**Software As A Service Enterprise Resource Planning System**

# **CHAPTER ONE**

## **1.0 Introduction**

Software as a service (SAAS) is a software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted by the vendor. It is sometimes referred to as "on-demand software", and was formerly referred to as "software plus services" by Microsoft. SaaS applications are also known as Web-based software, on-demand software and hosted software. SaaS apps are typically accessed by users using a thin client, that is a web browser.(Jamsa, 2012)

SaaS has become a common delivery model for many business applications, including office software, messaging software, payroll processing software, DBMS software, management software, CAD software, development software, gamification, virtualization,accounting, collaboration, customer relationship management (CRM), management information systems (MIS), enterprise resource planning (ERP), invoicing, human resource management (HRM), talent acquisition, learning management systems, content management (CM), geographic information systems (GIS), and service desk management.

Enterprise resource planning (ERP) refers to a type of software that organizations use to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations. A complete ERP suite also includes enterprise performance management, software that helps plan, budget, predict, and report on an organization’s financial results. ERP systems tie together a multitude of business processes and enable the flow of data between them. By collecting an organization’s shared transactional data from multiple sources, ERP systems eliminate data duplication and provide data integrity with a single source of truth.(Arik Ragowsky, 2002)

ERPs also provides an integrated and continuously updated view of core business processes using common databases which are maintained by a database management system. ERP systems track business resources—cash, raw materials, production capacity—and the status of business commitments such as orders, purchase orders, and payroll. The applications that make up the system share data across various departments (manufacturing, purchasing, sales, accounting, etc.) that provide the data.ERP facilitates information flow between all business functions and manages connections to outside stakeholders.

SaaS ERP is a type of cloud-based enterprise resource planning (ERP) software that runs on the vendor or cloud provider's servers, is sold through subscription and delivered as a service over the internet. It usually employs a multi-tenant Software as a Service architecture, in which multiple purchasers share the same instance, or copy, of the software, underlying infrastructure and database, but with each tenant's data securely separated. The vendor controls when the software is updated, usually quarterly, and all users get updates at the same time. Features of the software are standardized for everyone and cannot typically be customized easily. (Johansson & Ruivo, 2013)

SaaS ERP may also be offered in single-tenant mode where each customer gets its own instance of the software and database and typically has some control over updates and customization. Companies often choose single-tenant SaaS ERP to suit their privacy policy or to meet government regulations on data privacy and security.

## **1.1 Background Information**

The evolution of data management has led to challenges and opportunities for top managerial individuals of many organizations. Managerial decisions historically required that managers make sense of data from a variety of fragmented sources especially in multinational companies. Access to accurate and meaningful data are critical components of an organization’s operations and converging data from multiple sources to a single application facilitates an improvement in organization’s business processes and competencies.

Advancements in computing technology has enabled organizations to develop managing and processing data more efficiently. Infusing an ERP system with the proper managerial execution provides an organization the opportunity to make strides toward implementing strategic goals. However, a significant number of ERP system implementations did not meet the goals of the Organization. Approximately 90% of ERP system implementation projects exceed budget or delivery date and only about 30% of ERP system implementations are successful. Although the success rate is low, there are still benefits to implementing an ERP system. (Alhaisoni, 2008)

The amount of information in these organizations is heavily increasing and it has become vitally

important to efficiently manage and share information inside the organization. Companies

have to be swift in adopting new technology in order to remain competitive in a continuously developing business environment. This is where integration of Information Management systems come into play. Companies and other organizations are investing great sums in introducing information systems in the organization hoping to be able to make business more efficient and information sharing smooth.

An example of such an information system investigated in this proposal is an Enterprise Resource Planning (ERP) system. The quest for improving business processes and decision-making, integrating business units and their information flows has a long history. Computing and information technology advancements have enabled recent development in these spheres. This progress has led to emergence of Enterprise resource planning (ERP) systems which are at the forefront in company-wide IT solutions. (Alhaisoni, 2008)

## **1.2 Challenges Of Current Systems**

An effective business strategy centers on an aggressive, efficient use of information technology; for this reason the ERP systems have emerged as the core of successful information management, and the enterprise backbone of the organization. A successful ERP system will streamline processes within a company and improve its overall effectiveness, while providing a means to externally enhance competitive performance, increase responsiveness to customers, and support strategic initiatives. Despite such advantages, there are some of the challenges that are evident in the current Enterprise Resource Planning Systems.

* Flexibility challenges. Many ERPs in the market today have flexibilty issues and if this kind of an ERP is implemented in a certain organization, the organization has to adapt its processes to suit the ERP for it to work successful, This process is time and resource consuming for it would force the organization to re arragnge all business activites, retrain their staff inorder to make use of the implemented ERP.
* Mantainance costs. ERPs in the market today require regular checks and mantainances, and this price is paid by the target organizatio that has purcjased a certain copy of an ERP. Many ERP systems might seem cheap to start with, but if the target organization do not factor in the maintenance costs attached to it before implementation, they can end up with overwhelmingly large sums to pay.
* Hardwares investiments. Computationational hardware devices are required especially when a certain organization decides to implement an ERP, whether its cloud based or in hourse hosted. They will require to purchase high end workstations which will be acting as servers for the ERP, personal computers, printers, scanners and all other equipments required in implementations of the ERP. The cost of purchasing and mantaning the above equipments is high. Also ERP applications require sufficient storage and high work performance and low investment in hardware may result in various software issues.
* Multi currency support. Many ERPs in the market today lack this feature of handling more than one currency and converting it to local organization currency. Lack of this feature has led to implementation of other third party systems to act as currency converters.

## **1.3 Statement Of The Problem**

The current style of enterprise resources planning and management is basically performed manually or on some of organizations simple Information Management systems are implemented to aid of which they are not effective. Also it is evident that the cloud-based ERP has become popular.

This is because of its integrated nature in harmonizing all the departments and units of an organization all on one system as opposed to the past where different units used different systems which were all stand-alone, but this is not enough, because many cloud-based ERPs are hosted on the organizations Intranet and accessed over the network only in the organizations premises. Any employee can not have an access to the system if he or she is not connected to the organizations’ intranet.

This proposed system aims to implement a software as a service ERP which will be accessible by the subscribed organizations’ staff and employees everywhere anywhere. This proposed system also will not have any limitations like the ones evident in cloud-ERPs such as on premise access.

It will offer free subscriptions to middle level organizations which do not require complex features and functionalities thus reducing the complexity of the system. On high level cooperations and also any other organization which will have to utilize all the complex modules of the Enterprise Resource Planning System, they will have to subscribe to a non free packages.

## **1.4 Objectives Of The System**

### **1.4.1 General Objectives**

The general objective of this study is to evaluate the implementation of a Software As A Service Enterprise Resource Planning System.

### **1.4.2 Specific Objectives**

The specifics objectives of this study are :

* First the study will conduct data collection which will help in the analysis and design of the system during the system development.
* Secondly the study will create a system that will fulfill the user requirements and be able to perform various functions such as having an eco system that will manage clients` subscriptions to the ERP.
* The study will also perform system testing to ensure the that the system performs all the functions effectively and in an efficient manner.
* Finally the study will implement the system and perform all the post implementation activities and maintainance of the system.

## **1.5 Justification**

* This study will contribute to the adoption of Software as Service ERPs systems in the assistance facilities through gathering information on the important factors which drives the adoption of information systems in organizations.
* This study will provide information to the top managerial personnels of many institutions and organizations which may help them to avoid problems that would arise if they fail to adopt Software as Service ERP Systems.
* The information gathered and generated in this study will enable stakeholders to come up with good plans and formulate policies that will favor adoption of Software as Service ERPs in their organizations.
* Also it is expected that the vendors will use the information from this study to develop ERP systems with desirable characteristics that will increase their adoption in the industry.
* Also, the findings of this study will be used to improve the management process and that the study findings can be applied in areas and departments that are yet to be computerized.
* The proposed system will offer real time information management thus ensuring reliability and efficiency in organizations.

## **1.6 Scope And Limitation Of The Study**

The proposed system which will be a web based system, a desktop application and a smartphone application (Android or iOs) will be intented to implement a delivery model in which the ERP will be licensed on a subscription basis and it will be centrally hosted by the vendor. This Enterprise Resource Planning System will be used by organizations to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations also it will include an enterprise performance management software that will help in planning, budgetting, predicting, and reporting on an organization’s financial results.

The following are some of the limitations which are likely come accross during the development process of this system. The the cost of implementing the project is expensive, this limitation will affect much the vendor because they will be responsible for the architecture of the software and deployments. The second limitation is that users - clients will have to be trained on how to use the platform which will be time consuming and tendious. Another limitation is that some of clients (subscribed organizations ) will fail to pay their subscription fees in time and the subscription ecosystem will cancel the services thus causing an abrupt stop to the subscribed ERP modules which will affect the organization.

# **CHAPTER TWO**

# **LITERATURE REVIEW**

## **2.0 Introduction**

With the technological era advancements, cloud computing is becoming a major trend in the business industry and a business strategy for organizations which want to obtain a competitive advantage. Competitive advantage can now be achieved through adoption of technology and proper customer relationship management overall.

Software as a service (SaaS) ERP usage is one of the disruptive technologies that seeks to challenge the traditional and physical server-based hosting within local networks. (Lenart, 2011) In this chapter we’ll focuss on the related literature on the implementation of the SaaS ERP system, also this chapter has presented the theoretical foundation of this study and a summary of the chapter.

## **2.1 Related Litreature**

Enterprise Resource Planning systems have been in the market since 1980s and the beginning of the 1990s with the power of enterprise-wide inter-functional coordination and integration (Rashid et al., 2002). There are very many systems in the market but this study only focusses on few of them.

### **2.1.0 Microsoft Dynamics**

Microsoft Dynamics is a line of enterprise resource planning (ERP) and customer relationship management (CRM) software applications. Microsoft markets Dynamics applications through a network of reselling partners who provide specialized services. Microsoft Dynamics ERP Suite forms part of "Microsoft Business Solutions". This ERP is used with other Microsoft programs and services, such as SharePoint, Yammer, Office 365, Azure and Outlook. The Microsoft Dynamics focus-industries are retail, services, manufacturing, financial services, and the public sector. Microsoft Dynamics offers services for small, medium, and large businesses.(Shankar & Bellefroid, 2011)

### **2.1.1 SAP Business ByDesign**

The SAP Business ByDesign (ByD) is a cloud based enterprise resource planning software (Cloud ERP) that is sold and operated as software as a service by SAP SE. It is designed for large enterprises. The software is designed to provide business processes across application areas from financials to human resources with embedded business analytics, mobility, e-learning, and support. (GAAP, 2012)

## **2.1.2 Odoo**

Odoo is a suite of business management software tools including CRM, e-commerce, billing, accounting, manufacturing, warehouse, project management, and inventory management. The Community version is a libre software, licensed under the GNU LGPLv3. The Enterprise version has proprietary extra features and services. Odoo ERP is available for on premise environment, that is its can be hosted using tranditional server client architecture which is centrally hosted in the organization and accessed over the company’s intranet.(Ganesh et al., 2016)

### **2.1.3 ERPNext**

ERPNext is a free and open-source integrated Enterprise Resource Planning (ERP) software developed by Frappé Technologies Pvt. Ltd. and is built on MariaDB database system using a Python based server-side framework. ERPNext is a generic ERP software used by manufacturers, distributors and services companies. It includes modules like accounting, CRM, sales, purchasing, website, e-commerce, point of sale, manufacturing, warehouse, project management, inventory, and services. Also, it has domain specific modules like schools, healthcare, agriculture, and non-profit.(“ERPNext,” 2021)

### **2.1.4 Dolibarr**

Dolibarr is both an ERP and a CRM which is an open source, free software package for companies of any size, foundations or freelancers. It includes different features for enterprise resource planning (ERP) and customer relationship management (CRM) but also other features for different activities. There are several feature modules that can be enabled or disabled, as needed. This software is free under GNU General Public License 3.0. It is a web-based application, and can therefore be used wherever an internet service is available. Dolibarr aims to offer free open source ERP and CRM features for people with no technical knowledge, by providing a simple solution. (Johansson & Ruivo, 2013)

### **2.1.5 Microsoft Dynamics NAV**

Microsoft Dynamics NAV is an enterprise resource planning (ERP) app from Microsoft. The product is part of the Microsoft Dynamics family, and intended to assist with finance, manufacturing, customer relationship management, supply chains, analytics and electronic commerce for small and medium-sized companies and local subsidiaries of large international groups. For modifications of the system, the proprietary programming language C/AL (**C**lient**/**server **A**pplication **L**anguage) was the programming language used within C/SIDE the **C**lient**/S**erver **I**ntegrated **D**evelopment **E**nvironment in Microsoft Dynamics NAV) is used. (Shankar & Bellefroid, 2011)

## **2.2 Conclusion**

The literature review looked at the literature on the existing ERPs Systems and their implementation architectures. From the study of the existing systems, its evident that most of the systems are deployed on on-premise using a client-server architecture, this poses a huge challenge when a certain organization personnel or an employee wants to access the system outsise the company’s network ie the hosted intranet.

Also the existsing systems are made for big organizations that require a lot of customizations in order to suit the target company requirements and smoothly intergrate with the other existing systems in the organizations, this poses a big challege on small and middle level coporations which only requires a light weight Enterprise Resource Planning Systems which are already pre customized to suit their needs.

The proposed system which is a Software As A Service Enterprise Resource Planning System will curb the above problems that is it will be hosted by the vendor and only the subscribed users will be able to access it, this eliminates the issue of on-premise hosting and it cuts costs which are incurred by implementing the client server architecture, this price include hardware costs, software costs and also infrastructure costs. The proposed system also will suit most of all middle level and low level coporations because its already pre-customized and it will implement all the business requirements thus suiting the target organizations and subscribed clients needs too.

# **CHAPTER THREE**

# **METHODOLOGY**

## **3.0 Introduction**

This chapter gives a brief introduction on the methodology used for the proposed system. It

comprises of the research design used, how the study population was obtained, the sampling

technique that was used, how data was collected and analyzed to give the findings. All these help

in achieving the research objectives. Also it contains the design methods which include the flowcharts and data flow diagrams, software development methodology which is the waterfall method and the transition used that is pilot changeover.

## **3.1 Data Collection / Sampling Methods**

The sampling methods used were interviews, questionnaires and observation. A diverse group of people whose reactions are studied to determine the reactions that can be expected from a larger population of visited organizations. This helped in determining the features entailed in the system.

### **3.1.1 Interviews**

Interviews entails a one on one interaction of the stakeholder and developer aiming to get requirements, the interviewer poses questions that inform them of the type of system desired and also the expectations of the user. Based on Dorie Clark (2016) definition on informational interviews, it is the kind of interview that helps one to find out more about the type of industry, company, or role you’re interested in (Knight, 2016). This type of interview was carried on where specific people were selected and interviewed to give details concerning the current ERP system being used in the target organization.

### **3.1.1.0 Why Interviews Will Be Used**

The study chose interviews as a data collection method because:

* Interviews helps the reseracher to explain, better understand, and explore research subjects' opinions, behavior, experiences, phenomenon, etc.
* Interview questions are usually open-ended questions so that in-depth information will be collected.

### **3.1.2 Questionaires**

Questionaires are list of questions that are either open or close ended that cover the scope of the elicitation without collecting repetitive and redundant data. It is even possible to leave sections for comments as the respondents will feel free to be open and honest s compared to an interview situation. Questionnaires will be prepared by coming up with about fifteen questions on a softcopy form concerning the targeted organizations then printed and made copies of fifty.

The questionnaires will be taken later to the organizations and companies where the selected sample groups will be distributed to each participant to answer the questions provide in the form. The respondents are only required to tick or write the answer depending on the information provided.

### **3.1.1.0 Why Questionaires Will Be Used**

The study chose questionaires as data collection method because:

* A large number of stakeholders will be reached at a time and it hastens the process of collecting requirements
* Reduction of redundant data thus analysis will be quicker
* It is the foundation for further elicitation activities.

### **3.1.1 Observations**

Observation involves capturing what is actually going on in the case study by looking into their daily activity and either actively participating or being an inactive component of the case study’s environment. The observer takes into account the behavior, reaction to routine problems as well as gaps that are visible in how they do things. (Ramadhan, Maylawati, Amin, & Aulawi, 2018)

The researcher will visit target organizations and companies and observe their daily activities regarding how their current ERP system performs duties or functions.

**3.1.1.0 Why Observations Will Be Used**

* It is easy to grasp the recurring activities that happen during a typical day for the client thus it is faster to build the user requirements without asking the user directly.
* Suggestions from the developer are informed by firsthand experience of the observer or developer. This suggestions my not have come up if the developer had not experienced the system.
* The main downfall of this method is that the case study will tend to do things better to present a better image for themselves thus real issues may not come up during the observation process.

## **3.2 Design Methods**

The main design methods used by this study are flowcharts and a data flow diagram.

**3.1.1 Flowchart Diagrams**

The stduy used flowchart diagrams designed depending on the proposed system features or attributes. The first attribute is a client subscription and a login module structure which is designed to create username and password to the users in the subscription ecosystem. After the user has selected a subscription pakage which suits their needs and an created an account which will give them an authority to log in and s/he can later log out from the system.

Below are flowcharts that are implementing core features of the system.

#### **3.1.1.0 Subscription Package Selection Flowchart**

#### **3.1.1.1 A Sign Up Flowchart**

#### **3.1.1.2 A Sign In Flowchart**

#### **3.1.1.3 A Subscription Package Payment And Renewal Flowchart Using Credit Cards**

#### **3.1.1.4 An Enterprise Intergration Flowchart**

#### **3.1.1.5 A Finance And Accounting Feature Flowchart**

#### **3.1.1.6 Sales Management Flowchart**

#### **3.1.1.7 Jobs And Projects Management Flowchart**

#### **3.1.1.8 Inventory Management Flowchart**

#### **3.1.1.9 Business Intelligence Flowchart**

#### **3.1.1.8 Thirdparty Payments Intergrations Feature Flowchart**

**3.1.2 Data Flow Diagram**

**3.1.2.0 Subscription Management Eco System Data Flow Diagram**

**3.1.2.1 ERP System Data Flow Diagram**

## **3.3** **Method For Developing**

The methodology which will be used to develop the proposed system is waterfall. It has a sequence of steps which include: requirements gathering and analysis, system design, implementation, intergration and testing, deployment and mantainance.

### **3.3.1 Gathering the requirements**

### Based on infrectra (2018) understanding, this done by systematically identifying what a system or a software requires in order to run or function. This includes users who will use the system, system support which includes its capability towards targeted function, technical, quality, assumptions and acceptance.(infractra, 2018)

### **3.3.2 Design**

According to Joshua Feldman (2016) design process deals with developing codes and creating secured website in order to come up with the desired functionality of the system and goals.(Feldman, 2016)

### **3.3.4 Implementation**

This is the third phase in project management life cycle and it involves putting project plan into actions. The developer will coordinate and direct project resources to meet the objectives of the plan. This phase actually contain what the project do to produce deliverables or what it delivers in terms and services or products. The proposed system will be implemented using Javascript, CSS3 and HTML5 for front end, it will use AJAX and PHP for Server Side scripting and SQL for backend and as dabatase manipulation language.

### **3.3.5 Verifying and Testing**

Under this phase, the developer checks and demonstrate whether the predefine inputs met the expected results or outputs. Developer will code, debug and run the system before its released to the organizations or used by any other person. Testing is also carried on to enable user’s satisfaction depending on the service offered by the system.

### **3.3.6 Maintenance**

This is the last phase in project life cycle on waterfall model. Maintenance means that after the system has been tested and verified, the changes need to be corrected to improved system performance, enhance security and address user requirements.

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## **3.5 Method of transition**

This study proposed to use the pilot change over as method of transition where the new system is first introduce and run in the department of ICT before it spread out to the other departments. This is because this department seems to have more knowledge and experience on technology and it will be easier for them to adapt the new system. The new system will later penetrates or spread to the other departments.

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