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A PROPOSED FRAMEWORK FOR DEVELOPMENT OF UNIVERSITY ENTERPRISE SYSTEM

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ABSTRACT : University has developed various type of Enterprise Systems (ES). ES is a package application that consist of business process automation that reflect the common business operations. However, the developed system does not follow any standards or best practices for system development. This resulted the ES has variety of heterogenous architecture. Furthermore, it will complicate the maintenance work in the future for the ES. This paper proposed an empirically derived framework for ES for higher education (university). The framework addresses the standardization of ES development. Based on the study, eight elements are introduced to form the proposed framework.

Keywords : Enterprise System, ES, Enterprise Architecture, System Development.

I. INTRODUCTION

Public University has developed numerous information systems and applications. Some of the developed applications are categorized as an enterprise system. According to [1], An enterprise system is a packaged application that supports and automates business; processes and manages business data. They come with pre-implemented and customizable modules that reflect best practice for common business operations. Therefore, we defined Enterprise systems as packaged applications to automate business processes, integrating across all over functions at both intra-organizational and inter-organizational levels. Examples of enterprise systems such as Enterprise Resource Planning (ERP), supply chain management (SCM) and customer relationship management systems (CRM). The aims of enterprise system are to provide a solution that incorporates typical business processes and data and reflects industry best practices[2].

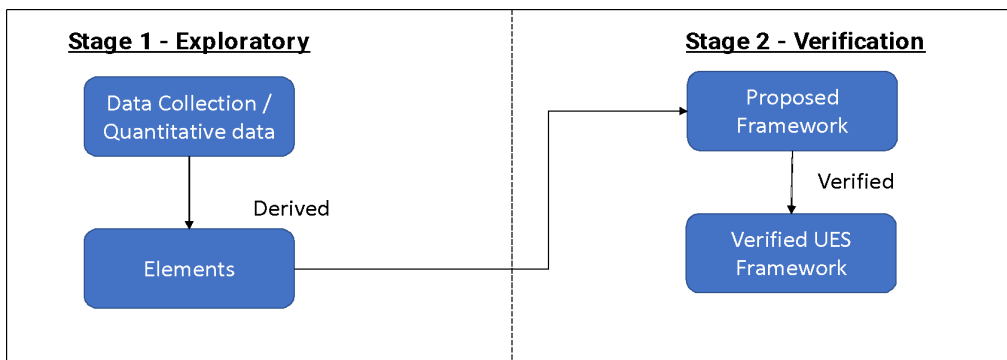
However, the development of information systems or applications at the University, that has been carried out, does not have, or comply with any framework, standard procedures, or best practices. This has resulted in the information systems and applications having a diverse and heterogeneous architecture, thus complicating maintenance work, and requiring a large workforce. Moreover, even in big enterprise system installations, direct and indirect costs of these systems are frequently underestimated, which results in many enterprise implementation projects going over budget [3]. This happens when there is no standard reference. It will cost the university more in the context of budget and human resource management.

The primary intended contribution of this paper is to develop a proposed standardized framework for the enterprise system in University. The proposed framework will be based on quantitative data collected through our facilitation system.

II. METHODS

Our main objective of the overall research study is to develop a standardized framework for the University Enterprise System. In this study, we adopted a multi-method research design, extending the research cycle proposed by [4] for developing and validating the proposed University Enterprise System. The method consists of two stages: exploratory and verification method. The exploratory stage mainly for identifying the elements of the framework to ensure the framework completeness. It is also to make sure that an appropriate element is considered in our proposed framework. The elements that were identified, will later become the basis of the a-priori framework to be operationalized in the verification phase. This method also applied in [5] and [6]. In the exploratory stage, we develop an online instrument where we intended to identify the elements for our proposed framework. The online instrument is an inventory system for all systems being developed in the organization. From the system, we collected the data and summarized the key elements. On the other hand, the study attempts to identify factors from the system. The summarized results from the system will be discussed further in the next section.

Figure 1 below, derived the research method based on the method we explain above. However, the result of this paper only covers the first stage. The other stage will be carried out in our future work.



III. RESULTS & DISCUSSION

Based on the first stage in our research method, we collected pools of data from the inventory system. Figure 2 illustrated parts of the quantitative data collected from the system. From these data, we identify the key elements from the data for our framework.

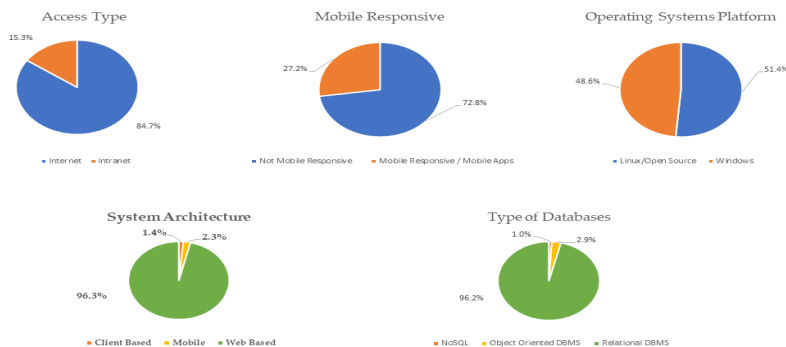


Figure 2 Quantitative Data Collection

We derived our proposed framework for University Enterprise System (UES) based on the identified elements. We identify eight main construct elements and these elements form layers of our proposed framework. Figure 3 is our proposed framework.

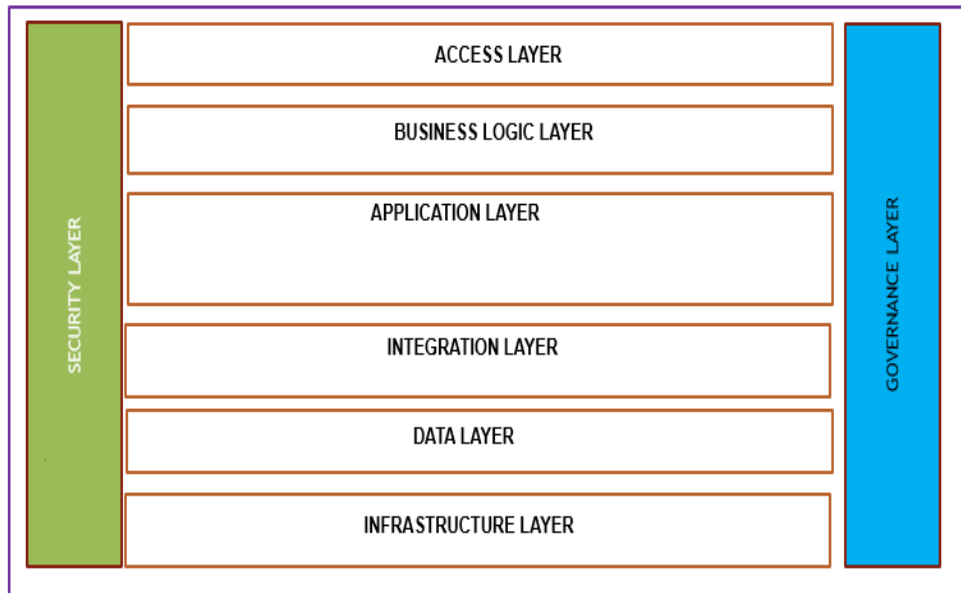


Figure SEQ Figure * ARABIC 3 Proposed University Enterprise System Framework

Besides the quantitative data, our proposed framework is also based on the Strategic Alignment Model (SAM) of Henderson and Venkataraman (1993), which suggests 4 constructs: Business Strategy, Business Infrastructure and Processes, IT Strategy and IT Infrastructure and Processes[7]. The SAM model is also used by [8] to construct their enhanced cross-domain strategic alignment model between business and IT. We add to the SAM model by incorporating ideas from the University’s enterprise architecture. The proposed framework is shown in Figure 2 above and the constructs of the main elements in the framework are explained in Table 1.

Table 1. Definition of the main construct elements

Main elements	Definition
Access Layer	Channels used for access to developed systems and applications.
Business Logic Layer	Explains about classification of university service delivery functions
Application Layer	System and application architecture processes as well as technology/platforms for system development.
Integration Layer	Explains the integration and its platform elements in system development
Data Layer	Explains the data and its platform elements in system development
Infrastructure Layer	technology of ICT infrastructure necessary for the construction of the system.

Main elements	Definition
Security Layer	elements and ICT security standards required in development of university enterprise systems.
Governance Layer	governance in developing system or application in university environment

All layers are interconnected between each other. Access layer is all about channels to access the developed system. It must contain diversity of channels to support multiple environments. The business logic layer will define the business processes involved and map to a classified university service delivery system. This layer is crucial as it will depict the system behavior plus the technology platform needed.

The data and integration layer are also connected to each other. Integration will derive the method to integrate the systems and data. While a data layer is the construct of a data model and its technology platform managing the databases in the system.

Infrastructure layer supports the application requirement in terms of technical requirements such as computing resources, network, and other related infrastructure. This will ensure the developed system/application will be operating in full capacity. It will then assist the system availability and performance.

Without governance and security, an enterprise system will not be fully operational. These elements are very important to develop an enterprise system. Additionally, the developed system must consider certain security concerns and solutions for preventing transactional mistakes plus follow the governance of the university.

IV. CONCLUSION

This paper presented a proposed enterprise system framework in higher education. However, this paper aims to pave way for further research to elaborate and empirically for the full university enterprise system in the future. Such a framework will then simplify hardware and software selection, increase agility in taking advantage of new and emerging technologies and improve business and IT alignment. Our future work is to finalize the proposed framework into a full university enterprise system framework. It will consist of sub elements for each layer. All elements will then be validated by a pool of experts. The validation then will prove our proposed framework is workable and as a standard reference for development of the system in a university environment.

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