Abstract—Modern business is under pressure from the economy; changing technology; changing customer, employee, suppliers and partner expectations; and the need to compete in an increasingly complex connected global economy. Many developing country small and medium sized enterprises (SMEs) that are aware that if they do not meet these requirements, they will not be able to access new foreign markets and may lose the contracts they already have. Cloud ERP system seeks to provide organizations with flexible business process transformations via cloud computing platforms. Modern business is the first key service field to be enhanced by new technology such as cloud computing and ERP. ERP systems are integrated software packages with a common database that support business processes in companies. Also, Cloud Computing provides many specifications and abilities to use IT infrastructures, and these specifications are based on high quality services with low prices. Thus by moving ERP systems to the cloud, companies can gain an assortment of technological and business benefits. This paper includes a Cloud ERP framework for modern business in developing countries to benefit from the Low cost ERP Solution to developing countries using latest technologies such as Cloud Computing specially for SME in the developing countries, this exposes several benefits to enterprises, promoting greater IT efficiency and agility.

Keywords—Cloud ERP, SME, SaaS, PaaS, IaaS, Cloud Computing, ERP

I. INTRODUCTION

Enterprise Resource Planning (ERP) is used more than a decade Enterprise. Enterprise Resources Planning (ERP) systems are enterprise-wide information system packages, which consist of a comprehensive set of software modules that aim to support and integrate all key business processes across various functional divisions of an organization by using a single data repository [1]. Strategy process looks at how strategy is implemented in modern business as a precursor to defining how Business applications can integrate organizational goals into Key Performance Indicators (KPIs).

Business maturity models are presented as a roadmap to measure the capability and readiness of an organization to progress Business, and business tools are discussed from the perspective of selection, integration strategies and delivery platforms suited to SMEs culminating in a best practices framework for Business integration in the all sectors.

Resource Planning System (ERP) is integrated information system with centralized database, which supports main business processes across organization. These systems are among most complex software solutions ever built, and are equally expensive. Traditional SaaS (Software as a Product) on-premise ERP systems imply significant investment in hardware infrastructure and purchasing software licenses. In addition, implementing ERP system in enterprise is costly, time-consuming, high risk process that extends over several years, and it often requires business process reengineering [2] [3]. Cloud computing can ensure the benefit of both vendor and the business user. Every organization is in a global world where all the businesses are very much familiar to use information communication technology (ICT) for processing daily work [4]. This is only part of the challenge, though. Forecasted growth will generally have at least some impact on IT operating costs. Here assumed that cloud is not only created for the ERP the total support and establishment of ERP will be from a cloud [5]. ERP software developers are finally catching up to this expectation, creating dynamic new models of mobile connectivity that will allow for on-the-spot responsiveness at all levels. Any company involved in an ERP evaluation and selection process needs to consider the role of mobile apps in its overall business solution [6].

Cloud ERP is Enterprise Resource Planning software that is hosted in a platform over the Internet. The use of the term “Cloud” includes a broad set of applications and software deployment models, namely Software-as-a-Service (SaaS). Software as a service (SaaS) is a software delivery model in which software and associated data are centrally hosted on the cloud by independent software vendors or application service providers on the cloud. [7].
Traditional ERP has a methodology that consists of four components. The software component is the expression of the ERP. The process flow is defining the flow of information among the ERP. Customer mindset set the work flow of an organization. This work flow set up will be done by compromising in between the before implementation way of work and after implementation way of work. Lastly, change management needed different state of ERP i.e. customer attitude resistance and any kind of business process changes. Traditional ERP implementation methodology, one hand, involves various processes and procedures, which constitute the conditions or means for formulating the actual implementation of ERP projects. Enterprise Resource Planning (ERP) software is designed to improve and auto-mate business processes operations. However, there are many unnecessary administrative, procedural costs and delays often associated with this practice. The top management of the company must participate as a control factor in each phase of an implementation and provide appropriate conditions for the ERP implementation. Balanced interactions between a consulting company and the top management of a company lead to the optimizing of the ERP implementation. ERP software is very much dependent on Software platform, Database, Intelligence, security and other third party software. Some time it is not possible for single software development firm to treat every dependency and feature in a same manner [8]. It is generally a misleading perception that implementing an ERP system will improve organizations’ functionalities overnight. The high expectation of achieving all-round cost savings and service improvements is very much dependent on how good the chosen ERP system fits to the organizational functionalities and how well the tailoring and configuration process of the system matched with the business culture, strategy and structure of the organization [9].

Apart from the implementation process, the fully control management on data and functionality are the discrepancy between traditional ERP and cloud ERP. Cloud ERP provides non-control for adopting organization on the version of the system. It is kind of easier for business but limits the specific/ customized function. There is one more issue, on the other hand, in terms of data security. Security is a vast issue for ERP. Cloud ERP vendors will provide security to their cloud, application and database separately. Security and encryption may be provided by the different vendor to make a reliable system [8].

Cloud Computing is a new computing method for delivering computing services [10]. In the late 2000s, there is an increasing trend for companies to migrate their ERP applications and databases into the cloud. Enterprise resource planning (ERP) covers the broad spectrum of activities - like financials, procurement, and inventory management - that help run a business. Cloud computing has a profound impact on the entire IT industry as a new business model. Integrated into all sectors of business applications, cloud computing will reflect the value in a deeper level. With the rapid development of cloud computing. Cloud ERP provides a business with agile and cost effective enterprise resource planning and transformation services. Cloud computing can help enterprises to access high-performance IT services with lower cost, and also conducive to small and medium-sized enterprises to access high-performance IT services like large enterprises. At the same time, the reduction of IT burden can help enterprises to concentrate on its core business. Delivered over the web in a SaaS (Software as a Service) model, the solutions need no upfront expenditure on infrastructure. Cloud ERP rids you of maintenance worries for outdated on-premise software, expensive upgrades, and version lock. It also takes care of your data storage concerns, integration issues in a multi-location framework and aligns your legacy systems with new modules, thereby reducing your operational costs and providing an opportunity for your business to boost its margin for growth.

The process optimization which based on cloud computing can achieve throughout a large-scale reconstruction of the industry, and enhance the overall IT standards and competitiveness [10].

Another advantage of cloud computing is it offers good advantages to the communicators. And these advantages are: the availability of large quantity of software applications, access to terrific processing power, abundant storage, and power of easily sharing and processing of information. All this information can be found in the browser anytime, anywhere through accessing the internet. It means computing ability also can be a kind of commodity, as gas, water and electric, easily use and cheap cost. “Could Computing’’ brings such a change—computer storage computing center are set up by professional network companies such as Google and IBM, through one cable user can access easily with browser, make “Could” as the center of material storage and application services [11].
The service layers (SaaS, IaaS, PaaS) work closely among each other in a cloud to reduce the costs and resources. The cooperation among these three layers results in better performance, stack harmonizing (Controlling the load competency from central position) and maximum utilization of the server capabilities. This is how, cloud computing results is better usage of the resources which in-turn reduces the maintenance cost [12]. There is no need to install large and complex systems in the sales room as organizations can make utilize the mobile devices and wireless networks for data transmission. This process enables all the information about sales and returns to be available immediately to the central office and company management [13].

The third generation mobile system such as UMTS (Universal Mobile Telecommunications System), soon will be set in any of the countries, which will not revolutionize but reform the telecommunication technology by providing feature rich contents to mobile users, wireless broadband access to internet and worldwide roaming [14]. Cloud computing is primarily characterized in three aspect from hardware point of view like, the appearance of unlimited computing resources accessible on demand, the abolition of an up-front assurance by cloud customers and the aptitude to pay for utilization of computing resources on a short-term basis as required[15].

IV. BENEFITS OF CLOUD ERP

Using ERP based cloud solution takes the benefits of ERP system and cloud computing technology. Organizations choose and deploy ERP systems for many tangible and intangible benefits and strategic reasons. In many cases the calculation of return on investment (ROI) is weighted against the many intangible and strategic benefits. Cloud ERP offers businesses speed of implementation and lower costs of entry. It is the shortest possible route to a new ERP system. One of the main advantages of cloud ERP is the low cost of entry. Cloud ERP provides a business with agile and cost effective enterprise resource planning and transformation services. No need to purchase expensive equipment or make sure that you have sufficient infrastructure to handle the system. Simply downloading a software application onto computers and allow a hosting company to provide the service. Despite widespread interest in adopting cloud ERP, many organizations are “flying blind” with respect to making them secure, potentially putting their operations, intellectual property and customer information at risk [16] Internationalization holds much potential for the growth of SMEs [17].

One very important trend to enable new knowledge creation and transfer in and to SME’s is the development of collaborative environments and networks to increase their innovation capabilities as a single unit but also the capabilities of the network as a whole through collective learning. The SMEs are one of the sectors that have a strong potential to benefit from advances in ICTs and the adaptation of new business modes of operation. The use of cloud computing can be considered as key factors for innovation and entrepreneurship. ICTs are a must for SMEs to innovate. So there are many benefits specially for developing countries such as [18]:

- **Reduced Cost:** The business model of Cloud computing is pay-per-use and hence the customers only need to pay on the basis of the usage of a particular service.
- **Uptime:** The system is always up and running, which guarantees a zero down time.
- **Human Resources:** Maintenance of the system is done by the service provider. Hence no additional skilled manpower needs to be employed by the organization.
- **Increased performance Requirements:** Expanding the system, handling peak load performance issues etc. become very simple for the organization.
- **Customization:** The customer has got the freedom to choose from among the modules and the services offered by the cloud service provider.
- **Group Organization:** All the different branches of an organization can access the same cloud based system in real time through the web.
- **Speedy Implementation:** Cloud ERP typically takes 3-6 months compared to the 12 months that it typically takes to implement an on-premise solution.
- **Scalability:** Cloud based enterprise systems gives the organization the flexibility to add more users as the business grows. In the case of on-site ERP solutions it is often necessary to provide additional hardware.

V. CHALLENGES OF CLOUD ERP

Many companies are somewhat wary of swapping their existing IT architecture for an integrated ERP solution. For large-scale companies which involve considerable investment, and comprehensive knowledge and experience. But to introducing more ERP applications among SMEs there are some challenges. Main problems/issues/concerns that enterprises deal with in case they exercise Premises based ERP in place of Cloud ERP are [19]:

- Speculation or Investment in setting up the confine or Local enterprise level network and other Information Technology resources that cannot be vindicated in short terms.
- Multi-user entry restricted within the premises and that's why calls for further investment if business are geographically isolated.
- Potential to inflate the client base of the Enterprise planning software hastily without any subsequent IT expenditures.
- Always on application access/entree and sharing ability/aptitude for all teams or groups occupied in real time.

Also there are challenges in the implementing the ERP clouds such as Legal issues, Data security, Difficulty of extracting data, Technological aspects issues and transparency and data privacy. But for SMEs the challenges are Perception, Cost, Limited resource, Awareness and Customization issues.

VI. BUILDING A CLOUD ERP FRAMEWORK FOR MODERN BUSINESS

Building a cloud Enterprise resource planning (ERP) framework for modern business for helping them to manage their accounting, procurement processes, projects, and more throughout the enterprise. Modern ERP cloud solution simplifies, standardizes, and automates business processes that helping organizations take full benefits.

Cloud-based ERP suites are mature offerings that now have many of the same features and functionality as their on-premise counterparts. In addition, the cloud deployment model easily enables the integration of other key technologies like mobility, decision support systems, and collaboration and social systems. Modern ERP cloud solution simplifies, standardizes, and automates business processes — helping organizations take full advantage of growth opportunities. A modern ERP cloud also enables a workforce to collaborate, analyze, and work on the move – accelerating performance and attracting great talent.

So, a modern ERP cloud reduces costs and makes smarter use of scarce IT resources so they can be focused on driving innovation. ERP Cloud is a perfect example of a suite of integrated applications that give organizations the functionality, analytics, and collaboration tools they need to run their business.

Its users have access to dashboards they can use to monitor and view their most pressing concerns; it integrates with existing applications like Microsoft Excel; it leverages in-context analytics that power decision making; and it allows users to easily collaborate within the applications to complete tasks faster.

According to the Cloud ERP framework for Modern Business as seen in figure1, in the first stage we determine the size of the enterprise in small, medium and large enterprise. Then in stage 2 each enterprise can select traditional ERP when an enterprise has sensitive and important data that are needed for business continuity or big size Enterprises that can undertake extra costs for ERP implementation.

![Figure1: Cloud ERP framework for Modern Business](image-url)
On the other hand the enterprise can select cloud computing. The Cloud Computing environment technology is divided into Public Cloud, Private Cloud and Hybrid Cloud. Public Cloud is a service that includes hardware, processing power and memory shares between different users and virtual machines are used to run and apply this service by users, the public cloud is low cost and low security. In Private Cloud hardware and IT infrastructures located in an organization or these infrastructure used with physical separation from other infrastructures, no hardware and software will be shared among users, the private cloud is high security and high cost. Hybrid Cloud is a combination of the two other structures; the hybrid cloud is medium security and medium cost. A hybrid Cloud is a private Cloud linked to one or more external Cloud services. It is a mix of both public and private Clouds [20].

In stage 3 the cloud services are provided into IaaS (Infrastructure as a Service), PaaS (Platform as a Service and SaaS (Software as a Service). Software as a service (SaaS) is a software delivery model in which software and associated data are centrally hosted on the cloud by independent software vendors or application service providers on the cloud. SaaS benefits list is increasing and it will go beyond cost-effective software delivery factors, enabling organizations to transform their business processes [21]. SaaS for ERP systems are provided by the cloud service provider. The Platform as a service covering a layer of software and presents it as a service that can be used to construct a higher-level services. Platforms as a Service is constructed from platform, depend on the integrating of operating systems, middleware, application software or an environment development which encapsulate service through an API manner an example of this service is the Microsoft Azure [22]. PaaS for ERP systems provide resources in a pre-defined software environment that are attractive for software development, testing, or the distribution of software but not for the actual operation of an ERP system.

In Infrastructure as a Service (IaaS), customers buy their needed infrastructures, you own and purchase the software and virtual power to execute as needed. This service is a running virtual server on a virtual environment [23]. Infrastructure as a service utilizes the main services such the storage and determine capabilities as modulated services over the network. Servers, storage systems, switches, routers are collective and situate available to utilize and manage a high-performance computing applications. IaaS for ERP systems are using IaaS for the operation of an ERP system the user company “rents” the computing resources from a cloud service provider.

Our Cloud ERP framework for Modern Business special in developing countries showed that it is the small and mid-sized companies that are most well-suited to benefit from a cloud ERP implementation. We found that SMEs and especially start-ups and small companies, which typically lack the financial resources to build a comprehensive on-premise ERP, highly appreciate the modest capital investment required upfront for the implementation of a cloud-based system. In addition, long term costs of a cloud ERP are considered to be quite lower for SMEs, allowing them to reduce their overall IT expenditure. On the contrary, the pay-per-use model of the cloud may be proved detrimental for large companies in the long run, due to expensive fees paid, as a result of their large ERP user-base and number of ERP modules used.

Thus form the previous Cloud ERP framework for Modern Business, for SMEs which select Software as a service (SaaS) in which software and associated data are centrally hosted on the cloud by independent software vendors or application service providers on the cloud. They expose several benefits to enterprises, promoting greater IT efficiency and agility in modern business worldwide.

VII. CONCLUSION

For many IT departments, ERP systems have often meant large, costly, and time-consuming deployments that might require significant hardware or infrastructure investments. Cloud computing represents a significant shift in the way that IT resources are managed, operated, and consumed. This change exposes several benefits to enterprises, promoting greater IT efficiency and agility.

In developing countries, a modern ERP cloud reduces costs and makes smarter use of scarce IT resources so they can be focused on driving innovation. ERP Cloud is a perfect example of a suite of integrated applications that give organizations the functionality, analytics, and collaboration tools they need to run their business.

In addition, Cloud based ERP benefits customers by providing application scalability and reduced hardware costs. For SMEs that apply cloud computing technology made it easier to deliver our ERP software as a service (SaaS) for customers who want to acquire cloud ERP and not have to manage hardware, software, and upgrades while reducing up-front expenses. It is low cost, supports rapid development, flexible and scalable. It improved accessibility, mobility and usability; also it improved system availability and disaster recovery. Moving into the cloud-based system is very beneficial, it’s always up to the company’s readiness and capability to handle such transition.
Providers are investing significantly in enhancing their offerings, expanding the functionality and availability of their services, and reducing the risks of adoption. Smaller companies that want to gain the benefits by lower their costs, and drive standardization should consider this option now, as should larger companies looking to lower costs and drive standardization within divisions or functional units. ERP in the cloud is the future, and even companies that have good reason not to take the plunge yet should be monitoring developments and considering their longer-range plans.

In the previous Cloud ERP framework for Modern Business by moving their core enterprise applications to the cloud, especially small but also medium sized companies can significantly reduce their IT costs. However, cloud-based ERP could not make financial sense to large companies, as their large number of ERP users could result in expensive subscription fees, which could be proved in the long run to be more costly than implementing and maintaining an on-premise ERP system. Furthermore, SMEs are most well-suited to reap organizational benefits, such as enhanced focus on core business tasks and business continuity. Simultaneously, they can achieve strategic benefits, such as rapid response to business-level volatility and access to advanced technology in a viable payment model, which finally help them to be more competitive.

REFERENCES


