Business architecture planning with TOGAF framework

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Abstract. Enterprise TOGAF architecture development methodology. TOGAF is a detailed method in its stages to build a new business process architecture and information system. The results in welcoming the era of industrial revolution, education in Indonesia especially higher education, one of which is obtained at STIKES strives to follow the development of information technology. One of the existing STIKES in East Java is a college that has a vision and mission according to the development of information technology. but in the implementation has not followed the rules of an enterprise, STIKES XYZ not have information systems, especially in the management of employees and Process /flow that occurs is still a manual process. Business process flow that exists requires improvement of business processes in order to improve quality and optimize the human resources information system with the support of a good and efficient. This study refers to the of this research are the blueprint new business processes in the form of a recommendation, which consists of documents that would explain what kind of information systems required by STIKES. The expected results of this research can be used as a guide in the procurement and development of information systems at STIKES XYZ.

1. Introduction

1.1. Background

High school health science (STIKES) is one of the institutions of higher learning that has an awful lot of enthusiasts in Indonesia. The number of demands should be accompanied by the development of technology and infrastructure both in internal STIKES. One of the existing STIKES in East Java is the College that are aware of the importance of information technology utilization in STIKES. In realizing the vision and mission as well as improved quality of STIKES required the existence of quality improvement efforts by optimizing the use of human resources information systems support is good and efficient. STIKES XYZ do not have information systems generally owned by the College, so haven't been able to optimize existing human resources. The process or flow that occurs is a manual process so that every data request performed repeatedly – and the absence of a person in charge at each business process so that the data submitted are not managed properly.

Research related to enterprise architecture modeling using the TOGAF framework already exists but has different cases. The journals related to the study include, (a) Enterprise architecture planning in the academic section of Surabaya STIKOM, this study uses Enterprise Architecture Planning (EAP) as its methodology, (b) Case study information technology architecture planning: PT. panurjwan archipelago shipping company, this study uses TOGAF and is combined with ISO 27001: 2005, (c) Design of personnel management information systems using the open group architecture framework (TOGAF) method, this study uses TOGAF, (d) Utilization of TOGAF ADM for design enterprise architecture

model, in this study presented the benefits of TOGAF ADM for enterprise architecture, (e) Modeling B2B business processes with BPMN (case studies of procurement of goods in the logistics division), this study provides an example of the functions of BPMN tools for business process modeling.

This research is focused on business process architecture planning, in the TOGAF framework stage which starts from preparation stage, architecture vision and business architecture which is management of business requirement. The result of this research is recommendation of business architecture planning which become reference for procurement and development of information technology at STIKES XYZ. Recommendations are given in the form of blueprints which consists of documents such as drawings, diagrams, models and documents in text form. The results of this study are expected to improve all business activities of the company, especially information technology activities in STIKES XYZ.

1.2. Formulation of the problem
The formulation of the problem studied in this research is how to plan business architecture to improve service quality at STIKES XYZ with TOGAF ADM.

1.3. Purpose of the problem
The purpose of this research is to design business architecture containing recommendations in STIKES XYZ using TOGAF framework.

1.4. Scope of problem
Limitations of the problem in this study are
- The framework used is the TOGAF 9 framework
- Research focuses on business architecture planning in STIKES XYZ especially on all office administration activities.

2. Literature

2.1. Enterprise architecture
Enterprise architecture is a single entity that deals about the principles, methods and a model that is used as the design and realisation of an organizational structure, business processes, information systems and infrastructure of an organization [1]. The enterprise architecture framework is also known as a thinking framework, the use of a thinking framework is better judged to accelerate and simplify architectural development, ensure complete coverage of design solutions and ensure selected architecture that enables future development in response to business needs [3].

In a survey conducted by Trendsin Enterprise Architecture in 2005 occurred significant developments in the use of the framework architecture. its development is many companies adopt frameworks that already exist to be his company's architecture. The framework is pretty well known and used by companies including the Zachman Framework, The federal enterprise architecture, Meta Framework, and The Open Group Architecture Framework [5].

2.2. TOGAF ADM
The history of TOGAF developments began before 1990. Created by the United States defence department and the manufacture of nets referring to TAFIM (The Technical Architecture Framework for Information Management). In 1990 TOGAF was adopted by the Open Group. In 1995 the first specification of TOGAF was introduced. 9 years later in 2004 TOGAF 8 (Enterprise Edition) was released. To refine the previous version in 2009 released TOGAF 9 [4].

According to surendro TOGAF is a very detailed method of how to build, manage and implement enterprise architecture in an information system [4]. TOGAF can be used freely by companies and organizations. TOGAF is the most accepted method for developing a company, because it is practical and exact. This is evidenced by the existence of clear stages in the cycle [6].

TOGAF has the structure and components, namely (a) Architecture Development Method (ADM). ADM explains how an enterprise architecture specifically fits the needs. ADM is a major part of TOGAF. (b) Foundation Architecture (Enterprise Continuum). The Foundation Architecture provides an overview of relationships for relevant architecture reliance and provides guidance on different levels of abstraction shift (c) Resource Base. This section provides information on guidelines, templates, checklists, background information and details of supporting materials that assist architects in the use of ADM [6].

TOGAF ADM has a clear vision and principles of enterprise architecture development. The principle is used to measure the value of success from the development of enterprise architecture by the organization /company. TOGAF ADM has its advantages and disadvantages, Mutyarini mentions TOGAF's advantages, i.e. (a) focus on ADM processes and cycles (b) Having three separate architectures and many architectural technical areas (c) Resource base provides many reference materials. TOGAF ADM deficiencies, i.e. (a) do not have a standard template for all existing domains (b) artifacts cannot be reused [2].
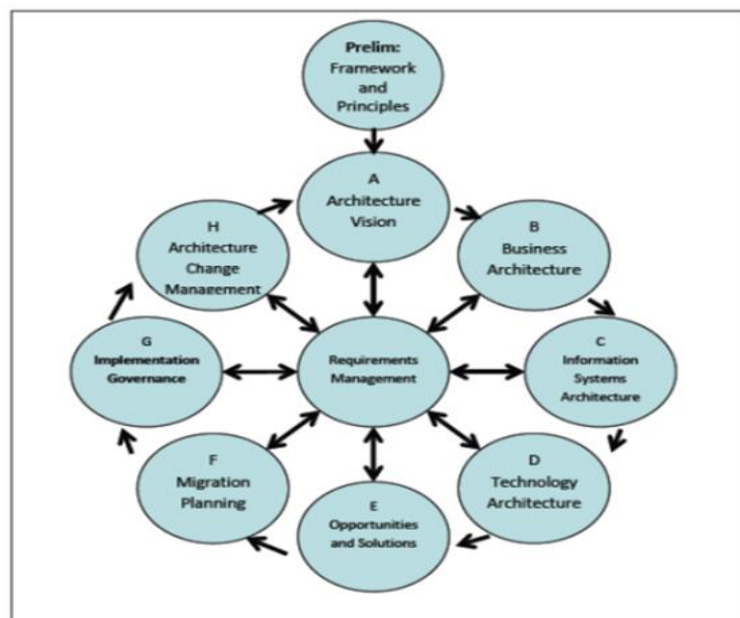

Figure 1. ADM cycle.

In Figure 1 is the TOGAF ADM cycle, the following describes the steps in the cycle: [3].

- Preliminary is a preparatory activity aimed as a business direction in creating a new corporate architecture. In this phase the framework and methodology are defined in detail which is used in the development of enterprise architecture.
- The vision of architecture is an activity that determines the scope of architecture to be developed. In this stage it is also used to harmonize views on enterprise architecture. In Architectural Vision there are questions to obtain ideal architecture such as organization profile, vision and mission, organizational goals and objectives, organizational business processes, organizational units and current architectural conditions.
- Business Architecture defines the initial conditions of business architecture, determines the model or business activity desired based on business scenarios. This step uses tools and methods to build the required model, such as: BPM, class model and use case model.
- Architecture Information system is divided into two stages of data architecture and application architecture. In the data architecture focus on the data to be used. In the application architecture focus on the application needs to be designed.

- Technology architecture aims to build the technology architecture desired by the organization. Things to do at this stage is to determine the type of technology candidate required using technology Portfolio catalog in the form of software and hardware. The technology architecture also considers the necessary alternatives in the selection of technology. Techniques used are Environment and location diagram, network computing diagram.
- Opportunities and solutions define the benefits derived from enterprise architecture i.e. business architecture, data architecture, application architecture and technology architecture so that it becomes the basis for stakeholders in choosing and determining the architecture to be implemented. Modeling in tahp in can use the project Context diagram and benefit diagram.
- The migration plan is carried out by providing an assessment to determine the migration plan of an information system. Modeling is done in this phase using the assessment matrix, the decision to the main needs and supporting the implementation of information systems within the organization / company.
- Governance implementation more to the preparation of organizational governance, information technology governance and governance architecture. Mapping can be integrated with the framework used for governance such as COBITS and ITGI.
- Architecture Change Management in this stage establishes procedures for managing changes to the new architecture. The purpose of this phase ensures the architecture lifecycle is maintained, the governance architecture framework is run, the company's architectural capabilities meet the current requirements.
- Requirement management in this case aims to provide the process of managing arithmetic needs throughout the phase of the ADM cycle, identifying the needs of the enterprise, storing and delivering it to the relevant phases.

3. Method

3.1. Literature study and problem formulation
Library study serves to learn the basic theory to support the writing of journals, but it is used to gain an understanding of the TOGAF framework, the concept and stages of information system development.

3.2. Data collection
Data collection was conducted with interviews and direct observation of the organization under study

3.3. Analysis and design of enterprise architecture
In this research, researchers use TOGAF ADM method as a reference in planning business architecture. This analysis is a series of work performed by TOGAF, where the stage consists of 9 stages in a cycle. But in this research will be analyzed to 4 stages only, that is Preliminary Phase, Architecture Vision, Business Architecture, Requirement Management and Opportunities and Solution
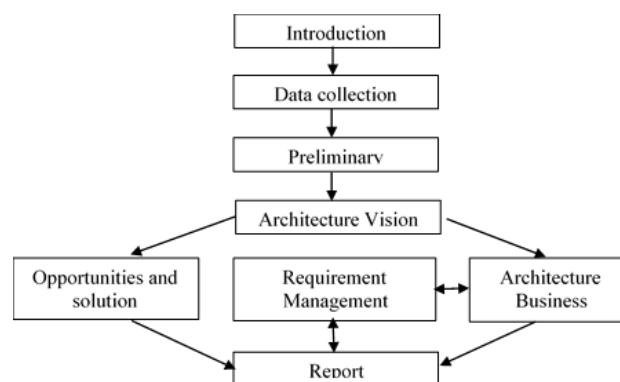

Figure 2. Research steps.

4. Result

4.1. Preliminary phase

Preparatory steps for a business process architecture planning:

4.1.1. Company scope. The scope of the organization refers to the activities and business processes that exist in STIKES XYZ. Results of definitions based on interviews to the head of department and Chairman of STIKES. Based on this stage, it can be seen that the organizational scope that is the object of research is all the activities in the XYZ STIKES. These activities will be explained at the stage of architectural vision.

It then defines the stakeholders involved during the enterprise architecture planning process. The analysis is done using RACI Chart. The results of defining stakeholders based on their respective roles can be seen in table 1.

Table 1. RACI chart analysis results.

Role	Stakeholder		
	Chairman STIKES XYZ	Head of Division	*Enterprise architect*
Building an architectural vision	A, C, I	C	R, I
Building an architectural business	A, C, I	C	R
Building an architectural information system	A, I	C, I	R
Building information technology architecture	A, I	C, I	R

Source: Results analysis with RACI chart.

A description of the roles of each stakeholder involved is as follows:
- Responsible (R), is a person who does a job
- Accountable (A), is the person responsible
- Consulted (C), is the person who asked for opinions about the job
- Informed (I), is a person who gets information about the progress of the work.

4.1.2. Framework. The framework used in the planning of business process architecture of STIKES employment section is TOGAF ADM version 9. The stages used include preliminary phase, architecture vision, business architecture, and Opportunities and solution and based on the result of business strategy described on TOGAF ADM circle that is requirement management.

4.1.3. Government confirmation and framework support. STIKES XYZ refers to the required government regulations, "UU Nomor 12 Tahun 2012 tentang Pendidikan Tinggi dan Permendikbud No. 50 Tahun 2014 tentang sistem penjaminan mutu pendidikan tinggi".

4.1.4. Tools. The tools used to build business process architecture is a Business Process Modelling Notation (BPMN), and manufacture the tools use the BPMN 1.1 on the Enterprise Architect (EA 8) 8. BPMN is a tool used for modeling business processes developed based flowchart so easy to understand.

4.1.5. The Principles of Architecture. The principles of architecture in STIKES XYZ is:

Table 2. The principles of architecture.

Type of Principle		Name of Principle
Business principles	a.	Main
	b.	conformity of IT and business
	c.	Business continuity
	d.	Development of appropriate technology standards and organizational policies
Data Principles	a.	Data is an asset
	b.	Data shared
	c.	Defining the data
	d.	Data security
	e.	Data confidentiality
Application Principles	a.	Supports mobility of users
	b.	Ease of use
Technology Principles	a.	Capacity management
	b.	Interoperability
	c.	Needs-based change

4.2. Requirement management

Requirement Management aims at identifying the needs of the organization that is tailored to the data needs at the ADM stage. The stages in requirement management include:

4.2.1. Identifying the core business of the organization. Business identification process is done by interview and preliminary observation on all parts in STIKES including head of STIKES and Chairman of STIKES. It aims to know the type of organization that becomes the object of research and determine the priority of designing the model later.

Core Business STIKES XYZ looks at the value chain diagram of the main activity and is supported by several sections contained in the supporting activities section. For more details can be seen in figure 3.

4.2.2. Identify organizational issues. Based on the results of interviews and overall observations of the business processes in XYZ STIKES there are several problems that exist in the company. The general explanation of the problems that occur is explained based on the analysis.

- Performance Analysis
  Performance issues that are still a weakness in STIKES XYZ include incompatibility of information provided between sections so it needs re-matching. The process of finding data contained in the archives will slow down the service activities provided to customers or between parts of the company.
- Information Analysis
  The report will produce the information needed by the Chairman of STIKES in making the decision. One of the weaknesses in this business process is still using the calculations manually. This can lead to errors in reports given later and cannot provide confirmation and information to customers as a whole.
- Economic Analysis
  It is a business process assessment of the reductions and benefits gained from the current business process. The old business process costs too much paper, especially when making mistakes in writing or correction it needs new paper again to print.
- Security Analysis
  The new system is expected to secure data from damage or loss of data by way of backup system periodically, because the data storage at this time is still in the form of manual storage that is archived and stored in the warehouse so that the risk of damaged and lost data will be greater.
- Efficiency Analysis

Because most are still using the manual system then the efficiency level is still less especially work efficiency and coordination between parts

- Analysis of Services
  The development of the organization will certainly be directly proportional to the good service, because it still uses the manual system then the performance of employees less quickly and less well

4.3. Architecture vision
At this stage there will be steps such as knowing the organization profile, stakeholder identification and business needs, and knowing the current state of business architecture. The results of this stage are as follows.

4.3.1. Identify the stakeholders involved. Stakeholders who have interests with STIKES XYZ, namely:
- Chairman (Chairman STIKES XYZ and Chairman of each department)
- Assistant Chairman II STIKES, Assistant Chairman II Prodi respectively, Head of academic and student affairs, head of general administration and staffing, head of financial administration and head of research and community service
- Employee on every part
- Lecturers and education personnel

4.3.2. Defines current business processes. The results of identification on the stages of the interview and observation of the company, especially the employment STIKES XYZ.
- Identify the current conditions to find out the problems and constraints that occur and make the concept of business solutions based on information systems as listed in the table below.

Table 3. Identify current conditions.

Activity	Obstacles	Solution	Type of Service
Civil Service Management and General Administration	Employee recruitment process, career ladder, study assignment, personnel completeness data and pension application still using manual process	- Utilization of software to automate the process of management of civil service and general administration and storage using a database. - Making SOP in managing staffing	Procurement of employee applications
	The process of reporting and performance evaluation based on the target achievement of each indicator is not supported by data or information	- Utilization of the application to monitor the activities of lecturers & employees throughout the company - Utilization of applications to create lecturer & employee performance reports.	Procurement monitoring application and employee performance evaluation
	The data processing of employee absenteeism is still manual	Employee attendance process automation	Procurement application that integrates with HR management tool of finger print
Financial management	Payment of salary, honorarium and incentives on the process is less effective The process of financial reporting, financial administration services students, tax reporting and accounting process are also less effective	- Utilization / procurement of software and hardware to automate and integrate transaction processing and payroll - Making Standard Operating Procedures (SOP) in performing the financial management process.	Procurement of integrated financial applications
Student academic management	The process of KRS and KHS are still manual, lecture like the Division of the application class, application for graduation thesis, also still manual	Utilization of academic student applications to automate and integrate the management of student academic	Procurement of integrated academic applications

4.3.3. Value chain analysis. Value chain analysis is divided into two main activities and supporting activities. Value chain in STIKES XYZ is as follows:
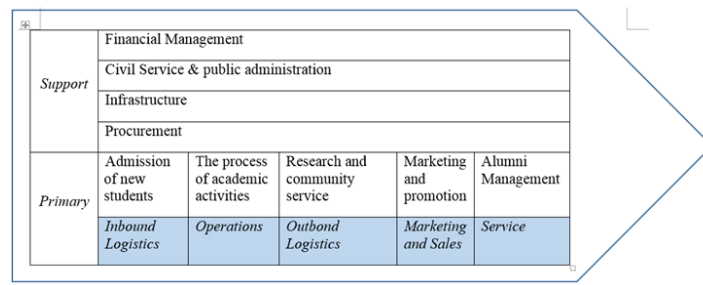

Figure 3. Value chain analysis.

4.3.4. Solution concept diagram. Based on the results of interviews and observations in STIKES XYZ known that the concept and solution in business architecture planning as shown in Figure 4.
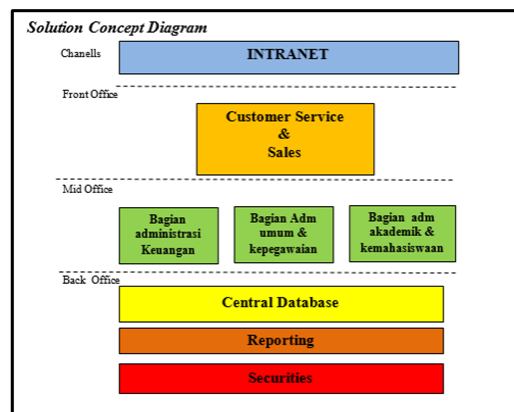

Figure 4. Solution concept diagram.

The concept of the solution presented is the result of identification of the issue issues contained in the company. Inside Solution Concept This diagram can be seen how applications communicate with each other, data storage process, system security and network to be used. In addition, the principles of architecture are also seen in this diagram, where data can be shared, because the data stored in databases that are integrated between applications, making reports in accordance with the needs of management with the right and quickly so as to provide good service to stakeholders.

4.4. Business architecture

Business Architecture describes how the current organizational business architecture then develops the existing architecture, the next stage performs gap analysis to develop strategies for achieving business objectives and achieving the strategic objectives that have been implemented.

4.4.1. Defines the movers, objectives and objectives of the mobilizing organization. Making the definition of movers, goals and objectives of STIKES XYZ can be seen in table 4.

Table 4. Organization definition/purpose/target/drivers.

Organization	STIKES XYZ
Purpose	Possession of stakeholders
Target	Improved quality of service management
Drivers	Enterprise architecture planning

4.4.2. Analyze the gap. Based on the current depiction of business processes and business processes will come with BPMN tools, it can be concluded that the gap analysis for business architecture is as follows:

Table 5. Business gap analysis.

Category	Business Gap Analysis
	Findings
People	- Staff sometimes still do work that is not actually their duties, so that in certain parts less focus with the work. - There are no employees who are experts in the field of IT to conduct supervision and control system information technology the company
Process	Business processes are ineffective and efficient
Tools	The existence of processes that have not been in automation
Information	Not yet integrated information between parts / implementing units

4.4.3. Determining the roadmap candidate. To achieve future business architecture required candidate road map. More details will be explained in table 6.

Table 6. Determining the roadmap candidate.

Sequence	Roadmap Candidate
	Findings
Process	Business processes are ineffective and efficient
Tools	The existence of processes that have not been in automation
Information	Not yet integrated information between parts / implementing units
People	- Staff sometimes still do work that is not actually their duties, so that in certain parts less focus with the work. - There are no employees who are experts in the IT field to supervise and control the information technology system in the company

4.5. Opportunities and solution

Based on the gap analysis described earlier, the constraints and business solutions of the business architecture condition STIKES XYZ are described in table 7 below:

Table 7. Identify business constraints and solutions on business architecture

Category	Findings	Solution
People	- Staff sometimes still do work that is not actually their duties, so that in certain parts less focus with the work. - There are no employees who are experts in the field of IT to conduct supervision and control system information technology the company	- Recruit employees in parts that are still short of employees - Make the main task and function of each position
Process	Business processes are ineffective and efficient	Performing ineffective and efficient business process improvement in accordance with business process architecture planning by: elimination, integration, simplification and automation
Tools	The existence of processes that have not been in automation	Making tools for ease in doing business process automation
Information	Not yet integrated information between parts / implementing units	Performed the information integration process and created a document of information flow related to enterprise architecture

5. Conclusion

The conclusion that can be given in this research is:

- The design of enterprise business process architecture with the approach of The Open Group Architecture Framework Architecture Development Method (TOGAF ADM) has met the concept of analysis in this research because the enterprise business process architecture in STIKES XYZ is an organizational and there is information technology involvement in its business process.
- From the results of gap analysis shows business solutions from the business architecture condition STIKES XYZ that is need to recruit new employees to fill the parts that lack of employees, make the main tasks and functions of each position so that staff more responsible for the work, make improvements ineffective and efficient business processes in accordance with the business process architecture planning, the creation of tools for ease of business process automation and the latter to process information integration and create document flow information related to enterprise architecture.

Blueprint generated in the business architecture planning in STIKES XYZ can be used as a view in the development of Information Systems / Information Technology at the company.

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