The Web-Based ERP Systems vs Offline ERP Systems of SMEs: A Review

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1. Introduction
From the beginning of 90s, the larger organisations are implemented the novel software system called Enterprise Resource Planning (ERP). It is expensive, complex and proprietary systems force the organisation to rebuild their structure (made proper data flow of the organisation). Later it has gained more attention in recent days due to technological advantages specifically the online ERP growth was increasing in all fields which make the organisation as high profitable, increased business capability, produce positive outcomes [1]–[5] and enhanced streamline process in overall business operations [6], [7]. It is applied for various business functions especially in making integration with business management and administrative functions include accounts payable, human resources, student system, finance and purchasing [8]. In addition to this, organisations applied this software in Customer Relationship Management (CRM) and Supply-Chain Management (SCM) to become more competitive. Earlier, offline ERP has been widely among the industrialists including small scale units, but due to recent penetration of Web based ERP, scholars have questioned on its effectiveness (strength and weakness) in comparison to offline. Therefore, the present review attempted to shed light on this aspect by exploring the strength and weakness of both ERP implementations in terms of reviewing the various previous research articles through different academia databases. Further this review also attempts to identify the critical success factors that influence the effectiveness on the basis of SMEs performance in comparison with both web based and offline ERP system (here in both offline and online has been used interchangeably).

2. Background of the Study
In Small and Medium Enterprises (SMEs) are the largest portion of each economy [9], [10] their importance and number of SMEs are increased in past few decades. In this sector, the chief factor is the number of employees has only below 100; on the other hand, medium sized enterprises have above 100 employees. Beyond their nature, the resources of SMEs are limited include budget, training, high skills etc. Hence, any solution must be consistent with their limitations, for instance, owing to designing the business processes and lack of knowledge among employees is a difficult task for the reason is most of them are adaptable with large enterprises, therefore it is necessary to choose a smaller scale method to Business Process Modeling (BPM) in SMEs [11].

Additionally, the major issue facing by SMEs is to obtain the goals of the business in such inflexible environment [12]. Apart from, ERP has been broadly applied in all industries as a general software to help the most business functionalities [13]. Thus, in comparison with large enterprises, ERP in SMEs is a novel process though facing substantial challenges in terms of low level of expert staff and budget. The implementation of ERP in SMEs is specified in two ways, offline and online ERP. Offline ERP consists of the ERP systems used offlinely in inside the organisation, ERP executed in the firm premises, the packages and servers. All the software’s are loaded on the computers in instore and the maintenance are also done in inside the company. The enterprise itself taking the responsibility of overall maintenance. On the other hand, web based ERP is different, this ERP software has been handled in anywhere and it was completely maintained by handler, easy execution process, rapid changes are possible. However, the implementation in offline method takes less time than web-based method. Hence, the present study reviews in this aspect of analyzing the strength and weakness of both online and offline ERP implementations which would enable SMEs to choose best ERP tool for their organization.
On the other hand, in India, the ERP software market predicted to grow at a $41.69 billion by 2020 [14] The medium-size business ERP market expected grow at Compound Annual Growth Rate (CAGR) of 19.4 percent from 2015 to 2020 [15]. Not only SMEs, but also some other Indian companies have adopted ERP practices namely, HLL, ONGC, ESSAR, Godrej Soaps, Rallis India, Sony India Private Limited, Kirloskar, Glaxco and others [16] Some of the educational institutions (For instance, Bharathidasan Institute of Management (BIM)) are also implement ERP system [17]. This shows that ERP systems are used not only industries but also in higher learning institutions. They argue that ERP software must address all the enterprise needs of an organization within the social context in which the enterprise operates which includes the local accounting practices, customs, sales tax and income tax. As per Frost and Sullivan [18], it has been found that due to rising competitive pressure many Indian companies specifically SMEs are looking forward to equip themselves with modern business processes like ERP solutions that can further provide unlimited access to information and enable them to compete effectively. This implementation of ERP in all sectors was influenced by some of the critical success factors. Factors that are influencing the effectiveness of ERP on the basis of firm performance in India such as higher Return On Investment (ROI), rapid industrialization and ease of integration with legacy systems [19]. Hence the main goal of this review is to evaluate the factors that influence the effectiveness on the basis of firm performance in comparison with both web based and offline ERP system.

The structure of this paper is as follows: section 3 introduces the concept of ERP, followed by conceptual difference between web-based and Offline ERP system while section 4 of this article critically analyses the strength, opportunities, weakness and threats associated with the ERP systems in both web-based and offline ERP. Section 4 focus on research methodology and section 5 reviews the previous studies with respect to critical success factors of ERP implementation and further reviewed both web-based and offline ERP, next section focusses on relationship between competitive advantage and ERP specifically in SME’s of both developed and developing countries with specific to India. Section 6 of this review identifies research gap based on the review and section 7 concludes the review and finally ends with future work.

3. Enterprise Resource Planning (ERP)
In the competitive business community, the ERP system is the aspirations which provide integration between external application and internal information system. Thus, according to Xu and Yeh [20], ERP systems are the integration of best business practices and advanced technologies. Later, Jalal [21] defined ERP systems as the business solutions management application, which integrates set of applications used by the companies to compile, maintain and process data from various business entities. However, Al-Mobaideen [22] defined ERP as regulatory systems, which combines set of software applications that offers administrative procedures in areas of logistics, production, commerce, controls, purchasing, accounts, marketing, sales, etc... ERP system assists various integrated areas of the company to contribute information and expertise, reducing cost benefits and to improvise the managerial activity [23]. In addition, these ERP system standardizes the business and producing processes, as it uses real time information [24], [25].

3.1. A Conceptual Difference: Web-based and Offline ERP
Majority of the information communication technology (ICT) used ERP as their backbone, however, due to high costs of implementation and licensing, a high degree of uncertainty has been observed among the users [25], both in offline and online systems. Leyh [26] stated that there are many distinct ERP systems in the current industry that includes SAP, Oracle EBS, Sage, Microsoft Dynamics and similar. Currently, there are various open source ERP applications accessible on the web. These applications are usually developed for small to medium-size companies, which often contend with regular ERP systems like Microsoft Dynamics due to their exceptional lower prices. However, not only SMEs used these solutions for also larger industries from the various economies adopted ERP solutions in their company [27]. Implementation of such applications has replaced the legacy old systems for the cause of meeting the ever dynamic business situations [28], [29].
Many large and small-medium scale process industries in both developed and developing economies have invested in ERP systems [27]. The adoption of such systems replaces outdated legacy systems in order to meet the ever-changing business environment [28], [29]. Moreover, the comparison of offline and online proved that ERP offers numerous revolutionary benefits, which drastically enhances the firm’s value creation ability than the former. These benefits include cost-effective and time consuming methods, which allows faster time to market, and great opportunities for creating new sources of value [30].

Thus, the shifting trends of ERP system it is evident that both offline and online has overlapping benefits and disadvantages, which is discussed in the below section.

4. Research Methodology
4.1. Client Requirements
The understanding the concept of web based and offline ERP system as well as effectiveness of ERP implementation among SMEs, the present study adopted the secondary data collection method. The reason for chosen this method it’s difficult to made quantitative and qualitative survey. Quantitative research involves estimating and examining the data which is helpful to measure the relationship between the variables. However, it needs a huge number of sample and expensive one. While qualitative research involves direct observation via interview and time taking process. Both these methods are not suitable to our research. Hence researcher used secondary data collection methods due to understand various advantages. Secondary method involves time saving, save expenses and efforts and also enhances the understanding of the problem. In the secondary method, various secondary sources like text books, magazine, peer journals and also academic databases include Emerald, Springer, Elsevier, PROQUEST, EBSCO and other indexed journals with the following keyword strategies such as ‘ERP Implementation’, ‘Online ERP system’, ‘Offline ERP system’ ‘Critical success factors’. Hence study used the review articles from 1998 to 2015, as it allowed identifying the offline and current ERP system prevailing in the SMEs. The articles have been collected from the year of 1998 is mainly the development of ERP has started in the year and moreover the implementation of ERP started from the 19th century.

5. Review of Empirical Studies
5.1. Benefits and Weakness of ERP (Web based Vs Offline ERP)
There are multiple studies that focus on the benefits of offline and web based ERP system. The present study views the benefits and weakness of web-based and offline ERP.

ERP in general has been widely applied in all sectors. Specifically, web-based ERP system was large number of benefits to the organisations include cost-efficiency, scalability, flexibility, remote data access and establishment of a novel customer driven association with the ERP vendor [31]–[34]. However, it has weakness to be used in organisations include customizability, cost and security [35], [36]. Likewise, offline ERP system had major benefits as this type of ERP does not rely on internet source, hence it is accessible at all times for the reason it is stored in computers. On the other hand, users can share their files or have the option to save the file on servers directly so that anyone can have the accessibility to use in offline. In addition, open their files in their own version of software track any changes or edit the latest updated files. All the saved files have stored in external hard disk due to avoid risk of losing all the information.

In general, this system supports to reduce the disparate within firm or between the firms [1]–[5], [7], [37], [38]. However, few issues are involved to maintain an ERP, notably in customizing ERP and hardware, change management, process and people as well as managing the transition [39]. Though, Chen [40] said that successful implementation of ERP helps to combine all functions within the organization into one single integrated system with transparent and easily sharable data.

5.2. Critical Success factors of Implementation of ERP
Globally, ERP system has been implemented in all types of major firms for various purposes such as higher outputs, increased business performance, capacity and helped to integrate their process [41].
However, the questions remain need to be clear that what factors which impact the implementation of ERP in organisations. To fulfill this, the present section views the factors which induce the ERP implementation in organisation in general.

However, eleven critical factors were clearly described by Kuang et al. [42] such as project companion, troubleshooting, testing and software development, monitoring and evaluation of performance, top management, ERP teamwork and composition, business plan and vision, project management, effective communication, change management program and culture, business process reengineering and minimum customization. IT legacy system are most important system for ERP implementation described by Nah et al. [43]. Likewise, Kuang et al. [42] found out the factors such as existing organization structure, business processes, information technology and culture influence the success of firm. Some other factors include the company’s vision and mission, business plan, communication, retaining employees with skill and experience, consultant and vendor support, performance monitoring and evaluation, problem’s anticipation change management composition, compensation, talent of the ERP team, project management [44]. In addition to this critical factors, other factors include analysis of the system, management support, championship and selection and technical implementation was reviewed by various authors [45], [46]; training [47], [48]; top management support [47], [49]–[53] minimum customization [47], [49], [51], [52], [54]; implementation time and business process reengineering [52]; team composition [55]; team skills [49]; change management [48], [56]; retain the experienced employee [57], [58]; consulting and vendor support [55], [59] as well as cultural diversity [60], [61]. Even though, ERP implementation had few challenges, as per Huang et al. [62] identified that failure to redesign business process, composition of project team members, failure to user support, lack of senior management commitment, inefficient communication with users, lack of effective project management technology and conflicts between user departments. Similarly, Dillard and Yuthas [63] described that most multinational firms used ERP, however, disadvantages include delayed an estimated schedule and overrun an initial budget [64], [65]; failed to attain the target of organization and desired results [64], [66], [67].

Thus, it is essential for all organizations to have deep understanding over the critical success factors, as these acts as guidelines during the implementation phase and supports in identifying, which factor needs more attention as the implementation process becomes success. These critical success factors are identified to create opportunities or risk, but these are determined based on firm’s capacity of the handles them.

5.3. Critical Success factors of Implementation of ERP

The advantages of ERP in organizations are appreciated without hesitation. The main key advantages of critical success factors are reduction in development time, reduction of productivity cost, low inventory overhead, fewer resources, and improved procurement transparency, improved supply chains time, improved response time in market conditions, better use of resources, customer satisfaction and ease of global reach [68]–[73]. Further, some small scale companies used ERP to increase their capability, profit and business activities, to replace their old system to overcome their competitors.

Luo and Strong [74] mentioned that the major drawback of implementing ERP is to determine the current system and the new ERP system. The assurance and inter-dependence of ERP systems [75] have risen exponentially from 1990s, and procurement and application of ERP system is one of the leading sectors of growth in IT sector. ERP systems hold the promise of improving business processes and decreasing costs [43], [76], as these systems facilitate communication and coordination, centralize administrative activities, improve ability to deploy new information system functionality, and reduce information system maintenance costs [77].

A successfully implemented ERP system can be the backbone of business intelligence for an organization, by giving managers an integrated view of the business processes [73], [78]. ERP systems can link different areas of an organization, such as manufacturing, order management, financial systems, human resources, suppliers and customers, into a tight integrated system with shared data and visibility [40]. For instance, ERP systems provide seamless integration of processes across functional areas with improved workflow, standardization of various business practices and access to real-time up-to-date data [65], [79].
Earlier information systems were not able to handle variance, speed and involve a transparent process. The current work process engines [80] and web services technologies have brought changes [81], [82] to support SOA architecture [83], [84], currently it is viable to control the complete organization process and just not within a single unit. ERP system has evolved significantly to connect various business functions and process them [85]–[87]. Furthermore, they integrate the flow of information within an organization [88] and manage and integrate physical, financial, and human resources of an organization [89]. ERP systems help to conduct business process effectively in the process of business effectiveness [90], [91].

Annamalai and Ramayah [19] conducted a study on the measurable and immeasurable benefits of ERP about Oracle and SAP. In specific, Managerial Benefits (MB) the Operational Benefits (OP) benefits of Information Technology (IT) Strategic Benefits (SB) and Organizational Benefits (OR) of Oracle and SAP packages were measured. The primary method of analysis used was the method of survey to extract details from Oracle and SAP ERP consultants. The smart PLS (Version 2.0) software was used to analyze the empirical results. The obtained results were further verified with Deloitte and O'Leary's details. The results indicate that the tangible benefits include reduction of procurement cost (SAP 32%, Oracle 30%) reduction in finance cycle (SAP 46%, Oracle 48%, productivity enhancement (SAP 50%, Oracle 41%) resource reduction (43% for both Oracle and SAP) and IT cost reduction (SAP 35%, Oracle 21%). The study shows that Indian organizations have attained higher ERP benefits when related to Deloitte and O'Leary's investigation. The limitations of the study were in the method of survey instrument, associated response bias and the study targeted only the manufacturing firms.

Clohessy and Acton [100] explored the benefits of ERP cloud computing over the offline ERP solution. A comparative study methodology has been used. The results have shown that the deployment of cloud has higher benefits over offline ERP such as lower implementation cost, better price benefits in licensing and technical support cost, quicker implementation of projects, faster agile functionality. The cloud based ERP solution has helped the Irish government for its disparate requirement to connect the distributed departments into one single public body. The best option for such transition would be to use the cloud based SaaS ERP solution which can include a collection of divisions like commerce, payroll, acquisition and human resource in one single platform. The study has limited itself to a comparative study and needs to do a qualitative study on another government that has implemented cloud ERP solution.

Johansson et al. [101] determined the opportunities of implementing cloud ERP based on varied company size. The methodology used was literature study in which the benefits and concerns of cloud ERP identified on previous studies which was used as a reference point for the estimation of empirical findings. A research framework of benefits and drawbacks were framed from the obtained literature review. The output the study shows that SMEs are much suited to cloud based ERP. The benefits include lower investment costs, low operating cost, easy access to advanced IT resources, higher security measures, easy mobility, high scalability, higher deployment speed etc., The limitations of the study include perceived insecurity of storage data, issues of jurisdiction, customization limits, significance in performance, migration limits and slow deployment.

Peng and Gala [102] have performed a study to determine the effectiveness and drawbacks of organizations with internal or offline ERP applications to web or cloud based ERP. The methodology used was qualitative interviews to 16 cloud ERP professionals. To obtain the results thematic analysis was performed. The results showed that cloud had economic and technology benefits. The drawbacks identified were the challenges due to numerous organizational factors and due to complex technology and legal issues with a cloud setting. The study has limited only to qualitative interview methodology. Future studies needed to incorporate quantitative methodology based on questionnaire method for more precise output.

Seethamraju [103] performed a research was to evaluate SMEs advantages and challenges of adapting SaaS systems. A cross-sectional field study was performed in four organizations as a case study. The results show that the major factors that influence are reputation of vendors, capability of software for the business, vendor support for the software, value for their customers. The limitation of this research would be the application of questionnaires for more effective analysis.
6. Research Gap Identified

From the review analysis, it is clear that majority of the studies conducted in both web based [19], [93]–[95], [97] and offline ERP system [23]–[25], [65], [92], [96], [104] in general via critical success factors which influence the firm performance. This shows that majority of the studies concentrated on web based and offline based ERP in general not much studies focus on comparison study specifically in small scale enterprises. Additionally, limited number of studies in India focus on SME sectors specifically the benefits and weakness as well as critical success factors influence the implementation of ERP in general. In addition, the studies like Purohit et al. [105] Upadhyay and Dan [106] and Sanyal et al. [107] conducted in India focused on the critical success factors alone. Hence the present review support future researchers whether the ERP implementation support competitive advantage of SMEs, not only SMEs but also support large enterprises.

7. Conclusion
7.1. Future Work

By From the analysis, it was evident that compared to offline ERP system the web based ERP has significant effect in enhancing the SMEs firm performance. However, web based ERP system is expensive in some SMEs (limited financial resources and other capabilities); however, it provides numerous benefits to SMEs. Considering various studies like Apshankar [108] and Clohessy and Acton [100] from the review web based service are more efficient based on the factors like Scalability, Maintainability, Portability and Return-on-investment (ROI). However, while considering time frame for implementation and cost factor the offline ERP system was more efficient. A successfully implemented ERP system could be the backbone of business intelligence for an organization, by giving managers an integrated view of the business processes. Moreover, expansion and integration of department was always a complex and expensive process, were adoption of web-based ERP system has eased the integration and reduced the Hosted Application Model cost. In the future world, the web-based ERP system could be brought in small scale firms had lot of advantages to their competitive advantage, which would address the portability and cost issues.

Acknowledgements

The authors wish to acknowledge the supportive part from the team Graduate Business School, Assumption University of Thailand, Bangkok for completion of this article. The authors would like to thank all the well wishers who supported directly and indirectly.

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