus that these steps should be performed, however they may not be tracked and followed. Organizations with an Enterprise Architecture framework at this level are still dependant on the knowledge of individual contributors.
2. Repeatable Program - The base architecture and standards have been identified and are being tracked and verified. At this point in the program processes are repeatable and reusable templates are starting to be developed. The need for product and compliance components to conform to the standards and requirements has been agreed upon, and metrics are used to track process area performance.
3. Well-Defined Program - The enterprise architecture framework is well defined using approved standard and/or customized versions of the templates. Processes are documented across the organization. Performance metrics are being tracked and monitored in relationship to other general practices and process areas.
4. Managed Program - At this point performance metrics are collected, analyzed and acted upon. The metrics are used to predict performance and provide better understanding of the processes and capabilities.
5. Continuously Improving Vital Program - The processes are mature; targets have been set for effectiveness and efficiency based on business and technical goals. There are ongoing refinements and improvements based on the understanding of the impact changes have to these processes. When used in conjunction with NASCIO's Enterprise Architecture Development Tool-Kit, organizations can use



the results from this maturity model to create a roadmap to further maturity. NASCIO recommends that organizations strive for greater maturity in their programs based on benefits of more mature programs mentioned in the previous section. A thorough evaluation using this model will help organizations remain focused in their enterprise architecture efforts and avoid common pitfalls which lead to stalled progress. ("NASCIO enterprise architecture maturity model: Version 1.3," 2003)

The criteria for organizations without formal EA program has an EA maturity rating below level 2. Based on the NASCIO EA Maturity Model, an organization at level 1 defined the base architecture framework and standards implicitly. While there is a general consensus that certain steps should be taken, there is no tracking mechanism or oversight. These organizations are dependent on the knowledge of individual contributors. Organizations at this level are expected to fit the following criteria:

- Administration
  - The need for committees to define the standards and processes has been identified
- Planning
  - Need for Enterprise Architecture has been identified
  - EA activities are informal and unstructured
- Framework
  - Processes are ad hoc and informal, processes followed may not be consistent
  - There is no unified architecture process across technologies and lines of business
- Blueprint
  - Documentation of business drivers, technology standards, etc, are informal and inconsistent
- Communication
  - The need to create greater awareness about EA has been identified

- Little communication exists about the EA process or possible process improvements
- Compliance
  - The need for compliance to standards has been identified
  - Compliance is informal and unstructured
  - Compliance cannot be measured effectively, because processes and procedures are not consistent across areas and/or projects
- Integration
  - The need to document common functions that integrate with an EA program has been identified
  - Projects and purchases are typically done in isolation, resulting in costly purchases and redundant development and training requirements
- Involvement
  - The organization has identified a need to make staff throughout the enterprise aware of the benefits and concepts of Enterprise Architecture
  - EA awareness efforts are informal and inconsistent
  - Some groups are unsupportive of the efforts and may cause unrest in the organization

This list of criteria that define organizations with informal EA initiatives forms a basis for typical organizations without formal EA programs are looking to initiate one. The section below describes the six assessment categories – leadership, culture, perspective/scope, resource, governance, and stakeholder involvement and support.

## Enterprise Architecture Is the Future

The “godfather” of enterprise architecture, John Zachman, spoke about his vision for EA in the years to come. In the next few decades, the enterprise that makes it is going to be an enterprise that can dynamically restructure itself day by day to accommodate the demands being placed on it from the external environment, and that EA is the key to engineering an enterprise with that capability (Kappelman, The Pioneers of Enterprise Architecture: A Panel Discussion, 2010).

While the discipline of Enterprise Architecture offers organizations experiencing problems associated with complexity, inefficiency, and isolation a solution, but because of the complex nature of organizations (commercial or public), efforts to implement EA is often hampered with severe challenges. This paper hopes to identify and clarify one major source of these challenges: factors hindering EA prior to its implementation. Although this paper cannot make an enterprise EA ready, it can help an organization to get started. By assessing the current state of the organization and determining the strong and weak areas, leaders can prepare the stage for a formal EA program that will not be hindered by the myriads of problems afflicting EA programs today.

Although a small step, it is hoped that this is headed in the right direction. The inspiration for this work is based on the vision of Peter Senge. Only through envisioning, designing, and engineering an enterprise, will produce an organization “where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole

together (Senge, 1990).”

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## Appendix A – Interview Transcripts

### Interview One: Nikhil Lele, Ernst & Young

Introduction – Good morning/afternoon! Thank you for agreeing to this interview! Your expertise in the domain of Enterprise Architecture is vital to my research.

My name is Mu Xu, and I'm currently a senior at Penn State University studying Information Sciences and Technology. I'm working on my thesis at moment, specifically researching the success criteria of Enterprise Architecture under Dr. Cameron's supervision. I'd like to conduct an interview regarding success criteria for EA programs. May I ask you a few questions?

#### Question 1:

What factors do you look for in an organization to determine the likelihood that the organization will be successful with enterprise architecture? (THIS IS WHEN AN ORGANIZATION IS CONSIDERING ENTERPRISE ARCHITECTURE AND HAS NOT STARTED ANYTHING YET)

1. What is the overall executive mandate?
2. Is the vision and value proposition clearly communicated for enterprise architecture?
3. Does the EA initiative have the practical, technical, people, business skills required?
4. Is EA integrated with the overall IT governance practices?
5. Is EA viewed as being as integral part of the IT strategic planning process?
6. Is EA viewed as being a value added partner to both the business and technology within the organization?

#### Question 2:

Can you brainstorm and list as many success factors for EA in a minute? N/A  
What are your top six from the list above?

- Same as above

Why do you feel these are the most important success factors?

...

#### Question 3:

Through conducting extensive research and literature reviews, I have gathered a rudimentary list of success criteria for EA: having the right leadership,

culture, perspective/scope, resource, governance, and stakeholder involvement and support; would you like to add anything to this list? (IF SOME OF THESE DON'T SHOW UP IN THE LIST FROM #1, CAN YOU EXPLAIN WHY?)

- This list is reasonable.

Question 4:

For the top six success criteria that you mentioned, how do you assess how well an organization is currently doing in each area?

- Speak to the partners and project sponsors to gauge the level of organizational maturity

Do you have tools that you use to assess an organization's strength in these areas?

- Yes.

If so, could you share these instruments for educational use only?

- In the process.

What issues do you encounter when assessing these areas in an organization?

- At times there is a lack of clarity around of roles and responsibilities, and that greatly affects the process.
- Another area of challenge is that it is very easy for EA function to be viewed as an ivory tower function, instead of a practical function

Question 5:

Do you measure these success criteria at other points during the implementation of Enterprise Architecture in the organization? Or is this only done at prior to EA implementation to give you an idea of areas of strength and weakness in the organization? Can you explain?

- Just setting up EA is not enough
- EA needs to be managed as it is a series of activities
- It is a process not just a single task

Question 6:

Is there anything else you'd like to add?

- The EA group within the organization should be the go to group for any complex solution

Conclusion:

Thank you so much for your time! Your help to this project is greatly appreciated!



## Interview Two: Joseph Tagliaferro, PricewaterhouseCoopers LLC

Introduction – Good morning/afternoon! Thank you for agreeing to this interview! Your expertise in the domain of Enterprise Architecture is vital to my research.

My name is Mu Xu, and I'm currently a senior at Penn State University studying Information Sciences and Technology. I'm working on my thesis at moment, specifically researching the success criteria of Enterprise Architecture under Dr. Cameron's supervision. I'd like to conduct an interview regarding success criteria for EA programs. May I ask you a few questions?

### Question 1:

What factors do you look for in an organization to determine the likelihood that the organization will be successful with enterprise architecture? (THIS IS WHEN AN ORGANIZATION IS CONSIDERING ENTERPRISE ARCHITECTURE AND HAS NOT STARTED ANYTHING YET)

1. I look for an organization that is not just focused on technology. The key to a successful Enterprise Architecture organization is the staff should have an excellent knowledge of the business, data, the applications and the infrastructure.

### Question 2:

Can you brainstorm and list as many success factors for EA in a minute?

1. Tight integration with Business Partners (Marketing; Finance; Sales; IT)
2. Time to Market (Time and Transit)
3. Playing the role of traffic cop is important to ensuring all constituents are being managed
4. Governance Model
5. Scalable Architecture
6. Web/XML/SOAP based solutions
7. SOA Architecture Approach (Classes and Object Driven Design)
8. Eliminate process / functions / system redundancies
9. Create and simplify Sales to Bill processes
10. Create a single simplified Workflow Management Environment
11. A simplified and accessible data architecture (Strong MDM and Data Management practices)
12. Standardize Internal and External Interfaces
13. Create Architecture Standards:
14. Reference Architecture
15. Application; Data

16. Architecture Assessments
17. Process Architecture
18. Architecture Solutions

What are your top six from the list above?

1. Tight integration with Business Partners (Marketing; Finance; Sales; IT)
2. Time to Market (Time and Transit)
3. Playing the role of traffic cop is important to ensuring all constituents are being managed
4. Governance Model
5. Scalable Architecture
6. Eliminate process / functions / system redundancies

Why do you feel these are the most important success factors?

- These factors are the key attributes which drive a successful architecture implementation. Understanding the environment and developing a roadmap for architecture simplification are what makes a design successful.

Question 3:

Through conducting extensive research and literature reviews, I have gathered a rudimentary list of success criteria for EA: having the right leadership, culture, perspective/scope, resource, governance, and stakeholder involvement and support; would you like to add anything to this list? (IF SOME OF THESE DON'T SHOW UP IN THE LIST FROM #1, CAN YOU EXPLAIN WHY?)

- I think you got it.

Question 4:

For the top six success criteria that you mentioned, how do you assess how well an organization is currently doing in each area?

At the end of the day the success criteria must demonstrate:

1. Positive user experience on delivery
2. Architecture flexibility which will allow for easily updating and changing environment
3. Efficient use of requirements and development times, which can be demonstrated by a reduction in Maintenance Requests and a drop in overall development costs

Do you have tools that you use to assess an organization's strength in these areas?

- Yes

If so, could you share these instruments for educational use only?

- Yes, the tool is available in Appendix B Tools

What issues do you encounter when assessing these areas in an organization?

- The largest issue typically faced, is getting through the politics of an organization. This is convincing IT that there needs to be an independent organization to look over the environment.

Question 5:

Do you measure these success criteria at other points during the implementation of Enterprise Architecture in the organization? Or is this only done at prior to EA implementation to give you an idea of areas of strength and weakness in the organization? Can you explain?

Implementing an Enterprise Architect organization does yield immediate results. Results will be measured after a few projects have gone through the process. There are many moving pieces that can be measured as part of the success. Some pieces to look at:

1. Properly documented 'As-Is' environment
2. End to End reference environment
3. Business process tied to Architecture flow
4. A quick turn-around on developing architecture solutions
5. IT follows the architecture roadmap
6. Reduced number of missed functionality
7. Efficiencies gained by reducing missed requirements

Question 6:

Is there anything else you'd like to add? N/A

Conclusion:

Thank you so much for your time! Your help to this project is greatly appreciated!

## Interview Three: Mike Hall, BAE Systems

Introduction – Good morning/afternoon! Thank you for agreeing to this interview! Your expertise in the domain of Enterprise Architecture is vital to my research.

My name is Mu Xu, and I'm currently a senior at Penn State University studying Information Sciences and Technology. I'm working on my thesis at moment, specifically researching the success criteria of Enterprise Architecture under Dr. Cameron's supervision. I'd like to conduct an interview regarding success criteria for EA programs. May I ask you a few questions?

### Question 1:

What factors do you look for in an organization to determine the likelihood that the organization will be successful with enterprise architecture? (THIS IS WHEN AN ORGANIZATION IS CONSIDERING ENTERPRISE ARCHITECTURE AND HAS NOT STARTED ANYTHING YET)

- Organizational culture
  - Acceptance of change and new programs
- Stability within the organization
- A viable IT infrastructure
  - Using in house software that is familiar to staff
- Information availability
  - Being able to get the information needed
  - Staff accessibility - ability to interact with people
- Strategic focus to Enterprise Architecture
  - An organization's ability to document what they want out of EA
- Corporate Buy-in

### Question 2:

Can you brainstorm and list as many success factors for EA in a minute? N/A  
What are your top six from the list above?

- Same as above

Why do you feel these are the most important success factors?

...

### Question 3:

Through conducting extensive research and literature reviews, I have gathered a rudimentary list of success criteria for EA: having the right leadership, culture, perspective/scope, resource, governance, and stakeholder involvement and support; would you like to add anything to this list? (IF SOME OF

THESE DON'T SHOW UP IN THE LIST FROM #1, CAN YOU EXPLAIN WHY?)

- Decision making cycles seems missing, it is one of the key benefits, and provides ways to streamline change

Question 4:

For the top six success criteria that you mentioned, how do you assess how well an organization is currently doing in each area?

- Adoption rate – the adoption of the company to take what you are providing
- End product is presentation ready

Do you have tools that you use to assess an organization's strength in these areas?

- Modified balanced score card
- Maturity models
- GAO OMB Tools and Reports
- Cost saving metrics – IT based, centered on consolidation and data redundancy

If so, could you share these instruments for educational use only? N/A  
What issues do you encounter when assessing these areas in an organization?  
N/A

Question 5:

Do you measure these success criteria at other points during the implementation of Enterprise Architecture in the organization? Or is this only done at prior to EA implementation to give you an idea of areas of strength and weakness in the organization? Can you explain?

- Strategically measure how well the organization is doing
  - Set time frames, maybe once a quarter
  - State what has changed in meantime
  - New additions to EA
- At times there is no quantified return on investment
- Federal clients have to do return on investment on individual projects, which makes it easier to assess
- Federal railroad administration uses alternative EA analysis to assess the organization

Conclusion:

Thank you so much for your time! Your help to this project is greatly appreciated!

## Interview Four: Cherusseri Suresh, Tata Consultancy Services

Introduction – Good morning/afternoon! Thank you for agreeing to this interview! Your expertise in the domain of Enterprise Architecture is vital to my research.

My name is Mu Xu, and I'm currently a senior at Penn State University studying Information Sciences and Technology. I'm working on my thesis at moment, specifically researching the success criteria of Enterprise Architecture under Dr. Cameron's supervision. I'd like to conduct an interview regarding success criteria for EA programs. May I ask you a few questions?

### Question 1:

What factors do you look for in an organization to determine the likelihood that the organization will be successful with enterprise architecture? (THIS IS WHEN AN ORGANIZATION IS CONSIDERING ENTERPRISE ARCHITECTURE AND HAS NOT STARTED ANYTHING YET)

- Primarily maturity of the organization
  - Existence of repeatable processes?
  - How is the business domain organized?
  - How do they exchange information?
  - Spending capability
  - How much capacity to spend?
  - Revenue, partner, spending, capacity
  - How big is the organization?
- Availability of sponsors at the C-level
  - Complete buy in at the C-level
- Process maturity
- Business domain
  - It depends on which industry they are in

### Question 2:

Can you brainstorm and list as many success factors for EA in a minute? N/A

What are your top six from the list above? N/A

Why do you feel these are the most important success factors?

- They should have a certain level of process maturity

### Question 3:

Through conducting extensive research and literature reviews, I have gathered a rudimentary list of success criteria for EA: having the right leadership, culture, perspective/scope, resource, governance, and stakeholder involvement and support; would you like to add anything to this list? (IF SOME OF

THESE DON'T SHOW UP IN THE LIST FROM #1, CAN YOU EXPLAIN WHY?)

- Business domain aspect – retail industry, telecom industry, insurance industry
- The brain has to come from the inside
- Because of the organizational dynamics, sometimes its better have an external consultant with an external view who will not be biased and come in to give suggestions

Question 4:

For the top six success criteria that you mentioned, how do you assess how well an organization is currently doing in each area?

- Maturity levels of 0 to 5 for each of the parameters, depending on the maturity of the organization, we mark a score for the, and see where they stand
- Maturity of adoption, areas with gaps where to focus

Do you have tools that you use to assess an organization's strength in these areas?

If so, could you share these instruments for educational use only?

What issues do you encounter when assessing these areas in an organization?

- People like to say what they are expected to do
- It's hard to get real answers, which may lead you to a totally different path
  - This issue can be avoided, if C-level sponsor, most people are operational nature no time.
- People tend to take a look at the auditors, try to not share organization
- Must have C-level
- Must have lots of awareness

Question 5:

Do you measure these success criteria at other points during the implementation of Enterprise Architecture in the organization? Or is this only done at prior to EA implementation to give you an idea of areas of strength and weakness in the organization? Can you explain?

- Value measurement framework
  - It depends on the nature of the engagement and the length of the engagement
- Between TOGAF and Zachman, but closer to implementation. Various architecture for various industries

- Discipline retail, telecom, manufacturing, banking, insurance
- The financial services industry is very loose in EA

Question 6:

Is there anything else you'd like to add?

- One area – EA as a domain has not established across the industry.  
EA's value has yet to be realized.

Conclusion:

Thank you so much for your time! Your help to this project is greatly appreciated!



## Interview Five: Colonel David C. Geuting, US Navy

Introduction – Good morning/afternoon! Thank you for agreeing to this interview! Your expertise in the domain of Enterprise Architecture is vital to my research.

My name is Mu Xu, and I'm currently a senior at Penn State University studying Information Sciences and Technology. I'm working on my thesis at moment, specifically researching the success criteria of Enterprise Architecture under Dr. Cameron's supervision. I'd like to conduct an interview regarding success criteria for EA programs. May I ask you a few questions?

### Question 1:

What factors do you look for in an organization to determine the likelihood that the organization will be successful with enterprise architecture? (THIS IS WHEN AN ORGANIZATION IS CONSIDERING ENTERPRISE ARCHITECTURE AND HAS NOT STARTED ANYTHING YET)

1. Senior leader buy-in
  - a. Not just talk about architecture
  - b. They have to show that they believe in EA
  - c. Taking ownership of the process
2. Decide where are you going to put it
  - a. Is your architecture process
  - b. Corporate architecting
  - c. IT, business
  - d. Where do we put this
  - e. The whole purpose of architecting is to provide support – decision making
  - f. If corporate leadership believe that EA can support decision making, through good and bad
3. Architecting office has to show through its actions and words that they understand the corporate mission and vision, and fully supportive of that mission and vision
  - a. Stay in IT or Business
  - b. Don't understand bigger corporate mission and vision
  - c. Techno geeky guys
  - d. Holistic picture
4. Early on, the architecting effort has to show success stories
  - a. Beyond senior leader buy-in, they need the rest of the stakeholder
  - b. Col. Geuting as the architecting division, people will only listen too much, they assume the Colonel is trying to protect his turf

- c. Without their skills and tools
- 5. Along with senior leader buy-in, also have to know why, know the value add
  - a. They don't have a well defined purpose
  - b. Organizational leadership
  - c. They have to expectations that realistic and doable
- 6. Approval of the architecture – tightly woven into the organizational structure

Question 2:

Can you brainstorm and list as many success factors for EA in a minute? N/A  
 What are your top six from the list above?

- Same as above

Why do you feel these are the most important success factors? N/A

Question 3:

Through conducting extensive research and literature reviews, I have gathered a rudimentary list of success criteria for EA: having the right leadership, culture, perspective/scope, resource, governance, and stakeholder involvement and support; would you like to add anything to this list? (IF SOME OF THESE DON'T SHOW UP IN THE LIST FROM #1, CAN YOU EXPLAIN WHY?)

- Add takes a long term commitment through leadership, if you have short term view, and if you have a bad year, and we need to cut somewhere, the first thing is to cut.
- Architecting is the long range exercise,
- Cutting in the organization, and trying to perform surgery
- Hire architects, growing architecture, takes times

Question 4:

For the top six success criteria that you mentioned, how do you assess how well an organization is currently doing in each area?

- We are just starting to create governance and oversight processes that need to be in place for architecting to continue to be successful
- Concept of operations, laid down in 24 pages
  - Provides basic process for architecting
  - Build, use, and govern

- Expanded, came up with approval process, organization below mine, can use the process approve
- AV-1 just published version 3.5 of Air force EA
- Have to be proactive
- Have to have a communications plan

Do you have tools that you use to assess an organization's strength in these areas?

- One tool is used to model the reference architecture
  - Reference models similar to FEA[F]
- Another tool that customers are used to
  - Show relationships

If so, could you share these instruments for educational use only? N/A

What issues do you encounter when assessing these areas in an organization?

N/A

Question 5:

Do you measure these success criteria at other points during the implementation of Enterprise Architecture in the organization? Or is this only done at prior to EA implementation to give you an idea of areas of strength and weakness in the organization? Can you explain?

- Is to have a story to tell, a scenario, to effectively
- You have to established your reputation, as a vital key member of the organization
- Need to make architecture understandable
- Need to make architecture relevant
- Terrible job at explaining architecture

Question 6:

Is there anything else you'd like to add?

Conclusion:

Thank you so much for your time! Your help to this project is greatly appreciated!

## Interview Six: Con Kenney, National Defense University

Introduction – Good morning/afternoon! Thank you for agreeing to this interview! Your expertise in the domain of Enterprise Architecture is vital to my research.

My name is Mu Xu, and I'm currently a senior at Penn State University studying Information Sciences and Technology. I'm working on my thesis at moment, specifically researching the success criteria of Enterprise Architecture under Dr. Cameron's supervision. I'd like to conduct an interview regarding success criteria for EA programs. May I ask you a few questions?

Question 1:

What factors do you look for in an organization to determine the likelihood that the organization will be successful with enterprise architecture? (THIS IS WHEN AN ORGANIZATION IS CONSIDERING ENTERPRISE ARCHITECTURE AND HAS NOT STARTED ANYTHING YET)

1. Maturity of strategic and planning and capital planning process
  - a. Budgeting in commercial sector, budgeting capital for investment
  - b. Strategic investment
  - c. Who is responsible for those processes, who participates in them, how they work
  - d. How well-regarded they are, is the output of the each process credible, or is it just wall paper
2. Maturity, reputation, and standing, and role of the IT organization
  - a. Is it enable value creation, or is it utility
3. What are the major challenges that organization is facing, the environment and how well adapted they are to the environment
  - a. Stable or turbulent
  - b. Business model changing
  - c. External stakeholders happy, or dissatisfied
  - d. Depends on what the objectives are
4. Culture
  - a. What are the norms here, who are the hero
  - b. What are the values, espouse but not practice
  - c. Do we behave consistently to follow the mission
  - d. Ad hoc – traditional EA is not a good fit, too rigid
5. SDLC methodology, tells how disciplined the IT organization is
6. Infrastructure inventory compiled by security people
7. Existing sources of information
8. Who stands to gain from and who might lose, people who like to make ad hoc positions
  - a. Politics

9. State of Enterprise Information in the organization
10. How consistently do they represent business concepts
  - a. Standardization
  - b. Harder to get people to use common terms
11. Process maturity of the core business
  - a. If there is duplication
  - b. Time lag
  - c. Stock
  - d. Remove the unnecessary complexity in the organization
  - e. Reduce the amount of variation in the infrastructure
  - f. Drive down cost

Question 2:

Can you brainstorm and list as many success factors for EA in a minute? N/A

What are your top six from the list above? N/A

Why do you feel these are the most important success factors? N/A

Question 3:

Through conducting extensive research and literature reviews, I have gathered a rudimentary list of success criteria for EA: having the right leadership, culture, perspective/scope, resource, governance, and stakeholder involvement and support; would you like to add anything to this list? (IF SOME OF THESE DON'T SHOW UP IN THE LIST FROM #1, CAN YOU EXPLAIN WHY?)

- May not have the right leadership, no directing, just influence
- In the absence of strong leadership
- EA is organizational intervention
- Organization in time to market competition – goal of reducing IT infrastructure cost, expectation
- EA has to promote organizational learning, if you don't do that, if you don't encourage learning, your architecture is not worth much
- Theory of intervention – matching value to what the organization needs
- Sustainable – trigger organizational learning
  - You don't get to control everything
- Organizational learning
- Tools and methodology

#### Question 4:

For the top six success criteria that you mentioned, how do you assess how well an organization is currently doing in each area?

- Consistency across information product
- Line with up budget with architecture and strategic plan; see if it's the same thing
- The GAO Reports
- OMB PART
- OMB IT dashboard – monthly performance information of the largest IT investment
- Commerce business daily – advertise contracts, solicitations can be instructive ex agency wants to consolidate data center, put lots of money to do it, congressional record
- Formalizes a lots of decisions, good information of the hole, avid consumers of the problems so they also know what's going on
- Enterprise architecture records solution, preparing to have the capacity to host that, it would cost more if, groups,
- Teamwork and collaboration
- A big issue is the availability of information – rarely is all this stuff in explicit form, in people's head, at a time where we don't have much to trade
- Questions may lead to dangerous territory, so just back off and come back to it earlier

Do you have tools that you use to assess an organization's strength in these areas?

- Assessment related topics
  - Balance sheet analysis – corporate, free cash flows, looks at market placement, strong differentiators, vulnerable to competition, profitably
  - Building the understanding of the company business model, opportunity cost
  - In the public sector, but there is a lot of legislation about what the agency is authorized to do, if you understand their authority, they you understand their business model pretty well
  - Commercial, market map, company relatively to competitors, look at a couple of major competitors, to see what they are up to
  - Stakeholder analysis – could not satisfy all the stakeholders, pick and choose, and communicate

- Classic value chain – a couple of Norwegian scholars that the value chain doesn't describe some business do, 2 additions, value shop – consulting, value network – company aggregate information
- Internet business model – a little taxonomy for understanding business models
- Profit tool analysis – Harvard business review
- Profit analysis, look at the market for each link in the value chain, estimate revenue profit, market share, market size, investment portfolio, which link does each investment support, rank each investment based on notion of value
- COMOCCO II, Barry Boehm wrote the classic test on software cost estimating

If so, could you share these instruments for educational use only? N/A  
 What issues do you encounter when assessing these areas in an organization?  
 N/A

Question 5:

Do you measure these success criteria at other points during the implementation of Enterprise Architecture in the organization? Or is this only done at prior to EA implementation to give you an idea of areas of strength and weakness in the organization? Can you explain?

- Evaluate how deep the questions are getting, getting below the level everyone around you understand
- Am I hearing stories about past events that were really informative for that organization?
- Am I starting to be able to read things knowingly?
- Usually in the first 2 months, identify a few anomalies, and then try to understand them
- Look at the utilization of the architecture, who will talk to you, if you start having information people value, in a financial
- The value usually can't be quantified
  - Work avoided – search cost reduced, 200 people 10 hours, save 2000 hours or 1 person, but he's still there, just better using his time for adding value
  - For people who are developing solution – is it easy for them to figure out the rules they have to follow, 40 % of IT project is rework TOM GILB,
- Can I tell people what the rules are?

- Can I prevent them to violate the standards and causing other people a lot of cost
- Whether the executives are using the information to make decisions, is the information credible

Question 6:

Is there anything else you'd like to add?

- Resources:
  - Peter block – flawless consulting
  - Organization learning – Peter Senge
  - Dorothy Leonard – Wellspring of Knowledge
  - Jim March – a Primer on decision making

Conclusion:

Thank you so much for your time! Your help to this project is greatly appreciated!



## Appendix B – Enterprise Architecture Readiness Assessment

### Tools and Guidelines

#### Assessment Tools

#### Microsoft Organizational Maturity Levels

	<b>Level 1 Performed</b>	<b>Level 2 Managed</b>	<b>Level 3 Established</b>	<b>Level 4 Predictable</b>	<b>Level 5 Optimizing</b>
<b>People</b>	Success depends on individual heroics. “Fire fighting is a way of life.” Relationships between disciplines are uncoordinated, perhaps even adversarial.	Success depends on individuals and management system supports. Commitments are understood and managed. People are trained.	Project groups work together, perhaps as an integrated product team. Training is planned and provided according to roles.	A strong sense of teamwork exists within each project.	A strong sense of teamwork exists across the organization. Everyone is involved in process improvement.
<b>Process</b>	Few stable processes exist or are used.	Documented and stable estimating, planning, and commitment processes are at the project level.	Integrated management and engineering processes are used across the organization.	Processes are quantitatively understood and stabilized.	Processes are continuously and systematically improved.
<b>Technology</b>	The introduction of new technology is risky.	Technology supports established, stable activities.	New technologies are evaluated on a qualitative basis.	New technologies are evaluated on a quantitative basis.	New technologies are proactively pursued and deployed.
<b>Measurement</b>	Data collection and analysis are ad hoc.	Planning and management data is used by individual projects.	Data is collected and used in all defined processes. Data is systematically shared across projects.	Data definition and collection are standardized across the organization. Data is used to understand the process qualitatively and stabilize it.	Data is used to evaluate and select process improvements.

### SPICE Criteria Levels<sup>1</sup>

Level	Level Name	Capability Level Description
0	Incomplete	There is a general failure to attain the purpose of the process. There are no easily identifiable work products or outputs of the process.
1	Performed	The purpose of the process is generally achieved. The achievement may not be rigorously planned and tracked. Individuals within the organization recognize that an action should be performed, and there is general agreement that this action is performed as and when required. There are identifiable work products for the process, and these testify to the achievement of the purpose.
2	Managed	The process delivers work products of acceptable quality within defined time scales. Performance according to specified procedures is planned and tracked. Work products conform to specified standards and requirements.
3	Established	The process is performed and managed using a defined process based upon good principles. Individual implementations of the process use approved, tailored versions of standard and documented processes. The resources necessary to establish the process definition are also in place.
4	Predictable	The defined process is performed consistently in practice, within defined control limits, to achieve its goals. Detailed measures of performance are collected and analyzed. This practice leads to a quantitative understanding of process capability and an improved ability to predict performance. The quality of work products is quantitatively known.
5	Optimizing	Performance of the process is optimized to meet current and future business needs, and the process achieves repeatability in meeting its defined business goals. Quantitative process effectiveness and efficiency goals (targets) for performance are established, based on the business goals of the organization. Obtaining quantitative feedback enables continuous process monitoring against these goals, and improvement is achieved by analysis of the results. Optimizing a process involves piloting innovative ideas and technologies and changing non-effective processes to meet defined goals and objectives.

From ‘Microsoft Readiness Framework Organizational Readiness White Paper

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<sup>1</sup> Levels 1 to 5 can be applied to an organization to determine its level of maturity in relation to people, process, technology, and measurement.

PWC Assessment Tool

ENTERPRISE ARCHITECTURE GOVERNANCE READINESS SCORE CARD		ANALYSIS				SCORE
Corporate Domains	Key Components of Alignment	Completely Satisfied (100%)	Partial Satisfied (50%)	Not Satisfied (0%)	Weight	
<b>Business Alignment</b>						
	<i>Business Portfolios based on Services / Products</i>					
	Business Portfolio Definitions					
	Business Services/Products Reference Flow (e.g. Products integrated with other products)					
	Service/Product Alignment Definition with Business Portfolios (Who owns what)					
	Services/Product Roadmap					
	Services Descriptions					
	Service/Product Development strategy					
	Service/Product Retirement Strategy					
	Service/Product Alignment Definitions					
	<i>Collaboration Services Across Business Users</i>					
	Process for interfacing with all business users					
	<i>Setting Common Principals</i>					
	Method for identifying Strategy					
	Method for identifying Pain Points					
	Method for identifying Short Term Objectives					
	Method for identifying Long Term Objectives					
	<i>Standardize Services</i>					
	Method for identifying synergies between services and current architecture					

	Method for managing changes in the Services					
	Cross Portfolio Service Dependency Definition					
	<i>Business Process Standardization and Service/Product Alignment</i>					
	Service/Product Process Flows					
	Sales					
	Ordering					
	Fulfillment					
	Billing					
	Collections					
	Asset Management					
	Finance					
	Cross Portfolio Service/Product Dependency Identification Process					
	Business Reference model creation process					
	Product/Service consolidation processes					
	<i>Change Management Empowerment with Business Users</i>					
	Clear Definition of Change Management Process					
	User Functional Responsibility Matrix (Who owns the systems and functions)					
<b>Organization Flexibility</b>						
	<i>Steering Committees covering cross functional areas</i>					
	Is there a formal Steering Committee including					
	Marketing / Sales					
	IT					
	Operations					
	PMO					
	Are there Committee Policies					
	Regularly scheduled meetings					
	Escalation process					
	Open Forum for Discussions					

	Does the committee provide the following guidance for					
	Business Operational improvements and issues					
	IT performance and environment improvements					
	Strategic planning					
	<i>Service and Process Ownership</i>					
	Has there been a clear delineation of ownership					
	Is there a process established to identify ownership					
	<i>Integrated Service Teams and Ownerships</i>					
	Has a working structure been developed between the execution team					
	Does EA have the ability to drive End to End architecture discussions					
	Are all corporate functional areas represented					
	Is there a tight PMO process to ensure objectives and goals are met					
	Has an escalation process been established within the teams					
	<i>Global Organizational</i>					
	Is there a process which integrates the global organizations					
	Are the Global organizations following the same structure					
	<i>Alignment with Business</i>					
	Is there a process which integrates the global organizations					
	Formalized interface plan with the Business					
	Latest Business Product/Service Strategy					
<b>Technology Alignment</b>						
	<i>Business Process Alignment with IT</i>					
	Is there a Architecture to IT validation process					
	Review of Development Activities					
	Review of priorities					
	Tactical Architecture Review Process					
	Formalized interface plan with IT					

	Is EA part of the SDLC process					
	<i>Flexible Model to Handle Business Agility</i>					
	Business Requirements Life Cycle Development Process					
	Software Development Life Cycle Process					
	Change Management Process					
	Strategic Planning Process					
	<i>Architecture Standards, Policies and Protocols</i>					
	Foundation Architecture Integration Process to Business Applications (i.e. Back office Infrastructure)					
	Adaption of a Architecture Framework (i.e. TOGAF)					
	Application Design Methodology (i.e. Web; Client Server; Mainframe)					
	Data Architecture Design Methodology (i.e. Transitional Data; Data Warehousing; Data Marts)					
	System Architecture Methodology (i.e. SOA; Java; .NET)					
	Application Reference Architecture					
	Data Reference Architecture					
	Process of Understanding Current Development to New Architecture Implementation Activities					
	Process for Tracking Architecture Development Metrics					
	Incomplete Business Requirements					
	Architecting to No Business Requirements					
	Time to Delivery (i.e. Are Architecture Solutions Delivered on-time?)					
	Process for Reviewing Application Development Defects and their associations to Change Requests					
	<i>Business User Empowerment of the Services</i>					
	Provide a User configurable environment (i.e. Business Rules)					
	Flexible Reporting					
	<i>Standard Based Data and Data Integration / Minimize/Eliminate Data Redundancies</i>					
	Process to Define, Convert and Implement New Data Elements into existing Data Stores					
	Data Management Process					

	<i>Process Integration with Services</i>					
	Business Requirement to Systems Capability Mapping					
	Process to Define Business Scope, Objectives and Pain Points					
	High Level Business to Systems Flow					
<b>Regulatory Compliance</b>						
	<i>Setting up Objectives and Policies</i>					
	Sarbanes Compliancy Procedures					
	Industry Specific Requirements Documented, Reviewed and Updated					
	<i>Defining Metrics For Performance</i>					
	Process and Delivery for Industry Regulated Required Tracking for SLA and Reporting					
	<b>Monitoring Performance and Enforcement of the Policies</b>					
	Process for Monitoring, Managing and Reporting on the Required Policies					
				<b>TOTAL</b>	<b>TOTAL</b>	

## Academic Vita of Mu Xu

Mu Xu  
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### Education:

Bachelor of Science in Information Sciences and Technology	Spring 2010
Bachelor of Arts in Economics	Spring 2010

Honors in Information Sciences and Technology  
Thesis Title: Enterprise Architecture Success: Assessment Categories of  
Enterprise Architecture Readiness  
Thesis Supervisor: Dr. Brian Cameron

### Work Experience:

Access Data (Broadridge) Software Developer Intern	Pittsburgh, PA	Summer 2009
Enterprise Architecture Initiative Research Assistant	State College, PA	Fall 2008-Present
Accenture Systems Integration Intern	Beijing, China	Summer 2008
Solutions Institute Web Developer Intern	State College, PA	April 2007-May 2008

### Awards:

Penn State Schreyer Honors College Scholarship  
Gerard L. Bayles Memorial Scholarship  
Dean's List

### Presentations/Activities:

Vice President – IST Consulting Club	
Gamma Tau Phi – IST Honor Society	
Teaching Assistant for Globalization Trends and World Issues	Fall 2008
Pennsylvania Governor School of Information Technology	Summer 2005