A REVIEW ON THE RELATIONSHIP BETWEEN ENTERPRISE ARCHITECTURE FRAMEWORKS AND ORGANIZATIONAL STRUCTURES

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ABSTRACT
In the heart of enterprise architecture, using and regulating enterprise architecture frameworks is inevitable. This exigency has something to do with the fact that architectural frameworks provide organized thinking about enterprise from stockholders’ various points of views and create a logical link between architectural outputs. In addition to time and research requirement for enterprise’s specifications, regulating methods for enterprise is related to skills and experience of enterprise’s architect. A considerable number of factors are taken in to account such as enterprise’s nature, enterprise ’s policies, architecturalpropeller, and some other factors while regulating enterprise architecture. In the era of growing acceleration of changes and technologies in all aspects of lives and social systems as well as the fact that information technology has led to advent of modern patterns from business and social transactions, enterprises are experiencing challenges which need planning and reviewing for adapting and leadership in the era of transformation. This article will introduce various architectural methods from the beginning, and then compare weak and strong points of each one. Furthermore, all types of enterprises’ structures are introduced in order to select suitable architectural methods considering their condition and activities.

Keywords: Enterprise Architecture, Enterprise Architectural Methods, Types of Enterprise Architecture, Enterprise Architecture

INTRODUCTION
In the last decade, a noticeable number of activities have been done in terms of enterprise architecture, methods, and implementation of standards worldwide in that, nowadays, almost all countries have accepted enterprise architecture as standard method for identifying enterprise ‘s current situation, designing desirable situation, and compiling transitional plans from current to desired situation. This is legally and compulsory being done is some countries such as the United States being considered three main planning steps of information architecture in any given organization or government. According to international polls conducted by International Federation Enterprise Architecture Development (IFED), Iran has promoted from 17th in …. To 8th in ….. And scored the top in Middle East in ….. . (Samadi, 2003). The 20th anniversary of Enterprise Architecture. During these 20 years, several methodologies and frameworks have been created for enterprise architecture. Zachman, Togaf, FEA, and Gartner are some, to name a few. In this article, first, enterprise architecture will be defined and different methodologies of enterprise architecture in four methodologies will be introduced. Then different types of structures will briefly be defined. After that, four methods will be compared in order to enable organizations to select appropriate methods based on their conditions.

Enterprise Structure
Architecture is defined as fundamental structure of systems, components, internal and external communications, and ruling principles of designing and growth. Enterprise in enterprise architecture can include the whole enterprise and/or a distinctive part in an organization. Generally, the term Enterprise
Architecture can be defined as following: Enterprise Architecture is an enterprise map which has defined mission structure and essential information for enterprise, necessary technologies for supporting them, and does transitional process for implementation of such technologies (Jafari and Kalantar, ????).

Enterprise – Architecture Pyramid
The pyramid of enterprise architecture includes three layers, from top to down: Strategic layer, operational layer, and information-technology layer.

Strategic layer: Parts of enterprise which are accountable for policy making, determining long-term goals, values, policies, strategies and macro-plans. This layer determines perspectives, efficiency – evaluation criteria, and efficacy of lower layers. Relevant documents of this layer are considered as inputs of enterprise-architecture process.

Operational layer: contains mission sectors including all organization’s activities such as product manufacturing or providing service and it covers all various levels like executive management, intermediate management, operation.

Information – and communication technology layer: This layer includes all informational and communicative technologies being used in direction with operational layer activities. It is important to point out that a difference exists between enterprise architecture and information-system production methodologies. Although, enterprise architecture is rooted in information and communication technology subjects, the main goal is implementing strategic ruling on organization as well as coordination among various layers of enterprise.

Enterprise Architecture Framework
One of differences between architecture and engineering is having methods. This is not only true about enterprise architecture but also about software architecture. Although the perception of “methods” concept differs in various fields, the idea and necessity are equaleverywhere. Framework [method] in the field of enterprise architecture is highly paid attention compared to other fields. In architecture`s point of view, method is a tool helping architect to think organized.

This tool for enterprise architecture means a logical structure for classifying and organizing descriptive models of organization where it is important for enterprise management similar to development of information or communication systems. It is noteworthy that most [people] defines architecture through methods and this definition might not be wrong because architecture without methods might not reach its ultimate goals. Instead, using a method guarantees monotonousness and standards during transitional period and integrating information systems. Different methods have been presented for enterprise architecture.

Enterprise Architecture Methods
In the last 20 years, a substantial number of methods have been created for enterprise architecture where they are being used in just ???? per cent of occurrences.

Zachman Method
Enterprise architecture was introduced for the first time by Zachman in ?????. Management of complexities of distribution systems were raised in his study. Zachman believed that Business success depends on information systems increasingly and regularly for management of those systems. Zachman method is a classification method and Zachman states his own classification in construction industry as following: Organizing in the mentioned industry is studied in two dimensions: First dimension: there are various players in the game such as industry owners or those who spend for the project; building constructors and those who generally find the location of buildings. A building architect provides different tools for each of these roles.

Each of players demand complete information which is different forms each other. One house owner is interested in a complete and comprehensive explanation of the building. Constructor is keen on extensive description of materials and processes. House owner does not care about the location of columns in the house and the constructor does not care about which window receives the sunrise. But, the second dimension is construction justification. What? How? Where? By who? When? Why? This dimension is completely independent from the first one. For instance, what is different in constructor’s or owner’s
point of view? Zachman method includes six operational aspects (data, function, network, people, time, and motivation) of the main layer (planner, owner, designer, constructor, and organization). Each cell of this table shows the language which needs to be used. For example, inputs or link between inputs in work are considered as data at home for work including customers, products, and etc. If you look at this table horizontally, different definitions will be seen from different outlook and if you look vertically (from top to down), the concentration is on one aspect but players or involved units in system change. It shows that what roles are played by each of these involved units. Some stumbling blocks exist for Zachman: this trend alone is not sufficient for enterprise architecture. This method does not create a step-by-step process for new architecture. Moreover, it does not help in terms of being the best architecture or not?

TOGAF Method
In this methodology, enterprise architecture is fallen in to four groups: Business Architect, architecture of requests and needs, architecture of data, and architecture of technology. Business architecture: explains processes used by business in order to reach goals. Architecture of needs: explains how to design needs and how to interact with each other. Data architecture: explains how enterprise data have been organized and how they are accessible. Technology architecture: describes software and hardware infrastructure, needs, and their interactions. This method is more architecture-development method called AMD rather than enterprise architecture. If we intend to compare Zachman and Togaf, Zachman states the way of classifying what needs to undergo architecture while Togaf presents process to create. Therefore, Togaf completes Zachman.

Federal Enterprise Architecture, FEA
Legislating Clinger-Cohen law in 2006, all parts of U.S. Federal government were required to compile their enterprise architecture. This law is an integrated method for promoting or maintaining the current technology as well as obtaining new technology in order to reach the strategic goals of organization and its resource management. Architecture development organization of US federal began to work under the supervision of management and budget office in February, 6th, 2003. The aim of this effort was to identify opportunities for simplifying processes and unifying the work through service and inside all business branches of Federal government. The output of these efforts was customer-oriented and citizen-oriented government increasing the investment on technologies to reach better outputs which is the ultimate goal of organization.

This method is the most complete one which has been discussed. This method enjoys five reference patterns including business, service, components, technique, and data. All these five patterns are for creating a common language. In a nutshell, the goals of these five reference patterns in FEA are standard phrases and definitions for enterprise architecture dimensions simplifying the collaboration and link between Federal governments. These patterns are: Business Reference Method (BRM): provides a business view for various tasks of Federal government such as water resource management which is one of sub-responsibilities (sub-function) of natural resources and one of branches of vast services for citizens’ business fields. Component Reference Method (CRM): defines information technology view of systems which can support operational aspect of business. Technical Reference Method (TRM): defines various technologies and standards for making IT systems. Data Reference Method (DRM): defines standard method of data description. Evaluating Reference Method: defines standard methods of value description made by enterprise architecture.

Procedure: FEA
FEA process initially focuses on architecture of one section as sub-section of organization. Classified development architecture process is done in four steps: 1. Architecture analysis: determines easy and brief overview for each section of organization and links it to the related organization. 2. Description of Architecture structure: determining expected architecture for organizational section, documenting performance goals, designing alternatives, and development of enterprise architecture for each section including business architecture, data, service, and technologies. 3. Determining investment strategies and fixed capital as well as considering projects which will be invested on. 4. Determining operational
projects, management plan of programs: creation of a plan for managing and implementing projects and performance criteria assessing project success. Measuring FEA success is ranked in three categories: green, yellow, and red groups for centres using both architecture and presenting a good result of partial architecture. Yellow is a satisfactory field and red is used for service centres without architecture or do not use effectively from the conducted architecture.

**Gartner Method**

This framework is neither a classification method like Zachman nor process method like Togaf and a complete method like FEA. It is an applied method (Gartner). It is one well-known research centre of IT and organizations’ consultants around the world. In 2003, a rival group called Meta Group joined Gartner and they were merged. Meta-group methods were focusing on process while Gartner method focussed on framework. Enterprise architecture method of Gartner defines a business concept including business strategies and internal tendencies (internal event trend) providing general concept for the enterprise. Gartner claims that at least three ideas are dependent (interdependent and correlative): opinion business. Information Opinion and technological opinion of Gartner.

He believes that no enterprise architecture will be effective unless it is implemented and no enterprise architecture is implemented unless future overview of organization, advice, and standards are taken in to account in organization’s decision making (Loakin, 2005). Enterprise architecture from Gartner’s point of view is strategy not in terms of engineering but organization destination. In other words, the most important issue from Gartner’s point of view is the fact that which direction is the organization taking and how it will reach the destination?. Therefore, enterprise architecture is an action not a noun. So far, we described enterprise architecture. Now, we compare them.

**Types of Enterprise Structures**

**Traditional structure:** These structures are normally fallen in to three categories based on task, type of product, and geographical location. Preparing enterprise structures based on type of activity and product type is the most common method being used by organizations. In task-oriented structure, activities are classified according to common nature from down to top. In product –oriented structure, different sections of organization are organized according to type of product, type of service, type of plans or main programs, or profit centres. In geographical location-oriented structure, the focus and attention are on customers and consumers (Ramazanian and Pour).

**Modern Organizational Structure (Adaptable with Communication Era)**

**Project structure:** number of units in any organization can be as many as the number of projects. This is convenient for organizations where their goal and mission can be operated in the form of projects and independent plans.

**Matrix structure:** is a type of structure where expertise is invited from different task-based centres in order to do certain tasks in groups led by project managers. At the moment, matrix structures belong to traditional structures because they perform two structures including task and product simultaneously. This structure is convenient for organizations with complex technology of various products.

**Specialized and Project Matrix Structure**

In specialized matrix structure, organization’s manager enjoys the main authority and production managers need to adapt their activities while in project matrix structure, project manager is the main responsible and intermediate managers can only appoint their technical staff in those units and provide them specialized consultations.

**Network Structure**

It is a modern structure convenient for virtual organizations.

**Process Structure**

It is a type of structures where staffs have special skills and they are placed in expertise positions and they are involved in process activities and process-activity team and they provide innovative actions. In this structure, expertise needs to have information and authority in decision making. At the moment, managers are going toward process management. Considering this point of view, management does not mean managing individuals and supervising them but managers in these types of organizations are following to...
implement effective activities for a process creating values for customers and beneficiaries (Ramezanian and Pour).

Comparison of Methods
Various frameworks have different methods. Which one can be the most convenient for architecture of a certain organization? In this regard, appropriate consultants and methodology expertise can be selected. The best method is applying these methods simultaneously. In other words, a certain method is used for architecture of each organization’s section. Thus, a consultant is needed who is familiar with all methods and is expert in the more suitable method. It is necessary to know that architecture of an organization is a road not a destination. Therefore, enterprise architecture is not valuable unless it provides real business of organization as quick as possible. One of the most important goals of enterprise architecture is to consider business and technology simultaneously in that both work in direction with organization’s goals. Some merits as a result of enterprise architecture implementation include: progress in using IT for business flexibility, higher collaboration between business groups and IT, focusing more in organization’s goals, reducing unsuccessful information systems, reducing IT complexities, more new dynamic IT systems, and closer links between IT results and business needs of organizations.

CONCLUSION
Obtained results from comparison of enterprise architecture methods indicate that the starting point of any organization is organization’s analysis. In other words, these questions need to be answered by analysis: Does the organization spend too much budget for IT systems while insufficient and inappropriate value is presented? Does IT lead to dynamism of the organization or it slows down the dynamism? Does IT grow with business? The most important question is that is organization required to solve these questions correctly? Do these requirements come from higher level of organization? Are all answers to these questions “yes”? Enterprise architecture is your solution. Then suitable method must be selected for enterprise architecture.

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