THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

COLLEGE OF INFORMATION SCIENCES AND TECHNOLOGY

ENTERPRISE ARCHITECTURE AS SEEN IN THE UNITED STATES AND CHINA

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Summer 2011

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Information Sciences and Technology and Chinese
with honors in Information Sciences and Technology

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ABSTRACT

This thesis attempts to analyze, explain and provide insight into the practice of Enterprise Architecture (EA) as seen in the United States and China. An understanding of how EA is used in various organizations on opposite sides of the world can allow for better means of overcoming challenges, enhancing efficiency, and enabling more effective development.

Open Group members present in both the United States and China, in addition to TOGAF Certified individuals employed in China-based organizations form the sample subjects who provided the primary data used for analysis. Findings show that the participants collectively faced similar challenges with regards to the establishment and development of the EA program at their respective organizations, which related to lack of support and initiative from the organizations' top leadership. An analysis was performed on the subject data in order to understand the current situation of the EA programs and to allow for informed suggestions on possible improvements. This thesis is presented with the hope that it will serve as a basis for future research and information sharing attempts to help increase the development of this EA practice.

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INTRODUCTION

Enterprise Architecture (EA) is an emerging practice that is gaining rapid popularity among the Information Technology (IT) departments of organizations across the globe (Background). However, the establishment and development of EA is undergoing many challenges while pushing for acceptance and recognition (Biggest Enterprise Architecture Challenge: Proving Its Value). This thesis examines the attitudes placed on the EA programs present in organizations based in the United States and China in hopes of addressing these challenges and presenting insight into the situation. Problems faced and considerations for improvements from EA practitioners in both nations are analyzed and commented upon. Before delving into the information contained within this document it is important to have a common perspective on the term "Enterprise Architecture", as it currently embodies an evolving concept lacking a canonical definition. This thesis will refer to "Enterprise Architecture" as follows:

Enterprise Architecture: *A practice of comprehensively describing an organization's internal and external components and their interoperability to evaluate its current state and recognize a more efficient and effective future state.*

EA is a comprehensive practice which analyzes an entire organization, not just from an internal systems standpoint, but also taking into account the business drivers and output, the organizational goals and vision, and the relationships among departments and how value is derived. There are currently several methodologies (frameworks) to approach EA, and as such EA serves as an umbrella for a number of frameworks which all work to achieve a similar goal (A Comparison of the Top Four Enterprise-Architecture Methodologies). Information sharing can create many mutual benefits for all parties involved, and EA is no exception (Benefits of

collaboration). It is important for organizations utilizing, or planning to utilize, an EA program to collaborate and learn with one another. The Open Group, the world's largest consortium of EA practitioners, recognizes this, and enables its members to share relevant knowledge, resources and experience with one another (The Open Group). The purpose of this thesis is to present useful information into the EA practice as seen in the United States in China which may serve as a basis from which organizations can better collaboration benefitting the establishment and development of EA. Additionally, it hopes to expose common challenges EA practitioners are currently facing, and recognize some possible solutions to overcome these obstacles and mitigate future potential problematic issues.

To obtain data, a 28-question survey was distributed to Open Group members present in both the United States and China, in addition to TOGAF Certified individuals based in China organizations. TOGAF is an EA certification awarded by the Open Group (TOGAF Certification Program). Questions were designed to elicit information regarding the EA program present at the participants' respective organizations. Participant answers serve as the primary data used for discussion throughout this document.

To better display the information found in this document the thesis will be broken down into the following segmentation. The proceeding section will explain the methodology of data collection. Next, results will be factually presented in textual expression along with associated tables and figures for a pictorial representation. A discussion section will follow which interprets and provides some personal insights into the results found. A conclusion will be provided recapping the main points covered. The remaining sections will provide an appendix with additional tables and figures, along with the actual survey used for data collection. Finally, the thesis will conclude with the writer's academic vita.

METHODOLOGY

To obtain data, a 28-question survey was presented to Open Group members present in both the United States and China, in addition to TOGAF Certified individuals employed in China-based organizations. TOGAF is an EA certification awarded by the Open Group (TOGAF Certification Program). Questions were designed to elicit information regarding the EA program present at the participants' respective organizations. Data was acquired from 33 US-based participants and 44 China-based participants.

The survey was created in both English and Chinese to ensure accurate understandings of the questions by participants located in both the United States and China, and underwent multiple revisions via the insights provided by the thesis advisors, and several Open Group members. The finalized survey was entered into SurveyMonkey, the world's leading provider of web-based survey solutions, as two surveys, one in English and the other Chinese (SurveyMonkey). Although there were several means for survey distribution, email was the medium chosen as it provided an easy way to disperse the unique URLs associated with the two surveys to the Open Group members via a mass messaging system.

The two unique URLs were then forwarded to an Open Group member who sent the emails out to the Open Group members worldwide. In addition, another Open Group member sent out the survey via email to the TOGAF Certified individuals based in China. To ensure only the desired sample subject data was collected, the survey's two beginning questions performed as filters. The first question asked whether the participant's organization was based in the "United States", "China", or "Other". Only participants selecting the "United States" or "China" options were allowed to continue. To ensure the participant's organization was familiar with EA, the

proceeding question asked if the participant's organization currently utilizes, or plans to utilize within the next year, an EA program. If the participant's organization did not meet this criterion then the participant was not allowed to continue.

Once the participant had completed the survey, results were immediately updated on SurveyMonkey. SurveyMonkey offered many ways to examine the response data. In addition to examining it on their web-service site which allowed multiple filtering options to analyze the data, the data was also exported the answers to an Adobe PDF reader and a MS Excel 2007 spreadsheet. Lastly, each Chinese answer was translated back into English.

To ensure an accurate comparison of similar organizations, the participant was asked to provide the organization's industry. This allowed for comparison based on locality and industry. Due to limitations regarding the sample data to work with, it was found impossible to make an accurate comparison among organizations based on locality, industry, revenue, and number of employees. As such, the following described approach was taken. The largest industry for both nations was found to be information technology (IT). Thus, IT was compared against the other organizations collectively to compose the first comparison. Results were found to be similar across industries, and as such the two nation-based organizations were then compared against each other. Also it is important to note that there are several written answer based question in the survey. Due to the nature of these written responses, an exact statistical representation of the findings is not possible. However, it is inferred that there were obvious parallels among many of the answers, and as such categorizations and comparisons were made.

***NOTE:** Survey questions found not to be relevant to the goal of this thesis were discarded. However the original survey in its entirety can be found within this document.

RESULTS

The sample data used for the results were collected from the Open Group members present in both the United States and China, in addition to the TOGAF Certified individuals employed in China-based organizations. TOGAF is an EA certification awarded by the Open Group (TOGAF Certification Program). The participant numbers are categorized as shown in the following list:

- 33 participants from United States-based organizations
- 44 participants from China-based organizations

Answers felt to be most relevant to the thesis topic are presented within this Results section.

PRIMARY INDUSTRIES OF OPERATION: INFORMATION TECHNOLOGY

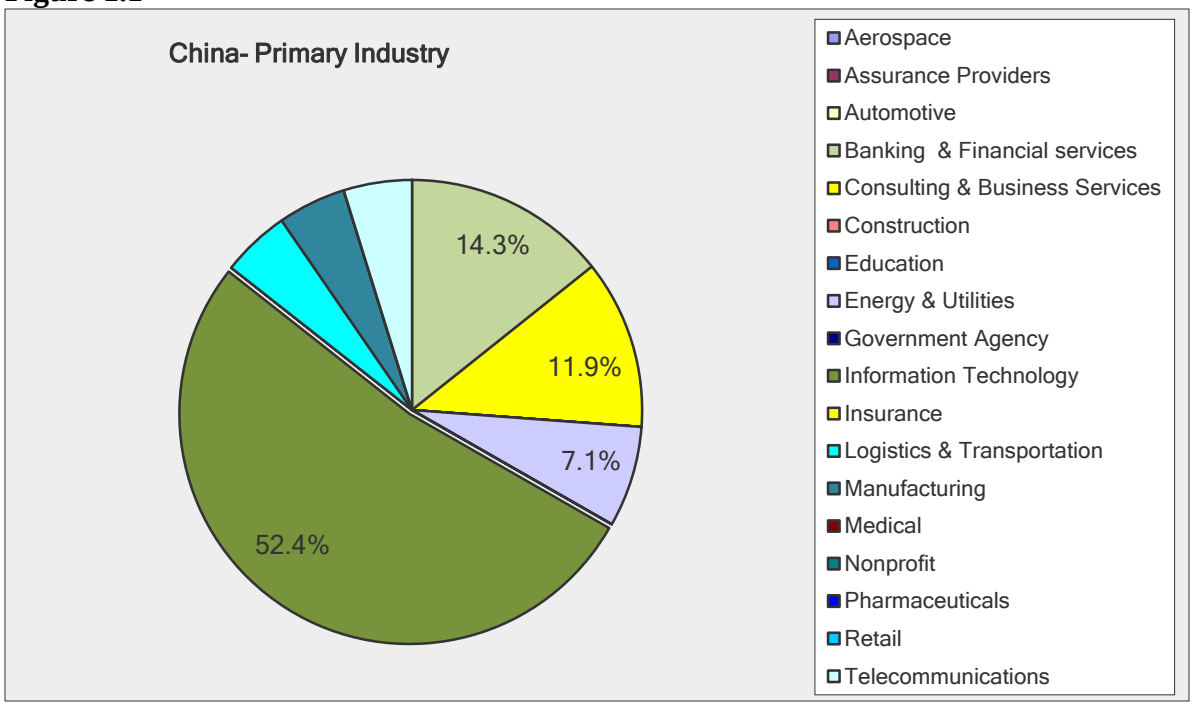
Information Technology was chosen by survey participants as the primary industry of operation for both nation-based organizations. In the United States the second and third most chosen industries in respective order are "Consulting & Business Services" and "Banking & Financial Services" (which also tied with "Technology Insurance"). In China, the second and third most chosen industries in respective order were "Banking & Financial Services" and "Consulting & Business Services". Interestingly, the top three industries for both nation-based organizations were identical: Information Technology, Consulting & Business Services, and Banking and Financial Services. The breakdown of participant's responses to the primary industry of operation are shown in Table 1.1, and displayed by percentages in a pie chart in Figure 1.1 (top 4 industry percentages are shown).

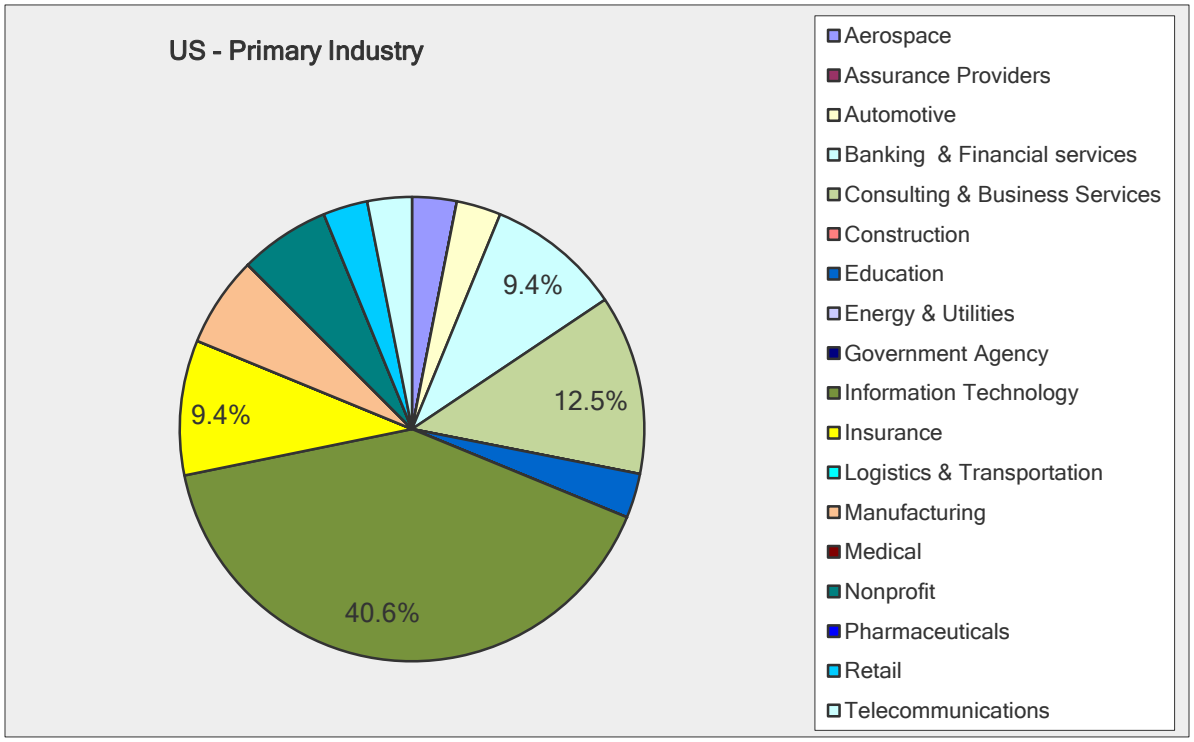
Table 1.1

United States - Primary Industry of Operation		
Answer Options	**Response Percent**	**Response Count**
Aerospace	3.1%	1
Assurance Providers	0.0%	0
Automotive	3.1%	1
Banking & Financial Services	9.4%	3
Consulting & Business Services	12.5%	4
Construction	0.0%	0
Education	3.1%	1
Energy & Utilities	0.0%	0
Government Agency	0.0%	0
Information Technology	40.6%	13
Insurance	9.4%	3
Logistics & Transportation	0.0%	0
Manufacturing	6.3%	2
Medical	0.0%	0
Nonprofit	6.3%	2
Pharmaceuticals	0.0%	0
Retail	3.1%	1
Telecommunications	3.1%	1
Other (please specify)		1
answered question		**32**
skipped question		**1**

China - Primary Industry of Operation		
Answer Options	**Response Percent**	**Response Count**
Aerospace	0.0%	0
Assurance Providers	0.0%	0
Automotive	0.0%	0
Banking & Financial Services	14.3%	6
Consulting & Business Services	11.9%	5
Construction	0.0%	0
Education	0.0%	0
Energy & Utilities	7.1%	3
Government Agency	0.0%	0
Information Technology	52.4%	22
Insurance	0.0%	0
Logistics & Transportation	4.8%	2
Manufacturing	4.8%	2
Medical	0.0%	0
Nonprofit	0.0%	0
Pharmaceuticals	0.0%	0
Retail	0.0%	0
Telecommunications	4.8%	2
Other		1
answered question		**42**
skipped question		**2**

Figure 1.1

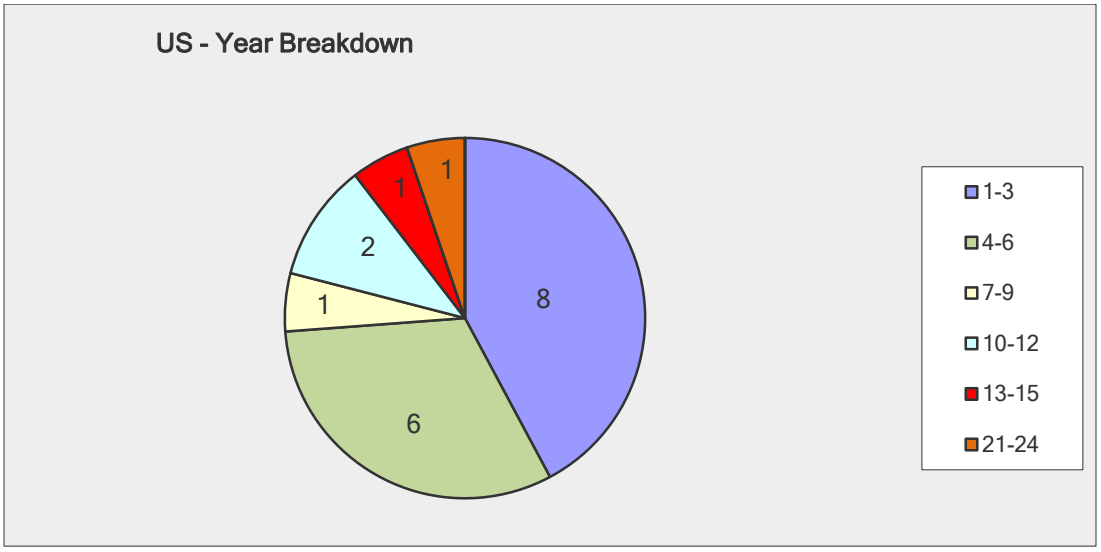

China- Primary Industry
14.3%
11.9%
7.1%
52.4%
Aerospace
Assurance Providers
Automotive
Banking & Financial services
Consulting & Business Services
Construction
Education
Energy & Utilities
Government Agency
Information Technology
Insurance
Logistics & Transportation
Manufacturing
Medical
Nonprofit
Pharmaceuticals
Retail
Telecommunications

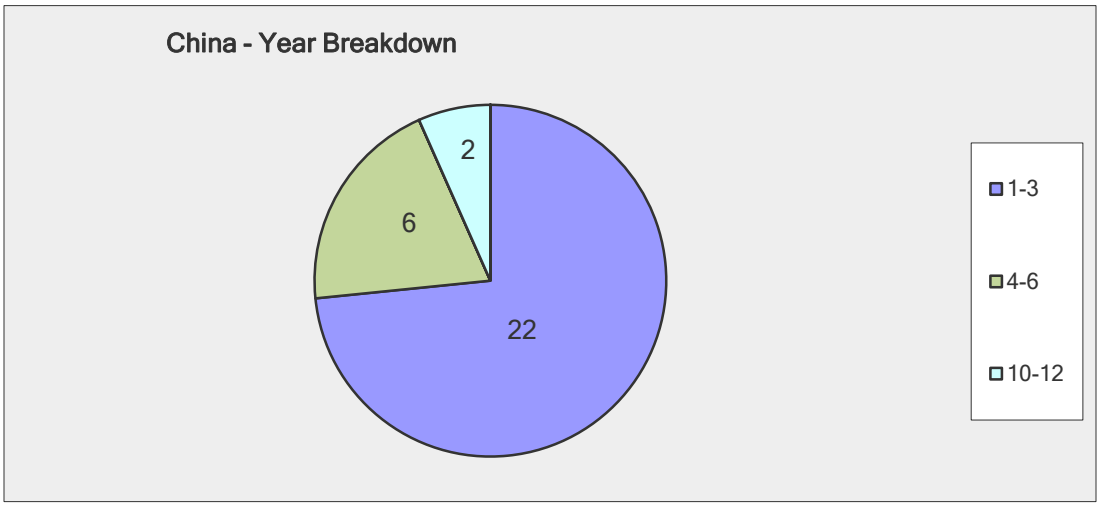

US - Primary Industry
9.4%
12.5%
9.4%
40.6%
Aerospace
Assurance Providers
Automotive
Banking & Financial services
Consulting & Business Services
Construction
Education
Energy & Utilities
Government Agency
Information Technology
Insurance
Logistics & Transportation
Manufacturing
Medical
Nonprofit
Pharmaceuticals
Retail
Telecommunications

EXAMINATION OF YEARS EXPOSURE TO ENTERPRISE ARCHITECTURE

The majority of United States and China based organizations' EA programs were initiated within the first 1-3, and 4-6 year spread. However results indicate that the EA practice has had longer exposure in the United States than in China, with participants in the United States choosing the 13-15, 21-24 year spreads. This can be seen in Figure 2.1. The numbers in the pie chart refer to the number of participants in each section of the pie.

Figure 2.1

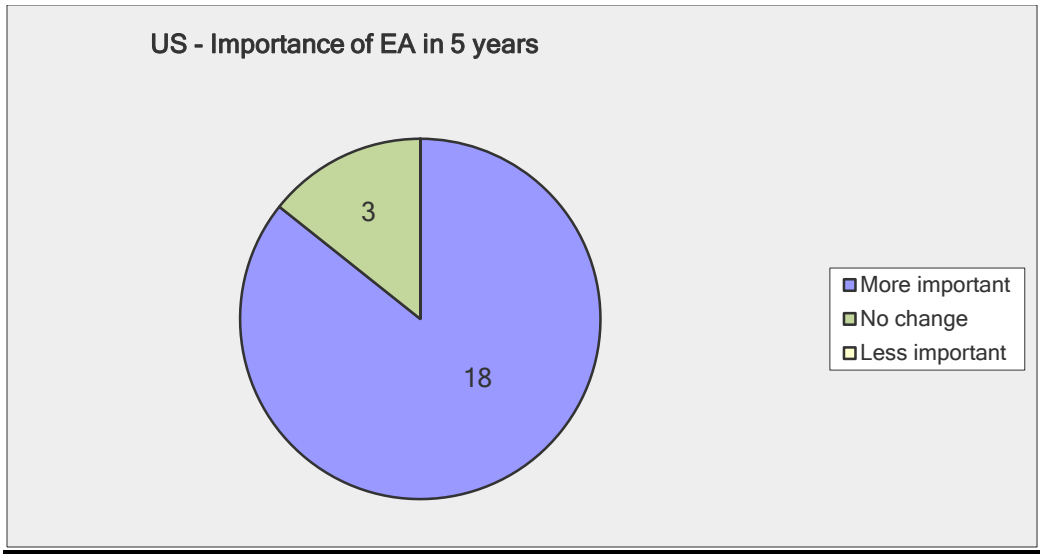


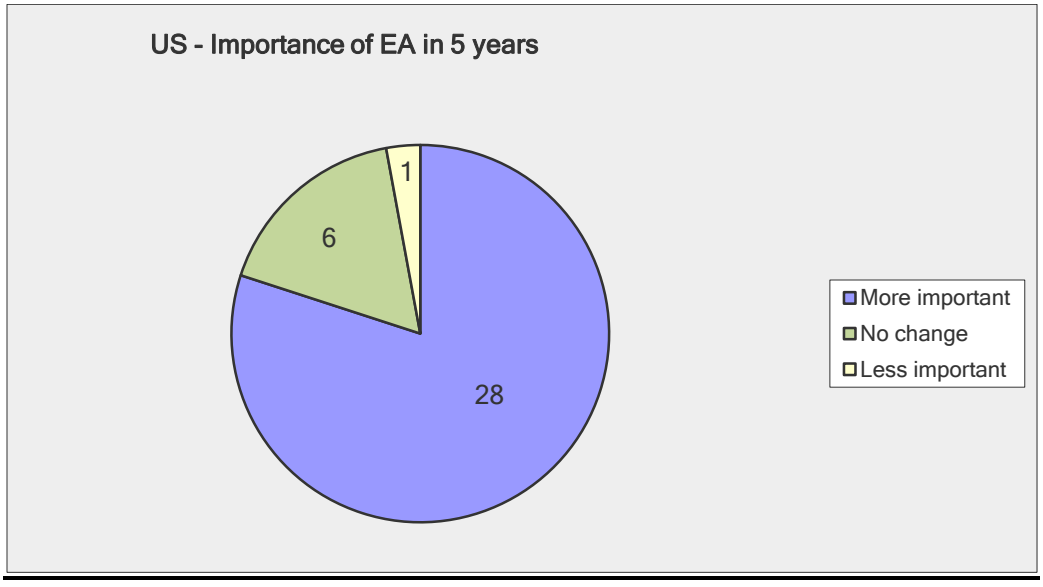


IMPORTANCE OF ENTERPRISE ARCHITECTURE IN 5 YEARS

The majority of participants in both the United States and China felt that the importance of EA will have become more important five years from now. This can be seen in Figure 3.1. The numbers in the pie chart refer to the number of participants in each section of the pie.

Figure 3.1





WRITTEN REPONSE EXPLANATION & ANALYSIS

As previously stated, the sample size was found to be not large enough to compare organizations within each industry according to revenue and number of employees. As the most widely chosen industry was Information Technology (previously shown), the following method was used for analysis: organizations placed in the IT industry were compared against organizations placed in the remaining industries. Based on the results, the two nation-based organizations were then compared with each other.

The tables showing the results to the following three questions are available in the Appendix section of this thesis (Tables 2.1 – 4.3). The exact appendix table corresponding to the result is listed in each section below, and Chinese answers are shown in both original form and with English translations. The following results come from written (non-multiple choice) answers. Due to the nature of these written responses, an exact statistical representation of the findings is not possible. However, it is inferred that there were apparent parallels among many of the answers, and the most frequently related answers for each country are highlighted below.

GREATEST CHALLENGES TO ENTERPRISE ARCHITECTURE

United States

Appendix, Table 2.1

Participants responded that the IT industry's greatest challenge was departmental conflicts of interest within the organization, and the remaining industries' greatest challenge was getting leadership to support the cause.

- Varying priorities among organization's departments

- Lack of leadership/top-level support

China

Appendix, Table 2.2 & 2.3

Participants responded that the IT industry's greatest challenge was lack of ability, and the remaining industries' greatest challenges were getting leadership to support the EA program, in addition to in sufficient understandings related to the nature of EA.

- Leadership
- Ability
- Lack of understanding the nature of EA

HOW TO IMPROVE EFFECTIVENESS OF ENTERPRISE ARCHITECTURE

United States

Appendix, Table 3.1

Participants responded that the IT industry's greatest challenge was related to communication and standardization improvements, while the remaining industries' greatest challenge was obtaining CIO and other executive leadership support. An EA governance system was also suggested.

- CIO and other executive leadership support
- Communication and standardization improvements
- EA governance

China

Appendix, Table 3.2 & 3.3

Participants gave a wide plethora of answers in both the IT and remaining industries. However, it is inferred that several major concepts were often seen reiterating throughout the answers. These are as follows: the need for executive leadership support, an increase in the use of standards/EA governance system, the actual execution of the EA practice's use, and being able to obtain the correct tools.

- Executive leadership support
- EA governance system/standards
- Execution of EA practice
- Obtaining correct tools

CHANGES NEEDED TO REACH DESIRED FUTURE STATE OF ENTERPRISE ARCHITECTURE

United States

Appendix, Table 4.1

Participants in both the IT and remaining industries gave very similar responses. Both felt big-picture thinking/long-term planning, along with leadership support, were necessary in order to reach the desired states for EA. Additionally, communication improvements among departments was felt to be important.

- Big picture thinking/long-term planning
- Better leadership support/understanding
- Communication improvement among departments

China

Appendix, Table 4.2 & 4.3

Participants in both the IT and remaining industries response were very similar, and although there were a wide spread of answers, three particular concepts appeared often. These three are listed below:

- Increase leadership understanding
- Increase employee understanding
- Reduce organizational bureaucracy

DISCUSSION

It was interesting, although not surprising to find that the largest majority of the participating organizations primarily operate in the information technology (IT) industry. Many believe that Enterprise Architecture (EA) is purely an IT concept (Enterprise Architecture: It's Not Just For IT Anymore). However, EA has nothing to do directly with IT although it is lead by IT people. EA comprehensively analyzes each aspect of an organization and its various relationships in order to identify a means for improvement, which ultimately add value to the entire organization as a whole (Developing an Enterprise Architecture). However, as the Consulting & Business Services, and Banking and Financial Services industries were the second two most-often-picked industries, this may serve as an indicator that EA will now gain more popularity and experience more development in the business and financial industries. With regards to the ratio of industries chosen out of those available to the participant, the United States had a greater variety with 11 of the 18 industries chosen. In China, only 7 of the 18 industries were chosen. A possible explanation may come from the comparison of how many years both nations have been exposed to the EA practice.

The majority of United States and China based organizations were started within the first 1-3, and 4-6 year spread. However results indicate that the EA practice has had longer exposure in the United States than in China, with participants in the United States choosing the 13-15, 21-24 year spreads. The longer time EA has been present in the United States leads one to consider that this is why the practice has spread to more industries than in China. However, both nations' participants responded that they felt 5 years from now the importance placed on the EA practice

will have increased. The participants' response serves as an indicator that EA may soon spread throughout the remaining industries.

With regards to challenges, one may initially believe that the problematic issues faced in the two nations may differ as the United States' organizations may face more developmental, expansion related issues, while China's may relate more to establishment issues. While this was shown to be true to a certain extent, a common solution can be constructed to collectively address these dissimilar problems. Both the United States and China organizations' most often used response to the greatest challenge limiting the EA program at their organization came back as lack of support from leadership. In order to better understand the lack of supporting leadership issue, it is necessary to examine the primary concerns of EA at both the United States and China-based organizations.

The United States participants said to be having difficulties developing an EA program due to the varying priorities among organization's departments. Additionally, success stories which could be used to popularize the practice are in wanting. Due to the fact that EA focuses on a long-term solution that constantly evolves and delivers an implicit value, there may be difficulty in displaying results (Enterprise Architecture Development). Thus, the metrics used to evaluate success at the respective organizations should be examined. According to the survey, the most popular three concepts related to methods for improving the effectiveness of EA did correlate with the major problems. These are listed as follows: more CIO and executive leadership support, communication and standardization improvements, and EA governance initiation.

Interestingly, the non-IT industry organizations directly stated more help was required from the CIO, however only one response in the IT industry related to the need for high-level support without direct reference to the CIO. This may indicate that the IT industry executives better understand the nature of EA, and the non-IT industry EA practitioners must develop a way to prove the value of an EA program (e.g. evaluating their current success metrics). A suggestion is for the non-IT industry to collaborate with IT practitioners for methods to develop a standardized approach designed to demonstrate the value of the program to garner executive support. Additionally, the non-IT industries may look to the IT industry for success stories to share with their leadership. For changes felt necessary to reach the desired future state of an improved presence of EA at their organizations, both the IT and remaining industries' answers are very similar. It was universally felt that a change to a "big picture" focus (e.g. needing to shift from short-term to long-term planning), better internal communication among departments, and greater leadership support and understanding were necessary to reach the desired future state of EA at their organizations.

In China, the problems seem to be of a different nature. With a relatively younger history in the EA realm, China-based organizations stated lack of ability and understanding to be the major challenges they are currently facing. In response to methods for improving the effectiveness of EA at their organization, the most often seen answers are as follows: executive leadership support, demonstrating value, the implementation of standards, and obtaining and using the correct tools. With regards to changes felt necessary to reach the improved presence of EA desired, both the IT industry and remaining industries gave a wide spread of answers. However three particular concepts were frequently reverberated throughout the rest. These are increasing leadership and employee understanding, and reducing the organizational bureaucracy.

While the challenges both country-based organizations are facing may differ, both have similar visions for what is needed to improve the effectiveness of EA at their organizations. Subsequently, a similar solution may be able to reduce the extent of the negative effects stemming from the dissimilar problems faced, while simultaneously mitigating future issues.

Taking into consideration the responses, it is felt that the largest obstacle hindering an establishment or quicker development of EA programs at organizations in both nations relate to lack of involvement from the top-level management. The cause is due to primarily a lack of understanding, and the inability to recognize the EA program's value. If executives are able to understand the two said aspects of EA, then they will provide the support and initial top-down push for an EA initiative enabling the program to rapidly develop and expand through the recognition, funding, and hierarchical power. Without this top-level support, the EA program will be unable to function as designed due to constraints resulting in mediocre results. This in turn will present the EA program as an unattractive option for top-level management to invest in, thus creating a negative cycle.

Based on this theory, it is essential to find a methodology on presenting an EA program to the executive leadership. The first step will be to creating a mutual understanding and recognition of the nature of EA and what it is used to accomplish. Secondly, there needs to be an evaluation of the EA frameworks and tools available which can suit the organization's goals. Additionally, these frameworks and tools must be scalable and aligned with each business division while having the ability to mature with the organization. Next, establishing a vision and attainable goal that everyone in the organization will be able to understand is critical. It is also essential to have thorough understanding of the business drivers at the organization so that it will be possible to present a quantifiable amount of value that the EA program will bring to the

organization. An EA champion is vital, and ideally having the CIO champion the cause is very beneficial as there will be better access to the other top-level executives. Once the executives can understand the nature of EA and the value the program can bring, they will give support and begin the top-down push needed to initiate and develop the EA's presence at the organization. This said theory is broken down into three phases and expanded upon below. Please note that the phases are presented with the idea that they are to be continually repeated, and is not a one time, static event.

Phase 1: EA Definition, Analysis & EA Champion

The first step relates to electing an EA champion and establishing a standardized organization-specific definition and concept for the nature of EA. Due to the necessity of understanding the business and having the executive power to push this through, the CIO appears to be the fitting EA champion. This correlates to the United States-based organizations' answers stating the need for CIO and executive involvement. The apparent first step would thus be trying to win the CIO's approval. One humorous response presented in the survey stated, "Our CIO resigned, we are in limbo". This shows the importance of having an active, CIO who recognizes the benefits of EA, as he or she can serve as the flagship of pitching the idea to the rest of the executives.

This step also involves creating an explanation for how the EA specific program relates to the organization as a whole and each specific department. This includes analyzing the various divisions and evaluating mature, scalable frameworks and tools which can be built upon in the future. In addition, the business drivers, organizational goals, organization divisions and their relationships must be analyzed.

Phase 2: EA Champion & Short to Long term planning

The second phase is for the EA champion to find a way to demonstrate the future monetary-value of the program. To popularize such a proposal, one must have knowledge closely tied to the business understanding (Enterprise Architecture: It's Not Just For IT Anymore). Without this, the champion will not know how to develop solutions. Additionally, long-term strategic savings are often pushed aside for short-term quick tactical benefits. As such, it would be advantageous to show strategic short-term cost savings paired against short-term tactical earnings. One way to present this would be to show the quantifiable the strategic long-term savings as a series of short-term savings paired against the tactical short-term earnings. In addition, it would be beneficial to show cost-savings results for each department in addition to the organization collectively.

Phase 3: Cross-divisional involvement

The fourth phase relates to involving other divisions. A great challenge was said to be varying priorities among different departments. The first 2 phases collectively attempt to explain and justify the value need for the initiation/development of the EA program. However, it is also essential to obtain stakeholder buy-in from the other organizational divisions. Instead of keeping the other divisions at a distance, an aim towards transparency and collective involvement are essential. Although, EA has been typically led by IT people, there should be an attempt made for other division member involvement. For example, none of the participants in the United States said their EA program reports directly to the CEO, and only 1 participant responded that the EA program is delivered to the CFO and COO. The majority of respondents in the United Sates organizations said the EA program directly related to the CIO. Instead of delivering results to

only the CIO, it would be beneficial to deliver quick standardized status updates on the progress of the EA program each week to the heads of every department involved in the EA program. This would enable the top-level management to personally keep track of progress. In addition, greater awareness of the EA activities would allow for more input from each division resulting in an increase in knowledgeable communication across organizational divisions. Without such a practice it will be very difficult to attempt to gain the top-level support that the survey participants are searching for.

CLOSING THOUGHTS

Based on the survey findings, Enterprise Architecture (EA) will continue to expand and develop permeating through all the industries presented in this document. It is believed that the level of support from the top-level executives that the survey participants are looking for will eventually be reached, however there will be many challenges before this can be obtained. The information presented in this document, and the 3-phase suggestions provided in the discussion section, hope to facilitate this process.

This thesis was created with the belief that information sharing and transparency can help facilitate growth and allow for a plethora of benefits. By better understanding the EA program as seen in the United States and China, better collaboration can be made benefitting the establishment and development of EA. Although the challenges regarding EA practice in the two nations may be different, a common approach can be taken to address many of these dissimilar problems. This thesis hopes to have presented insight in the EA practice as seen in the United States and China which may serve as a catalyst for future research, and a means for these two countries to work together to overcome adversity and create solutions to better spread the development and use of EA.

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ENTERPRISE ARCHITECTURE SURVEY

- **Where is your organization based:**
    - United States of America
    - China
    - Other

- **Does your organization utilize (or plan to utilize within the next year) an enterprise architecture (EA) program?**
    - Yes/No

- **Which of the following is your primary industry of operation? (Please select only one)**
    - Aerospace
    - Assurance Providers
    - Automotive
    - Banking & Financial services
    - Consulting & Business Services
    - Construction
    - Education
    - Energy & Utilities
    - Government Agency
    - Information Technology
    - Insurance
    - Logistics & Transportation
    - Manufacturing
    - Medical
    - Nonprofit
    - Pharmaceuticals
    - Retail
    - Telecommunications
    - Other (Please Specify)

- **What is your organization's annual revenue (if a company) or operating budget (if Government or Non-Profit organization)? (Please select only one)**
    - Less than $1 million
    - $1 million to less than $5 million
    - $5 million to less than $10 million
    - $10 million to less than $25 million
    - $25 million to less than $50 million
    - $50 million to less than $100 million
    - $100 million to less than $250 million
    - $250 million to less than $500 million
    - $500 million to less than $1 billion
    - $1 billion to less than $10 billion
    - $10 billion to less than $100 billion

- More than $100 billion
- Don't know

- **Please indicate the overall budget for enterprise architecture program in your organization (USD)**
  - Less than $100,000
  - $100,000 to less than $500,000
  - $500,000 to less than $1 million
  - $1 million to less than $2 million
  - $2 million to less than $3 million
  - $3 million to less than $4 million
  - More than $5 million
  - Don't know

- **For the organization being described, please indicate the number of employees (Please select only one)**
  - Less than 100
  - 100 - 249
  - 250 - 499
  - 500 – 999
  - 1000 – 2,499
  - 2500 – 4,999
  - 5000 – 9,999
  - More than 10,000
  - Don't know

- **How many people are employed in the enterprise architecture program in your organization? (Please select only one)**
  - 1 – 3
  - 4 – 6
  - 7 – 9
  - 10 – 14
  - 15 – 19
  - 20 – 29
  - 30 – 39
  - 40 – 49
  - 50 – 99
  - 100 or more
  - Don't know

- **What enterprise architecture frameworks does your organization utilize?**
  - The Open Group Architecture Framework (TOGAF)
  - Federal Enterprise Architecture (FEA)
  - The Zachman Framework for Enterprise Architectures
  - Internal
  - Other/ Combination:

- **What enterprise architecture tools does your organization utilize?**
    - ARIS Platform
    - Troux Architect
    - Visio
    - Visio Powerpoint
    - Open Source
    - Powerpoint
    - IBM System Architect
    - SparkxSystems Enterprise Architect
    - Other:

- **On a scale of 1-5, within your organization, are the tools utilized up-to-date with your current architecture framework? ('5' being entirely up-to-date, '1' being least up-to-date)**

- **Which of the following does your enterprise architecture group evaluate?**
    - Process
    - Application
    - Infrastructure
    - Data
    - Other (please specify)

Where in the organization does the enterprise architecture program report directly? (Please select only one)

- Chief Information Officer (CIO)
- Chief Technical Officer (CTO)
- Chief Executive Officer (CEO)
- Chief Operating Officer (COO)
- Chief Financial Officer (CFO)
- CIO/CTO
- CTO/CEO
- CTO/CFO
- Head of IT planning
- Head of application development
- Head of infrastructure/operations
- Head of corporate strategy/planning
- Other (please specify)

- **What percentage from each of the following areas within your organization initiates Enterprise Architecture?**
    - Information Technology
    - Business

  - Operations
  - Senior Management
  - Other:
- **How long (years) has your organization been using Enterprise Architecture program?**
  - 1-3
  - 4-6
  - 7-9
  - 10-12
  - 13-15
  - 16-18
  - 19-21
  - 21-24
  - Don't know
  - Other (please specify)

- **How many projects, started from January 2010 to December 2010, has an Enterprise Architecture approach been applied to at your organization?**
  - 1
  - 2
  - 3
  - 4
  - 5-9
  - 10-15
  - 16-20
  - > 20
  - Don’t Know

- **How many projects (regardless of approach) were started from January 2010 to December 2010?**
  - 1
  - 2
  - 3
  - 4
  - 5-9
  - 10-15
  - 16-20
  - > 20
  - Don't Know

- **In the last 5 years, have the number of Enterprise Architecture projects increased, decreased, or stayed the same?**
  - Increased
  - Decreased
  - Stayed the same

- **Which of the following are top three organizational goals for the enterprise architecture program in your organization? (Please select at most two goals the following)**
    - Strategic alignment of business and IT
    - Better communication with stakeholders
    - Enable greater flexibility in business processes
    - Efficient and effective business operations (improved ability to seize new business opportunities, flexible outsourcing capabilities)
    - Legacy transformation which include technology convergence
    - Cost savings through shared infrastructure and services from standardization, consolidation of application and component reusability
    - Better predictability of project costs (acquisition cost, operation and maintenance costs)
    - Protection of intellectual property
    - Better governance
    - Early risk mitigation
    - Satisfy compliance requirements
    - Deliver applications and new IT services faster (enhanced service delivery) to facilitate technology leadership
    - Improve management decision making
    - Improve cross governmental interoperability
    - Improve interoperability with business partners
    - Innovation exploration
    - Adaptability / fluidity of organization
    - Other (please specify)

- **How do you measure the effectiveness of your enterprise architecture program?**
    - Long term cost savings
    - Short term cost savings
    - Improved interoperability among departments within your organization
    - Was 100% EA delivered
    - Decreased time in development delivery
    - Other (please specify)

- **How effective is your organization's Enterprise Architecture program currently? ('5' being most effective, '1' being least effective)**

- **What have been the great challenges limiting the overall effectiveness of Enterprise Architecture at your organization? (*WRITTEN RESPONSE)***

- **What considerations are made to make your enterprise architecture program more effective? (*WRITTEN RESPONSE)***

- **From which of the following areas within your organization did the most resistance against the establishment of the enterprise architecture program come?**
    - Information Technology

- Business
- Operations
- Senior Management
- Other (please specify)

- **Since the implementation of the Enterprise Architecture program at your organization, how has the level of resistance from the department which resisted the establishment of an enterprise architecture program changed? ('1' being "more resistant", '3' being "no change", '5' "very supportive")**

- **In the next 5 years, what level of importance do you feel will be placed on Enterprise Architecture at your organization?**
  - More important
  - No change
  - Less important

- **What changes in culture, management, etc. will be necessary to reach the desired future state of enterprise architecture at your organization? (*WRITTEN RESPONSE*)**

- **Has your organization considered outsourcing your enterprise architecture activities to a third-party vendor?**
  - Yes
  - No
  - Unsure
  - EA activities currently outsourced

- **Given the nature of the industry in which your organization sits, do you find it difficult to implement an enterprise architecture program?**
  - Yes
  - No

APPENDICES

UNITED STATES: GREATEST CHALLENGES TO ENTERPRISE ARCHITECTURE

Table 2.1 shows the responses from United States-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 21, "What have been the great challenges limiting the overall effectiveness of Enterprise Architecture at your organization?" The answers are displayed as received.

Table 2.1

IT Industry	Remaining Industries
Various business units have different priorities	Unable to staff the right number of skilled individuals
Lack of holistic approach every Division is different	EA is still perceived as a cost center
Effective communication	Organization size and complexity.
Internal politics on control of the EA initiative	Funding & Drivers
The global nature and scale of the corporation	Personnel who have those strengths and a lack of interest at the CEO level. The business unit VPs understand the importance of EA but the CEO and COO do not support it (though we have generated millions in savings and directly affected the bottom line)
Not having enough bandwidth to handle all requests	Who owns what
	Lack of resources
	Tactical issues have more importance to address than Strategic Intents
	Buy in from management
	Changing the culture of how things are done in IT.
	Communicating the value
	Understanding the impact of non-standard proposals
	Hyper-defensive line of business application owners
	Stakeholder buy-in

CHINA: GREATEST CHALLENGES TO ENTERPRISE ARCHITECTURE

Table 2.2 shows the responses from China-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 21, "What have been the great challenges limiting the overall effectiveness of Enterprise Architecture at your organization?" The answers are displayed as received.

NOTE: *Table 2.3 shows Chinese written responses translated to English*

Table 2.2

IT Industry	Remaining Industries
组织文化的转型	了解
复杂	部门间利益冲突
"创新"不受控制、转型无目标、运作不规范。	能力
需求分析	官僚主义
技术创新能力	组织架构的管理
中高级管理人员对企业架构知识了解的局限性	工具，资源（案例）
部门流程不畅，各部门内部不规范	高层支持力度不够
实践经验	高素质的架构师团队缺乏
有统一的沟通语言	成本效益分析
成果展现	组织总在调整
内部共识	管理体系
方法论尚未推广	业务操作的随意性
多余的架构	认知
懂得企业架构应用的人员短缺	投入大，短期难见效
规划不足	整体对企业架构的认识，特别是管理高层对企业架构的认识。
领导意识	
对于企业架构的理解以及其能带来的效益	

CHINA: GREATEST CHALLENGES TO ENTERPRISE ARCHITECTURE (English Translation)

Table 2.3 is the English translation of the Chinese text shown in Table 2.2. It shows the responses from China-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 21 "What have been the great challenges limiting the overall effectiveness of Enterprise Architecture at your organization"?

Table 2.3

IT Industry	Remaining Industries
Transformation of organizational culture	Understanding
Complicated	Departmental conflicts of interest
Cannot control "innovation", Transformation has no target, No standardized operations	Ability
Needs analysis	Bureaucracy
Technological Innovation Ability	Organizational Structured Management
Senior management know about the limitations of Enterprise Architecture	Tools, Resources (case)
Department processes are poor, Each department lacks internal standards	Not enough high-level support
Experience	Lack of high-quality expertise architects
A uniform language in which to communicate	Cost/benefit analysis
Visible results	Organization constantly adjusting
Internal consensus (e.g. lack of agreement)	Management System
Method hasn't been promoted (Method = EA)	Random Business Operations
Redundant Architecture	Really knowing about EA (i.e. cognitive)
Understand there is a EA staff shortage	Large investment, and difficulty in achieving a short-term benefit
Inadequate planning	Overall understanding of EA, especially senior management's understanding of EA
Leadership Awareness	
(Lack of) understanding and the benefits EA can bring	

UNITED STATES: HOW TO IMPROVE EFFECTIVENESS OF ENTERPRISE ARCHITECTURE

Table 3.1 shows the responses from United States-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 22, "What considerations are made to make your Enterprise Architecture program more effective?" The answers are displayed as received.

Table 3.1

IT Industry	Remaining Industries
Better communication	We need to implement architecture governance
Does it help us sell more software?	More direct support from CIO. More centralized control and less federation
Executive sponsorship	Emphasis placed on TOGAF training, certification, adaptation and application.
Cross organizational steering body	CBA and Budgeting to include additional funding
Considerations Organizations Making to Enterprise Architecture More Effective Improved collaboration, federated EA model	My CIO resigned. We are in limbo
Applicability savings	More and better communications
	Better communication
	Standardization of IT solutions
	Educate mgmt on how all of our competition is using EA
	Chief Enterprise Architect is a member of the IT Executive Group leading the IT organization.
	Better communication regarding the architecture decisions
	Higher reporting levels and decreasing backlog of requests
	CIO's "big stick"

CHINA: HOW TO IMPROVE EFFECTIVENESS OF ENTERPRISE ARCHITECTURE

Table 3.2 shows the responses from China-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 22, "What considerations are made to make your Enterprise Architecture program more effective?" The answers are displayed as received.

NOTE: *Table 3.3 shows Chinese written responses translated to English*

Table 3.2

IT Industry	Remaining Industries
成立专门的团队组织进行管理	了解
现状混乱	数据共享
规范运作，减少所谓创新，优化流程	精简流程
执行力	管理改革，以人为本
集成与整合能力	组织架构的管理
来自高层推动	成熟可扩展的架构工具
管理层的支持	高层支持
实践案例	有效的架构管控检查评审
通过不断的培训加强影响力，让高层参与这项活动	要真正体现一下架构实际业务运作中的价值
成果总结	统一的标准
内部共识	高管理念
积极的商业模式推广	更简洁的过程
减少层级	实践
更多的人了解和支持企业架构	提供与方法论配套的工具集
加强长远规划	提高管理高层对企业架构的认识，不断加强各个层面的企业架构的培训，更好地用企业架构的方法指导信息工建设工作。
领导支持	
增强培训，加强市场培育	

CHINA: HOW TO IMPROVE EFFECTIVENESS OF ENTERPRISE ARCHITECTURE
(Translation to English)

Table 3.3 is the English translation of the Chinese text shown in Table 3.2. It shows the responses from China-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 22, "What considerations are made to make your Enterprise Architecture program more effective"?

Table 3.3

IT Industry	Remaining Industries
Establish an exclusive EA team for management	Better/increase understanding
The current situation is chaos	Improve/initiate data sharing
Standardize operations, reduce the so-called innovation ,optimize processes	Streamline processes
Execution	Management reform, people-oriented
Integration and the ability to integrate	Organization's Architecture Management
Initiative from the top-leadership down throughout the organization (e.g. top down approach)	Mature and scalable architecture tools
Managerial support	High-level support
Success stories	Effective architectural control, inspect and review (system)
Through continuous training and demonstrating the impact of EA to attract the organization's top leaders to participate in relevant activities	Must demonstrate the architectural value to business operations
Summarizing results	Uniform Standards
Internal consensus	Top management's concept (for support/initiative)
Promote a positive business model	More concise processes
Reduce Layers	Practice
(Get) more people to understand and support EA	Provide complete set of tools and methodology
Strengthen long-term planning	Improve senior management's need to understand EA, continuously strengthen each level of EA's cultivation, better ways of using EA to guide the information construction work.
Leadership support	
Enhance training, strengthen EA's market cultivation	

UNITED STATES: CHANGES NEEDED TO REACH DESIRED FUTURE STATE OF ENTERPRISE ARCHITECTURE

Table 4.1 shows the responses from United States-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 26, "What changes in culture, management, etc. will be necessary to reach the desired future state of Enterprise Architecture at your organization?" The answers are displayed as received.

Table 4.1

IT Industry	Remaining Industries
Better understanding of value at CXO level	We need to realize that EA is NOT just IT - it is the entire business.
Upper management understanding and support	More support from senior leaders
Effective communication	Greater shared vision and intentionality in developing our company's foundation for execution.
Big picture thinking rather than short term thinking	Helping understand the value
Communication , education	Need top's focus on the big picture vs. all the exceptions
Focus on long term over short term	Change in the position of the COO and CFO
Change in philosophy to understand design, plan, do	Better communication
	Focus should be on the strategic goals rather than short term gains.
	Way we work
	More involvement of EA in key projects.
	IT should feel that EA 's perspective is a requirement for any change programs
	Understanding EA is for all of us, not a way to say no.
	EA has to become more than a checkbox on the project management checklist. It has to be proven, marketed and sold as a highly collaborative value added level of accountability.
	More success stories.

CHINA: CHANGES NEEDED TO REACH DESIRED FUTURE STATE OF ENTERPRISE ARCHITECTURE

Table 4.2 shows the responses from China-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 26, "What changes in culture, management, etc. will be necessary to reach the desired future state of Enterprise Architecture at your organization?" The answers are displayed as received.

NOTE: *Table 2.3 shows Chinese written responses translated to English*

Table 4.2

IT Industry	Remaining Industries
以内外服务经营为导向的整体转型	开放
法制	企业文化
随需而变	精简，敏捷
了解 EA 的意义	减少管理层级，弱化阶层界限，提升沟通效率
整合创新能力	标准化，节能化，成本减少。
加强对企业架构的了解	Too many
企业全局观	需要全新的企业架构知识、理念
需要重视 IT 长期规划和战略	更加重视 IT 的价值，加大 IT 预算投入
加强培训，短期内见到成效	主要在加强规范遵循和检查，树立规划先行的理念的落实
更加开放	普及架构的意义，让架构知识通俗化
管理确认	不是很清楚，应该需要高层管理者的支持
将企业架构融入到企业战略中	企业良性运作是前提条件
减少官僚	认识企业架构给企业在业务支持、信息规划及管理方面的作用及效果
普及企业架构基本知识.	五大转型
重视	正确理解信息系统的作用和地位
领导支持，全员意识加强	完善企业的架构的团队，高层加强对企业架构的重视，提高企业全员对企业架构的认识。
文化未变，管理方式方法发生了变化	

CHINA: CHANGES NEEDED TO REACH DESIRED FUTURE STATE OF ENTERPRISE ARCHITECTURE (Translation to English)

Table 4.3 is the English translation of the Chinese text shown in Table 4.2. It shows the responses from China-based organizations in the Information Technology industry compared with the remaining industries responding to the survey question 26, "What changes in culture, management, etc. will be necessary to reach the desired future state of Enterprise Architecture at your organization?"

Table 4.3

IT Industry	Remaining Industries
Overall transformation of internal and external services in addition to business operation's orientation	Openness
Legal system	Culture
Demand and change	Streamlined and agile
Understanding the significance of EA	Reduce management layers, weaken hierarchical boundaries, improve communicational efficiency
Integration and innovation	Standardization, energy conservation, cost reduction
Enhance the understanding of EA	Too many
Overall view of the enterprise	Need completely new EA knowledge and ideas
Need to focus on the IT long-term planning and strategy	Pay more attention to the value of IT, and increase the IT budget
Enhance training, see short-term results	Mainly focusing on work inspection and strengthening compliance, in addition to establishing a plan for future implementations
Become more open	Popularizing the significance of EA enables the popularization of EA
Managerial recognition	It is not very clear, should require the support of senior management
Incorporate EA into business strategy	Healthy business operations is a prerequisite
Reduce bureaucracy	Understanding of EA's effects and functionality in enterprise business support, information planning and enterprise management
Popularize basic knowledge related to EA	Five transformations: Strategy, R&D, Operation, Culture, Entrepreneurship
Importance	Correct understanding of the role and position that information systems are playing
Leadership support, all employees should have EA concept.	Perfect the EA team, top leaders need to strengthen the awareness of the importance of EA, raise the enterprise employee understanding of EA
The methods of management have changed but the culture remains the same	

Thomas Hsiao

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EDUCATION

The Pennsylvania State University — **University Park, PA**
Schreyer Honors College — **Class of 2011**
B.S. in Information Sciences and Technology – Integration and Application
B.A. in Chinese
Minor: Supply Chain and Information Sciences and Technology
Minor: Security and Risk Analysis

WORK EXPERIENCE

PricewaterhouseCoopers - Hong Kong, China — **Hong Kong, China**
*Summer Forensics Technology Solutions/**Senior Associate*** — **Summer 2011**

- Currently working directly with client on worldwide-scale project
- Utilizing EnCase Forensics Software to image, mirror, and extract data from targeted computers
- Managing PwC's asset management of the client's property for recording purpose
- Serving to connect the PwC Hong Kong, United States, and Canadian forensics teams
- Performing many project-related functions with SQL Server, MS Access 2007, and MS Excel 2007

PricewaterhouseCoopers - Mclean, VA — **Mclean, VA**
Summer Forensics Technology Solutions Intern — **Summer 2010**

- Worked directly with Forensic Technology Solutions team on approximately 10 projects
- Used forensic specific tools such as EnCase
- Utilized SQL, MS Excel 2007, MS Access 2007, Oracle Schemas, CSS, HTML, XHTML to contribute to projects
- Added-value related to efficiency by using VBA to write excel macros which automates a previously tedious task
- Placed in finals in intern-wide competition related to finding business opportunities for the firm

Jade Bird Software — **Beijing, China**
Marketing Intern — **Spring 2010**

- Translated entire company presentations and advertisements from Chinese to English for international usage
- Taught English to company employees by focusing on cultural issues
- Assimilated self into company environment and served as liaison between American and Chinese cultures

Progressive Insurance — **Mayfield Heights, OH**
Summer IT Intern — **Summer 2009**

- Worked two rotations within the company: Network IT Operation Center, and Desktop Support
- Fulfilled same responsibilities as full-time Progressive employees – involved in daily break-fix issues related to IT
- Learned how IT supports and is integrated into a corporation – enabling the organization to function properly
- Enhanced communication skills – learned how to effectively and efficiently work with customers to resolve issues

Smeal Business College — **State College, PA**
Smeal Web Site Webmaster — **May 2008-Present**

- Edit and update the Smeal Business College's 'Quality Team' webpage
- Manage the website using the PLONE content management system

Chinese College — **State College, PA**
Teaching Assistant for Chinese 001 — **Fall 2009**

- Worked one-on-one with students to improve language, reading, and writing skills
- Graded various student assignments, such as exams, quizzes, and homework

IST College **State College, PA**
Teaching Intern for IST 230 (Discrete Mathematics) **Spring 2009**

- Aided students with in-class assignments related to the subject of discrete mathematics
- Scheduled meeting times with students outside of class to review and explain material
- **Nominated for the Teaching Assistant of the Year Award**

Private Schools **Easton, PA**
Chess Instructor and Tutor August 2003-May 2007

- Instructed over 75 students yearly of various ages for over 5 years
- Developed lesson plans, homework, schedules, and competitions
- Accompanied and encouraged students as they participated in local tournaments
- Students had much success, consistently finishing in the top 3 of their section

STUDY ABROAD

IES Beijing **Beijing, China**
Language Intensive Program **Spring, 2010**

- Completed 10, 400-level language credits
- Obtained insight into the Chinese culture and way of living by staying with Chinese host family
- Visited many Chinese corporations to talk with leaders about the business environment in China

SCHOLARSHIPS/AWARDS

- Schreyer Ambassador Travel Grant 2010 & 2011
- PNC Technologies Scholarship Fund 2009 - 2011
- Whole World Scholarship Spring 2010

SCHREYER HONORS COLLEGE THESIS

Topic: Compare, contrast and analyze through an object lens how United States and China based companies approach the practice of Enterprise Architecture.
Objective: Discover cultural differences present in businesses based in the United States and China, and present an analysis on how to facilitate better relations among dissimilar organizations leading to mutual added-value.
Methodology: Construct and submit survey to United States and Chinese companies familiar with the Enterprise Architecture practice, and analyze their culture and approach to the Enterprise Architecture system.

SKILLS

- Business Related: Problem Based Solutions, Leadership, Team-Building, Project Management, Understanding in areas relating to Private Equity, Portfolio Companies, and Venture Capitalism
- Technology Related: SQL, MS Office Access 2007, Telecommunications, Networking, HTML Web Design, Plone, C++ Programming, Java

STUDENT ORGANIZATIONS

- IST Honors Society
- The Kairos Society – Entrepreneurship Related
- Chinese as a Second Language
- Chinese Undergraduate Student Association
- Allied Christian Fellowship
- PSU Chess Club