Relationship between enterprise architectures planning and information system

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Abstract. The main purpose of this research is to define the benefits of architectural business planning and its relationship with the development of information systems. The method used in this research was a descriptive method; descriptive mode was chosen to present accurate subjective or objective views from the situation related. The results of this study explain to us that there is a positive relationship between enterprise architectures planning and information system, to produce a blueprint, so that we can used as a basic foundation for the development of information system in architecture planning. From this research we obtained by discussing and observing those journals that relate enterprise architecture planning with information systems. The conclusion of this study is that enterprise architecture planning is very useful for information systems, especially in terms of developing information systems in the future, to make integrate from some decision-making.

1. Introduction
Planning is a must, in any case; we clearly can see it by its definition. The definition of planning is a managerial process to determine goals, purposes, and find the best way to realize the goals of an organization [1]. Inter-Enterprise Architecture (IEA) is a new concept, this concept seeks to implement a collaborative context of Enterprise Architecture (EA) tools and methodologies to model an integrative collaborative organization, but the Enterprise Architecture (EA) must be adapted to the framework work, methodology, and modeling languages, so that in Sensing Enterprise (SE), the quality of a company or network must be able to enable it to react to business stimuli with Internet-based [2]. Whereas other information systems in planning architecture are Enterprise Architecture Management (EAM), which is a holistic approach to IT architecture, with the aim of addressing the complexity of a solution by utilizing information technology (IT) so that it can achieve more agility in an organization, there are three response options for initiatives in using EAM, namely active compliance with EAM strategies, loyal but passive responses, and directors who tend to rebel [3].

There are several studies linking Enterprise Architecture Planning with Information System have been carried out. An example is research conducted by Bobi. The result is that Enterprise Architecture Planning can be used as a basis for the designers of Information System to recognize the limitations of the development in its organization [4]. Research related to information systems in architectural planning shows that there is a need to standardize terminology based on a meta-analysis of some literature. So, in making a corporate architecture program, it requires a commitment in all elements of
the organization to create an effective information system and must provide benefits to every element of the organization to add value [5].

Apart from being used directly in architectural planning, Enterprise Architecture (EA) information systems are also modified and used for Health Management Information Systems in Tamil Nadu (TNHMIS), based on this study found that this system can consolidate data at the state level in real time, connecting all health institutions, and make it possible to track the health index of each individual. Thus, data obtained from this system can be used to plan health care, manage drug inventory, and plan health initiatives [6]. There are various methods and schemes that can be used for seeking some profits and finding some relation between Enterprise Architecture Planning and Information System. However, in this research, the author will be more narrowed down to one specific scheme named Zachman Framework. Other studies that use strategic enterprise architecture planning are found in the Irenk bank of Yogyakarta using TOGAF ADM as a barrier. This study found that using this system can harmonize the application of information systems and technology information strategies to corporate strategies so as to reduce operational costs and develop business strategies based on information systems and information technology [7]. This was also supported by Rouhani et al. research which found that the implementation of the EA Implementation Methodology (EAIM) used in Enterprise Architecture (EA), proved that EAIM was effective to use but, there were still problems in the EAIM component, such as deficiencies in supporting tools for all parts in implementing EA, and there are shortcomings in the implementation of the EAIM method especially in modeling, management, and maintenance, and has the disadvantage of considering non-functional requirements in existing EAIM, because there are no appropriate considerations in needs analysis in most EAIM [8]. However, despite having various shortcomings in reality Information Technology in an organization can influence in determining the direction to integrate the two functions and produce a choice of integration mechanisms. So that Information Technology especially in Information Systems can be used as a business enabler by requiring sequential and reciprocal integration at the level of strategic and operational planning [9].

The goals of this research itself are to define the benefits of Enterprise Architecture Planning, to find the relation between Enterprise Architecture Planning and Information System and communicate the results from both goals to the readers.

2. Methods
This research used a descriptive method to present a subjective or objective from the situation that related to Enterprise Architecture Planning and Information System development. It is support with some literature about Planning and Information System development from some articles and journals previous research. This method we used to define the benefits of Enterprise Architecture Planning, and to find the relation between Enterprise Architecture Planning and Information System and communicate it.

3. Results and discussion
To identify and determine how far the benefits from the relation of Enterprise Architecture Planning (EAP) and Information System, there are several things which must first be understood, including:

- Business Architecture
- Zachman Framework.
- Enterprise Architecture Planning (EAP).
- The role of Enterprise Architecture Planning (EAP).
- Steps of Implementing Enterprise Architecture Planning (EAP).

3.1. Business architecture
Nowadays people usually understand that architecture only something related to physical construction, but the architecture itself is very broad. What people do not know that is, in fact, architecture also exists in the business context, and also software engineering context. This thing was also described by
O’Rourke in 2003; he said that architecture is a design for all types of structures either it is physical or contextual and either it is real or unreal [10]. Business Architecture is a process translation of a business’s vision and strategy into something that changes the business itself positively. Business Architecture also has several components as described below (Figure 1) [11].

Figure 1. Business architecture components [10].

Business must always be seen as a complicated system, which in every its activity has some inputs that produce the output. All companies or business performer always move through various cycles that surrounded by an external environment. All external environments that become an input go through a transformation process as shown at the picture above (figure 2) and finally it becomes an output.

3.2. Zachman Framework

Zachman Framework is a scheme or framework that has the purpose of getting a broad corporate architecture so it can be used for good things in the future [12]. Zachman Framework has six columns and six rows, each column presents focus, abstraction, and topic of business architecture, including data, function, location, human network, time, and motivation. While the rows present its perspective, you can see the depiction below (figure 2) [13].

Here is the purpose of every perspective in each row that exists below (Figure 2) [13].

- Planner: Establish a context, background, and purpose.
- Business Owner: Establish a business conceptual model.
- Designer: Establish a system information model and bridging what the owner wants and what can be realized technically and physically.
- Implementer: Establish a technical and physical design that will be used for overseeing the implementation itself.
- Subcontractor: Establish a role for referrals for those who responsible for developing an information system.
- Functioning System: Representing the perspective of the user and the results of the implementation of the information system.
3.3. Enterprise Architecture Planning (EAP)
According to Spewak Enterprise Architecture Planning (EAP) is an approach method with the intention for planning data quality oriented to business also to implementation its architecture, in the process Enterprise Architecture Planning is carried out in such a way to support the rotation of the business wheel and to achieve the organization’s goals [14]. From Figure 3, we can see the Enterprise Architecture Planning (EAP) is divided into four dimensions, it is business architecture, information architecture, system architecture, and technology architecture, which interconnected one and the other to build enterprise Architecture Planning (EAP).

![Figure 3. Dimensions of Enterprise Architecture Planning (EAP) [15].](image)

The process at each level occurs from left to right but takes the input from right to left [15]. After being divided into four dimensions, there is also four layers of components Information System as shown below (Figure 4).

3.3.1. First layer—The Beginning. In the top layer, there is a process of forming a work plan and emphasis on top-level management commitment in order to support and provide resources to the component layers below. In this first layer, there is only 1 component, named Planning Initialization.
Initialization Planning includes general matters such as: what methodology will be used, who will be involved in the business, supports needed, and what tools will be used.

3.3.2. Second layer – Where we are now. In this layer, there is a baseline for defining architectural forms for the future and plans to migrate for a long time. In this second layer, there are two components which exist such as business modelling and system modelling that is running.

- Business Modeling includes a collection of basic knowledge about business in order to support and doing the various business process.
- Current systems and technologies that have been running must have a point which provides a baseline for long-term migration plans

3.3.3. Third layer – The vision we want. The third layer has an arrow that contains a meaning that there is an architectural stage in this layer, the first stage is data architecture, second is application architecture, and the last is technology architecture.

- Data architecture defines the types of data needed to help business processes.
- The Application Architecture defines the types of applications needed.
- The Technology Architecture defines what technology platforms are needed to manage data and help other business functions.

![Layers of Enterprise Architecture Planning (EAP) [14]](image)

3.4. The role of Enterprise Architecture Planning (EAP)
Complicated organizations have several forms of business planning strategies, usually coordinated through an organizational strategy or planning committee that identifies business threats and opportunities that comes from the environment and recommendations that are by the response and investment of the organization. These recommendations become part of business planning and budget planning of an organization or company.

Nowadays most companies that run in the field of information technology already have a part that sets an information technology goal manages the acquisition and development of new hardware as well as a software system. The good company is the one which derives its goals and priorities according to their strategy and planning. What most companies forget is a mechanism that bridge the gap between the concerns of business strategists and information system project managers. So the good company is the one who enables align its business strategy, business program, business architecture into technologically sophisticated business strategy as shown below (figure 5) [16].
3.4.1. Steps of Implementing Enterprise Architecture Planning (EAP). In implementing an Enterprise Architecture Planning (EAP) into an information system, there are several steps that must be passed, such as:

1) Planning initiation
In this step, there are seven steps that must be passed, including:
- Defining the purpose and the scope.
- Defining the vision & mission of the organization / company.
- Methodology selection.
- Form a planning team.
- Use of computer resources.
- Form an EAP planning.
- Ensure the Budget & commitment from the team.

2) Identify and define business functions
Second, we have to observe the company so that we can divide the functions in the company into two functions, main functions and supporting function.

3) Define data architectures
After that, we must define the data in the company into two types, candidate entity data and entity set, attributes and its relation.

4) Define application architectures
The purpose of this step is to define main features that needed to support the functions of the organization.

5) Define technology architectures
After we create the application architecture the next step is to define the technology architecture according to the application architecture that has been created.

6) Implementation plan
The last step that must be made is implementation planning to unify data architecture, application architecture and technology architecture to integrate.

3.4.2. Critical success factor. Nowadays in the world of management strategy, there will always be one thing called Critical Success Factor. Critical Success Factor is a factor that will greatly influence the implementation of strategies in a company [16]. If we want to determine the Critical Success factor, it must be based on several things, such as:
- Market situation.
- Competitive situation.
• Opportunities.
• Company physical resources.
• Company human resources.
• The advantages and disadvantages of the company.

4. Conclusion
The use of Enterprise Architecture Planning (EAP) specially used to implement the concept of Zachman Framework to produce a blueprint. The blueprint that had been produced can be used as a basic foundation for the development of an information system; it was very important because every information system developer needed restrictions to make a valuable information system. The incorporation between enterprise architecture planning (EAP) and information systems would maintain the integrity between one unit and another.

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