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Bachelor Thesis

ERP for Sales in SMEs: A Case Study

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ERP for sales in SMEs: a case study

Objectives of thesis

The main objective of the thesis is to compare various ERP systems for sales and their deployment options for a small or middle-sized enterprises (SMEs).

The partial objectives of the thesis are such as:
- to make overview of current ERP system vendors and evaluation of ERP deployment options;
- to short list suitable ERP products, and find an optimal product and deployment option for a selected SME;
- to evaluate findings and formulate recommendation for the company.

Methodology

The literature review will be conducted to understand the current market of ERP systems and their deployment options with a particular focus on needs of SMEs. The findings will be used to specify selection criteria and possible deployment options of an ERP sales module for a selected company. Methods of multiple-criteria decision analysis (MCDA) will be used to select an optimal solution including financial evaluation. Final recommendations and conclusions will be formulated.

The proposed extent of the thesis

30 – 40 pages

Keywords

ERP, sales, SAP, Oracle, Microsoft, implementation, criteria, selection.

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ELBAHRI, Faisel Mohamed, et al. Difference Comparison of SAP, Oracle, and Microsoft Solutions Based on
    Cloud ERP Systems: A Review. In: 2019 IEEE 15th International Colloquium on Signal Processing & Its
    Applications (CSPA). IEEE, 2019. p. 65-70.

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    Business Expert Press, 2017.

SAMARA, Tarek. ERP and Information Systems: Integration Or Disintegration. John Wiley & Sons, 2015.

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Declaration

I declare that I have worked on my diploma thesis titled " ERP for sales in SMEs: a case study" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 30th of November 2020 _____

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ERP for sales in SMEs: a case study

Abstract

The main objective of the case study is to find an optimal ERP software for a selected small and middle size enterprise (SME) and the suitable deployment option for the selected company. To find the Optimal ERP software among SAP, Oracle and Microsoft Dynamic for the selected company, multicriteria decision making analysing methods and the Saaty's matrix methods has applied. The weight of the criteria is selected by an expert who has long time experience of working through different ERP software. According to the evaluation of multicriteria decision making analysis SAP has selected as an optimal ERP software for SMEs where the score of SAP is 8.84 which is the highest among the alternatives. Besides this, by applying the weight of Saaty's matrix, the weighted total of SAP was 8.89 which is the highest as well. As a result, applying both methods to find the optimal ERP product, SAP has highest weighted total that illustrate that SAP is the optimal ERP solution for SMEs. On the other hand, the cost of Ownership for cloud-base ERP solution depends on the number of users. The cost of ownership of cloud-base ERP software increase with the increase of the employee. However, the On-premise ERP solution needs to spend lots of money to maintain the data infrastructure that difficult to bear for the small and middle size enterprise. As a result, cloud-base ERP solution is the best for SMEs. Finally, for the small and middle size enterprise SAP is the optimal ERP software and cloud-base ERP software is the suitable deployment option to be successfully operate the business.

Keywords: ERP, sales, SAP, Oracle, Microsoft, implementation, criteria, selection, Cloud, On-premise, Deployment, Software, Market share.

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1 Introduction

In the modern world, business plays an important role in the world economy, and the things that make the world business more easy, comfortable, convenient, and more profitable are different software. ERP is a business software that is quickly becoming the most successful Business software in the world. Almost all large and middle-size enterprises use different ERP software to operate their business. The ERP software makes the sales and distribution, financial accounting process, customer relationship, asset management easier for the business organizations.

Enterprise resource planning (ERP) suite modern business. It increases customer satisfaction and reduces churn by better service levels, enabled by a better flow of information order status and tracking. ERP has different modules. For example, the financial accounting module is for recording and reporting all financial activities of the company for a certain period. Besides this, the sales and distribution module helps companies by providing sales data in the long run as well. It has the customer relationship management module, asset management module, warehouse management module, and so on. By using the sales and distribution the company can reduce the sales and distribution cost and keeping the master data of the customer to analyze and observe the customer's choices and interests. It also reduces the order management cost and opens many features for ordering.it not only reduces the ordering cost but also processes the order to send it to the customers and until receiving the product to the customer's company can track to be confirmed of the arrival of the product. There are various ERP products that are in the markets. Different ERP products are used by different industries according to the needs of the organizations. Among all the ERP software SAP has the highest market share in the world ERP market, followed by Oracle, Microsoft Dynamics, and Infor has a big market share in the world ERP market. Different ERP products have their individual advantages. Some of them are cost-friendly, some of them have advanced features and functionalities, while others offer a better capability to maintain the financial accounting department of an organization. There are various options for the implementation of ERP software. The cloud-based ERP has some advantages for the customers because in the cloud-based ERP solution the customers can customize ERP according to their needs to operate the business. As a result, different small companies' impalement cloud ERP. On the other hand, On-premise is suitable for large enterprises where the organization must build their own data infrastructure and has to hire an expert to maintain it.

In the new business perspective, ERP has opened a unique opportunity to reinvent the business model and drive new revenue and profit. For example, the entrepreneurs now can be connected to the people, to the customers' devices and business network to deliver the new value to their customers on any channel – the Internet of Things and Big Data become accessible to any business. Besides this, now the companies can easily simplify their process of sale and distribution, can drive them in real-time, and change them to get the new efficiencies -no more extra processing is required. In a word, by using ERP enterprises can conduct everything including their business and analyse the result by keeping data in memory.

2 Objectives and Methodology

2.1 Objectives

The main objective of the thesis is to compare various ERP systems for sales and their deployment options for small or middle-sized enterprises (SMEs).

The partial objectives of the thesis are such as:
- to make overview of current ERP system vendors and evaluation of ERP deployment options.
- to short list suitable ERP products and find an optimal product and deployment option for a selected SME.
- to evaluate findings and formulate a recommendation for the company.

2.2 Methodology

The literature review is conducted to understand the current market of ERP systems and their deployment options with a particular focus on the needs of Small and Middle Size enterprises (SMEs). The best deployment option will choose for the Small and Middle Size Enterprise from the different deployment options according to the cost of implementation. The findings will be used to specify selection criteria and deployment options of an ERP sales module for a selected company. Methods of multiple-criteria decision analysis (MCDA) will be used to select an optimal solution including financial evaluation. Final recommendations and conclusions will be formulated.

3 Literature Review

The literature review mainly is about understanding the current market of ERP systems and the different deployment options of ERP with the particular for the small and the middle size company. It describes the history and the evaluation of ERP and the latest version of ERP products. It describes the different deployment options of ERP for small and middle-size companies. For instance, cloud ERP solution and On-premise ERP system. It also contains the advantage of the cloud and On-premise ERP software deployment options and the challenges as well. The literature review also conducted a description of different ERP products that are suitable for small and middle-size enterprises. It describes SAP, SAP S/4 HANA, Microsoft Dynamic, and Oracle. The different modules and components of these ERP products are also dillustrate in the theoritical review part. In addition, the study also shows the features, components, and modules of SAP, Oracle, and Microsoft Dynamic to get information about which ERP products are suitable for which industry. This theoretical part also mentions the market share of the ERP product according to the global ERP market.

3.1 History and evolution of ERP

Nowadays almost all large companies in the world are using an ERP system to operate their business. ERP systems have already proven its importance in a business to be successful financially. ERP system helps to keep the master data of the customers much more accurately and on a massively larger scale than was possible through manual means. Because of inventing the SAP ERP system, business activities become more easy, effective, and straight forward. (Jack G, 2017)
In the year between 1980 and 1990, the biggest firms in the world used to hire many system analysts who were responsible for a generated a huge number of useful computer applications to do a business activity more efficiently and effectively. In conjunction with the appearance of affordable personal computers, this led to just about every department of a large organization developing their own computer applications. This system creates a problem for the managers because high levels of duplicated effort and diverse sets of data have shown different managers different opinions about the current situation of the organization. While this was going on, SAP carefully developed a system expendable into enterprise-wide the system, enabling the integration of applications, so that there could be more of a shared vision organizational performance. There were many other large firms that were trying to develop a different database system. For example, oracle devolved a highly effective database system. Besides this, another firm name Peoplesoft developed a human resource product. (Jack G, 2017)
Enterprise resource planning (ERP) systems continue to be one of the largest, fastest, growing, and influential commercial software products. Enterprise resource planning (EPR) has different module application software that helps an organization to the business function. In production planning and execution, manufacture, procurement, tracking the orders continue the communication with the customers and the vendors of the organization. The development of an ERP can involve considerable business process analysis employee retraining and new work producers.

Prior to 2000, ERP systems create very large firms that could afford the rather high cost of pursuing an ERP system. After the year 2000, the demand for ERP was starting to decrease, in part because firms were often concerned with Y2K issues prior to 2000 which motivated many ERP system acquisitions. The vendors reacted in different ways. First, the market was

affected by Oracle purchasing PeopleSoft. Then SAP advertises that they can serve small businesses too. But it was clear that they had more value in the large market. Many countries, for example, China, India, and others have thriving markets for ERP systems designed especially for local conditions, all through SAP and Oracle have customers all over the world.

3.2   What is ERP software

ERP stands for Enterprise Resource Planning and refers to software and systems used to plan and manage all the core supply chain, manufacturing, services, financial and other processes of an organization. (Perkins, 2020). Enterprise Resource Planning software can be used to automate and simplify individual activities across a business or organization, such as accounting and procurement, project management, customer relationship management, risk management, compliance, and supply chain operations. Individual ERP applications can offer software as a service (SaaS), while a complete suite of ERP applications forms an ERP system that can be used to effectively communicate and bring together business processes to enable a flow of data between the applications, typically through common databases either on-site/on-premise or in the cloud. ERPs connect every aspect of an enterprise. An ERP software system allows for better performance and project management that helps plan, budget, predict and accurately report on an organization's financial health and process enterprise Resource Planning (ERP) software is a system that handles all the resources required to make, ship, and account for customer orders. It does this by integrating all the information flowing through the various departments of a large complex organization. ERP traditionally involved many different processes, such as manufacturing, supply chain, and accounting. ERP software has also expanded beyond its original business functions to include newer functional areas like business intelligence (BI), CRM and Marketing Automation, and eCommerce. As a result, modern ERP can benefit a broader range of companies than traditional manufacturing-centric users. (Elbahri, 2019). The entire data flow across these functions is enabled by a central database that manages the data flow. All functions see and operate with the same data. This unified view of a business's data mitigates discrepancies across departments and business units and makes financial processes more efficient. For example, adopting an ERP system can streamline accounting and financial reporting, and resource planning. (Elbahri, 2019). Not only the big companies with huge capital are benefited by using ERP system but also the small and middle-size companies are taken the advances of using ERP products in their business. The small and middle-size company can use the ERP cloud service to avoid the different complexity of data management and implementation. (Perkins, 2020)

3.3   Cloud ERP System

The main benefit of a cloud ERP system is the minimum price of login. Industries don't possess to buy, and payment cycle expensive tools equipment or type assured that have enough substructure to holder the group of the method. They simply detect and recovery a software request onto clients and let a hosting business supply and support the service of process. Also, cloud ERP systems have little IT support and maintenance requirements. The hardware tools are preserved on the hosting business; thus, industries don't possess apprehension around experimentation and commissioning the organization on an even basis or make certain that all of the gear's tools are in occupied instruction. The ERP system hosting business achieves this service for its clients. Cloud ERP Systems indicate in together the applications brought systems as services through the network, the software and hardware methods in the database and information centres that supply and support those services. The essential cloud services are

shown as Software as a Service (SaaS), Infrastructure as a Service (IaaS), and Platform as a Service (PaaS). (Elbahri, 2019).

In the IaaS type, clients or sellers charge only the workstation infrastructure. PaaS type, both infrastructure, organizational structures, and software design implements are hosted through the vendor. The stage ability to remain applied for the application of a Web- developer software on the hosted substructure. The SaaS type, client's payment for software methods hosted through the vendor. The Cloud ERP system offers a simple method and little price on executing strategy and applying. Some of the changes among cloud ERP systems and SaaS: "cloud ERP system was indicated to host service brought through the network." ERP organization in the SaaS type refers to the cloud, which offers calculating control to route the ERP software organization (Elbahri, 2019). The structure is obtainable to the consumer or employers proceeding request once the payment fee is received. To preserved admission, the users need an internet construction. SaaS type is not a required and necessary constituent of ERP method however administrations can buy the additional supple Cloud ERP method once it is obtainable in a SaaS type. The industry can consume Cloud ERP deprived of SaaS (cloud platform or cloud infrastructure), SaaS ERP system deprived of cloud ERP (web-based), or SaaS ERP software system allowed through the cloud (cloud software application manager). The SaaS methods type has constant monetary and financial compensations over the others in on-campus software systems types. The processing price is actually fewer and the payment price is correspondingly little usually far inexpensive than a licensed request system payment which is potential because of its once-a-month payments-based revenue types. Through SaaS Planning, a provider licenses a request system to clients on payment-based service package delivery. It lets the client need a processer or a server room with internet admission to upload/download the request system and use the software, which type client to get rid of purchasing high expensive software/hardware to track a request system. (Elbahri, 2019)

3.4   On premise ERP system

With the traditional on-premise deployment, ERP software is installed and run-on dedicated servers in-house. The company owns and service the hardware in fracture and software licenses. In an on-premise ERP deployment system, all the infrastructure and software are owned by the company, reside within the organizational boundaries or firewall, and are handled by the internal IT team. With an on-premise ERP system allows the company to maintain full control over the company data and software. By minimizing the cost involved in building and training an internal IT support and development team, companies can reduce the IT overhead in an on-premise ERP system. IT resources can then be focused on more strategic efforts, such as making use of new technology to drive business advantage over their competition. Also, companies do not have to worry about the recovery objectives and carrying out other IT maintenance tasks in the on-premise ERP solution. Moreover, moving the development and testing environments to an on-demand model allows for better resource utilization and faster deployment of changes which can now be transferred simultaneously to all the company's location, with little deployment latency. (Elbahri, 2019)

3.5   On premise ERP Vs Cloud ERP System

Total cost of ownership: The total cost of ownership for a cloud ERP system depends on a subscription pricing model. Total cost includes all hosting, server, maintenance, and software updates. However, implementation and training services are charged as an additional fee in could ERP system. While on the other hand, on-premise software is often charged as a large

one-off license fee. However, as you're responsible for hosting, maintenance, software updates, and the general running costs of the solution, you'll also need to factor in these additional fees into the total cost of ownership of an on-premise ERP solution. Similar to cloud ERP, all training and implementation services you receive from the vendor or third-party resellers are usually charged as an additional fee. On-premise systems are typically considered to be a capital expense as it's just one large investment up front, while the costs of cloud ERP systems are usually considered to be an operating expense, as it's an additional overhead your business will continue to pay for the length of time that you have the software for.

Maintenance and software update: Typically, the user of cloud ERP regularly receive the update as part of the continuous improvement model associated with most cloud and SaaS systems, which means you can often avoid the dreaded experience of large version upgrades that are synonymous with on-premise solutions. This is the main benefit of using a cloud ERP system, as the users can get the latest features, with no need to work with the developers to updates the whole system for the company. However, in terms of on-premise environments usually require businesses to employ a full-time IT Administrator. When it comes to supporting, these platforms are not always retail-centric, making technical issues more difficult and time-consuming to resolve.

Deployment and implementation: Cloud ERP is easy to operate compering with on-premise ERP. Cloud-based ERP software is hosted on the vendor's servers and accessed through mobile apps, Internet browsers, and sometimes both. Whereas, on-premise ERP software is installed locally on your own computers and servers. Moreover, configuration, hosting, setup, and implementation of cloud-based ERP usually take mere weeks to set up, rather than months or even years compared to a traditional on-premise solution. (CLOUD ERP VS ON-PREMISE ERP, 2020)

Security: security is always meaning the data security of the company. There has some comparison between on-premise and cloud ERP solutions. In terms of an on-premise ERP solution, the system can only be used by the people or an employee who has access to the company computer and hardware that means all information and data of the company are almost safe and risk-free. Regarding the cloud-based systems, there is some confusion over whether they can be deemed as safe and secure as an on-premise solution or not.

Post-sales support: For an on-premise ERP, it is required to handle bug fixes, maintenance, and software updates regularly. This means the vendors have more control over when the software will be updated, however, on the other hand, the IT department becomes the technical support team, and getting additional help from the software vendor can be tricky, time-consuming, and costly. As for cloud ERP, the subscription fee should also include access to a technical support team, whether this is via email, phone, live chat, online documentation, or otherwise.

Business change and Adaptability: In the past, the business usually upgrade and change their software less frequently than now. However, in today's, society, retailers and alike require a high level of agility to keep pace. If it takes over six months to install and customize software, three months to build an instigation to the latest sales platform, or four to six months to task a developer with changing the system to support vital business changes, then it will simplify fall behind and someone else will take the place at the top of the retail chain. Usually, a cloud-based ERP system is typically less complex comparing with an On-premise ERP solution. As a result, a cloud-based ERP system is more flexible to make the change as the requirement of the

business grows and as the industry itself evolves, without needing to wait for or pay for a developer to implement those changes for the company.

3.6 Benefits of cloud ERP

For small and the middle size company ERP cloud-based system is more beneficial compared with on-premise ERP software. (Elbahri, 2019). One of the main benefits of design and implementing the ERP software method is to help the management of the company to reduce price and saving time and upsurge the productivity system and excellence of the company and also advance the customer service through mechanizing basic data and repetitive processes. (Elbahri, 2019). ERP software methods mechanically measure the request for activation, instruction, instruction the raw materials, tools, deliver manufacture schedules, path down the complete inventory, assign prices, and save the past client. The benefits of ERP are listed below:

- **Lower upfront cost:** In the case of cloud service, computing resources are separated from the enterprise location. As a result, enterprises do not have to pay the cost of building the computing environment. The enterprise only needs to pay for access to the environment over the internet. (Elmonem, 2016)
- **Lower operating cost:** The provider of cloud service is responsible for operating and providing the cloud service to the enterprise that isolating the operation process from the enterprise as well as the operation cost.
- **Using advanced technology:** by using cloud service from the provider, they are allowing the enterprise to get access to using advanced technology and advanced computing resources available over the cloud service.
- **Cost transparency:** Using cloud service is cost saving for enterprises. Enterprise has to pay-per-use or subscription models according to the enterprise plan. The enterprise does not have to control the entire infrastructure and does not have to pay for everything. enterprise only pays what they use and no need to pay what they do not use or do not cover the enterprise's needs. (Elmonem, 2016)
- **Rapid updates and upgrades:** In cloud ERP solutions update and upgrade accomplished faster than traditional ERP application. According to the needs and requests of the enterprise, the CSPs perform all updates and upgrade processes.
- **Easier integration with cloud service:** There is a huge number of cloud applications offered to satisfy enterprise needs. Due to the nature of the ERP systems which connect different parties inside and outside the enterprise, the integration with other services becomes easier at the cloud. Moreover, the enterprise does not have to think about the operation and does not have to worry about developing the system because the cloud service supplier usually does this. As a result, enterprises can more focus on their work and development. (Elmonem, 2016)

3.7 Challenges of Cloud ERP

In the modern world using the ERP cloud service become more popular among the different enterprises and different industries due to its huge benefits in operations though the enterprise must face some challenges of using Cloud ERP solution in their daily operations. The challenges are listed below:

- **Performance risks:** In a cloud ERP system the clients and the CSPs are separated geographically from each other and usually they maintain their connection through internet service. Network failures and many other connection problems can happen

more often during the working time of the enterprise that will reflect directly on the performance of the ERP cloud service. (Elmonem, 2016)

- **Customization and intermigration limitations:** Usually the CSPs use to offer the ERP solutions according to some paradoxes with some limited intermigration and customization option that sometimes does not meet the need of the enterprise. As a result, the subscription cost may increase in some cases but in the traditional ERP system, the organization does not have to face this kind of problem. (Hale, Cloud ERP vs. On-Premise ERP, 2019)

- **Security risks:** Due to the high availability over the cloud for cloud services the security risks increase as well. The CSPs get the information about the data and internal information of the client that increase the data and information security for the enterprise. Thus, handling security issues for cloud ERP is a challenging and complex process. (Elmonem, 2016)

- **SLA issues:** Defining Service level agreements (SLAs) is a very hard and complex process for cloud ERP; it should consider all aspects of the provided services including the intermigration and customization. (Elmonem, 2016)

- **Hidden cost in the contract:** There are some hidden costs in terms of using the ERP cloud. For example, transition cost, monitoring cost, and coordination cost.

- **Start-up support:** To facilitate the moving from traditional ERP to cloud ERP clients and customers need support from the cloud ERP provider to facilitate this moving. (Elmonem, 2016).

3.8   ERP products

There are many ERP products in the markets. For instance, SAP, Oracle and Microsoft Dynamics, Infor and so on. The implementation ERP software depends on the needs of the companies as different ERP software has different advantages and disadvantages for different industries. The disruption of various feature and components of SAP, Oracle and Microsoft Dynamics are discussing bellow:

3.8.1   SAP

SAP is the market topper in enterprise application software, helping the companies to run their business. It is the fourth largest software company in the world. The word SAP stands for system applications and products in data processing. it usually provides end to end solutions for financials, manufacturing, logistics, distributions, and so on. All business processes can conduct by using the SAP system which makes the business process easier and convenient. Not only the large companies are using the SAP system to improve their revenues but also the small companies are getting familiar with the SAP in all kinds of industries. Around 77% of world transaction revenues touch an SAP system. About 437, 000 customers in more than 180 countries are using SAP. There are more than 98,600 employees in around 140 countries in SAP, where more than 1800 partner companies of SAP all over the world. SAP has more than 100 innovation and development centers all over the world. (SAP, 2019)

SAP was established by five German entrepreneurs in Germany with the goal of increases the business potential of technology in 1972.in order to develop the company first program mainly takes place at night and on the weekends. The first version of SAP was launched at the end of 1972 was named R/1. In the year 1977 SAP moves their headquarter from Weinheim to Walldorf and in the same year SAP started to introduce their system outside of Germany for the first time. Two companies in Austria decided to use SAP. In 1979 second version of SAP R/2 was introduced with IBM database and dialogue-oriented database. SAP presents the first applications in its SAP R/3 system at CeBIT in Hanover, where the response is highly positive. With its client-server concept, uniform graphical interface, dedicated use of relational databases, and support for servers from various manufacturers, SAP is set to tap into new market potential: midsize companies, as well as the branch offices and subsidiaries of larger corporate groups. SAP started working with the world's largest software company of the world Microsoft in 1993 to port SAP R/3 to the Windows NT operating system. In 1996 SAP introduce internet facilities with Microsoft. Through the open interface, customers can connect the online applications to their SAP R/3 system. 2011 was the revolution year for SAP as they introduce SAP HANA in the market. Customer-first got the memory product in the SAP HANA platform enabling them to analyze data in seconds rather than the days or even weeks they would otherwise have needed. In the same year SAP also opens the mobile application for the users that make the software more popular and convenient. SAP introduces Ariba in the year 2013 with the goal to deliver an end-to-end cloud procurement solution and become the leader of the first growing segment of enterprise cloud-based business network.

Finally, in 2015, SAP opens a new generation of business software with some glorious feature, SAP S/4 HANA. This is more advance than any other model and built on the memory platform break down all the limitations before.it designs it is designed on modern design principles with the SAP Fiori user experience (UX) for mobile devices. The initial launch is soon followed by SAP S/4 HANA, which gives customers the opportunity to deploy real hybrid scenarios — combining on-premise and cloud solutions — for unprecedented IT flexibility and accelerated business innovation.

3.8.1.1 SAP S/4 HANA

SAP S/4HANA is the next-generation business suite, that is designed to run simple in the digital economy. SAP S/4 HANA is an ERP business suite that is based on the SAP HANA in-memory database which allows different companies to perform transactions and analyze business data in real-time. It is built on the advanced in-memory platform, SAP S/4HANA, and offers a personalized, consumer-grade user experience with SAP Fiori. Fundamentally it redefined how enterprise software creates value across industries with instant insight. SAP S/4HANA can drive instant value across all types of businesses and industries.

SAP S/4 HANA is also known as the SAP business suite SAP HANA. The meaning of this is, it is the 4[th]version of the SAP business suite. SAP introduced SAP business suite on HANA in the year 2013, HANA based ERP system that included modules for CRM (customers relationship management), SRM (suppliers relationship management), PLM(product life cycle management), and SCM (supply chain management) SAP launched their new version S/4 HANA in February 2015 added a new area that customers will migrate to as the next-generation successor to the SAP business suite ERP platform. SAP S/4 HANA required rethinking the database concepts and rewriting 400 million lines of code. According to SAP, the has made the ERP system easier to understand and use and it becomes more agile for developers. One of the most important things in S/4 HANA is it uses the SAP Fiori UI rather than the traditional SAP

GUI. Usually, SAP Fiori used in the SAP S/4 HANA function. It is simple to access across various devices including desktops, tablets, and mobile phone devices. In the year 2017 SAP introduces a new version of SAP S/4 HANA named S/4 HANA clouds S/4 HANA cloud includes next-generation technology like machine learning through a tool called SAP Clea and a conversational digital assistant bot called co-pilot. In the year 2018, SAP launched its new version S/4 HANA HCM, An on-premises human capital management application. SAP describes S/4 HANA as a sidecar application that runs alongside or is integrated with S/4 HANA, but it is not part of the module. According to SAP, S/4 HANA HCM will be available from 2023 and will be supported through at least 2030. (Devraj Bardhan, 2019). Among all the ERP products SAP has the most market share in the market as well.

3.8.2 Key components of SAP S/4 HANA

1. Sales and distribution (SD).
2. material management (MM).
3. Financial Account (FI).
4. production planning (PP).
5. controlling.
6. warehouse management (WM).
7. Enterprise and asset management

Sales and Distribution (SD): Sales and distribution are important in SAP S/4 HANA and ERP systems. The SD component of SAP S/4 HANA deals with the processes of sales and distribution. It also includes selling products or services to the customers and manages the processes of distributing the service or product to the customers. Sales and distribution components of SAP S/4 HANA also manage the return of the customers. The sales and distribution component deals with the return of the customers and billing of the order as well as the credit issuance. It is possible to track the order in terms of the distribution of the products to the customers. Sales and distribution components also help to make a relationship with the customers and vendor by keeping the master data on the memory. (Bardhan, 2016)

Financial Accounting (FI): The company's financial transaction is usually written on the financial account part in the SAP S/4 HANA. Moreover, the transaction that held between the customers and the vendors also recorded on the financial account. The financial account is also maintaining the receivables from sales, payables for procurement, and cash management as well as bank payment and reconsolidation processes. The company's general ledger also deals with the SAP S/ HANA finance. (Maunil & Parikh Sam, 2019)

Controlling: The Component manages the cost centre accounting, profit centre accounting, profit centre accounting, and internals orders and it also offers financial planning. The product costing feature is also including in controlling in SAP S/4 HANA. It compares the simulated costs actual costs and is primarily intended to help manufacturing organizations. Besides this, by using SAP S/4 HANA Finance accounting and controlling, it is possible to reduce the data redundancy.

Material Management: The materials management components deal with the inventory of the company products. After using the materials in the production, the material management component updates the inventory of the materials. Materials management components also manage the procurement system for the companies. Materials and services procurement can be from local vendors or international suppliers. In inventory management, material management

components in Sap S/4 HANA control the all-goods issuance location to another. By counting the reconciling materials physical inventory is also managed in material management components. Materials management components also handle the vendors' invoice analysis for the hole organizations. SAP material management components also deal with the determination of organizations requirements and then follow by determination of the source of supply, material procurement. it also helps to goods receipt location issue to production lines or cost objects including project cost centre, asset, order, and finally is finished through invoice verifications. SAP material, management component helps to be sure about the inventory of an organization. The SAP material management helps to complete the procurement processes of the company and the business of material management results in cost-effective inventory processes. In a business environment, an organization requires to complete business flow through proving material or services from external vendors or internal procurement. The SAP MM represents basic procurement and special procurement in such cases. (Bardhan, 2016)

Warehouse Management (WM): SAP Wearhouse component is the component of SAP logistics execution system. SAP Wearhouse management is related with the different terms of business. For example

1. Inventory management in randomly organized and fixed vin storage type.
2. Processing all relevant movement and task in the Wearhouse
3. goods receipts form vendors and goods issues to the customers and
4. goods movements in the Wearhouse

- **Production Planning (PP):** The production planning component of SAP is important for a company to create a relation with the supply and demand and increase the production according to the capacity and it also, helps a company to increase the accuracy in sales and distribution. The production planning (PP) component plays an important role to complete the project in time according to the plan of a company. In a word, production planning is the process of maintaining the demand according to the manufacturing capacity to create the production and procurement schedule for finished products and components materials. In SAP production planning is an important component as it maintains and tracking the manufacturing flow.

- **Human Capital Management:** The human capital management component of SAP manages payroll, time management activities such as attendance and leaves, career development, travel, and workplace safety. Functional modules have submodules, which can be implemented if they are required to run the business processes of the company.

3.8.2.1 Sales, Order, billings and return Management in SAP

In order to improve the sales analytics and monitoring, some new enhancement and innovations have been included in the area sales orders billings and return management.

- By using the new functionality and innovation, it become possible to track sales order app to enable users to do the following:
  - execute mass transactions directly from the sales order list generated though the app.
  - navigate from the "search result "list to sales order details .in this section sales order fulfilment details are displayed graphically.

- in this section users can view the orders with the details of issues, and they can directly go to the sales order fulfilment cockpit to resolve this issue.
- reject sales order and the order items from the detailed view from the relevant sales order.
- The workflow approval capabilities for credit memo requests are provided and the users can manage and display the approval workflow credit memo request with an app named inbox approval app.
- For managing sales orders and managing sales order without applying charge enhancement have been made with some new capabilities to perform mass change at the header level.
- In order to managing the incomplete sales orders with the difference in price with the price that customers are expected, including blocking and releasing these incomplete sales order a new SAP Fiori application is available now.
- Enhancement have been made to the manage customer return app, provide support to the users to do the following:
  - return third party products to the suppliers
  - conduct inspections at customers sites and have materials remain at the customer's site.
- In terms of advanced return management, a new feature has included, enabling the followings:
  - processing of service materials, bills of materials and full products in the returns order and material inspections.
  - Entry of additional inspection fields in the return orders and materials inspections. -supports of legal requirements related to the refund of services related to a physical product when products and service have been sold together.
- New features and enhancement for billing and invoicing are work following: -via Microsoft excel functionality of billing documents are uploaded for omni channel convergent billing using the manage billing documents request applications.
- easier scheduling of reoccurring billing documents creation and billing jobs release using rule-based data selection.
- Specify the period for billings, enable user to set the relative rules.
- Enabling the users to the specify variables date rules, for example, to bill all the billing due list documents with a billing date before the first of the month on the fifth of the same month.
- Enhancement to manage billing document application with new functionality to perform billing documents and view what has caused the document spilt. (Bardhan, 2016)

3.8.3 Microsoft Dynamics

Dynamic 365 is cloud base enterprise application software platform that released in November 2016. It is the combination of customer relationship management (CRM), enterprise resource planning (ERP), human capital management (HCM) products with power BI reporting functions in one streamlined, unfilled package. This is the updated version of the ERP system. It was known as Dynamic AX. (Shanahan, 2016)

This solution is working based on Microsoft Azure, a Microsoft cloud computing technology service that has hosted data centres all over the world. this software is possible to access not only on an individual computer also it can be accessed through a web browser.it means that any

kind of update of the software or any kinds of fixes can manage from anyplace or any time with the help of the internet connection on the computers. There are many dynamic 365 applications are based closely on previous dynamic products, these applications are not the replacement for dynamics AX, NVA, GP, SL, or CRM, which will all continue to be available for the foreseeable future. This Microsoft dynamic 365, which is totally different way to license and use the business application. (Addams & Eric, 2018)

3.8.3.1 Feature and apps of Microsoft Dynamic

Customers insights: It has the power BI analytics and visualization, and it has artificial intelligence tools. Microsoft dynamics can analyse the customers' behaviours and it can help to provide the predictive scouring. The combining customer data from Microsoft dynamic 365, from office 365, and from the third-party data sources can be analysed and assist the users to take the actionable insight from this different data.

Customers services: Omnichannel is known as a customer's engagement tool, customer self-service, and tools for support agents. Omnichannel is used for distribution, promotion, and communication. The customer service application is usually designed to give a 360 view of a customer lifecycle, facilizing retention, and case management. It also allows customer service representatives to deliver in a fast and personalized way by guiding them in the right direction with an intelligent process.

Finance and operations: Manufacturing tools for project management, production planning, scheduling, and cost management, warehouse, and inventory controls are included in the financial feature. Besides this, marketing, project service automation, retail, sales, and human recourse are part of the feature of Microsoft dynamic 365. The Finance and operation application unify a company's operations and finances for a better business overview to make fast informed decisions. Dynamic helps business adapts much quicker to changing market demand, enhancing business growth. (Wood, 2018)

Dynamic for Marketing: Dynamic's marketing application is built to maximize lead conversations. Leads, opportunities, contact, and campaigns can all be managed in one place. Report and analytics between the sales and marketing department are available for deep insight, enhancing better campaign planning and execution. (Wood, 2018)

Dynamic for sales: With its digital intelligence and analysis Microsoft Dynamic empowers salespeople that maximize lead conversions. Because of Microsoft Dynamics, the salespeople now can be more engaged with the customers more effectively that helps them to understand their needs. The predictive analysis by Microsoft Dynamic allows the team to stay motivated and close more deals by identifying more opportunities.

Dynamic 365 for Talent: To transform a company's human resources department Microsoft Dynamic built its own talent applications. Hiring the right people and setting them up for success has become easier with a personalized onboarding experience. Retention and growth within a business is another great advantage to create, with continuous learning, personalized career path, and development guideline. (Wood, 2018)

3.8.4 Oracle

Oracle is one of the largest vendors in the enterprise It market and the shorthand name of its flagship product, a relational database management system (RDBMS) that formally calls the Oracle database. This database software sits at the center of many corporate IT environments, supporting a mix of transaction processing, business intelligence, and analytics application. An Oracle database system is a platform with at least one application running on it to access and process the data. In the Oracle database system data is usually stored in the form of tablespaces and physically in the form of data files. The structure that is recommended for the Oracle database is the institute RAC- Real application cluster. Multiple instances, usually on different servers, attach to the central storage array. It offers better performance, scalability, and redundancy for users. This software E-business group is very much capable to integrate different components Seamlessly into a single system for the facility of the usage. Oracle E-business group also allows the user to automate several of the procedures so that information entered is no longer wanted. This upsurges and productiveness. It also removes all faults and ensures the information as a result of information is not lost. Finally, the Oracle software E-business collection is very influential, effective, robust, and instinctive ERP software that can encounter the wants of virtually any industry.

There are many versions of oracle management software. Oracle has divided its different products into different editions to track marketing and sales. Here is the description of various editions of Oracle ERP. Each edition is suitable for development and deployment options for the enterprise. Oracle also offers several database options, packs, and other products that enhance the capabilities of Oracle database edition.

Standard Edition 2: It usually provides the Enterprise level function for middle size organization. Sold through Oracle 400 value Added resellers.

Oracle Database Enterprise Edition: The full suite of performance, scalability, security, and reliability store on either a clustered or single server. Oracle database edition usually provides the performance, availability, scalability, and security that is required for the mission-critical application. For Example, the high-volume online transaction processing applications. This Edition of oracle database can contain all of the components of the Oracle database and it can be further enhanced with the purchase of the option of a different package of the database.

Oracle Database Express Edition: Oracle database express edition is an entry-level edition of Oracle database. It is easy to use, quick to download, very simple to install, and simple to manage. Another advantage is, it is free to develop, deploy, and distribute. In the Oracle database management system, XE can be installed on any size machine with any number of CPUs. Without costly and complex migrations, the Oracle database XE has made it easy to upgrade to the other editions of Oracle. In Oracle database management it is possible to store up to 11 GB of user data, using up to 1 GB of memory, and using only one CPU on the host machine. Support is provided by an online forum. Primarily Oracle database Express edition intended for students to learn about the coding applications for oracle. It is small, free, and has limited capacity.

Oracle Database Personal Edition: The Oracle Database Personal Edition supports single-user development and deployment environments that require full compatibility with oracle database standard edition one, Oracle Database standard edition, and Oracle Database Enterprise Edition. The personal Edition of Oracle database includes all of the components that are included with Enterprise Edition as well as all of the options that are available with

Enterprise Edition, with the exception of the Oracle Real Application cluster option, which cannot be used with personal Edition. In addition, the personal edition of the Oracle database is only available on Windows and Linux platform. The management packs are not including in the Personal Edition of the Oracle database.

Based on the size of an organization there are only three true choices. Of these three, two are for the developers and the other just provides access to database information from a mobile device. Oracle does, however, some other "flavors" to offer as well. Oracle products lines include Peoplesoft, Siebel, JD Edwards, Hyperion, Agile, Auto Vue, and Fusion.

Oracle Business Suites have over more than 140 applications which can be installed in their platform. These include:

- Enterprise performance management
- Business process outsourcing
- Customer relationship management
- Customer self service solutions
- Financial management solutions
- Human capital management
- Procurement
- Project management
- Transportation suite and so on. (Shah, 2018)

3.9   Market of ERP solutions

There are many Enterprise Resource Planning (ERP) products in the market. According to the research of the different organizations, SAP is at the top of the world market. The popularity of ERP products in the world market is increasing over the years as the market increase by 10% in 2018 compared with the previous year. (Tadviser, 2019). The specialist explained the growth in sales of ERP systems with the continuing digital transformation of business in the companies, development by solution SaaS and demand for new versions of products. (Tadviser, 2019).

According to the Gartner Inc research, the largest producer of ERP software is SAP which earned around 7.7 billion USD in the year 2018. In the same year, Oracle earned around 2.33 billion USD that is far away from SAP. The leading three was closed by Workday with ERP revenue in the amount of $2.33 billion at the end of 2018. On the fifth position was Infor which sales in the considered market, it was equal $1.72 billion was located. SAP was in the leading in the different segment on the ERP as well as comparing with other products such as Financial Accounting, Enterprise and Asset Management, Human Capital Management, and in manufacturing and operations. In 2018 revenue from the financial managerial system was 2.98 billion USD for SAP and 1.9 billion USD for Oracle ERP system. Oracle lags behind SAP in all segments. However, in the year 2018 the American corporation concedes also to workday on the sales amount of management systems for human capital: revenues of the companies here at the end of 2018, it was equal 1.9 billion USD and 2.02 billion respectively. (Tadviser, 2019). In addition, the revenue from the Enterprise asset management section was around 2.4 billion USD where the revue of Oracle from the same section was only 0.77 billion USD and 1.64 billion for Infor.

According to the research, SAP was the leader in the ERP software market in the year 2018 and Oracle stands in the second position though for the enterprise management section Infor earn more than Oracle in 2018. (Wilson, 2019). The Revenue from the Human capital management section in SAP was 269 USD billion is almost 2 billion USD more than Oracle in

2018. From manufacturing and operations SAP earned about 17.88 Billion USD in 2018. The popularity of cloud ERP products is in many respects caused by the convenience of their implementation as first, such systems can be tested in combat conditions, without spreading the large amounts for implementation. If to go on the way of local infrastructure, then it is necessary to configure everything independently: buy licenses for server operating system, for the SQL server, for ERP server. Plus, can happen so that it is necessary to update the equipment. All these expenditures are not justified if you need to estimate ERP system work only. The market of schedule systems of resources of the enterprise remains growing, despite uncertainty in a political and economic situation which took place in 2018. According to the confirmation of IDC the growth rate of ERP at the end of the year 2018, but do not disclose dynamics in the free selection to research.

Criteria	SAP	Oracle	Sage	Workday	Infor
Enterprise Asset Management	244	77	0	0	164
Financial Management System	2978	1430	302	1526	499
Human Capital Management	26982	1899	2022	328	132
Manufacturing and Operation	1788	495	195	0	924

Table 1: Market leaders of ERP by revenue in 2018, data of Gartner (Tadviser, 2019)

On the other hand, according to Gartner's research, SAP was at the top in the market share in 2017 as well. Around 22.50% of the total ERP software market was under SAP. Oracle was far from SAP in market share about 12.20% of the total ERP software market share was taken by this American company. Sage had 6.1% of the total ERP software market in the same year where workday and Infor have 5.80% and 5.10 % respectively as well. However, around 52.00% market share was taken by the other software company in the ERP software market in the year 2017. The ERP software market internationally is predicted to drop 148 billion USD in 2018 to 145.2 billing USD in 2020 at a compound annual growth rate of -1.2% (CAGR).

From the report of the panorama, in the year 2016 around 20% of the total ERP market was taken by SAP and followed by Oracle was 13.9% in the world ERP market. The top five ERP software in the world market as SAP, Oracle, Microsoft, Infor, and Epicor and their percentage were 20, 13.9, 9.4, 7.4, and 3.5 accordingly in the year 2016. First place on payback periods of investments into ERP was won by SAP. On the speed of implementation products of Oracle are in the lead, and on costs for implementation, the palm was taken by the NetSuite systems which cost customers on average 2.8% of revenue. IN the research Panorama such advantages of the Infor systems as ample opportunities of use of mobile versions by remote offices and

employees, well-tried and intuitive remedies of the analysis of business data and optimal indicators of time and implementation cost and also an investment payback are also noted.
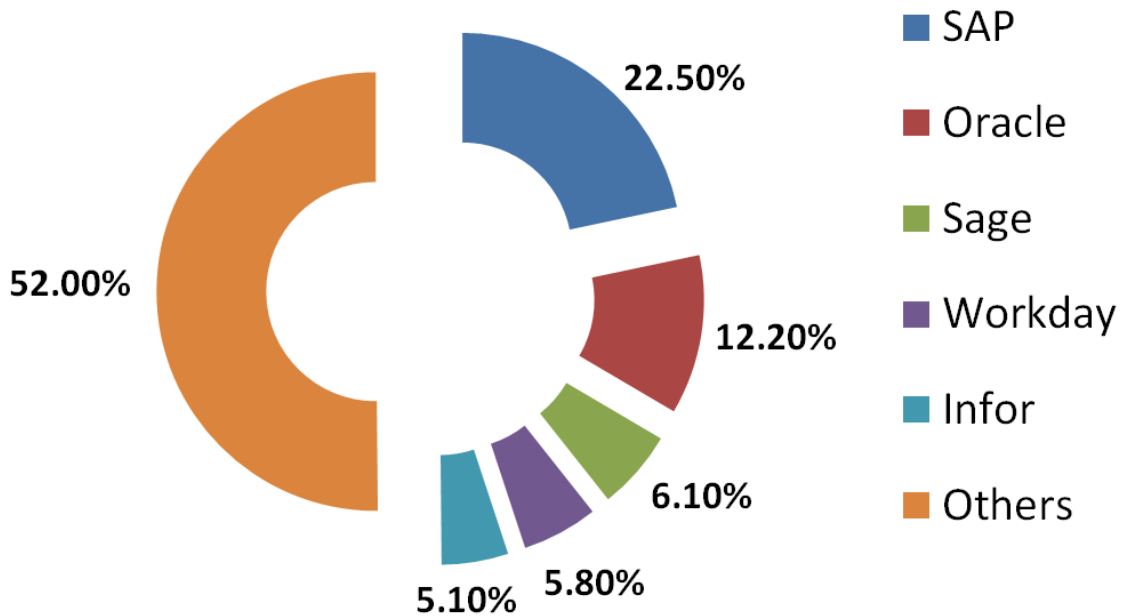
2017 ERP Market Share

Figure 1: ERP Market Share in 2017 (Tadviser, 2019)

Besides this, according to the Panorama report about ERP market for diffrent industries, about 32% of total ERP software are used by the manufacturing industries where 18% of total ERP revenue come from information and technology service. Besides this, 17% of the total market share is in profesional and Financial services. (Panorama, 2019). Furthermore, the market share of ERP in 2019 in public sectors and whole sale and distribution industries was 11% and 6% respectively. The market share of ERP in Retail, Energy and Resources were around 5% where the market share in health care industry were about 3 % in the year 2019 according to the Panorama ERP report 2019. (Panorama, 2019)

4 Practical Part

The main finding of the research is selecting the best ERP software for the Reach Surgical company which is a small or a middle size company willing to implement ERP to extend the business and run their business activity more efficiently and effectively with the help of ERP. Different deployment options have been discussed and choose the best deployment option to formulated for the Reach Surgical company. In addition, different ERP products such as SAP, Oracle JD Edwards, Microsoft Dynamic is listed to choose the suitable one for the Reach Surgical company. Selection of the best ERP for Reach Surgical company has done according to the evaluation of different criteria that is important to consider for the company for implementation of ERP. To come out for the result of choosing the best ERP product for the Reach Surgical company, multiple criteria decision-making analysis (MCDMA) has been applied. The weight of the criteria is selected according to the importance of them for the SMEs and it is selected and evaluated by an expert who as has the experience of working on SAP, Oracle as well as on Microsoft Dynamic. The best deployment option has chosen according to the cost of ownership compared with cloud ERP solution and on-premise ERP software and the optimal ERP software has chosen by evaluating different important criteria that need implementation. Finally, all the finding is recommended for the 'Reach Surgical Inc' to implement the best ERP product and the best deployment option for their company to be more successful in the future. The findings of the study are the answers to the two important questions. The research questions are such as the following:

1. What is the most suitable deployment option of ERP for an SME in medical equipment manufacturing industry?
2. Which is the optimal ERP product for an SME in medical equipment manufacturing industries like Reach Surgical Inc.

4.1.1 Case study of Reach Surgical Inc.

Reach Surgical, Inc, is dedicated to providing advanced medical devices and equipment for surgical procedures, through its product development centers and manufacturing bases in China. Reach surgical Inc is a company that is focused on providing surgical instruments and medical equipment, integrating research and development, production, and sales together. This is a private Limited company. The company was established in 2005. The headquarter of Reach Surgical Inc company is situated in Tianjin, Chania. *'Yuncai Fang'* is handling the responsibility of the CEO in Reach Surgical Inc. This is a healthcare industry providing Research and Development, manufacturing, and medical equipment sales. This is a middle size company that has already earned a lot of reputation in their business is willing to become more advance with the help of technology. There are around 280 workers involve in this company who are working in different sectors in this company. The total revenue of this company is around 33.63 million US dollars in a year. This company started using SAP S/4 HANA and starting to get the better result they used to get before by using other business software in the business. As Reach Surgical is middle size enterprise, this company can be more profitable by using the cloud version of ERP software. (Reach Surgical Inc, n.d.).

4.1.2 Deployment Options of ERP for SMEs

The goal of a business is to earn the largest profit by using the perfect instrument and info structure in the business activities and in the business operation. To receive support and buy-in

of senior executives, the company need to demonstrate how exactly companies modernizing ERP system is positively affected the company's bottom line. From two deployment options to select the best option for a company is depends on the industry, company size, and the number of employees is working in the company as well as some criteria that are related to the business. The important one is quantifying the cost and the return on investment for the ERP. The comparison of the cost associated with moving an on-premise ERP system to cloud for the small and middle-size enterprise including:

- A reduction/reallocation of ERP resources, increased automation and self-service tools.
- The insight granted by new built-in analytics.
- The increased efficiency of individual processes, especially those that may still be spreadsheet-based.
- The cost savings that occur by improving visibility to all ERP processes.
- Better control over budgets, forecasting, and procurement.
- The lower initial price point and ongoing operating expenses (vs. capital expenditures). (Hedges, 2017)

Comparison of cost of ownership for ERP on-premise and ERP cloud solutions for small and middle-size enterprises depends on the number of employees are using the ERP. The total cost of ownership of a company provides a realistic measure of long-term costs for an enterprise to acquire and operate technology solutions. The cost of ownership becomes the top consideration when a business can achieve their same goals by using all the alternative options. By selecting the perfect ERP and organizing all the tools of the company can reduce the cost of business activities for an organization. The total cost of ownership of ERP on-premise and cloud is including:

- The planning and selection process cost
- Infrastructure cost. For Example, cost of hardware, software, and IT support maintenance cost.
- Subscription cost for Cloud ERP
- Implementation cost

4.1.3   Cost comparison of Cloud-based ERP vs On-premise ERP software

Ongoing training cost for the employee to cope them with the update version of the ERP. The data of the graph shows the comparison of the cost of ownership for an On-premise ERP solution and a cloud ERP system. According to the chat, the cost of ownership with the increase in the number of users in the company. If the enterprise has a number of users between two and five, then the cost of ownership is 20,045 USD for an On-premise ERP solution. On the other hand, for could ERP solution cost is much lower. It is about 4980 USD. The cost of ownership increases with the increase in the number of users both in the Cloud ERP system and in the cloud ERP solution. The cost reaches 49,160 USD and 23,544 USD for six to 10 users in terms of On-premise and clouds ERP solutions accordingly. (Hedges, 2017). For the middle-size enterprise that has 50 to 100 users cost 281,300 USD for an On-premise ERP solution and 144,700 USD for a cloud ERP solution. In addition, for 100 to 250 users the average cost of ownership for a cloud ERP solution is 268,467, where the cost for another option is much higher than the cloud and it is 431,00 USD. software. For small companies using On-premise ERP is not cost-friendly comparing with cloud ERP solutions. Research has found that for the four years life span the total cost of ownership of cloud ERP solution is on average 45 percent less

than on-premise ERP solution for a small to medium-size business. The cost advantages remain significant across all deployment sizes but do taper off (slightly) as the number of users rises. (Hale, 2019). The cost of IT infrastructure is the most significant difference between the two models. IT infrastructure costs for cloud ERP are zero because the cloud provider includes this as part of the annual subscription.
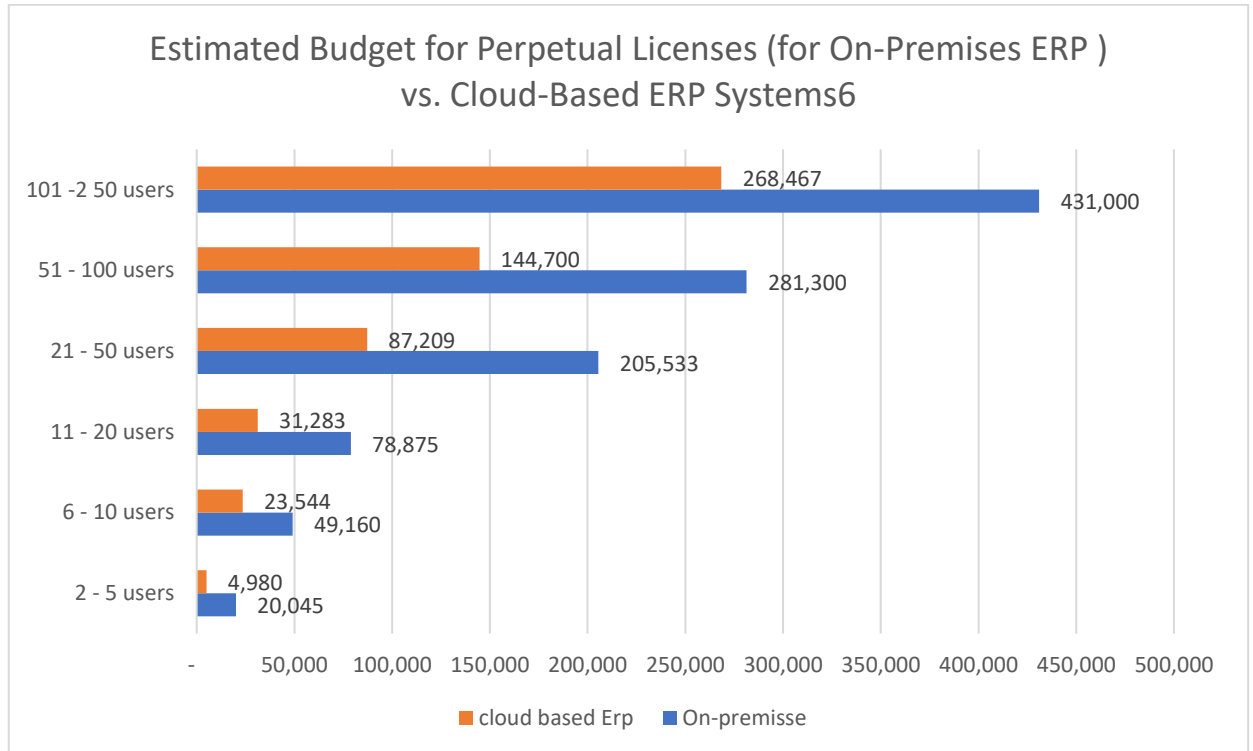
Figure 2: Cost of ERP Software implementation according to deployment options and number of users (Hedges, 2017)

However, infrastructure costs are significant in the on-premises scenarios, accounting (based on deployment size) for approximately $550K to $1.1 million over the course of four years. Delivery of the cloud-based solution is also about 70 percent less expensive than on-premises since cloud software does not need to be deployed on-premises, which eliminates many of the issues that pop up in company-specific data centers. (Hedges, 2017).

4.1.4 Selecting the optimal ERP Product for an SME

Among the various ERP products in the market, SAP, Oracle, and Microsoft dynamic are the most popular as they have a huge share in the ERP market, especially for ERP cloud software services. In Table 2, multiple criteria decision-making analysis has been applied to find the optimal ERP product for small and middle-size enterprises. Some important criteria of SAP, Oracle, and Microsoft Dynamics that are essential to implement ERP for the company is also listed on the table and rated according to the importance to be successful in the business for an organization. For example, in terms of the implementation cost of Microsoft Dynamics has less implementation cost comparing with oracle and SAP according to the review of the Users who has the experience to work with all these ERP products. Users who have the experience to work

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through SAP, Microsoft Dynamic, and Oracle rated SAP at 8 out of 10 for implementation cost purposes where the rating is 6 for Oracle and as Microsoft Dynamic has less cost, it is rated the highest 9 on the same scale. (Synoptek, 2019). In addition, for integration Oracle is the best among the three where SAP is slightly better than Microsoft Dynamics according to the user of these three ERP products.

Criteria	SAP	Oracle	Microsoft Dynamics	Weight
Cost of implementation	8	6	9	0.18
Integration	8.2	9.4	8	0.15
Ease of use	7	9.6	9	0.05
performance	9.8	9.6	9.2	0.20
Reviewed and Recommendation	7.5	9.8	9.4	0.05
Implementation time	9	9.3	8	0.12
Advanced Featured	9.5	7.6	8.8	0.10
Customers supports	9.7	7.7	8	0.15
Total (Weighted)	**8.84**	**8.41**	**8.62**	**1**

Table 2: Selecting the optimal ERP Product for an SME (Pat Reasearch, 2019)

The rating of the experts' review for integration purpose is 9.4 for Oracle however 8.2 and 8 is the rating point SAP and Microsoft Dynamic accordingly. Besides this, SAP also performs better than Oracle and Microsoft Dynamic. In this case, the performance of SAP is better than Microsoft Dynamics and their rating is 9.8, 9.6, and 9.2 respectively as the satisfaction level of the users. SAP is the best for customer supports for the business. However, comparing with Oracle and Microsoft Dynamic users are more satisfied to use SAP for Customers supports management in their daily business operations. The user's ratings of SAP, Oracle, and Microsoft Dynamic rated their satisfaction for customer services 9.7, 7.7, and 8 accordingly. According to the reviewer who have expressed their opinion through the website about SAP, Oracle, and Microsoft. (Synoptek, 2019) The features of SAP are more advanced than Oracle and Microsoft Dynamic.

In addition, for advanced featuring issues, the user rated SAP 9.5 where the rating for Microsoft Dynamic is 8.8 and for Oracle is 7.6. Oracle and Microsoft Dynamic both are Easy to use and simple to operate for the users comparing with SAP. In SAP, there are so many functionalities and features that make it comparably hard to learn. As a result, the user's rate SAP at 7 and they rated Oracle and Microsoft Dynamics at 9, and the ratings for Oracle are 9.6. The users rated SAP by 7.5 for review and recommendation where the ratings are 9.8 and 9.4 for oracle and Microsoft Dynamic accordingly. Compering with SAP and Oracle, Microsoft Dynamic takes more time for implementation where Oracle has the shortest period to implement among this ERP software. All the criteria do not have the same importance for the organizations. The importance of different features depends on the activities of the firm. As a result, according to differences in the industry, the importance of criteria also be different. Here,

the rating of the ERP software has collected from the website where the experts about SAP, Microsoft Dynamic, and oracle expressed their opinion by adding the ratings for the software.

4.1.5 Multicriteria Decision Making

Multicriteria decision-making analysis is a very important tool that can apply to find out the solution to many complex problems. This method usually applies to find out the best solution or find the best option among several alternatives.(Valipour & Khalil, 2015)Multi-criteria decision making means the process of determining the best feasible solution according to established criteria and problems that are difficult to solve in normal equation (Hedges, 2017). To find the best ERP product Multi-criteria Decision-making Analysis has applied. Weight has added according to the importance of the criteria in Table 2. The importance is according to the highest rating point from 0 to 1. The higher weight means the higher importance of the criteria. In addition, different criteria of ERP product are also rated according to their importance value and usefulness from 1 to 10 where the higher rate indicates the best option and the lower rate indicate the comparably less suitable option to choose for company. The rating has multiplied by the weight for every ERP product. After multiplying then the result has added differently for SAP, Oracle, and Microsoft Dynamics. The highest weight total is considered as the best ERP product for SMEs.

4.1.6 Selection of best ERP Products for SMEs

Among the lots of ERP products in the market for the business especially for small and middle-size enterprise, SAP, Oracle, and Microsoft Dynamics are the most suitable for the business the operation for Financial accounting, Sales and Distribution, Asset Management, Human Resource Management, Customer Relationship Management, and many other modules. In Table 2 different criteria and their ratings of usefulness have compared according to the review of the users of this software. Multi-criteria decision-making analysis has applied to find the optimal product for SMEs. The importance of the criteria depends on the activities of the firm. As a result, some industries have more importance of Financial accounting activities whereas some industry gives the more priority to Wearhouse and material management, some industries need the production planning and project management module comparing with others. In Table 2, the ratings were added by the expert who has the experience to work through SAP, Oracle, and Microsoft Dynamics for three ERP products according to their importance of different criteria. The weight for the cost of implementation is 0.18 which means implementation cost is one of the most important factors that a company or an organization considers in their business. All ratings of the selected criteria of SAP, Oracle, and Microsoft Dynamic was multiplied by their weight to find the weighted total of competitive advantage. The ratings of all other criteria also were multiplied by their weight. For example, the weight of performance is 0.20. This weight was multiplied by the SAP ratting (9.8*0.20), by the Oracle ratting (9.6*0.20), and by the Microsoft Dynamic rating (9.2*0.20). All the criteria were multiplied by their weight accordingly for Integration, Ease of use, Reviewed and Recommendation, implementation time, Advanced Features, and for the Customers Support. After multiplying every criterion by their importance, the result of multiplication was added to find the optimal ERP solution for Reach Surgical Inc. The weighted total has calculated according to the multicriteria decision-making analysis. The weighted total for SAP is 8.84 is the highest among the three ERP software. Besides this, the weighted total for Oracle is 8.41 and for Microsoft Dynamic the weighted is 8.62.

4.1.7 Saaty's matrix

Saat's matrix is the method that can be defined as a method of normalized arithmetic averages. This method is impactful to find the optimal solution by calculating the weight. The prepared pairwise comparison matrix is normalized. As a result of the normalization, matrix A= [a ij] is transformed into matrix B = [b ij]. (Hengjie Zhang, 2016). The easiest and most intuitive way of weights assessment in the pairwise comparison matrix is the use of various scoring scales. It can be undertaken in a comparison matrix telling which one of two criteria is more important than the other and to what extent is it preferred before the other. Saaty defined a pairwise comparison matrix in which, using the scale of the comparison of criteria can be done. The matrix itself must be reciprocal and the preference consistency must hold. (Hlavatý, 2014). This method is the pairwise comparison of different factors. It defines the competitive advantage or disadvantage of two or many factors that can illustrate how big or how important one factor is comparing with others. For instance, someone has two phones. The price of the first one is 200 USD and the second one is 400 USD. Comparing the cost of 2 phones 2ndphone is 2 times costly than the first one. As a result, if someone thinks about the cost the weight must be double with a comparison of the first one. This is the implementation of Saaty's matrix.

4.1.8 Define the weight applying Saaty's matrix

In Table 3 the weight of the criteria of SAP, Oracle, and Microsoft Dynamic has defined by applying Saaty's matrix analysis. This is the pairwise comparison of Saaty's matrix. All the weight has calculated by defining the importance of the criteria that have selected by an expert who has the experience to work in SAP Oracle and Microsoft Dynamic. This scale of impotence is also indicating that how which criteria are most important to the company to implement ERP in their company. According to Table 3, the most important factor to implement ERP in Reach Surgical is the performance of the ERP software. As a result, the criteria performance has selected in the number. On the other hand, the implementation has the importance 2 indicate that the performance of the software is 2 times more important than the cost of implementation to the company to implement ERP software in Reach Surgical Inc. The pairwise comparison is the method in which every criterion has to normalize by dividing every importance by a selected value. First of all, in the 3rd row, every value of the 2nd row has divided by the importance of cost of implementation that means the criteria performance is has divided by 2 (1/2). This calculation illustrated that the criteria performance is 2 times important than cost. Besides this, the cost of implementation is (3/2) times important than customer support, (4/2) times important than integration, (5/2) times important than implementation time, (6/2) times important than Advance feature, (7/2) important than Reviewed and recommendation, and (8/2) times important than ease of use. This is called the normalization of the criteria. Similarly, in the 4th, 5th, 6th, 7th, 8th, and 9th row have to divide the value of every column by 3,4,5,6,7, and 8 accordingly to complete the normalization process in the whole table. After completing the normalization, the weight of the criteria has to calculate by applying the formula.

To find the weight for every criterion, one column has to choose for calculation. First of all, the value of the column has to add and then every value of each column has to divide by the total sum of the column. For example, adding all the values of column nine. It will be, (8 + 4 + 8/3 + 2 + 8/5 + 4/3 + 8/7 + 1) = 21.74. Now the value of every column has divided by this number to get the weight of the criteria. For instance, the weight of criteria performance is (8/21.74) = 0.37, for cost of implementation is (4/21.74) = 0.18, for customers support is {(8/3)/21.74} = 0.12, for integration is (2/21.74) = 0.09, for implementation time is {(8/5)/21.74} = 0.07, for advanced features is {(4/3)/21.74} = 0.06, for reviewed and recommendation is {(8/7)/21.74}

= 0.5, and for the criteria ease of use is (1/21.74) = 0.05. According to the importance of the criteria that have selected by the expert and applying the Saaty's matrix analysis the weight for the criteria, performance is 0.37, for the criteria implementation cost the weight is 0.18, for the criteria customers support the weight is 0.12, for the criteria integration, the weight is 0.09.

Criteria	perform ance	Implement ation Cost	Customers supports	Integrat ion	Impleme nt time	Advanced Feature	Review	Ease of use	weight
Performanc e	1	2	3	4	5	6	7	8	0.37
Implementa tion Cost	1/2	1	3/2	2/1	5/2	3/1	7/2	4/1	0.18
Customers supports	1/3	2/3	1	4/3	5/3	2/1	7/3	8/3	0.12
Integration	1/4	1/2	3/4	1	5/4	3/2	7/4	2/1	0.09
Implement time	1/5	2/5	3/5	4/5	1	6/5	7/5	8/5	0.07
Advanced Feature	1/6	1/3	1/2	2/3	5/6	1	7/6	4/3	0.06
Review	1/7	2/7	3/7	4/7	5/7	6/7	1	8/7	0.05
Ease of use	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	0.05

Table 3 : define the weight applying Saaty's matrix, source: own. (Hlavatý, 2014)

For the criteria implementation time, the weight is 0.07, for the criteria advanced features the weight is o.06, for the reviewed and Recommendation the weight is 0.05, and for the criteria ease of use the weight is 0.5. The optimal ERP software must find by using this weight in the Table2.

4.1.9   Selection of optimal ERP software applying the weight of Saaty's matrix

The weight that has calculated in Table 3 by applying Satya's matrix has added in Table 4 to find the optimal ERP software for Reach Surgical Inc. Besides this, the value of every criterion for each ERP software like SAP, Oracle, and Microsoft Dynamics has added according to the review of the users who has the experience to work in SAP, Oracle, and Microsoft Dynamics. The scale of rating is from 1 to 10 where 1 indicates the worse and 10 indicate the best choice comparing with SAP, Oracle, and Microsoft Dynamics. In terms of cost, the rating for SAP is 8, for Oracle is Microsoft Dynamics is 9.

Criteria	SAP	Oracle	Microsoft Dynamics	Weight
Cost of implementation	8	6	9	0.18
Integration	8.2	9.4	8	0.09
Ease of use	7	9.6	9	0.05
performance	9.8	9.6	9.2	0.37
Reviewed and Recommendation	7.5	9.8	9.4	0.05
Implementation time	9	9.3	8	0.07
Advanced Featured	9.5	7.6	8.8	0.06
Customers supports	9.7	7.7	8	0.12
Total (Weighted)	**8.89**	**8.48**	**8.71**	**1**

Table 4: Selection of optimal ERP software applying the weight of Saaty's matrix, (Pat Reasearch, 2019)

The rating 9 for Microsoft Dynamics is the highest among SAP, Microsoft Dynamic and Oracle illustrate that Microsoft Dynamics is the cost friendly among these ERP software and the rating 8 for SAP for the same criteria illustrate that the cost of implementation of SAP is more than Microsoft Dynamic but less than Oracle which has rating point 6. The calculation of finding weighted total is the sum product of each ERP software and the weight of the related criteria. For example, the weighted total of SAP is the sum product of rating of criteria of SAP and the weight of the related criteria of. This is called the multicriteria decision making analysis method of finding the optimal solution from several alternatives. The weighted total of SAP is $(8*0.18) + (8.2*0.09) + (7*0.05) + (9.8*0.37) + (7.5*0.05) + (9*0.07) + (9.5*0.06) + (9.7*0.12) = 8.89$, the weighted total of Oracle is $(6*0.18) + (9.4*0.09) + (9.6*0.05) + (9.6*0.37) + (9.8*0.05) + (9.3*0.07) + (7.6*0.06) + (7.7*0.12) = 8.48$, the weighted total of Microsoft Dynamics is $(9*0.18) + (8*0.09) + (9*0.05) + (9.2*0.37) + (9.4*0.05) + (8*0.07) + (8.8*0.06) + (8*0.12) = 8.71$. According to the calculation of the criteria and their weight that has collected from Saaty's matrix, the weighted total of SAP is 8.89, the weighted total for Oracle is 8.48 and the weighted total for Microsoft Dynamics is 8.71. As a result, the optimal ERP software is SAP for Reach Surgical Inc as it has the highest weighted total among SAP, Oracle and Microsoft Dynamics. It also illustrates that; the weighted total of Microsoft Dynamic is 8.71 and the weighted total for Oracle is 8.48. As weighted total of Microsoft Dynamic is greater than Oracle, Microsoft is more suitable than Oracle to implement in Reach Surgical Inc, but SAP is the optimal ERP software to implement In Reach surgical.

5 Results and Discussion

5.1 Results of the study

Finally, according to the calculation of multicriteria decision making analysis in Table 2 and by using the weight of Saaty's matrix in Table 4, it can be concluded that SAP is the optimal ERP software to implement in a small-sized organization like Reach Surgical Inc, has the highest weighted total among all the alternatives both in Table 2 and Table 4. Besides this, from figure 2, it can conclude that cloud-based ERP software is the suitable deployment option for small and middle-size enterprises like Reach Surgical Inc. From the result of the multi-criteria decision-making analysis in Table 2, the weighted average for SAP is 8.84 which is the highest among the three alternatives. The weighted average for Oracle JD Edwards is 8.41 which has the lowest weighted average among the three ERP software. Comparing with other options Microsoft Dynamic has the 2nd best-weighted average that is 8.62 means that if Reach Surgical Ing implements Microsoft Dynamic for their business operation will get less advantage than SAP but will get better facilities than Microsoft Dynamics. On the Other hand, by adding the weight of Saaty's matrix from Table 3 to Table 4 and then applying the multicriteria decision making analysis in Table 4, the highest weighted total has found on SAP is 8.89, and the weighted total of Microsoft Dynamic is 8.71 that is the second-highest among three ERP software where the weighted total for Oracle is 8.48 in Table 4. Describing in different aspects and circumstances, SAP is the optimal product for a small and middle-size enterprise and SAP is the optimal ERP software that Reaches The surgical company can implement to advance their business to cope with the modern business world. In addition, another important finding of this case study is choosing the best deployment option for the small and middle-size organization. The best deployment option for Reach Surgical Ing is the cloud ERP software because of the lower costs. According to the research, the cost of ownership varies according to the number of users of the organization. The number of employees works in Reach Surgical Ing is 280. As a result, to implement ERP on-premise software cost of ownership will be around 431,000 USD in financial a year. On the other hand, the total cost of Ownership for cloud-based ERP is 268467 USD (Hedges, software Advice, 2017)in a financial year to operate the business activities in Reach Surgical Inc. Finally, as the weighted average in the multi-criteria decision-making analysis for SAP is 8.84 is the highest as well as according to the Saaty's matrix analysis the weighted total for SAP is 8.89 that is the highest among SAP, Microsoft Dynamics, and Oracle, SAP is the best ERP product for Reach Surgical company and Cloud ERP software is the best deployment option for the company because cloud ERP software is cost-friendly for the Reach Surgical Ing comparing with On-premise ERP software. By using SAP cloud service in Reach Surgical Ing, financial growth can increase.

5.2 SWOT Analysis of SAP ERP for Reach Surgical Inc

SWOT is a vital strategic planning tool which usually used by managers to do a situational analysis of a firm to identifying and comparing different issues with the competitor of the firm. It is a powerful technique to evaluate the present strengths (S), weakness (W), Opportunities (O), and Threats (T) that the Firm is facing in the current environment of the business. (SAP SWOT Analysis / Matrix, n.d.). SAP is one of the leading ERP software in the world ERP Market. Reach surgical Inc is recommended to implement SAP for their business operation. The Strength, Weakness, Opportunities, and the Threat of implementation of SAP in Reach Surgical Inc is discussing on the below:

5.2.1 Strengths

- SAP's low-cost structure helps it to produce at a low cost and sell its products at low cost to customers that is a big advantage for Reach Surgical to get the SAP service at a reasonable price.
- According to the number of users in Reach surgical Inc, cloud ERP software is the best option for the company and SAP provides the cloud service with a great efficiency that helps Reach Surgical to reduce the cost of ownership by using the cloud-based service of SAP.
- SAP has invested a huge amount in research and development that will bring advanced features and functionality to the customers. The invention of advanced features and functionality may help Reach surgical Inc to grow fast and make the business activities faster, efficient, and easier for the users of Reach Surgical Inc.
- SAP has a well-established IT system that ensures efficiency in its internal and external operations and the cloud software that will help Reach Surgical company to choose their suitable package that the company extremely needs. SAP offers both On-premise and Cloud ERP solution for its customers.
  SAP's product has a frame of maintaining quality service for the customers. This a great advance of SAP and as a customer for Reach Surgical as well.

5.2.2 Weakness

- High turnover of the employee can be the cause of the high spending of a new employee for training. That will be the effect on the cost of service, and it is a matter of concern for Reach Surgical Inc to affect the price of service and increase the cost for Reach Surgical Inc.
- SAP needs more time to implement compared with other ERP software is a great concern for Reach Surgical Inc. (Williamson, 2018) to implement SAP for business operations. It also takes a long time to get back on the investment. As result, the investment in other sectors can be hampered due to a long return on investment time.
- SAP spent less than their competitors for quality control of their service. It can be a threat to Reach Surgical Inc. without quality and efficient service of cloud service of SAP Reach Surgical will find it hard to operate the business activities efficiently.

5.2.3 Opportunities

- SAP offers both On-premise and Cloud ERP solution for its customers (SAP SWOT & PESTLE Analysis, 2020). As of now, Reach Surgical has 280 employees and the company needs cloud base ERP solution. However, when the company will grow and need to expand the functionality, easily can implement On-premise and they do not have to face any problem to train the employees. That will save the cost to train the users to use the new system.

- The number of E-commerce business is increasing all over the world. Online sales are increasing over time.
- Technological development all over the world comes out with tremendous benefits for the business world because it reduces the cost of operation. That is impacts both Reach Surgical to be more cost-friendly in near future. (Williamson, 2018).
- By using the project management module through SAP, Reach surgical Inc can successfully complete their project.

- For maintaining the customer relationship SAP has an advanced customer relationship management module (CRM) that can help Reach Surgical to provide better customer service and increase the customer satisfaction of the company.

5.2.4 Threats

- SAP's current structure and culture have resulted in the failure of various mergers aimed at vertical integration. About 36% ERP are failed to implement. (Panorama, 2016 REPORT ON ERP SYSTEMS AND, 2016) The failure of implementation can be a big threat for Reach surgical Inc in the future.

- The technological development of a few competitors can be a threat for Reach Surgical Inc. If the customers of Rach Surgical Ing use another ERP product rather than SAP, it will be difficult to customize business with customers and the business partners.
- As technology is come out with different surprise invention, subsequent products can be available at low cost and more advanced facilities. If Reach Surgical implements the SAP will be difficult to compete with the competitors in the business market who will provide better service at a low cost.
- As SAP is continuously advanced its functionality, it needs training and needs to spend more money to hire a skilled employee to adapt to the new system. It is a matter of the extra cost of the company to continuously spend money on training.

5.3 Discussion and recommendations

According to this case study, the optimal ERP product for Reach Surgical Ing is SAP because in both analyses in Table 2 and in Table 4 the weighted total for SAP was the highest that indicates that SAP is the optimal ERP solution for Reach Surgical Inc. Besides this, the best deployment option is cloud ERP software because Reach Surgical is a middle size manufacturing organization. As Reach Surgical is a medical Equipment producing company, the company can increase the efficiency of their production by using the cloud version of SAP software. By using SAP, they can make the proper use of their workforce that will be the cause of a huge impact on the production. In addition, SAP will improve management performance and accuracy as well. When the company will implement the cloud version of SAP software it can control its cost for the management, inventory, warehouse, human capital management, and asset management and can increase the revenue to income ratio. Furthermore, SAP is the most popular software in the market now. It occupied more than 22% market share in the world ERP software market. (Tadviser, 2019)

The companies that have already implemented the SAP software for sales and distribution, financial accounting management, sales order management will be more interested to make the business relations with the Reach Surgical company so that vendors or the customers can easily complete their business transaction between them which will reduce the complexity of account payable and receivable, processing orders, invoice issuing, and many business processes among the company, customers, and vendors. Implementation of SAP in this company will play an important role in the company to increase the revenue because the company will be connected in the global market more actively by the implementation of SAP. Besides this, using the customer relationship management module in SAP can save the customers data and their needs that help the company to analyses previous customer data to make proper forecasting of sales, revenue, expenditure, and the profit that will give a clear view about the financial position and goal of the company that will motivate the investors to invest

more in the company when it will the public in the share market. In addition, for the middle size company like Reach Surgical maintaining the huge data center, IT infrastructure, and developing the process will be very difficult and expensive because the cost of ownership for around 280 users are 431000 USD for On-premise ERP software where the cost of Ownership in cloud-based software is 268467 USD for the same number of users. Furthermore, it is estimated that the cost of cloud ERP software is around 15% less than On-premise ERP software and the time of implementation of cloud-based ERP has decreased from 70% to 50% that is a big advantage for small and middle-size enterprises (AlBar & Rakibul, 2017).

Thus, using cloud software is the best option for the company. As a result, the company can use a package of ERP service according to their needs and number of users. With the passing of time, when the company will expand and added different departments on their business need different new feature can be easily connected with a new module and they do not have to spend money to develop a new system to support their business needs. For example, if Reach Surgical company starts working on a different project, they would need to implement the planning and project management module. If they use on-premise ERP software it will be costly to develop new features in the future however the company can easily use it from cloud service. As the most important factors of implementation of the ERP software is cost. Comparing with other ERP software the implementation cost of SAP is lower. Not only in cost perspective but also if you think about the advanced feature for manufacturing industries, SAP is better than Oracle JD Edwards and better than Microsoft dynamic. Oracle is a good choice for Human Resource management, but SAP goes the extra mile here. (O'Shaughnessy, 2020). SAP has the key performance indicator that is used to calculating the performance of the employee that surely increases the efficiency and productivity of the employee. For the procure-to-pay process SAP done a better job than Microsoft Dynamics and Oracle which is very important for the company. Finally, Reach surgical Ing definitely needs to implement SAP rather than implementing Oracle and Microsoft Dynamic because by using SAP this company can get a better return on investment, can advance their business operation that will help the company to increase the revenue, profit, and net income in the future. Using KPI can evaluate the performance of each employee to reward the best employee and take control of the people who are not doing well.

6 Conclusion

The main objective of the thesis was to find the optimal ERP software comparing various ERP system for a selected small and middle-size enterprise as well as to find the most suitable deployment option for the same company. The company is Reach Surgical which is a medical equipment manufacturing company that has around 280 employees. According to the case study, the suitable deployment option for this company is ERP cloud-based software because this is a middle size Enterprise. For a small number of users, cloud-based ERP is cost-effective and more suitable to maintain easily. In addition, after comparing SAP, Oracle, and Microsoft Dynamic according to the various important criteria that are essential for the company, SAP has considered the optimal ERP software that Reach Surgical should implement to Extend their profit and to extend their business in the future. Multi-criteria decision-making analysis has applied to find the optimal software that is suitable for Reach Surgical Inc.

The optimal product was chosen from the three leading ERP software SAP, Microsoft Dynamic, and Oracle. The comparison has conducted according to a review of the users who has the experience to work in every software. Rating is from 1 to 10 and the higher rating indicates better. Every ERP software has an individual's importance in different sectors of the company and for different industries. SAP is less expensive comparing with Oracle and Microsoft Dynamics and for Reach Surgical Ing cost is a very important factor to consider.

Users are using cloud ERP software because it is easy to customize, cost-effective, easy to maintain, and do not have to invest in hiring experts for maintaining the data infrastructure. As the middle size enterprise has small revenue, limited users, and limited resources, it is hard to invest money for research and development for the middle size macro enterprise. On the other hand, without updating the system with the changing world, it is not possible to be successful in the business. As result, the cloud is suitable for small and middle-size enterprises. When the company will grow, need to expand the business operation, the firm can then implement their own database and data infrastructure. Besides this, SAP has a memory database system that helps them to save the customer data for a long time and can use it in the future to forecast the revenue for the company that will help the small company to set the goal. Customer data also help the companies to increase the sales by analyzing the customer's needs, their interest by using SAP. By using SAP can update about a new product, discount rate to the customer that will play a vital role increase the sales for the companies.

Finally, it can be concluded that after analysing the different perspectives of the business and the business environment it can be recommended to Reach Surgical Inc and other new small and middle-size enterprises to implement the SAP cloud-based ERP solution for their business in order to improve company profitability and growth. Later in the future, the company can implement a hybrid combination of SAP on-premise ERP software with the cloud to be more independent in the business.

There is some limitation of the research. Because of the limitation of data accessibility of SAP, Oracle, and Microsoft Dynamic, it was not possible to include the estimate of the actual cost of implementation for each ERP software. Further interesting research direction would be the impacts of an ERP implementation on sales and logistics performance of an SME with growth potential and internationalization plans.

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