

Cloud ERP: An Overview

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Abstract— In the current market practice, cloud ERP application has gained momentum with the changing market scenario. Companies are evolving with cloud platform with low initial investment. This study aims to depict the current scenario of the cloud ERP market and their offerings and further implementing issues with a greater focus on strategic business process.

Keywords— Enterprise Resource Planning (ERP), Cloud ERP, Cloud offerings

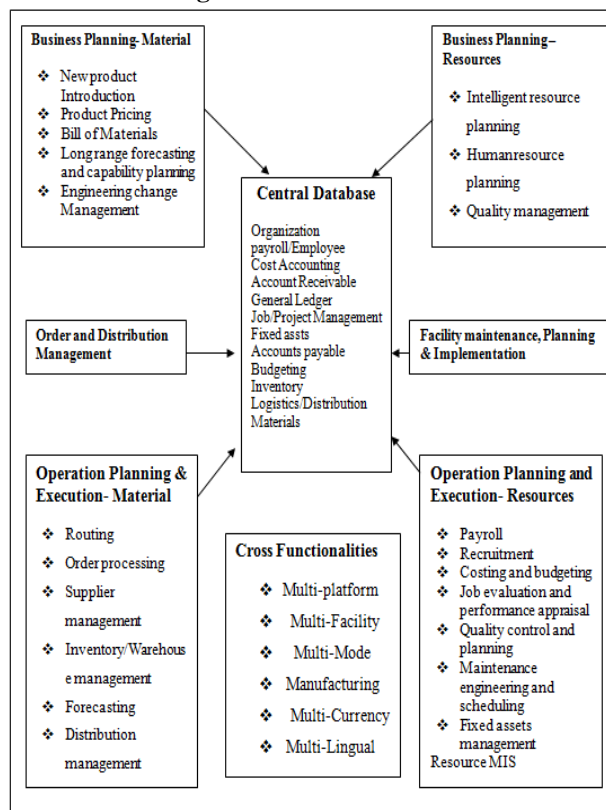
I. INTRODUCTION

E-Commerce is often equated with the use of the internet for business practices. Undoubtedly, internet has been the prime contributor in the rapid expansion of e-commerce; still the concept is much wider in the current market scenario. E-commerce is often defined as “the sharing of business information, maintaining business relationships, and conducting business transactions by means of Internet-based technology”(Riggins, 1998). Alternately it is also explained as “...anything that enhances your relationships with an existing customer and increases the revenue you get from the customer”(Sullivan, 1998).

‘ERP is a high-end solution that streamlines and integrates operation process and information flows in the company to create synergy through business processes’. This single database, application and user interface for the entire enterprise, integrate as well as synchronize various business processes in order to gain competitive advantages. Allied Market Research (2015) expects global ERP market with CAGR of 8 % approx by 2020 (see Annexure 1). Evidently, the role of ERP has evolved from back office operations to integrated business process. Back office operation like production, sale, inventory control, order management, accounting, and marketing are part of conventional ERP. Basically, ERP operates as modules. Multiple software modules operate under an ERP module. Each module focuses on a specific business process and customized as per the requirement or specification of the companies.

The general ERP model is shown below-

A generalized ERP model



Source: Garg, V.K & Venkitakrishnan, N.K; “Enterprise Resource Planning:- Concepts and Practice”, 2nd Edition

The general model of ERP consisting of business activities portrays business as an integrated system. This business process model is developed based on the strategies and objectives of the business. It integrates functions like manufacturing, distribution, finance, and sales. Taking

information from each function it assists employees and managers to plan, monitor and control the business process. In the early 1990s, the advancement of the ERP system is at its peak. The major concern of the companies were with customization which can balance the systems' high cost and flexibility. In the early 2000s, pioneer companies like SAP and Oracle stepped further and arrived at a hosted solution. It is a platform which is managed offsite and the software needs to be installed on the end users computers. Most recently ERP software is deployed as cloud-based software where ERP is distributed from the cloud. Cloud ERP is accessed by the end user via a web browser. Efficient resource management and integration of organizational activities are the main objectives of installation of ERP system. With the increase in organizational complexity and rapidly evolving business models, there is a high demand for ERP solution. Cloud ERP software added more flexibility to the ERP system yet there lies major challenges of high implementation cost, open source application and tough competition in the software market.

The cloud computing model is given below in Fig 1

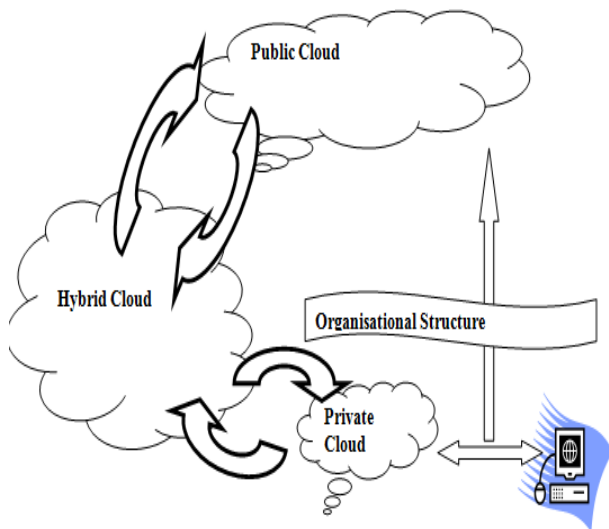


Fig.1. Cloud computing model

The cloud computing model presented above, depicts three categories of cloud i.e. public, private and hybrid. Public cloud infrastructure is primarily owned by organizations offering cloud services and mainly serves general public or large organizations. It is owned by organizations selling cloud services. Private cloud infrastructure serves single organization that may be managed by an organization or third party. Hybrid cloud infrastructure consists of two or more cloud platforms i.e. public, private or community that enables portability. Cloud services cover mainly *SaaS*, *PaaS*, and *IaaS*. *Software as a Service (SaaS)* provides access

to software over the Internet which eliminates installation and running the application on the customer's own computers thereby simplifying maintenance and support system. *Platform as a service* provides a layer of software as a service that is used to construct higher-level services. *Infrastructure as a Service (IaaS)* offers a virtual platform with preinstalled operating system as a service. Cost of servers, software, and space networking equipment are eliminated as the clients buy those resources as a fully outsourced service.

II. ERP SOFTWARE PROVIDERS

ERP Software is the platform that integrates core services like customer relationship management, accounting, HR, supply chain management etc in one platform. Due to complex and standardized features, large enterprises and corporations traditionally adopt ERP software solution. But in recent years with continuous fluctuations in the market trends even small and medium-sized business felt the necessity to incorporate ERP software solution. Table 1 represents the major ERP Software providers by niche.

Table.1. Major ERP Software Providers in Market

Enterprise	Medium Sized	Small Business
SAP	Netsuite	Deltek
Oracle	Sage	Work(etc)
Microsoft Dynamics	Infor	Syspro
IFS Applications	Macola	Intacct

Source: Enterprise Resource Planning Software Buyer's Guide (2018, September 17). Retrieved from <https://technologyadvice.com/erp/>

ERP software provides varied features depending upon industry focuses yet the core features are quite same and presented in the form of modules like Inventory procurement and control, Order processing and management, Supply chain management, Finance/Accounting, CRM, HR, IT, E-commerce etc. As per Table 1 the features offered by the above mentioned ERP providers are given below in annexure 2: Table 2.

From the Table 2, we present all major offerings vertically and the ERP Softwares are mentioned in horizontal headings. It is evident that Cloud deployment is offered by almost all types of ERP vendors being at enterprise, medium-sized and small business level. Further Table 3 given below presents a brief overview of cloud offerings by some of the major market players of the market in the field of ERP.

Selected Major vendor's offerings

Table.3. Selected cloud-based ERP vendor offerings

ERP Suppliers	Cloud Offerings	Functionality	Target Customers/Users
SAP	Business By Design	Integrated package with financials, sales, procurement, customer service, supply chain management and HR. Professional services to companies, and manufacturing and wholesale industries.	Small and midsized enterprises, subsidiaries of large companies
	Additional components available as cloud solutions	Human Resource Management with talent and workforce management. Future expansion services: Sales OnDemand, Financials OnDemand, and HANA	Large companies
Oracle	ERP Cloud Service/ Fusion	Focus on financial management and procurement functions.	Medium sized companies
QAD	QAD on Demand	Specific focus on business processes of manufacturing industry. Offers automotive, configured products.	Small and medium enterprises
Microsoft	Microsoft Dynamics ERP	Windows Azure platform Partners developing vertical solutions and add-ons through Microsoft Dynamics Marketplace	Targets small, midsized, and enterprise customers

Source: Utzig, C., Holland, D., Horvath, M., & Manohar, M. (2013). *ERP in cloud: Is it ready? Are you?* Retrieved from: https://www.strategyand.pwc.com/media/file/Strategyand_ERP-in-the-Cloud.pdf

III. RATINGS AND SCORE ANALYSIS

As per the TrustRadius review site for business technology, a two-dimensional chart is presented (see annexure 3: Chart 1) to compare the ERP products based on satisfaction ratings and research frequency. The product needs at least 30 ratings to appear on the below stated product chart. The product

above the median is considered to be top rated products. The database of satisfaction ratings, score and research frequency are derived from the review site 'TrustRadius' given in annexure 7: Table 4. The satisfaction ratings are presented in chart 2 (see annexure 4) where we find only 2 major players i.e. Sage Intacct and ERP eBusiness Suite scoring more than 300 ratings. The TR score and research frequency are presented in chart 3 (see annexure 5) where we find a fluctuating trend in research frequency similar to satisfaction ratings but the TR score obtained after considering various parameters are quite stable as most of the scores lie between 6 to 8. Thus, from this, we can decipher that all the ERP software are lying in same evolutionary phase if we consider overall parameters depicted through score thereby there is more competitiveness which in turn benefit users to reduce cost and improve business operations and planning through greater choice of offerings

IV. BENEFITS OF CLOUD ERP SYSTEM

At any business process, the cost is the most important parameter of consideration. Implementation cost under cloud-based ERP is through a subscription model rather than outright purchase. Thus, capital expenditure is low at the initial level which attracts small business firms also to incorporate cloud ERP system. Cloud-based offers are more at ease as the offerings evolve with organization's needs. Maintenance of both hardware and software including all upgrade and refreshes are done by the vendor. Back up services, system maintenance, and user support are also included in maintenance which eliminates the organization's IT maintenance cost.

In-house and hosted ERP system needs to be customized and configured to match the company-specific business process. This customization and configuration takes much time and not suited to the current rapidly changing market. Whereas cloud-based solution is designed to offer a basic configuration that meets most business and further new business functionalities are added as per requirement.

In order to provide efficient software delivery process vendors like SAP and salesforce.com offers bolt-on application processes for collaboration, advanced analytics, and financial management through web-based application or app stores.

In brief, organizations that have integrated ERP solutions are maximizing their ROI. And they are experiencing Reductions & improvement as given in percentage in chart 4 (see annexure 6).

V. LIMITATIONS OF CLOUD ERP

As cloud-based ERP is quite new to the market, the long run prospect with the changing scenario remains uncertain.

Updated functionalities, customization and data risk are the major challenges.

Till now, vendors of cloud-based ERP system mainly aimed at core functionalities. Developing advanced functionalities like statistical forecasting, constraint-based planning, media integration etc are growing challenges with the changing market scenario. Incorporation of these advanced functionalities will play a major role in the sustenance of cloud ERP.

Cloud-based ERP offers more standardized business process configuration rather than a tailor-made business solution. Perceived data risk is one of the vital issues for the companies choosing cloud-based ERP. Cloud providers like SAP and Oracle claim state-of-the-art security which is much better and advanced than on-premise and hosted solution. Securities of data will be under national jurisdiction.

Moving from ERP to cloud-based ERP can create organizational resistance. IT departments with strong organizational presence may not readily accept the new application and infrastructure outsourcing and are likely to fill threatened.

VI. SUCCESS LIKELIHOOD MATRIX OF CLOUD ERP

Implementation size	Large	High	Low
	Small	Very High	Medium
		Low	High
		System complexity	

Source: https://www.strategyand.pwc.com/media/file/Strategyand_ERP-in-the-Cloud.pdf

Source: Utzig, C., Holland, D., Horvath, M., & Manohar, M. (2013). *ERP in cloud: Is it ready? Are you?* Retrieved from:

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As of now, small and medium-sized companies are most likely participants of cloud-based ERP due to low implementation and support cost. In relation to complexity, the cloud-based platform may not be a good solution to opt with. Large complex companies will potentially find in-house ERP more beneficial than the cloud-based platform.

VII. CONCLUSION

Companies lose their control over crucial financial and managerial database. With continuous advancement of industry, security standard company should take a comprehensive approach to cater to security risk. Providers of cloud ERP application are significantly investing in data

risk and secured offerings, advanced functionalities with a focus on strategic business process will pave the path of the cloud market.

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Authors Profile

Dr. Debdas Rakshit is Professor at the Department of Commerce of the University of Burdwan, West Bengal, India. He has over 18 years of teaching experience at the post-graduate level and 5 years of industry experience. He is a life member of the Indian Accounting Association, Indian Commerce Association and Fellow member of Cost and Management Accountant. He is also an invited member of various academic bodies in different universities in India. Professor Rakshit has so far contributed more than 100 papers in reputed professional and academic journals. He has authored four books in the area of Corporate Restructuring, Buyback of shares, Co-operative movements in India and EVA Based Segmental Reporting published by different reputed International publishers. He has acted as visiting faculty in different universities in India. Under his supervision 10 researchers and 5 scholars have completed their Ph.D. and M.Phil degrees respectively. Dr. Rakshit has attended many seminars and conferences and also acted as chairperson in several national and International seminars. His areas of interest include Corporate Restructuring, Financial Statement Analysis, Corporate Performance Measurement, Corporate Financial Management, International Accounting, Value Based Management etc.

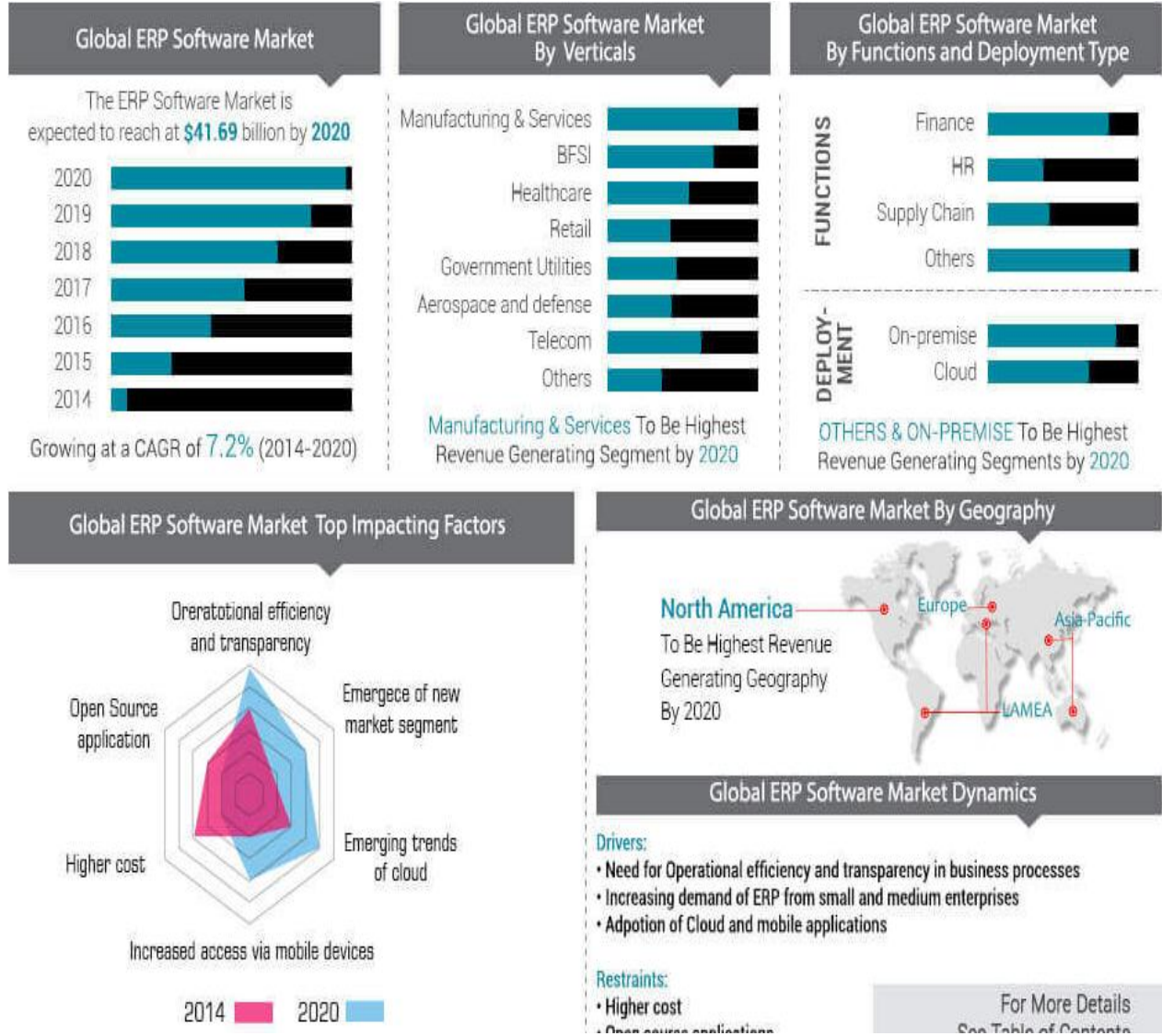


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ANNEXURE

1. FIG.2. OVERVIEW OF GLOBAL ERP MARKET



Source: www.alliedmarketresearch.com/images/erp-software-market

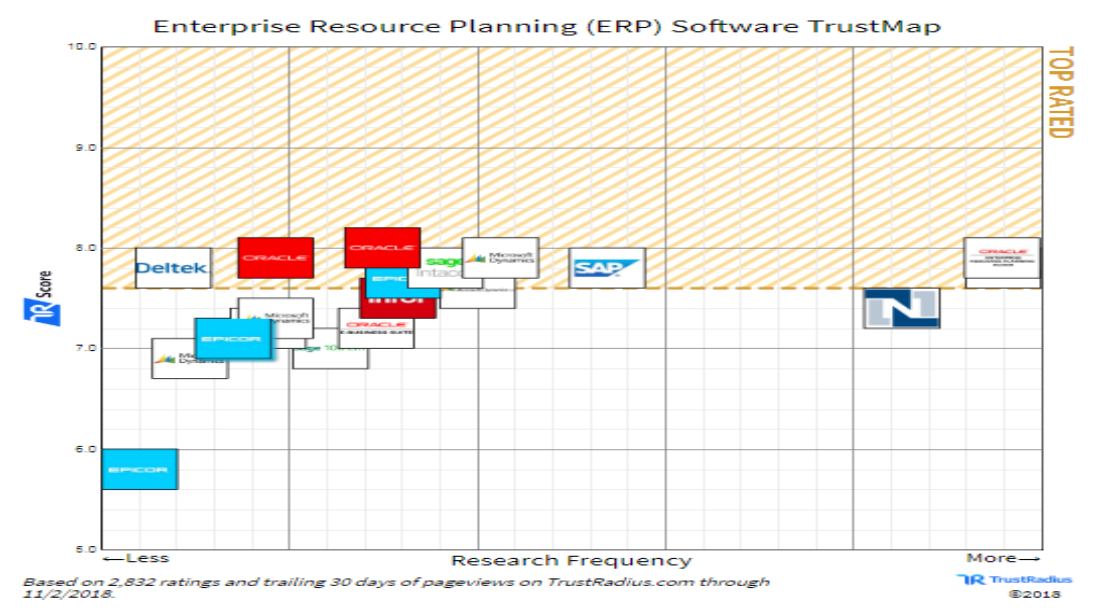
2. TABLE.2. MARKET OFFERINGS OF ERP SOFTWARE PROVIDERS

Source:Enterprise Resource Planning Software Buyer’s Guide (2018, September 17).Retrived from Source:Enterprise Resource Planning Software Buyer’s Guide (2018, September 17).Retrived from <https://technologyadvice.com/erp/>

ERP Software→ Features ↓	Enterprise			Medium Sized			Small Business		
	SAP ERP	Oracle EBS	Microsoft Dynamics AX	NetSuite	Sage 300	Infor	Workday	Work(etc)	Spyspro
Mobile	✓	✓	✓	✓	✓	✓	✓	✓	✓
Human	✓	✓	✓	✓	✓	✓	✓		

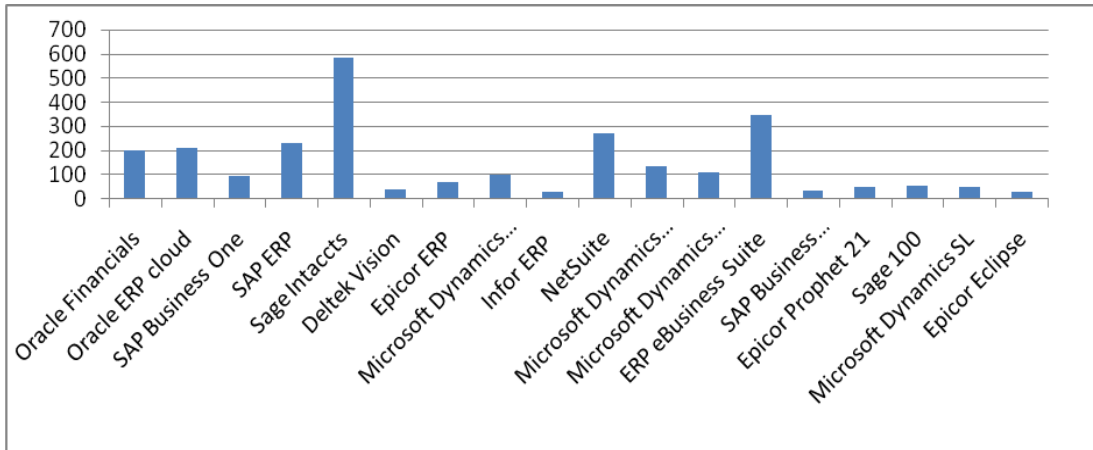
Resource									
CRM	✓	✓	✓	✓	✓	✓	✓	✓	✓
Finance	✓	✓	✓	✓	✓	✓	✓	✓	✓
IT	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warehouse Management	✓	✓	✓	✓	✓	✓	✓	✓	✓
e-Commerce				✓				✓	
Cloud Deployment	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry Specific Software	25 Industries	23 Industries	4 Industries	14 Industries	6 Industries	4 Industries	8 Industries		20 Industries
Supply Chain	✓	✓	✓	✓	✓	✓			
Asset Management	✓	✓	✓						
Procurement	✓	✓	✓	✓	✓	✓	✓	✓	✓
Processing	✓	✓	✓	✓	✓	✓	✓	✓	✓
Integration			SAP	SAP			Custom Tool	Google Apps	App Store

3. CHART.1. ERP SOFTWARE PRODUCT CHART

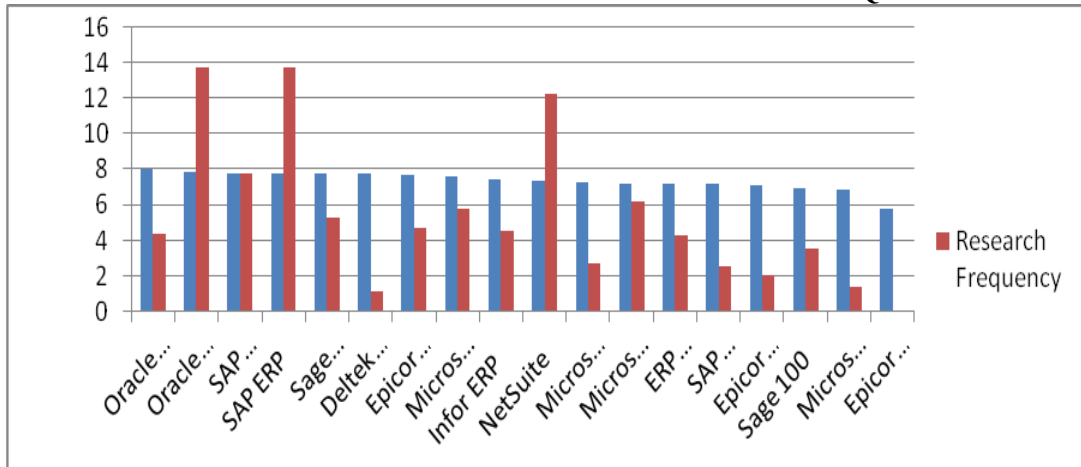


Source: Best Enterprise Resource Planning Software. Retrieved from <https://www.trustradius.com/erp>

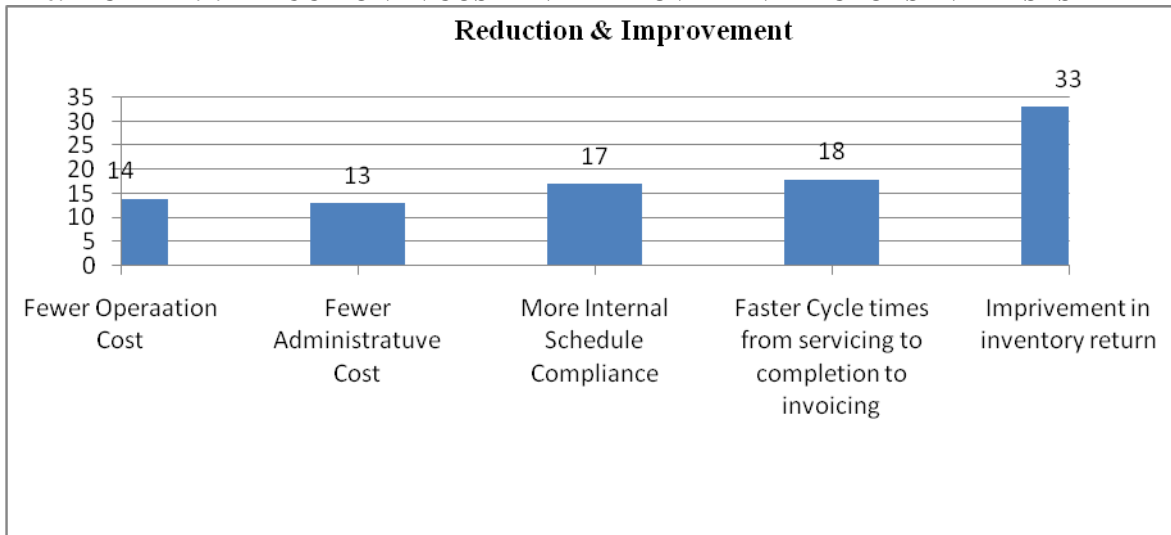
4. CHART.2. SATISFACTION RATINGS



5. CHART.3. TOP RATING SCORES AND RESEARCH FREQUENCY



6. CHART.4. REDUCTION IN COST AND IMPROVEMENT FACTORS IN ERP SYSTEM



Source: Top ERP Software companies. Retrieved from <https://financesonline.com/list-of-erp-software-companies/>

7. TABLE.4. ERP PRODUCT RATINGS, SCORE AND RESEARCH FREQUENCY

ERP Software	Ratings	TR score	Research Frequency (%)
Oracle Financials	200	8	4.4
Oracle ERP cloud	209	7.9	13.8
SAP Business One	95	7.8	7.8
SAP ERP	234	7.8	13.8
Sage Intacct	584	7.8	5.3
Deltek Vision	39	7.8	1.2
Epicor ERP	71	7.7	4.7
Microsoft Dynamics AX	100	7.6	5.8
Infor ERP	31	7.5	4.6
NetSuite	271	7.4	12.3
Microsoft Dynamics GP	138	7.3	2.7
Microsoft Dynamics NAV	111	7.2	6.2
ERP eBusiness Suite	346	7.2	4.3
SAP Business ByDynamics	33	7.2	2.6
Epicor Prophet 21	48	7.1	2.1
Sage 100	55	7	3.6
Microsoft Dynamics SL	49	6.9	1.4
Epicor Eclipse	31	5.8	< 1

Source: Best Enterprise Resource Planning Software. Retrieved from <https://www.trustradius.com/erp>