

**Quality and Critical Factors for Successful Implementation of CB-ERP  
(Cloud Based-ERP)**



**Thesis Submitted to  
The Superior College, Lahore**

In Partial fulfillment of the  
Requirement for the Degree of

**Master of Science in Computer Science**

By  
**Muhammad Yousaf**

**Roll No. MSCS-F16-026**

**Session: 2016-2018**

**Registration No: MSCS-F16-026**

**The Superior College (Department of Computer Sciences), Lahore  
DEC-2018**

**Quality and Critical Factors for Successful Implementation of CB-ERP  
(Cloud Based-ERP)**

By  
**Muhammad Yousaf**

**Roll No. MSCS-F16-026**

**Session: 2016-2018**

Registration No: MSCS-F16-026

**Thesis Submitted to  
The Superior College, Lahore**

In partial fulfillment of the  
Requirements for the degree of

**Master of Philosophy in Computer Science**

Approved By:

---

**Dr. Usman Hashmi**  
**Program Manager, Research Degrees**

---

**Dr. Amjad Farooq**  
**Research Supervisor**

---

External Examiner

---

Controller Examination

Thesis Submitted to



**The Superior College  
School of Management Sciences, Lahore, Pakistan**

**DECLARATION TO BE FILLED BY THE STUDENT AT THE TIME OF  
SUBMISSION OF THESIS TO THE SUPERVISOR AND/OR FOR  
EXTERNAL EVALUATION**

<b>Section 1: Particular of the Student</b>		
1.1	Full Name	MUHAMMAD YOUSAF
1.2	Father's Name	SUFAID KHAN
1.3	Roll. Number	MSCS-F16-026
1.4	Program	Master of Science in Computer Science

<b>Section 2: Particular of the Thesis</b>		
2.1	Title	<b>QUALITY AND CRITICAL FACTORS FOR SUCCESSFUL IMPLEMENTATION OF CB- ERP (CLOUD BASED-ERP)</b>
2.2	Supervisor's Name	Dr. Amjad Farooq
2.3	Date of Completion	22-12-2018



**The Superior College  
School of Management Sciences, Lahore, Pakistan**

**SUPERVISOR'S CERTIFICATE ON  
THESIS SUBMITTED BY A STUDENT**

<b>Section 1: Particulars of the Supervisor</b>		
1.1	Full Name	
1.2	Address	The Superior College, School of Management Sciences, Lahore.

<b>Section 2: Particulars of the Student</b>		
2.1	Full Name	MUHAMMAD YOUSAF
2.2	Father's Name	SUFAID KHAN
2.3	Registration Number	MSCS-F16-026
2.4	Program	Master of Philosophy in Computer Science

<b>Section 3: Particulars of the Thesis</b>		
3.1	Title	QUALITY AND CRITICAL FACTORS FOR SUCCESSFUL IMPLEMENTATION OF CB-ERP (CLOUD BASED-ERP)
3.2	Date of Completion	22-12-2018

I certify that:

- a. The above named student has completed the cited thesis under my guidance and supervision.
- b. I am satisfied with quality of the student's research work, and
- c. I consider it worthy of submission for external evaluation.

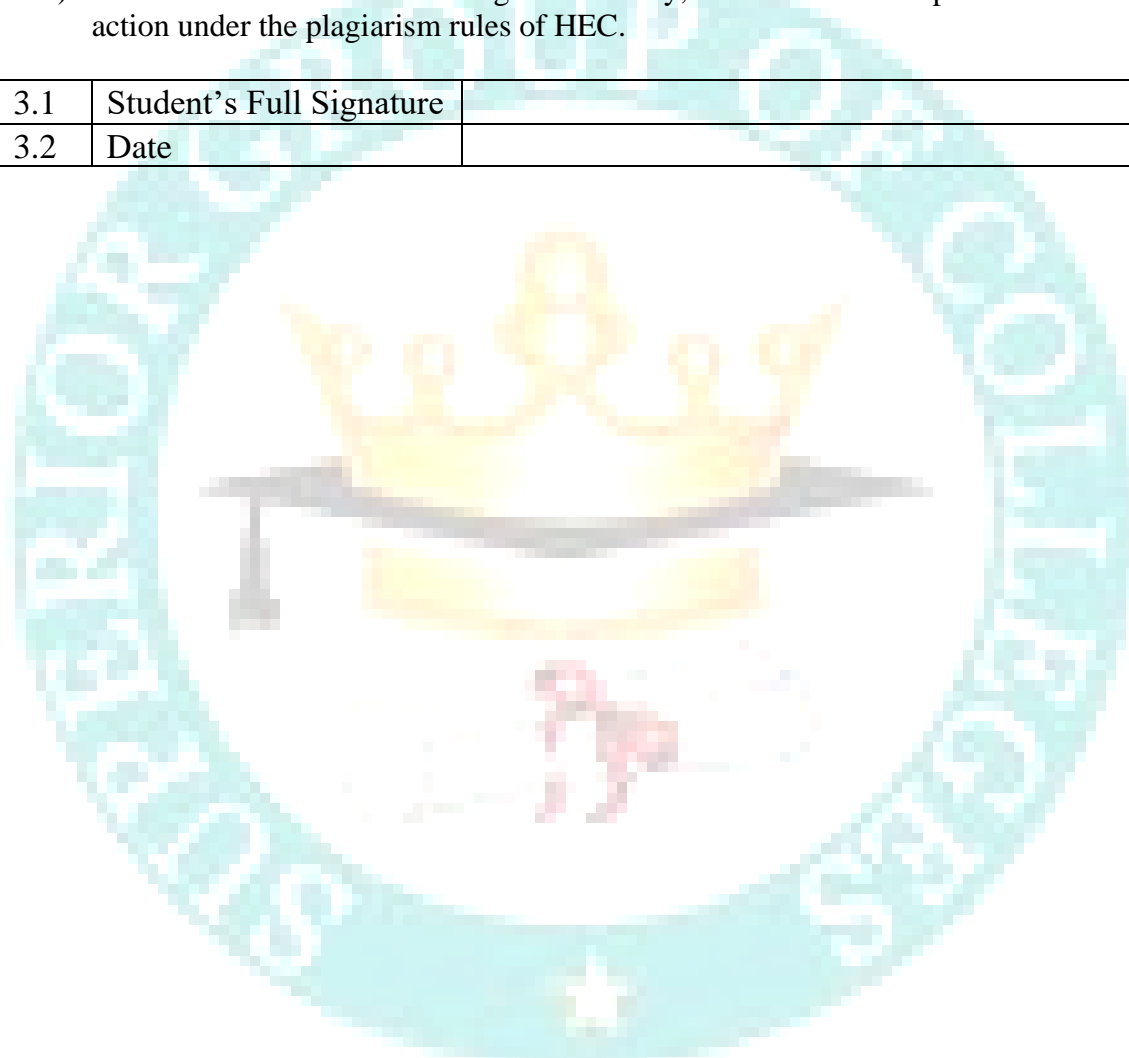
4.1	Supervisor's Full Signature	
4.2	Date	

## Declaration of Originality

I **Muhammad Yousaf** hereby solemnly declare that this project:

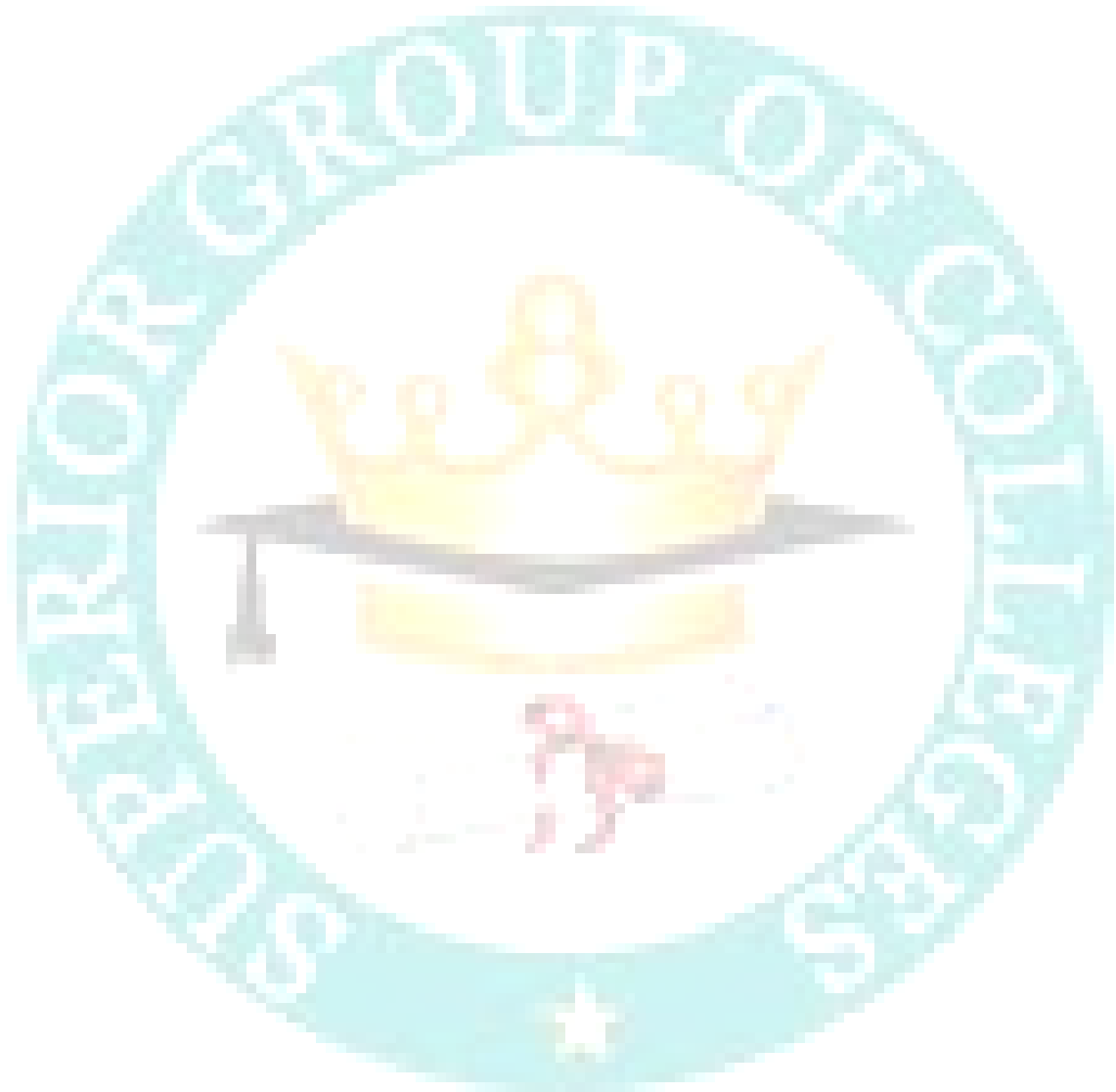
- a) is my original work, except where otherwise acknowledged in the text
- b) has not been published earlier and
- c) shall not be submitted by me in future for obtaining any degree from this or other university or institution
- d) has been incorporated HEC Plagiarism Policy
- e) In case of violation of HEC Plagiarism Policy, I shall be liable to punishable action under the plagiarism rules of HEC.

3.1	Student's Full Signature	
3.2	Date	



## DEDICATION

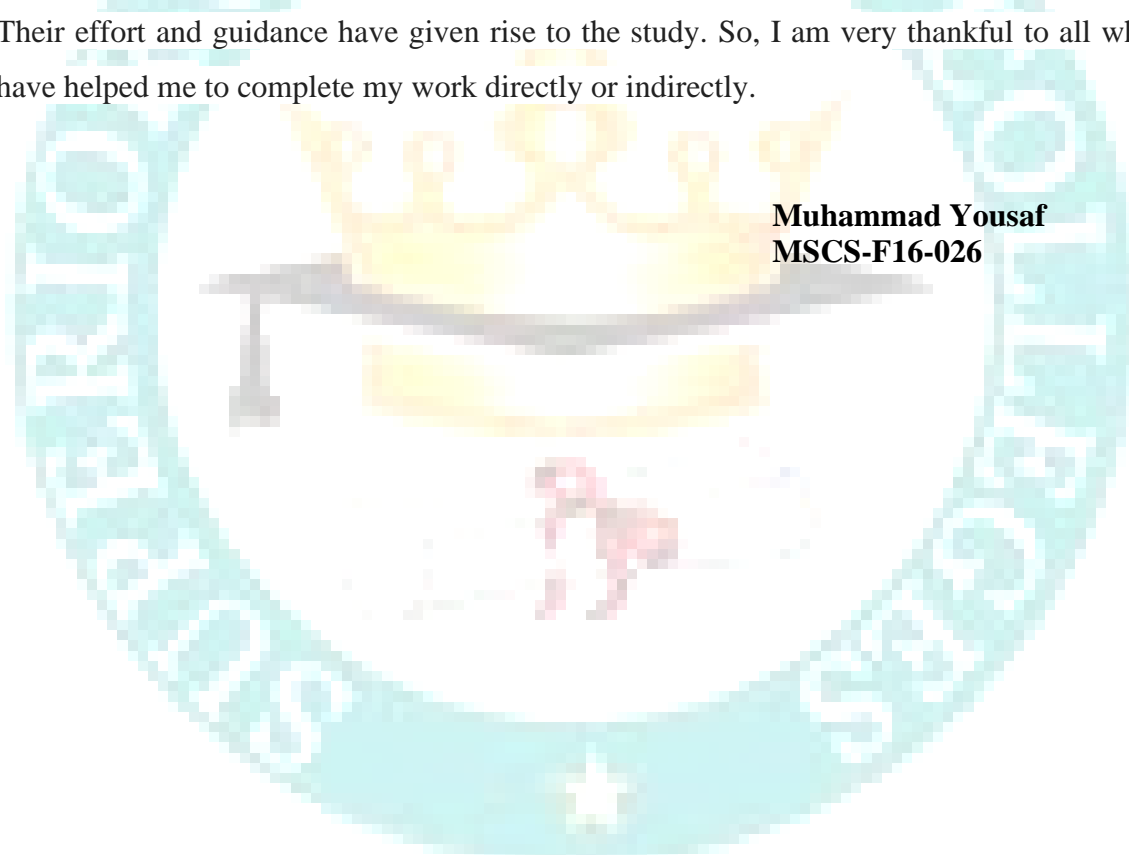
This work is dedicated to my beloved parents, my brothers & sisters, my Supervisor, friends and teachers who encouraged me to face any challenge.



## **ACKNOWLEDGEMENT**

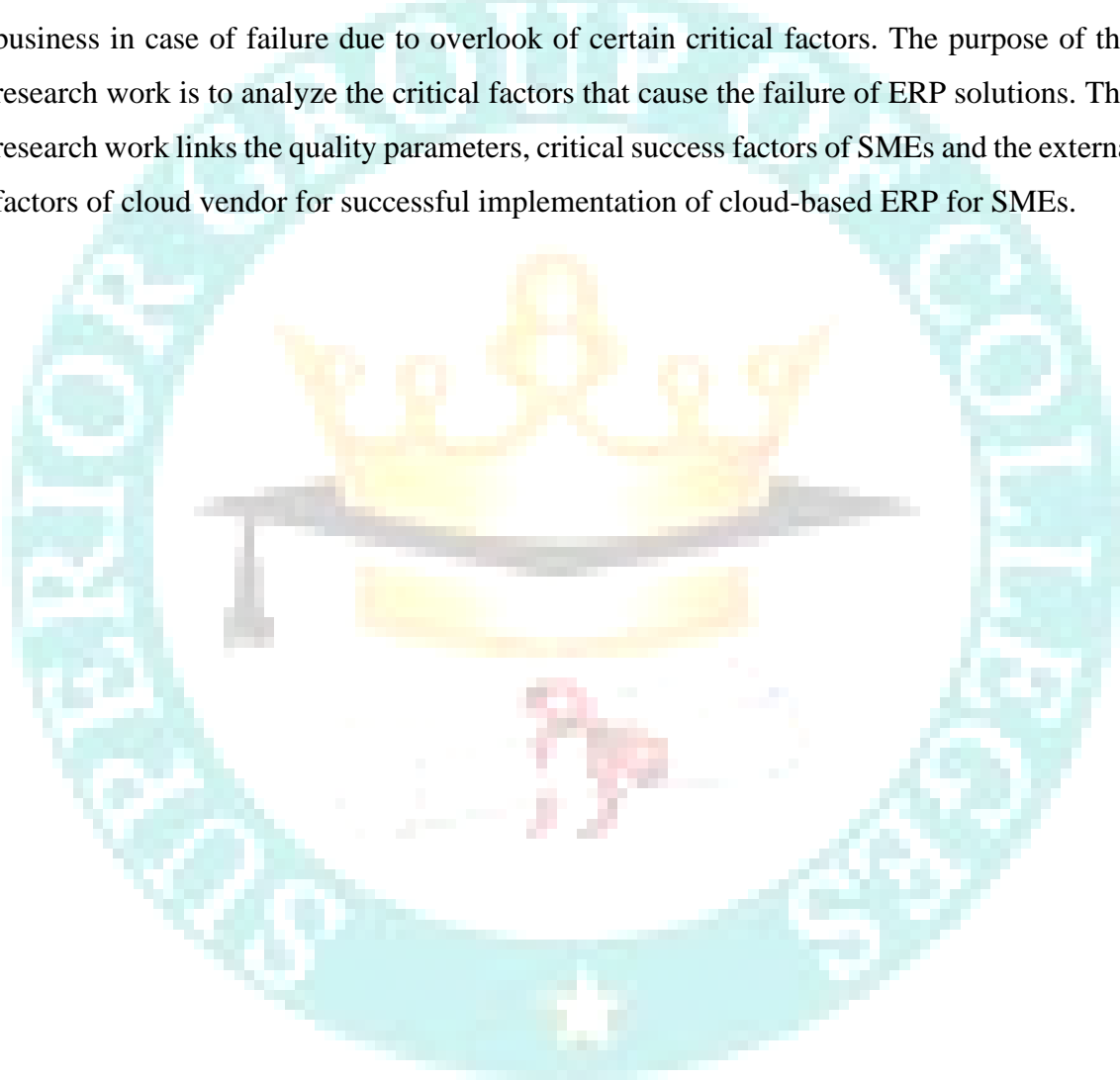
First, I would like to thank my supervisor Dr. Amjad Farooq, Superior University Lahore for all the support and guidance during this thesis writing. The study was carried out under his guidance. I thank Sir for providing the necessary support from time to time. His broad knowledge and logical thinking have been of great value to me. His understanding, motivation and personal guidance has provided a good basis for the present study. During this work, I have collaborated with many colleagues and industry professionals for whom I am very pleased. I am very grateful to all those who have helped me to carry out the study. Their effort and guidance have given rise to the study. So, I am very thankful to all who have helped me to complete my work directly or indirectly.

**Muhammad Yousaf**  
**MSCS-F16-026**



## **ABSTRACT**

Emergence of cloud technology, expeditious transfer of IT resources to online services in cloud is attracting attention of many companies to shift their Enterprise Resource Planning (ERP) on cloud. Besides this, many Small Medium Enterprises (SMEs) have built their costly ERP solution. Provision of cloud-based ERP services disavows an SME from required development and maintenance cost. ERP solutions have many implications on a business in case of failure due to overlook of certain critical factors. The purpose of this research work is to analyze the critical factors that cause the failure of ERP solutions. This research work links the quality parameters, critical success factors of SMEs and the external factors of cloud vendor for successful implementation of cloud-based ERP for SMEs.



# Table of Contents

## Table of Contents

<b>Chapter 1 INTRODUCTION</b> .....	14
History .....	14
Enterprise Resource Planning (ERP) .....	14
Problem Statement .....	15
What are critical success factors (CSFs?) .....	15
What are exceptional Parameters?.....	15
Motivation.....	16
Research Questions.....	16
Research technique.....	16
Outline of Thesis.....	17
<b>Chapter 2 LITERATURE REVIEW</b> .....	18
Analysis of the CSF for ERP implementation from stakeholders .....	18
Improvement of two-manner section model evaluation for CSF for ERP.....	19
CSF in implementation of ERP .....	21
Safety troubles in agency aid planning .....	22
CSF for ERP implementation in SMEs.....	23
Top management .....	23
Organizational way.....	23
External strain .....	23
Project Management.....	24
Project Management.....	24
Enterprise process Reengineering (EPR) .....	25
Implemented modules .....	25
Organizational .....	25
Outcomes of CSF on overall performance of an agency .....	27
How 'critical' are the CSF.....	28
Organizational factors .....	29
Humans elements.....	29

Technological factors.....	29
Deliver Base Complexity.....	30
Number of providers .....	30
Shipping Reliability of suppliers .....	30
Differentiation between providers.....	30
Corporation, technological and community security CSF .....	31
Risk elements in ERP venture .....	31
Trying out CSF the use of essential evaluation .....	35
Identifying CSF for low customize ERP .....	36
CSF for the implementation of SMEs .....	37
CSF for implementation of ERP in Belgium SMEs.....	37
Effective CSF upward push blessings of ERP .....	38
Implementation challenges discussed in earlier work.....	39
Cause of ERP failure .....	41
CB-ERP (Cloud Based -ERP).....	44
Organization Factors .....	45
Technological factors .....	45
Organizational overall performance .....	46
Monetary performance .....	46
Advertising and marketing performance .....	46
Survey method .....	46
Theoretical contributions.....	47
Managerial implications .....	48
Proposed Critical and Quality Factors .....	51
<b>Chapter 3 RESEARCH METHOD AND DATA.....</b>	<b>53</b>
List of proposed CSFs.....	53
Reliability and validity .....	57
Adoption of cloud ERP systems.....	57
Cloud ERP systems .....	58
Observations from the customers.....	60
<b>Chapter 4: RESULTS.....</b>	<b>63</b>
<b>Result provided by Company North-Bay Solutions .....</b>	<b>63</b>
Critical success factors (CSF) .....	63
Strongly Agree .....	63

Agree .....	63
recommended .....	63
Neutral.....	63
Disagree.....	63
<b>Result from Open Sol Globals .....</b>	<b>64</b>
Critical success factors (CSF) .....	64
Strongly Agree .....	64
Agree .....	64
recommended .....	64
Neutral.....	64
Disagree.....	64
<b>Results of Company TV2U Private Limited .....</b>	<b>64</b>
Critical success factors (CSF) .....	65
Strongly Agree .....	65
Agree .....	65
recommended .....	65
Neutral.....	65
Disagree.....	65
<b>Results by Apps Geni .....</b>	<b>65</b>
Critical success factors (CSF) .....	66
Strongly Agree .....	66
Agree .....	66
recommended .....	66
Neutral.....	66
Disagree.....	66
<b>Results by Soft pyramid.....</b>	<b>66</b>
Critical success factors (CSF) .....	66
Strongly Agree .....	66
Agree .....	66
recommended .....	66
Neutral.....	66
Disagree.....	66
Summarize form of results.....	67
<b>Chapter 5 DISCUSSION.....</b>	<b>71</b>

Switching to cloud-based ERP makes sense.....	71
Why CB-ERP training is better than On-Premise ERP systems? .....	71
Customized ERP.....	72
Implementation problems .....	72
Theoretical implications.....	73
Barriers.....	73
Future work.....	74
<b>References</b> .....	75

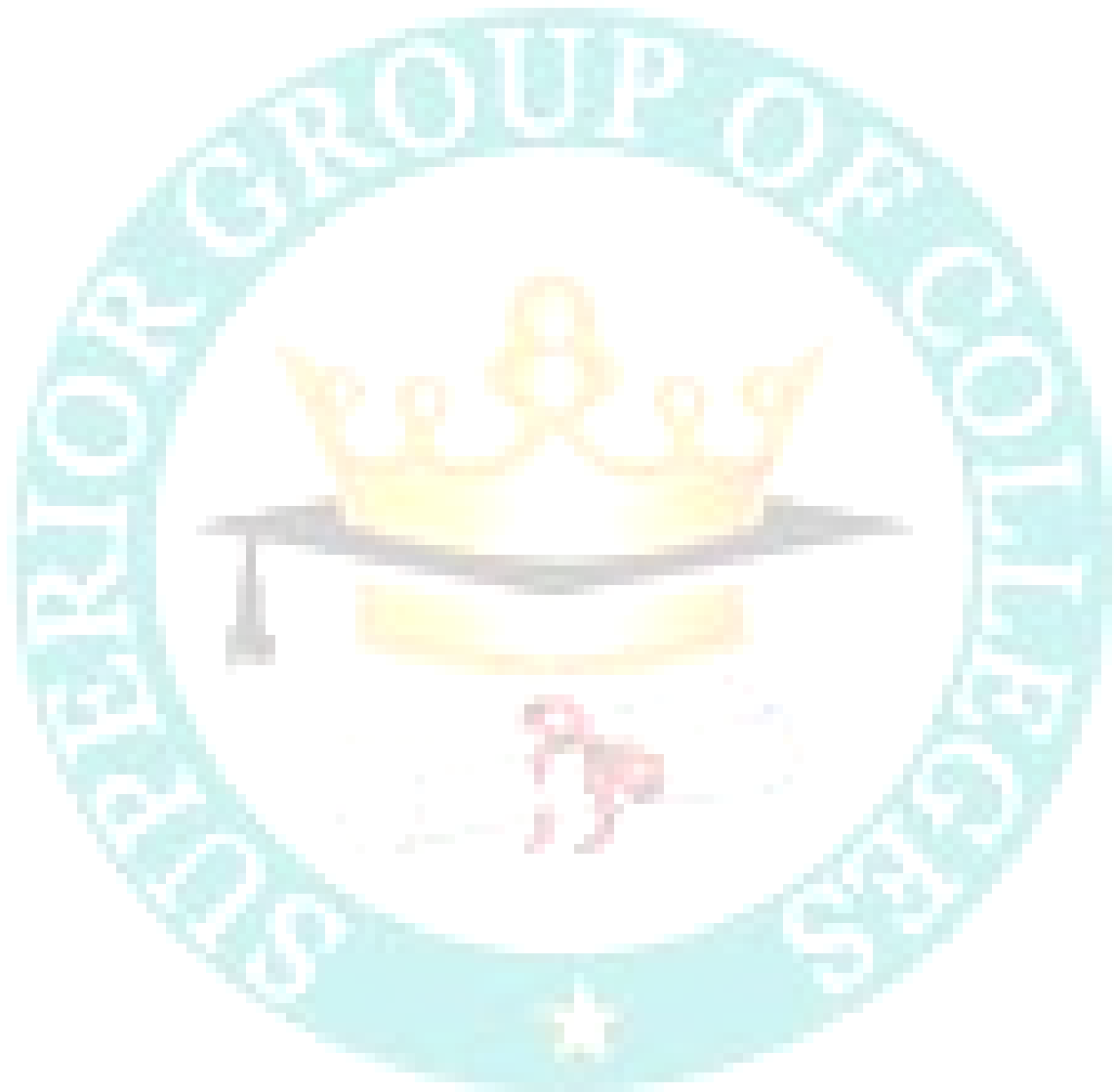
## **Table of Critical Success Factors (CSF)**

Table 1: CSFs.....	18
Table 2: CSFs.....	21
Table 3: CSFs:.....	28
Table 4: CSFs.....	29
Table 5:CSF for cloud based ERP .....	31
Table 6: CSFs.....	35
Table 7: CSFs.....	35
Table 8: CSFs.....	36
Table 9: CSFs.....	37
Table 10: CSFs.....	37
Table 11: CSFs.....	38
Table 12: Common CSFs catagorize .....	51
Table 13: Identified gaps in CSFs.....	52
Table 14: List of proposed CSFs.....	54
Table 15: List of Interviews.....	56
Table 16: Results about CSF by Company A .....	63
Table 17: Results about CSF by Company B .....	64
Table 18:Results about CSF by Company C .....	65
Table 19: Results about CSF by Software-house A.....	66
Table 20: Results about CSF by Software-house B.....	67
Table 21: Color scheme to show the results .....	68
Table 22: Summarize results about the CSFs .....	69

## **Table of Figure**

Figure 1: ERP.....	15
Figure 2:Outline of processes.....	17
Figure 3:CSFs.....	23
Figure 4: Results of structure model.....	26
Figure 5 ERP selection framework .....	32
Figure 6 Risk factors rate in literature.....	33
Figure 7: Selection.....	33

Figure 8: Latten Variable .....49  
Figure 9:Cloud maturity by industry.....59



## Chapter 1 INTRODUCTION

### History

In 1990, ERP emerges as an extension of material necessities planning (MRP). Acronym of ERP period turned into first used by Gartner group as an extension of MRP. Because the need grows, to satisfy with the tough necessities of the companies, ERP II comes into an life with some added functionality [13]. According to the customers, ERP II is greater bendy than first era ERP. Cloud computing and ERP have become increasingly critical inside the world of facts generation (IT) and conversation. But deploying traditional ERP systems can be tough and frequently pricey and resource extensive. However, with the emergence of cloud-based totally ERP solutions, it has lower price implications than conventional ERP [13]. Organization useful resource planning (ERP) software program is the most popular enterprise software programs on the market from 1990's, and until 1998 has reached at its height. The business capabilities of an organization can be incorporated and centrally managed ERP software program [42]. Corporations of all sizes and brands have implemented ERP software packages to control their organization, such as public-sector companies [43].

### Enterprise Resource Planning (ERP)

An ERP is like a system or software that used to manipulate correctly and correctly all the resources of whole organization through centralized utility that procedure the statistics in a actual time state of affairs and lets in systematically to combine the enterprise approaches to a employer. OR ERP is an organization-extensive information machine that facilitates the drift of statistics and coordinates all sources and activities in the corporation. An ERP consist on special modules like production, stock, transport, invoicing, patron courting management, income & advertising, billing, production, inventory and human useful resource management. The ERP system facilitates in managing the connections to outside stakeholders as well as improving the control overall performance. All the ERP modules relate to centralized database. It affords a unified, steady, uniform environment [3].

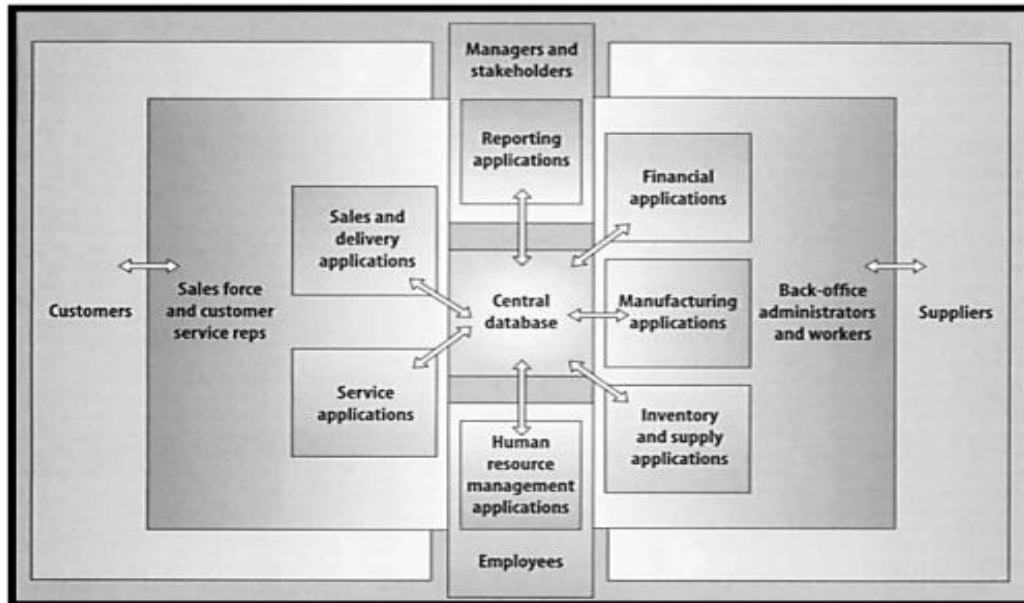


Figure 1: ERP

### Problem Statement

A successful ERP system has many benefits, but in case of failure have considerable implications not only business but also on ERP vender. ERP fails due to overlook of certain critical factors. So, in this research our problem statement is, to identify hidden (CSFs) that can reduce the failure chance of an ERP solution.

### What are critical success factors (CSFs?)

A vital success factor (CSF) is the sort of factor that can make a success ERP and then notably improves the changes of a hit challenge implementation. There is no standard consensus on the critical achievement factors of an ERP implementation [6]. CSFs are defined as “the restricted variety of regions in which ends up, if they are fine, will make certain aggressive performance for the organization [7]. The most frequently noted CSFs are:

- Top control support
- Exact and powerful conversation
- Clear vision, intention and scope
- ERP approach
- Mission budget
- Retain the skilled worker.

### What are exceptional Parameters?

As ERP is a software program, so some software program needs software necessities to carry out the feature accurately. So, through literature survey fundamental quality

parameters recognized which might be nearly not noted continuously which may be cause of failure of an ERP. A few excellent parameters that are chosen are given under.

- Capability
- Integrity
- Technical elements
- Regular updates

### Motivation

This study will attempt to identify and classify the numerous effective crucial achievement factors to enhance the achievement fee for the implementation of cloud-based totally ERP for an SME. By way of making use of diagnosed critical fulfillment elements, we will become capable of reduce the failure charge for implementation of a cloud-based totally ERP. So overall fulfillment charge of ERP could be stepped forward.

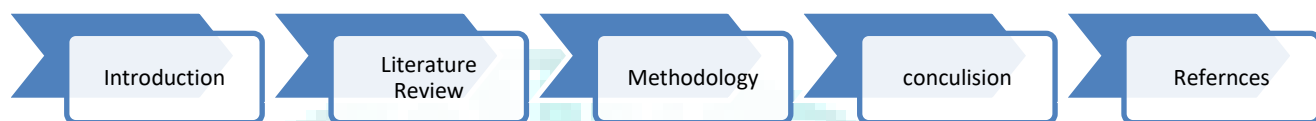
### Research Questions

- A) What are the vital achievement factors for imposing a success ERP?
- B) A way to discover new important fulfillment elements?
- C) What are the issues for imposing ERP solutions?
- D) Whether or not new critical fulfillment elements worked or not?
- E) A way to show the diagnosed vital fulfillment elements if they truly worked?
- F) Why is cloud-primarily based ERP device more possible than regionally hosted ERP structures?

### Research technique

- Literature survey
- Analyze it and notice the important thing elements.
- After studying finally finish it showing their similarities and brief-coming, then at the bases of evaluation we can conduct our analytical observe.
- Endorse a few new satisfactory & important achievement elements on the base of above survey.
- Then we will behavior a case has a look at for the validation of identified factors.

## Outline of Thesis



*Figure 2:Outline of processes*



## Chapter 2 LITERATURE REVIEW

### Analysis of the CSF for ERP implementation from stakeholders

As a hit implementation tasks of ERP are useful for imposing an employer then in case of failing ERP projects has lots negative results which affect your commercial enterprise as well as ERP dealer. Due to the fact the vendor had to pay repayment to enforcing company consequently be carefully approximately all the elements that would influence the achievement of projects. Company aid planning (ERP) gadget is a statistics device that allows the enterprise to coordinate and integrate facts inside departments. It is one instance of the alternative enterprise structures (ES), together with supply Chain management (SCM) gadget, which manages raw substances and merchandise deliver. ERP system makes an employer now not only to control its inner commercial enterprise methods however additionally it gives an included software program software to the company with incorporated modules for every department inside the employer with a unified database for all departments to manage, execute, store information and display center commercial enterprise procedures: Procurement, production and Fulfilment processes in addition to other departments' functionalities including human sources, sales, manufacturing and accounting devices. One of the large blessings of this system is that ERP gadget assists the businesses to automate their enterprise methods through coordinating and integrating the information among departments. Failing this venture might have numerous bad implications not only at the commercial enterprise however also on the ERP supplier [1]. The maximum often noted CSFs are

- Pinnacle control aid and commitment
- Education and schooling
- Task management
- clear imaginative and prescient and targets of the ERP gadget
- Careful exchange management and Interdepartmental communication

*Table 1: CSFs*

This systematic assessment has targeted on two crucial elements that are related to the subject of ERP implementation. It measured authors' agreement on the CSFs that accompany the ERP undertaking with the aid of recording the frequency of appearance of these elements and then it furnished a categorization for the determined elements according to stakeholders concerned within the ERP implementation and usage. 2 predominant

problems are identified a reason of failure in ERP implementation misalignment and value. Now a day's generally misalignment is taken into consideration as the huge troubles in ERP failure. Some of the ERP companies provide the ERP software in much less price compromising with the security [1].

### Improvement of two-manner section model evaluation for CSF for ERP

ERP structures not best increase the expertise processing talents but additionally boom the fulfillment of groups with the aid of making use of them successfully. However practically almost all the company has been failed in enforcing and successfully used ERP structures. Consequently, for decreasing the failure hazard broadly speaking firms focus on crucial fulfillment aspect (CSF) at some point of ERP implementation. A capital funding reported in the literature for critical achievement aspect and additionally coping with massive quantity of factors decision makers face problems, need a real time utility or model to clear up this hassle. A structural version is proposed for concluding ERP CSFs. It has component, within the first part of the look at interpretive (explanative) structural modeling is followed to shape CSFs in hierarchical form. And in the second component the hierarchical form of based CSFs is concluded through fuzzy cognitive maps. The proposed model is carried out in one of the huge Turkish ERP vendors that allows you to display the applicability of the model. An agency resource making plans (ERP) machine is a packaged software that gives an integrated solution to the businesses for processing required statistics and effective use of assets. An ERP system embodies (to take the form, mojasma) a set of practical competencies which can match a commercial enterprise model. Real existence practice indicates that neither all the firms have been successful in implementing ERP systems nor the ERP structures have been used correctly. For this reason, firm's cognizance their attention to critical fulfillment elements (CSFs)-based evaluation frameworks so one can lessen the chance of failure in ERP implementation. Even though a enormous amount of CSFs has been reported within the literature, choice makers face problems in coping with huge quantity of factors. On this admire, a possible and understandable assessment model is needed in actual existence situations. Consequently, a -manner structural model is proposed for comparing ERP CSFs. In the first segment of the have a look at, explanatory structural version is used to shape CSFs in a hierarchical shape. In the 2d segment, hierarchically established CSFs are evaluated using fuzzy cognitive maps. A fuzzy cognitive map is a map within which the relations among the factors (e.g. Concepts, occasions, and challenge assets) is represented. Fuzzy cognitive maps were introduced by

way of Bart Kosko. In method vital heritage information concerning the ISM and FCMs are supplied. Many companies have stated ERP implementation to be fraught with disasters due to the style of challenges. Especially, complicated technical, organizational, cultural, and political troubles make the integration technique a totally tough undertaking. Accordingly, failure prices of these initiatives are very high. It is stated that ERP projects are 178% over price range, taking 2.5 times longer than anticipated and turning in best 30% of promised benefits. The main hindrance by using the proposed model is that enormously depending on the professional's perceptions. Outcomes are difficult to be generalized. And 2nd factor is that the consequences would possibly represent single-sided views. No question the presented take a look at may be progressed in terms of many elements. From the methodological point of view, fuzziness can be integrated into the ISM algorithm. Furthermore, the better order uncertainties, along with type-2 fuzzy sets, hesitant fuzzy units, etc. Can be used in the survey processing degree. On the other hand, different stakeholders' perspectives, consisting of clients, providers, and and so forth. May be blanketed. Last however no longer least, the proposed model can be applied in extensive sort of decision troubles [2]. Contribution of this paper to the literature is given below.

- First time inside the literature, ISM technique is implemented for the analysis of ERP CSFs. ISM method is hired to shape a doable assessment hierarchy within the context of ERP CSFs.
- Interactions among ERP CSFs are investigated by means of FCMs. The different aspect of the proposed version is that FCM simulation is performed for deriving priorities of CSFs inside the hierarchical evaluation structure.
- The proposed evaluation version can tackle both structuring and assessment of CSFs.
- The proposed model addressed in this paper transforms the field specialists' perceptions into a visual and interpretable version by means of assisting individuals to articulate the relationships amongst CSFs. A real-life case looks at is provided [2].

The strategy, shape, and business strategies of an agency are related by means of ERP structures with IT structures. Many achievement and failure memories about the implementation system of an ERP finds during the special way of coping with. By way of doing research on

1) What are the vital success elements in the implementation of ERP?

- 2) Why are these factors crucial?
- 3) what is the criticality credential of every factor?
- 4) How vital are those elements for customers, consultants, and companies, the file targets to identify the important fulfillment factors in ERP implementation and apprehend the criticality degree of each aspect from the views of three parties (businesses, specialists & companies).

### CSF in implementation of ERP

The study is proceeded with blended strategies of qualitative and quantitative. The qualitative approach for the interviews becomes selected with the intention to get the records in depth. A semi-dependent interview enables to offer some simple questions as guiding principle. Moreover, the quantitative technique contributes to manipulating the facts for a more comprehensive evaluation of empirical findings. This record states eleven CSFs (critical achievement factors) from three factors of view: strategic, tactical, and cultural [3]. They may be:

- Top management support and ERP strategy
- Enterprise procedure Reengineering
- Project crew & alternate control
- Maintain the experienced worker
- Consultant and dealer assist
- Monitoring and evaluation of performance
- Problems anticipation (troubleshooting, insects, and many others.)
- Organizational lifestyle
- Powerful communication
- Cultural variety.

*Table 2: CSFs*

With the aid of testing the perceived CSFs in six respondents (VSM group, Scania, Sogeti, system, Oracle, and SAP), this file puts the eleven factors into three usual ranks (maximum important, medium crucial, and less vital), gains three different new vital elements (testing, Commercial enterprise version, and consumer's sources), and clarifies the diverse critiques approximately CSFs From customers/corporations, experts, and providers. The maximum essential elements are top Control aid, BPR, undertaking crew & alternate control, and

powerful communication. The medium essential factors visit ERP approach, consultant and dealer assist, And Organizational way of life. And the final 4 elements belong to less essential category. For the differences, their settlement comes into the 4 maximum important factors. In tracking and assessment of overall performance they agree on its much less criticality. All clients, experts and providers have quite one of a kind reviews about the remaining 6 elements. Reviewing the research questions, this document has fulfilled the primary goals and purpose. With better information of the complete identification of CSFs and criticality rank of each aspect, management will be capable of judge and allocate vital assets which are required to bring ERP implementation into success [3].

### Safety troubles in agency aid planning

Efficaciously implemented ERP software have several benefits like actual time facts access, future predicting, improved client's relationship, business unity, interdepartmental communicate in less time. This paper proposed a model to assume on safety issues which normally are overlooked with the aid of numerous agencies due to cost, awareness. In beyond days getting records turned into lengthy and time eating. But in step with the developing wishes brief get entry to of actual time statistics is required that's possible through a software program. A software program that is combination of all incorporated software or modules. ERP is a kind of software solution via which many groups or organization are coping with their obligations profitably. A few enterprise as Cisco structures use ERP to address its assets. Cisco's ERP machine became the backbone that enabled global Networked commercial enterprise based on digital communications to build interactive with its customers, personnel, suppliers and commercial enterprise companions. In 1990 ERP grows as an extension of MRP (fabric necessities making plans). This time period first time was utilized by Gartner organization. In keeping with the needs to meet the difficult necessities of the companies, ERP II came into the existence with a few new functionality more flexible than first generation ERP. Fundamental troubles diagnosed that turn out to be cause of failure of ERP implementation.

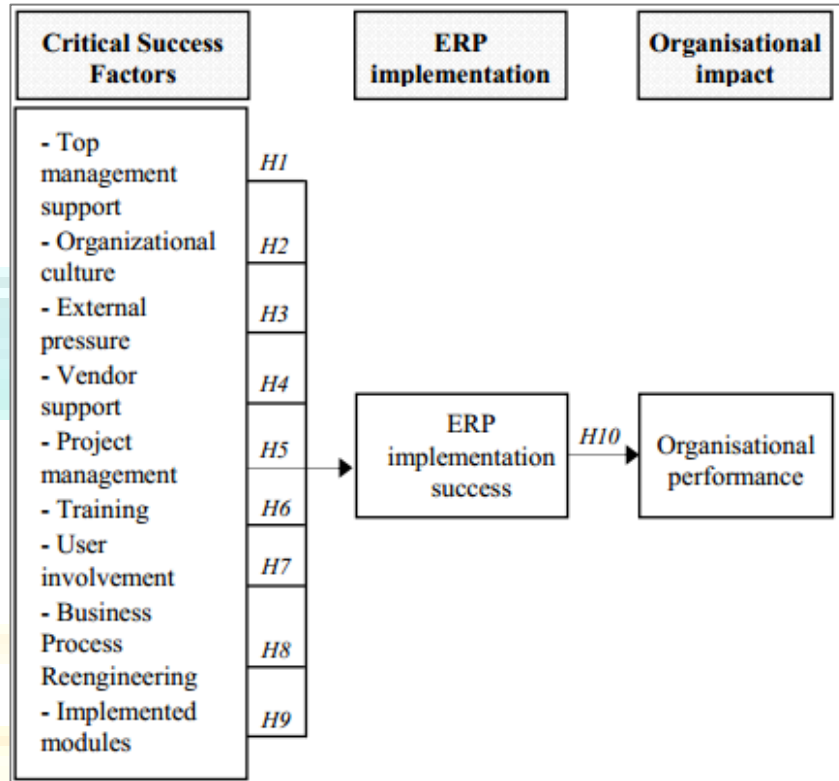
- Misalignment
- Cost

Now a day's usually misalignment is taken into consideration because the huge troubles in ERP failure. Several the ERP companies provide the ERP software in less price compromising with the safety [4].

## CSF for ERP implementation in SMEs

### Top management

It will be easily described because the involvement of business executives within the regions associated with ERP implementation. It has been highlighted, by several authors, as a vital element for the successful implementation of ERP systems. Ngai, regulation, and Wat argued that senior executives play a sizable role in ERP implementation achievement, given that those projects are, usually, time consuming and call for vast economic aid. Senior management has two roles at some stage in implementation: offering funds and imparting management.



*H1*: pinnacle control guide has a success.  
3:CSFs

Figure

instantaneous wonderful impact on ERP implementation

### Organizational way

Organizational way of life represents the shared ideologies, requirements, convictions which influence organizational attitudes and sports. A commonplace culture, shared between numerous organizational individuals, has an impact on the willingness to alternate, e.G. To adopt a new information gadget. Research has shown that organizational lifestyle is quite big for the achievement of most organizational changes. Moreover, in step with Jones, Cline, and Ryan, organizational tradition has an effect on worker behavior towards information sharing, while knowledge sharing is important for a hit implementation of ERP systems.

*H2*: Organizational lifestyle has a right away high-quality effect on ERP implementation achievement.

### External strain

Inside the gift look at, it is hypothesized that when groups discover themselves beneath

pressure from the external environment, they generally tend to attempt tougher to gain their favored dreams. Therefore, the better the external strain, the greater a success the implementation of the ERP gadget.

H3: Outside pressure has an instantaneous advantageous impact on ERP implementation fulfillment.

### **Project Management**

Project Management is offered from software program shops and/or consulting organizations. In most of the instances, the store is, additionally, the representative for the duration of, or after, the implementation. Thru non-stop collaboration, formal schooling and information dissemination, specialists assist their clients in receiving the full blessings of the applied system. The trustworthiness of the vendor is extraordinarily important in determining the success, or the failure of the whole effort.

H4: seller guide has an instantaneous fantastic impact on ERP implementation achievement.

### **Project Management**

The implementation of an ERP system is a volatile and complex challenge. As it's miles obvious, such projects acquire first rate management, considering that numerous stakeholders (distinctive enterprise devices, suppliers, customers, companies/ experts) are deeply concerned. The supervisor of an ERP task should bear in mind distinctive timetables, various milestones, equipment necessities, group of workers availability, and budget wishes. Subsequently, a hit implementation is synonymous with the management of a plethora of obligations. Some of these tasks must be carefully monitored and managed.

H5: project management has an immediate advantageous impact on ERP implementation success.

Training is a basic parameter in every ERP implementation venture. Hong and Kim argue that education should be furnished before, throughout and after implementation, while both technical and procedural issues must be cautiously addressed. Sooner or later, in-residence training (on-the-process education) appears to be the maximum green preference, among all to be had strategies. Additionally, enough training builds a fantastic climate closer to the implemented system, for this reason, growing its use and overall acceptance. Moreover, schooling enhances the ease of use, which in flip increases the probability for gadget success.

H6: training has an immediate tremendous impact on ERP implementation achievement.

User involvement is one of the most influential elements in ERP implementation initiatives. Several researches argue that customers must be actively concerned before and throughout

the complete ERP implementation system. This can make sure that the device has a higher fit with commercial enterprise procedures,

Because its improvement will be primarily based on real desires. Moreover, the recognition of the ERP system may be multiplied, given that users could have participated in its development. Eventually, resistance to change will be extensively decreased. According to diverse authors, user involvement will increase user satisfaction and user recognition, by way of developing sensible expectations approximately the abilities of the gadget. Moreover, user involvement will increase the perceived level of manage, thru person participation in the complete challenge. When all the above conditions are being correctly met, the implementation of the ERP device might be tons more efficient.

H7: person involvement has an instantaneous nice impact on ERP implementation achievement.

#### **Enterprise process Reengineering (EPR)**

EPR is the essential rethinking and drastic remodel of business tactics, if you want to attain improvements in important measures, consisting of value, pleasant, delivery, and pace. ERP implementation requires this type of radical redecorate of business strategies, because the new ERP system is predicted to substantially trade several elements of doing commercial enterprise.

H8: commercial enterprise method Reengineering (BPR) has an immediate nice impact on ERP implementation achievement.

#### **Implemented modules**

An enterprise does now not ought to behavior a full-scale implementation; at the opposite, sure modules will be implemented on the basis of its special needs and necessities. In step with Yeh, Yang, and Lin, it'd be unwise to keep away from implementing most of the to be had modules, due to the fact simplest full implementation without a doubt ensures the expected advantages. Some empirical research has argued that there is a courting among the variety of applied modules and the practical effectiveness of the ERP device.

H9: The number of applied modules has an instantaneous tremendous impact on ERP implementation achievement.

#### **Organizational**

Overall performance because it has been captured in the present observe, consists of measures of multiple dimensions, such as productivity, cycle time, value reduction, information float, and customer satisfaction. Many previous researches have investigated the effect of ERP implementation on firm performance, at the same time as its effect on

organizational performance has obtained less empirical exam. Consequently, its miles hypothesized:

H10: ERP implementation fulfillment has an instantaneous superb effect on organizational overall performance [5].

	<i>Causal Paths (hypotheses)</i>	<i>Estimate</i>	<i>p</i>	<i>Result</i>
H1	Top management support → ERP implementation success	0,26	0,000	Accepted
H2	Organizational culture → ERP implementation success	0,23	0,000	Accepted
H3	<i>External pressure → ERP implementation success</i>	-	0,098	Rejected
H4	Vendor support → ERP implementation success	0,36	0,011	Accepted
H5	<i>Project management → ERP implementation success</i>	-	0,267	Rejected
H6	Training → ERP implementation success	0,29	0,000	Accepted
H7	User involvement → ERP implementation success	0,26	0,000	Accepted
H8	Business Process Reengineering → ERP implementation success	0,35	0,000	Accepted
H9	<i>Implemented modules → ERP implementation success</i>	-	0,164	Rejected
H10	ERP implementation success → Organisational performance	0,34	0,003	Accepted

Figure 4: Results of structure model

### Outcomes of CSF on overall performance of an agency

CSFs are defined as “the restricted number of areas in which ends, if they are best, will ensure competitive performance for the organization. The principle contribution of this examine is to provide evidence for whether the claimed CSFs inside the ERP literature were empirically set up as CSFs. The examiner highlights the significance of empirically organizing CSFs as “vital” in preference to simply identifying them as candidates for being CSFs. Whilst the scope of our research is confined to CSFs in an ERP context, the authors accept as true with that the importance and implications of this research’s findings have to be viewed in a much wider context because the identification of CSFs has remained a completely popular research flow across diverse disciplines, which include management, advertising, trade, and organizational conduct and statistics structures. Thus, with the aid of supplying initial evidence inside the context of CSFs to ERP, this observe additionally makes a extensive contribution by means of putting the groundwork for the evaluate of the criticalness of CSFs in different disciplinary contexts. Such an expertise can decorate the conceptual and realistic software of the CSFs concept. Similarly, this look at’s findings can help to improve the excellent of the studies output on CSFs and expertise switch to industry. The relaxation of the paper presents a short overview of the concept of CSFs, observed by using the research technique and facts evaluation. Eventually, the findings, conclusions, contributions and barriers of the look at are mentioned [6].

CSFs identified	Some references
<i>Organisation-related</i>	
1. Organisation culture and political structure	Ngai <i>et al.</i> (2008)
2. Top management support	Žabjek <i>et al.</i> (2009)
3. Change management	Cheng <i>et al.</i> (2006)
4. Cooperation	Ngai <i>et al.</i> (2008)
5. Change agents and leadership	Motwani <i>et al.</i> (2005)
6. Cross-functional cooperation	Motwani <i>et al.</i> (2005)
7. Management readiness for change	Motwani <i>et al.</i> (2005)
8. Scope for change	Motwani <i>et al.</i> (2005)
9. Management of change	Motwani <i>et al.</i> (2005)
10. Presence of champion	Bradley (2008)
11. Business plan/vision/goals/justification	Ngai <i>et al.</i> (2008)
12. Project justification based on cost and economic scale	Ngai <i>et al.</i> (2008)
13. Retrain IT workforce in new skills	Ngai <i>et al.</i> (2008)
14. Employee moral	Ngai <i>et al.</i> (2008)
<i>Technological/ERP-related</i>	
1. Customisation of ERP	Al-Mashari <i>et al.</i> (2003)
2. Technological complexity	Chang <i>et al.</i> (2008)
3. Compatibility	Chang <i>et al.</i> (2008)
4. Legacy systems	Al-Mashari <i>et al.</i> (2003)
5. Data analysis and conversion	Somers and Nelson (2004)
6. Data accuracy	Ngai <i>et al.</i> (2008)
<i>Project-related</i>	
1. Project management	Zhang <i>et al.</i> (2003)
2. Training and education	An-ru <i>et al.</i> (2009)
3. System integration	Al-Mashari <i>et al.</i> (2003)
4. Business process re-engineering	Ettlie <i>et al.</i> (2005)
5. Full time project manager	Bradley (2008)
6. Communication	Al-Mashari <i>et al.</i> (2003)
7. Minimal customisation	Ngai <i>et al.</i> (2008)
8. Implementation strategy and methodology	Ngai <i>et al.</i> (2008)
9. Teamwork and team composition	Ngai <i>et al.</i> (2008)
10. Project team competence	Ngai <i>et al.</i> (2008)
11. Steering committee	Somers and Nelson (2004)
12. ERP selection	Ngai <i>et al.</i> (2008)
<i>Individual-related</i>	
1. Perceived usefulness	Amoako-Gyampah and Salam (2004)
2. Ease of use	Amoako-Gyampah and Salam (2004)
3. Attitude towards ERP system	Amoako-Gyampah and Salam (2004)
4. Shared belief in the benefit of the system	Amoako-Gyampah and Salam (2004)
5. Social factors	Chang <i>et al.</i> (2008)
6. Facilitating conditions	Chang <i>et al.</i> (2008)
7. Near-term consequences	Chang <i>et al.</i> (2008)
8. Long-term consequences	Chang <i>et al.</i> (2008)
9. Affect (feeling of joy or displeasure with a particular act)	Chang <i>et al.</i> (2008)
10. Users' absorptive capacity	Park <i>et al.</i> (2007)
11. Usage performance	Park <i>et al.</i> (2007)
12. User satisfaction	Bradford and Florin (2003)
13. Learning capacity	Motwani <i>et al.</i> (2005)
14. User involvement	Ngai <i>et al.</i> (2008)

Table 3: CSFs:

### How 'critical' are the CSF

On this paper based on preceding literature have come to recognize approximately three main factors for instance organizational elements, people factor and era factors. Besides this associated critical key element are discussed with these 3 principal factors.

- Organizational elements

- people elements
- Technological factors
- number of suppliers
- transport Reliability of providers
- Differentiation among suppliers
- Geographic Dispersion.

Table 4: CSFs

### **Organizational factors**

Strategic desires and targets are the basic governing forces for any business enterprise, these goals, once formulated, should be communicated correctly in any respect levels of the corporation. Effective conversation ensures role clarity among specific personnel and aligns their work to the strategic desires and objectives. All the above-mentioned components need to be properly-organized and coordinated which in addition requires a competent group and a proficient group leader. The fulfillment of cloud ERP relies upon on powerful mission control by way of those people.

### **Humans elements**

Besides aid and involvement of humans in the enterprise, there may be a need to study. The factors out of doors the boundaries of enterprise which includes cloud vendors. Deciding on a cloud seller is a vital decision. Trustworthiness - based totally on personal stories and feedbacks about supplier recognition - and competence - based totally on SLA ensures - of cloud dealer influence this decision.

### **Technological factors**

There may be a want to map the capability of cloud ERP to the modern business approaches. Any mismatch inside the same may reason problems and put off in implementation. That is resolved by opting for custom designed cloud ERP answers which may vary across distinct providers. The decision involves troubles like deciding on the cloud layers along with IaaS (Infrastructure-as-a-carrier), SaaS (software program-as-a-provider) or PaaS (Platform-as-a-service), and deployment fashions (personal cloud, public cloud or hybrid cloud). Another essential component to be considered is the mixing of facts with the carried-out cloud ERP answer. Care have to be exercised all through the conversion of information to make certain its accuracy and validity for proper system operation. On-premise cloud ERP involves good sized funding in terms of both hardware and software whereas this requirement in the case

of cloud ERP implementers is tons much less. Cloud ERP carriers provide those offerings to the purchaser wherein the latter can utilize all functionalities much like on-premise ERP in a fee effective way.

### **Deliver Base Complexity**

Supply Base” is the organization of providers from which the agency purchases its requirements. Deliver Base Complexity (SBC) is a feature of the complexity inside the supply facet of the business firm. SBC may additionally have direct implications for the organizational performance, because it has a ability to disrupt the plant functioning and affect the plant overall performance.

### **Number of providers**

The wide variety of providers is a quantitative size of the deliver Base Complexity as recognized by way of preceding works, which include Choi & Krause. It takes under consideration the range of providers related to the business organization and may be seen as the measure of density of connections between diverse nodes. Businesses may additionally strive to keep the range of suppliers on top of things in order to test the supply Base Complexity and for that reason the enter cloth pleasant

### **Shipping Reliability of suppliers**

Shipping reliability of suppliers is a qualitative size for the deliver Base Complexity. The transport reliability is a crucial parameter of supplier perform. It represents a crucial vendor attribute that is used as a selection parameter in case of more than one provider. Delivery reliability of provider may additionally have implications on the transport reliability of the consumer company.

### **Differentiation between providers**

Differentiation between suppliers is every other qualitative dimension that distinguishes providers from each other. Diverse researchers have mentioned specific standards based totally upon which suppliers can be differentiated, which include the perceived first-rate of additives price shipping time, monetary As cited in advance, the present have a look at objectives to at least one) build a conceptual framework along with the most great experiences of ERP implementation fulfillment and a pair of) take a look at that framework gathering quantitative statistics. The 9 independent factors are listed below: pinnacle management support, Organizational tradition, outside pressure, supplier aid, task management, education, consumer involvement, commercial enterprise procedure reengineering, carried out modules [7].

## Corporation, technological and community security CSF

The success elements for the implementation of cloud ERP from the organizational and technological point of view are considered for this look at.

<b>Organizational Factors</b>	<b>Technological Factors</b>	<b>Extrinsic Factors</b>	<b>Network Factors</b>	<b>Security Factors</b>
<ul style="list-style-type: none"> <li>• Strategic Goals and Objectives</li> <li>• Reduced Organization Resistance</li> <li>• Communication</li> <li>• Project Budget</li> <li>• Project Management</li> <li>• Business Process Re-engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Selection of ERP Package</li> <li>• IT Infrastructure</li> <li>• Data Integrity and System Testing</li> <li>• Functionality</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance</li> <li>• Cloud-based Segregation of Duties (SOD)</li> <li>• Global Compliance Standards and Regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Network Latency</li> <li>• Upload Time</li> <li>• Lack of Standardized APIs</li> <li>• Network Layer Complexity</li> <li>• Printing in the Cloud</li> </ul>	<ul style="list-style-type: none"> <li>• Confidentiality of Data</li> <li>• Encryption</li> <li>• Accountability</li> <li>• Maintenance [8].</li> </ul>

Table 5:CSF for cloud based ERP

## Risk elements in ERP venture

On this research discussed about the essential CSF that can grow to be a hit or ought to lead implementations risks, time and cost. They cautioned that a wrong package deal selection can lead a total project failure. Besides this, they guide and encourage for based multi criteria method for for the selection of right ERP system and vendor. This standard consist of a many factors included functionality, technology, support and costs.

ERP systems selection in multinational enterprises: a practical guide.

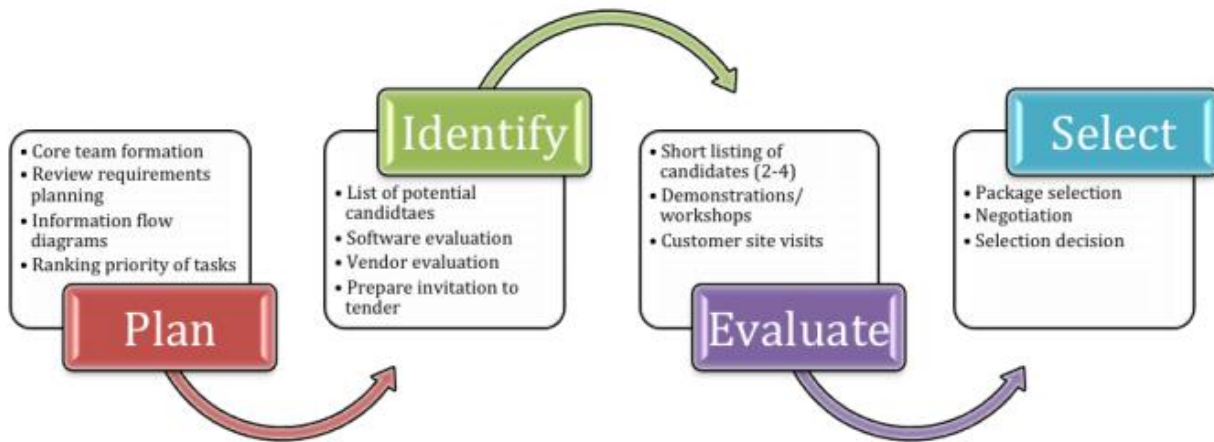


Figure 5 ERP selection framework



Multiple case study gives the information about the risk factors frequency which come into the consideration during the literature survey in ERP [8].

<b>Risk factor</b>	<b>Frequency rate</b>
Inadequate ERP selection	High
Poor project team skills	Medium
Low top management involvement	Medium
Ineffective communication system	Medium
Low key user involvement	Medium
Inadequate training and instruction	Medium
Complex architecture and high number of modules	Low
Inadequate business process reengineering (BPR)	Medium
Bad managerial conduction	Medium
Inadequate financial management	Low
Inadequate change management	Medium
Inadequate legacy system management	Low

Figure 6 Risk factors rate in literature

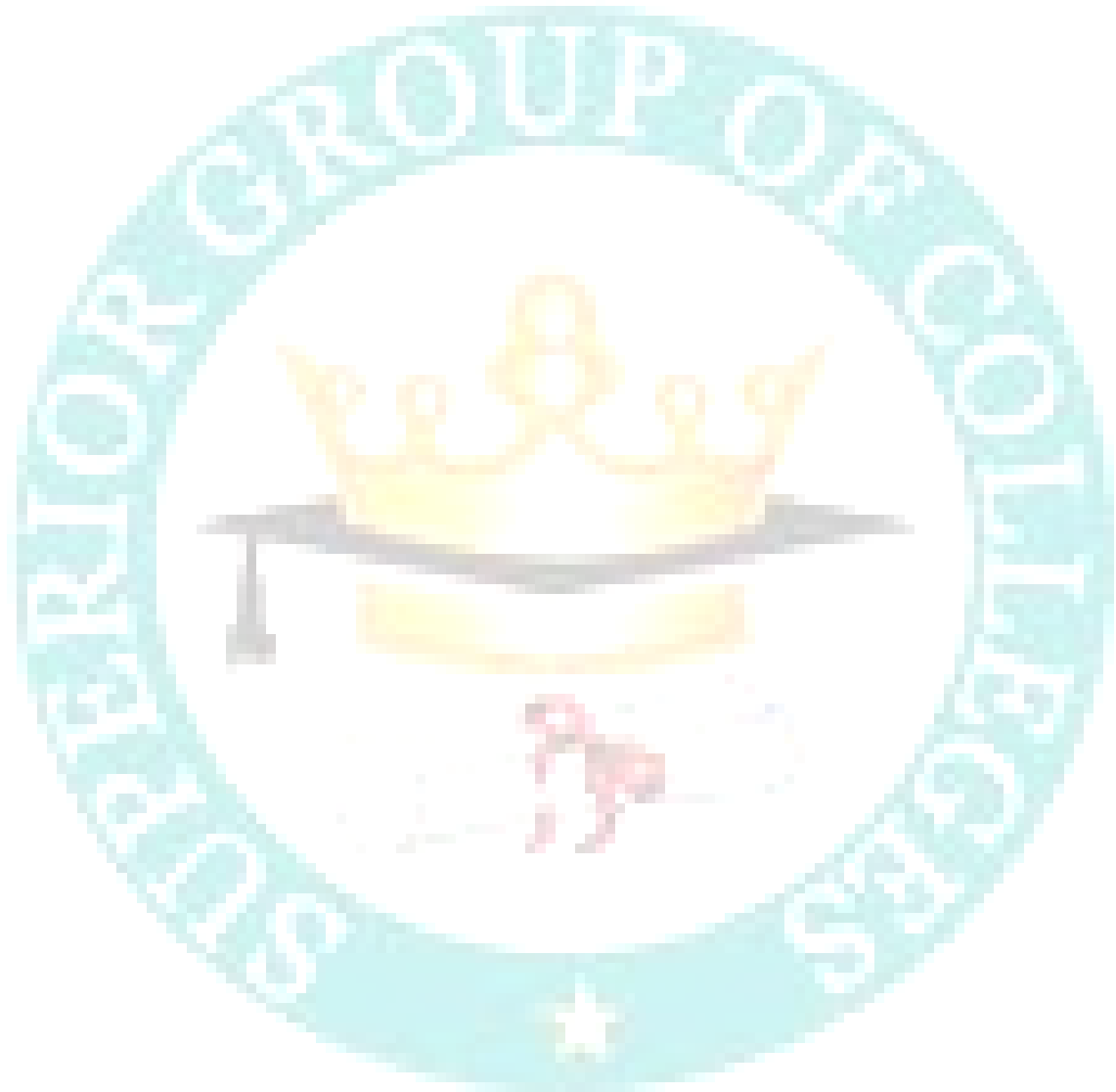
Table provides a summary of the two ERP systems, the selection criteria, and their match with the organization requirements and characteristics [8].

<b>Criteria</b>	<b>A1</b>	<b>B1</b>
ERP Functionality	✓	✓
Technical Criteria		✓
Cost and Budget		✓
Service and Support	✓	✓
Vision	✓	✓
System Reliability	✓	✓
Compatibility	✓	✓
Vendor's Market Position	✓	✓
Modularity and Integration	✓	✓
Implementation Methodology	✓	✓
ERP Package Fitness		✓

Figure 7: Selection

the choice of right ERP system and vendor. This fashionable encompasses a many factor included functionality, era, assist and expenses. Normal this frequency analysis combines 913 articles from a ramification of research, maximum of which are cited CSFs are top control assist, venture control, challenge group, and person education and exchange management. Different studies that are searching at this paper might also use similar articles

as a supply of records. Consequently, the outcome of the look at is not exactly accurate, but it offers a robust indication that management has a substantial position inside the achievement of the ERP undertaking. Under discern indicates that the pinnacle control help turned into mentioned in nearly 1/2 of the literature reviewed, the basic technical CSF is the commercial enterprise device cited by simplest 6% in literature [9].



- Top control
- Mission management
- Challenge team
- Person education
- Trade management
- Implementation approach
- Organization device
- BPR and software
- Clean dreams.

Table 6: CSFs

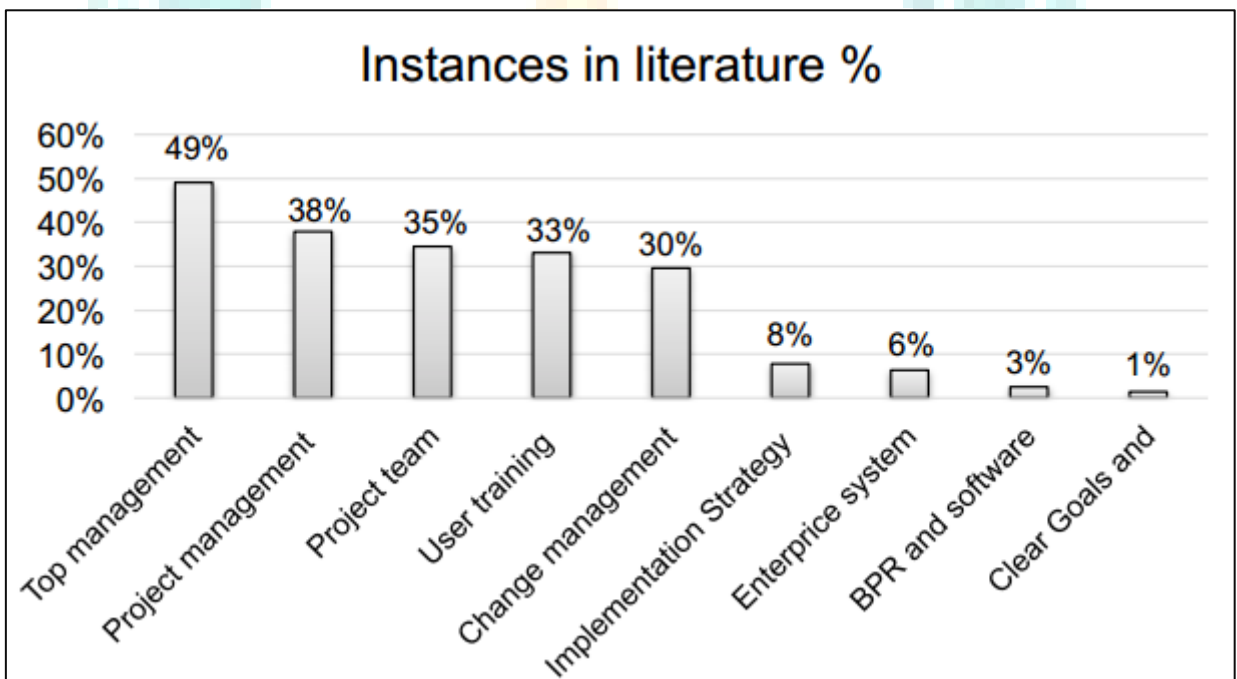


Table 7: CSFs

### Trying out CSF the use of essential evaluation

This research makes theoretical contributions. The primary is that out of the factors identified the 10 applicable elements are empirically tested within the SME context which can be given below inside the desk. Additionally, the studies play a function of the level of customization on the connection between CSFs and implementation success. The second contribution is this studies confirmed that ERP implementations cannot be seen as an ordinary idea. The consequences show that the elements influencing ERP implementation

fulfillment that may be examined deliberating the extraordinary implementation techniques. It is critical to make a difference between business method and system customization while those implementation strategies have exclusive critical success factors [10].

- Task manager
- Motivation gadget
- Co-operation with provider
- Implementation dreams
- Pre-implementation evaluation
- monitoring and comments
- rapid effect
- challenge team empowerment
- IT infrastructure
- Legacy structures

Table 8: CSFs

### Identifying CSF for low customize ERP

Preceding studies identified many success factors appears necessary for implementation of SMEs, there is probably a sequence wherein achievement elements become vital for success, now not all success factors are vital for corporations, that are practice inside the initial ranges of implementation of SMEs, and a few success elements seem to most effective be essential for business enterprise's that have already grow to be superior. This insight into the temporal nature of success elements contributes to the existing literature in methods. First, our findings provide a more expertise of the criticality of achievement elements, suggesting that instead of being static in nature, achievement issue criticality adjustments throughout a company's lean adventure. In addition, confirmation in research and in a larger pattern however, those findings can help to strengthen the frame of information. Second, the look at additionally makes a methodological contribution in showing that some relationships are higher analyzed using a essential angle [11].

- Pinnacle control assist
- Shared development vision
- Exact verbal exchange
- Leadership
- Human beings' attention
- Enough sources

- Improvement training
- Performance management machine
- Supplier hyperlink
- Patron link
- Help congruence

*Table 9: CSFs*

### CSF for the implementation of SMEs

Carrying out the research has won us deepen information approximately the maximum vital elements, knowing why they are essential, and viewing the diploma of importance from 3 extraordinary perspectives (agencies, experts, and companies). In a phrase we can say that we've got fulfilled our studies motive. Besides answering our studies questions, the more findings upload our information of the actual commercial enterprise international. We then got here up with 11 factors that we thought were vital for a hit ERP implementation [12].

- Pinnacle control support
- Organizational way of life
- External stress
- Seller support
- Venture management
- Training
- User involvement
- Commercial enterprise system reengineering
- Carried out modules

*Table 10: CSFs*

### CSF for implementation of ERP in Belgium SMEs

The biggest fraction of the critical success elements located in the literature applies to the Four implementations studied. This shows that a majority of vital success elements which can be valid for massive organizations are also applicable to SMEs. The maximum important crucial success factors for SMEs diagnosed on this observe are [13].

- Clean imaginative and prescient of the strategic desires of the ERP implementation
- Senior management help
- Active consumer involvement
- An appropriate corporate lifestyle this is open to change

- Internal communique at the ERP undertaking, both before and at some point of the mission
- Right management of the ERP dealer
- A formalized task method and methodology
- A focal point on person necessities
- The usage of external experts
- Person education, both on technical factors and on enterprise aspects, oriented
- Toward practice
- Proper venture making plans, phasing and comply with-up
- Proper mission management
- A task team, composed of a combination of users, i.e. Internal technical and enterprise
- Specialists and outside representative

*Table 11: CSFs*

### Effective CSF upward push blessings of ERP

Correctly applied ERP software program have numerous benefits like real time records get right of entry to, future forecasting, stepped forward purchaser's dating, business cohesion, interdepartmental communique in much less time. This paper proposed a model to assume on security troubles which generally are ignored via numerous organizations due to fee, attention. In beyond days getting records become lengthy and time consuming. However, in keeping with the developing desires short get entry to of actual time facts is required which is feasible through a software. A software program that could be a mixture of all included utility or modules. ERP is a type of software program solution with the aid of which many groups or organization are coping with their tasks profitably. A few employers like Cisco use ERP to deal with its assets. Cisco's ERP system is the backbone that enabled international Networked commercial enterprise based totally on electronic communications with its customers, employees, suppliers and commercial enterprise partners for connecting to every other constantly [4].

Use of ERP in the main at college level, economically and business level exist from many years however in school very rare. We want to get reviews from the scholars approximately ERP implementation in schools. For it we endorse integrating getting to know unit ERP based totally sport for introducing ERP systems [5].

Previous research has identified a huge range of CSFs for ERP implementation success or Change overall performance consequences. The authors proven that a limited quantity of CSFs was empirically investigated for their position in, and effect on, implementation success or post-implementation performance results. Even as reporting the factors that have some evidence to support them, the authors query the application of the general concept of CSFs [7].

(ERP) and cloud computing are becoming increasingly critical in the world of data technology (IT) and communicate. However, deploying traditional ERP systems can be difficult and often high-priced and useful resource intensive. But, with the emergence of cloud-based totally ERP answers, it has lower cost implications than conventional ERP. The objective of this studies is to approach the applicable concepts multi-dimensionally, illustrating the advantages and demanding situations of cloud-based ERP on schooling and proposing a cloud-based ERP solution that could follow to any instructional organization in Vietnam [13].

#### Implementation challenges discussed in earlier work

Challenges in imposing a Cloud based totally ERP solution vary to a degree depending on whether the implementation is from scratch or a migration from an existing option to a cloud as SaaS. Besides this key venture are common to both methods like identifying the foremost architectural and licensing fashions, records safety inside the cloud and shortage of confidence, problems related to technological aspects as of set up, migration, preservation, testing and so on. Issues because the performance, reliability of the cloud-based totally ERP, complete tracking, investigation and constructing agree with inside the implementation of the cloud-based ERP, troubles associated with mobile get entry to and provisioning, customization to the agency wishes, confined assets and finances, low cognizance and belief about ERP, user on boarding and education [15].

ERP benefits to business in step with this paper associated with Operational are value reduction, cycle time reduction, productiveness development, statistics satisfactory development, client's offerings improvement. From the point of managerial are better aid management, better selection making, and better performance manage. From the factor of strategic are supports contemporary and destiny business growth plan, supports commercial enterprise alliances, helps price leadership, supports product differentiation, supports external linkages, permits labored extensive growth and enables enterprise. From IT infrastructure are extended commercial enterprise flexibility, it value discount, extended IT

infrastructure capability. And from the organizational factor of view are supports business organizational modifications, facilitate enterprise learning and broaden employee competencies, empowerment, modified employee conduct with a shifted cognizance and better employee morale and pride [17].

A step-by-step method for ERP implementation is proposed and applied in three businesses. Inside the first method a 5 level ERP implementation version is proposed which are organizational readiness evaluation, ERP selection, ERP implementation, ERP final practice and ERP stay run. In addition detail approximately sub elements in the above 5 fundamental elements like ERP value and advantages manage, traceable operation cost, periodic gadget performance evaluation, fantastic patron satisfaction, machine operations performance, worker productivity and delight, sufficient preservation budget, effective verbal exchange, dealer control, inside the 2d method approximately eighty vital success elements (CSFs) from the literature are interpreted into key overall performance indices (KPIs) which might be related to each stage of ERP implementation by way of ten nearby ERP specialists. And inside the ultimate and 1/3 method the weights of the KPIs are calculated using the Dumpster-Shafer method and the evaluation of ten experts. At some point of the implementation procedure the performance is measured at every degree and remedial actions are diagnosed if the overall performance is underneath expectation. An implementation flowchart is advanced based on a 5-degree model and the philosophy of continuous development. 3 motion cases in Chinese production organizations are carried out to demonstrate the outcomes of the evaluation model, which is likewise presently being utilized by a consulting company focusing on ERP implementation. Within addition assessment by neighborhood professionals, the model can function a guiding principle for ERP implementation in different countries [18].

This paper is geared toward featuring a link between the issues of cloud supplier and the CSFs which can be labeled as organizational, human beings, and technological elements. Structural Equation Modeling (SEM) was used to establish whether there may be any moderating impact of compliance, community, and protection at the CSFs for SMEs in India. Perspective of 208 respondents belonging to SMEs changed into taken into consideration and it became observed that most effective the relationship of organizational factors with a hit implementation of cloud ERP changed into moderated. There has been no vast impact on the human beings factors and technological elements by the moderating variables compliance, community, and protection [19].

## Cause of ERP failure

As a hit implementation tasks of ERP are beneficial for implementing an employer then in case of failing ERP initiatives has tons negative effects which affect your business as well as ERP supplier. Consequently, be carefully about all of the factors that might have an effect on the achievement of ERP projects. The most often mentioned CSFs are top control support and dedication, training and education, venture control, clear imaginative and prescient and targets of the ERP gadget, cautious exchange control and Interdepartmental conversation. This paper observed the CSFs from the prospective of stakeholders. This study had provided pivotal CSFs for the implementation of ERP. It also displays the ordered of these factors which might be essential in keeping with the stakeholders. And categorization the elements undoubtedly and negatively that affects the ERP implementation in line with the stakeholders. On this manner this work facilitates the participants of new stakeholders for deciding on right factors. Thus, in this way they can get high comparative performance and might emerge as a success an ERP [1].

Even though a success implementation of an ERP task can supply strategic competitive Blessings, sizeable enhancements in performance, productiveness, and first-class, organizations Come across sort of difficulties within the adoption procedure. Alas, many establishments have Said ERP implementation to be fraught with disasters due to the type of demanding situations [2]. Rock-art defined CSFs as constrained variety of regions which could lead an agency to have a competitive advantage over the others. If the implementation of those factors isn't completed in an effective and timely way, then the final results of the business enterprise will be much less than predicted [8]. ERP structures nearly used in all kind of businesses today. They display structure of an organization, integration of companies and cross organization collaboration. Give up user schooling on ERP systems is highly-priced however required to stop refusals of gadget use and assignment failures [5]. ERP systems exist in a huge range of integrated packaged software program structures that support the all operation of an employer. For this purpose, an organization need a big investment. All through the literature survey come to recognize that many ERP failed due to the lacking capability in line with the commitment. Consistent with the survey which performed in the America 70% venture changed into being a hit. And 55% ERP undertaking failed because of exceeding the finances in accordance various organizations. According to this survey the fee of achievement of the implementation of ERP does no longer technique 50% [8]. A crucial fulfillment aspect (CSF) is this kind of thing which can make a hit ERP

and then drastically improves the adjustments of a hit undertaking implementation. There is no fashionable consensus on the critical success elements of an ERP implementation [6]. CSFs are described as “the limited quantity of regions in which ends, if they're satisfactory, will ensure competitive performance for the company [7]. Cloud computing is becoming greater popular within the data and communications era (ICT) global and is certain to revolutionize it. The maximum sizeable purpose for this is the search for an adaptive and dynamic IT infrastructure, which does now not save you enterprise improvement [13]. ERP systems were completely covered now not simplest in mainstream of information generation (IT) periodicals however also in instructional literature due to substantial adoption by companies in the closing two decades [16]. An ERP system is a commercial software package deal brings benefits consequences if it is correctly deployed [18]. Deciding on elements without justification is considered as a significant challenge [9].

Security is crucial for ERP structures, among the modern-day structure's recognition on confidentiality elements of safety problems exist in each side of an ERP device. Those sides are classified into 3 categories: network layer, presentation layer, and application layer. Because the ERP turns into extra internet based totally, the security problem inside an open system will become crucial. Lots of the focus on ERP protection has been on confidentiality. The top 3 reasons for the failure of IT-associated initiatives, as noted through IT managers surveyed with the aid of statistics Week, were terrible making plans or bad control (mentioned by way of 77%), alternate in business desires at some point of the project (75%), and shortage of commercial enterprise control support (73%). As a result, maximum IT-related projects fall far brief of their ability payback, and 26% are canceled before of entirety [21].

The fulfillment fee of business enterprise useful resource planning (ERP) implementation is less than 49% round the world owing to its complicated nature. The important thing attention of information gadget (IS) researchers has been to explore the approaches to reduce threats to ERP implementation posed in particular by means of person resistance. Although the motives for person resistance have already been treated in previous studies, our understanding of how users assess a brand-new ERP machine within the pre-implementation section and what activates their choice to withstand it's far away from complete. A reason for person resistance or ceases-consumer grumbling from the perspectives of popularity quo bias and technostress turned into found to be lacking. So that it will fill this hole in studies, the model proposed in the present look at integrates repute

quo and technostress, hence throwing light on the end-user grumbling behavior that precedes the implementation of a new ERP gadget. Records became gathered via a survey questionnaire disbursed to 221 respondents from 5 exceptional manufacturing industries in Bangladesh that are presently inside the technique of installing the famous SAP ERP machine. Results of this examined version indicate a sizable effect of the constructs of reputational bias and technostress on give up-user grumbling. Additionally, quit consumer grumbling has positive sizable impact on symbolic adoption. Furthermore, the paper discusses common approach bias and the limitations of the study, even as providing an outlook for destiny studies [14].

ERP systems not best growth the know-how processing abilities but additionally boom the success of businesses via utilizing them successfully. But almost nearly all of the firm has been failed in enforcing and efficaciously used ERP systems. Therefore, for lowering the failure danger in the main firms focus on essential fulfillment element (CSF) during ERP implementation. A capital investment mentioned in the literature for vital success thing and dealing with massive wide variety of factors selection makers face difficulties, need a real time software or version to solve this problem. A structural version is proposed for concluding ERP CSFs. This model breaks up into two phases. The primary phase of the explains the interpretive structural modeling this is followed for structuring CSFs inside the hierarchical shape. And 2nd phase explain the hierarchical form of based CSFs which are concluded via fuzzy cognitive maps. The proposed version is implemented in one of the large Turkish ERP vendors to display the applicability of the model. Corporation aid making plans (ERP) gadget is a packaged software program which offers an incorporated technique to the corporations for processing required records and effective use of assets. An ERP gadget suggests a set of practical skills to take the form which can match a business version.

Realistic life indicates that many companies were unsuccessful in imposing ERP systems. And now not used efficiently. Therefore, the all firm's consciousness their attention to important success factors (CSFs) to lessen the threat of failure in ERP implementation. Even though many CSFs has been suggested inside the literature, however nevertheless selection makers face problems in handling massive variety of factors. It approaches to solve the trouble we want this sort of model that can be clean in control and information in habitual actual lifestyles. Therefore, a -manner structural model is proposed for identifying ERP CSFs. Within the first phase of the look at, explanatory structural version is used to structure

CSFs in a hierarchical form. Inside the 2d segment, hierarchically based CSFs are evaluated by the usage of fuzzy cognitive maps. Vital historical past facts concerning the Interpretive Structural Modeling (ISM) and Fuzzy Cognitive Maps (FCMs) are furnished. Importantly complex technical, organizational, cultural, and political troubles make the combination process a very challenging undertaking. Besides this failure prices of these initiatives are very excessive. Its miles said that ERP projects are 178% over budget, taking 2. Five times longer than anticipated and handing over best 30% of promised blessings [2]. Contribution of this paper to the literature is given under.

- ISM method is implemented for the analysis of ERP CSFs first time in literature. ISM technique is used to form such a hierarchy that may be easily manage within the context of ERP CSFs.
- diagnosed the relationship among the ERP CSFs through FCMs. Clear issue of the proposed version is that FCM simulation is finished for deriving priorities of CSFs inside the hierarchical evaluation structure.
- The proposed evaluation model can handle through both manner structuring and evaluation of CSFs.

The proposed model solves the experts' perceptions into a visual and interpretable model by using relationships among CSFs. A real-life case study is provided for evaluating ERP CSFs. In the first phase discuss ISM and in second phase FCM for showing relationship among CSFs. The proposed model is implemented in Turkish for expressing the applicability of the model. The main limitation of this proposed model is that highly dependent on the expert's perceptions. Results are difficult to be generalized. And second thing is that the results might represent single-sided views [2].

Hidden variables in the literature section the various hidden variables and the concern factors that help to explain these variables have been unveiled.

### CB-ERP (Cloud Based -ERP)

ERP coordinates the two procedures and elements of an organization making a consistent, proficient and more straightforward method for executing business activities. There are two types of ERP are deploying extensively with the purpose that corporations can utilize it, specifically, first is traditional ERP and secondly CB-ERP services. In a traditional ERP solution, real time monitoring of system, maintenance and development of IT-Infrastructure belongs to an organization. As traditional /on premise ERP is much expensive than CB-ERP due to affordability of highly paid experience team, IT infrastructure, hardware, software and maintenance cost. Due to the awareness about that thing business

organizations are excited to move their ERP towards CB-ERP solutions. In light past three aspects organizational, technological and people related factors, which have a successive impact on the implementation of CB-ERP [28].

### Organization Factors

The fundamental administering capacity for any organization are the strategic objectives and goals [28]. These targets, once defined, ought to be keep in view at all stages of the organization. Communication also an important part of an organization. So, captivating communication guarantees part of lucidity among various employees and adjusts their work according to the strategic objectives and goals [31]. While choosing the usage technique, usually business organization has to face various types of problems for example, decision about the adoption of cloud ERP bundle, vender's agreement conditions for hiring their services, and administration and estimation of ERP execution accomplishment in connection to extend expense allocated for the entire exercise [31]. The greater part of the previously mentioned perspectives ought to be efficient and composed which additionally requires a skillful group of competent teams and a leader of the Crew who splendid in his work area. The success of CB-ERP is based upon a success venture administration by means of those individuals. Besides this inside an organization not only need person involvement and support however also a focal point at the elements which can be even outsides from the business enterprise's frontier such as cloud service providers. It's a crucial step to select a cloud service company. To judge the reliability associated carriers few matters must be in view. The primary issue you can decide a vendor by your private revel in, secondly feedbacks from the people approximately dealer that have used their services and the 0.33 SLA (service degree settlement) assurances, this stuff have vast impact inside the choice of cloud vendor [26].

### Technological factors

There may be a want to map the capability of C-ERP (Cloud-ERP) to the contemporary enterprise approaches [33]. Any mismatch inside the same may motive troubles and put off in implementation. This is resolved by using opting for customized C-ERP answers which may vary across one of a kind vendors. The selection includes troubles like selecting the cloud layers consisting of IaaS (Infrastructure-as-a-service), SaaS (software-as-carrier) or PaaS (Platform-as-a-service), and deployment models (non-public cloud, public cloud, community cloud, or hybrid cloud). Another crucial factor to be taken into consideration is the mixing of records with the implemented C-ERP solution. Care ought to be exercised for

the duration of the conversion of information to make certain its accuracy and validity for correct system operation [23]. On-premise C-ERP involves vast funding in phrases of each hardware and software while this requirement within the case of cloud ERP implementers is a good deal much less. Imperatively, corporations identified 4 relevant factors. 1) number of providers 2) delivery Reliability of providers 3) Differentiation between suppliers four) Geographic Dispersion.

### Organizational overall performance

Organizational performance has been measured through the subsequent parameters a) economic performance b) advertising and marketing performance.

### Monetary performance

Financial performance metrics stays one of the maximum outstanding metrics hired to access performance in organizations accordingly, we integrated three most essential parameters from [25, 27, and 34] to degree the financial overall performance, viz., (a) average go back on investment, (b) average income, and (c) profit increase.

### Advertising and marketing performance

Each monetary and advertising performances were used together in past to recognize the outcome of the deliver chain manner for this reason, we included advertising overall performance as any other variable in our version. We use three parameters previously utilized by [25, 27, and 34] to seize the marketing overall performance, viz.: (a) average marketplace share boom, (b) common sales quantity increase, and (c) average income (US dollars) increase. The relationship among CB-ERP offerings and the performance isn't always a only linear courting and it's been hypothesized that it's far moderated with the aid of the supply base complexity. Primarily based on preceding instructional literature evaluate, the hypotheses formulated on this examine are as follows:

H1: CB-ERP services have a superb effect on the SMEs.

H2: CB-ERP services have a high-quality impact at the economic performance of an organization.

H3: CB-ERP offerings have a wonderful impact on the advertising performance of a company.

### Survey method

An internet survey is carried out in Pakistan wherein the questionnaire is first pretested by using 7 respondents to ensure the validity, readability and usability of the questions. A Overall of a hundred seventy-five filled questionnaires are taken into consideration for this observe and the information is standardized wherein there's no case of lacking statistics, no

0 variance, and no rank associated issues located. Likert scale of one to 5 is used in which 1 is considered as strongly disagree, 2 as disagree, 3 as impartial, 4 as agree, and 5 is taken into consideration as strongly agree. This scale is used in this look at as the distance between any consecutive parameters is equal. For example, the gap between categories 2 and three is same as distance among classes four and 5 of the Likert scale [41]. In table 1, we can see the respondents' profile. That has been taken into consideration for this observe.

In this section, we talk the results of the findings drawn out of the records analysis from the theoretical views, in addition to how it can upload fee to the managerial elements. This segment is divided in the following three sub-parts: theoretical contributions, managerial implications, and obstacles and further research.

### Theoretical contributions

We've got used Contingent resource-based theory to provide an explanation for the position of cloud-based totally ERP services on the performance of a company. Extant literature considers supply chain as a treasured resource and deliver chain competencies as differentiating factors for achievement. SMEs with the assist of CB-ERP has established giant in phrases of higher transport, consumer trouble fixing, optimizing inventory and minimizing costs to clients. On the other hand, ERP functionalities may be availed on a application basis and a miles more price-effective manner by switching to CB-ERP. Although the extant literature talks approximately the significance of ERP integration of CB-ERP and impact of it on organizational performance, and the significance of C-ERP for business groups; the relationship most of the above-referred to phenomenon is not completely explored and empirically tested.

As a result, findings of the existing paintings make contributions to present literature in phrases of knowledge the connection of cloud ERP with supply chain performance and typical overall performance of the enterprise with it working as a contextual influencer or moderator within the above relationship utilizing the contingent aid-primarily based view. Because the organization's wanting to evolve and regulate to the ever converting internal and outside surroundings, we used Contingent aid based totally View principle to explain the conceptual model (Brandon-Jones et al., 2014). This idea mitigates the static nature of the RBV principle and that is obtrusive from parent 1, wherein it's far visible that the latent variables used on this observe hold on changing primarily based at the internal and external environments.

## Managerial implications

Now, extra than ever, commercial enterprise corporations are searching out methods to improve their cost Performance and growth average overall performance. Primarily based at the findings of our contemporary study Highlighting the tremendous impact of Cloud ERP on deliver chain overall performance moderated by Supply base complexity, involved commercial enterprise groups ought to recall enforcing Cloud ERP, which is a fee-powerful manner of integrating the enterprise strategies and improving. The work performance [24, 25,27]. Within the gift work, we have tried to empirically affirm the effect of Cloud ERP on supply chain overall performance moderated through supply base complexity. It has implications for managers in phrases of expertise the fine effect of cloud ERP on deliver chain overall performance. Knowledge how diverse factors of supply base complexity (quantity of providers, reliability, differentiation among providers and geographic dispersion) can slight the overall performance can help managers formulate appropriate strategies and streamline their Operations.

Although the prevailing paintings generates insights on a sizeable aspect of cloud ERP based totally Organizational performance, some limitations exist in phrases of sample length and region. First, considering we conducted the have a look at in India where the potential of cloud ERP remains no longer absolutely found out, the results can also mirror extra of perceived usefulness of this technology. 2d, growing the sample size might also lead to more significant effects. 0.33, we have attempted to apprehend the relationship between cloud ERP and organizational overall performance which might not be the best moderator affecting such relationship. As a result, destiny research may be performed to discover and empirically affirm different deliver chain related factors like supply chain resilience or deliver chain hazard as moderators. Also, CB-ERP device can be hired to analyses huge records sets and this capability could be a big increase in Clubbing the advantages of cloud computing and big records predictive analytics. Sooner or later, the theoretical lens (caused assumptions about both recognized variables and relationships, which must result in further empirical investigation soon.

<b>Latent Variable</b>	<b>Measurement Constructs</b>
Organizational Factors	<ul style="list-style-type: none"> <li>• Strategic Objectives &amp; Purpose</li> <li>• Project management</li> <li>• Effective Communication</li> <li>• Implement Strategy</li> <li>• Project Budget</li> <li>• Organizational Resistance</li> <li>• Business Process Re-engineering [19]</li> </ul>
Folk Factors	<ul style="list-style-type: none"> <li>• User involvement</li> <li>• Selection of Vendor</li> <li>• Top Management System</li> <li>• Training of User</li> <li>• Trust on Vendor [19]</li> </ul>
Technological Factors	<ul style="list-style-type: none"> <li>• IT Infrastructure</li> <li>• Data Integrity and System Testing</li> <li>• Functionality [8]</li> </ul>
Financial Performance	<ul style="list-style-type: none"> <li>• Average Return on Investment</li> <li>• Average Profit</li> <li>• Profit Growth [41]</li> </ul>
Marketing Performance (MP)	<ul style="list-style-type: none"> <li>• Average Market Share Growth</li> <li>• Average Sales Volume Growth</li> <li>• Average Sales (US Dollars) Growth [41]</li> </ul>

Figure 8: Latten Variable

In the below table many factors have categorized at the bases of similar role are presented in different papers and article by different researchers.

(CSF) Critical success factors for ERP implementations	1. Critical Success Factors in ERP Implementation (2005)	2. Critical success factors for ERP implementations in Belgian SMEs (2010)	3. Critical success factors for ERP implementation in SMEs (2016)	4. Implementing lean practices in manufacturing SMEs: testing 'critical success factors' using Necessary Condition Analysis(2018)	5. Identifying the Critical Success Factors for Low Customized ERP System Implementations in SMEs (2018)
1. Top management support	✓	✓	✓	✓	
2. ERP strategy	✓				
3. Business Process Reengineering	✓		✓		
4. Project management		✓	✓		
5. Project manager					✓
6. Project team empowerment					✓
7. Implemented modules			✓		
8. User involvement			✓		
9. training			✓	✓	
10. Improvement training					
11. Vendor support	✓	✓	✓		
12. Organizational culture	✓	✓	✓		
13. Cultural diversity	✓	✓	✓		
14. External pressure			✓		
15. Vision, scope, and goals		✓			
16. Implementation goals					✓
17. Shared improvement vision				✓	
18. Retain the experienced employee	✓				
19. Effective communication	✓	✓		✓	
20. Problems anticipation (troubleshooting, bugs, etc.)	✓				
21. Monitoring and evaluation of performance	✓				
22. Monitoring and feedback					✓
23. Performance management system				✓	
24. Infrastructure		✓			
25. IT Infrastructure					✓
26. Leadership				✓	
27. Supplier link				✓	
28. Customer link				✓	
29. Support congruence				✓	
30. Sufficient resources				✓	

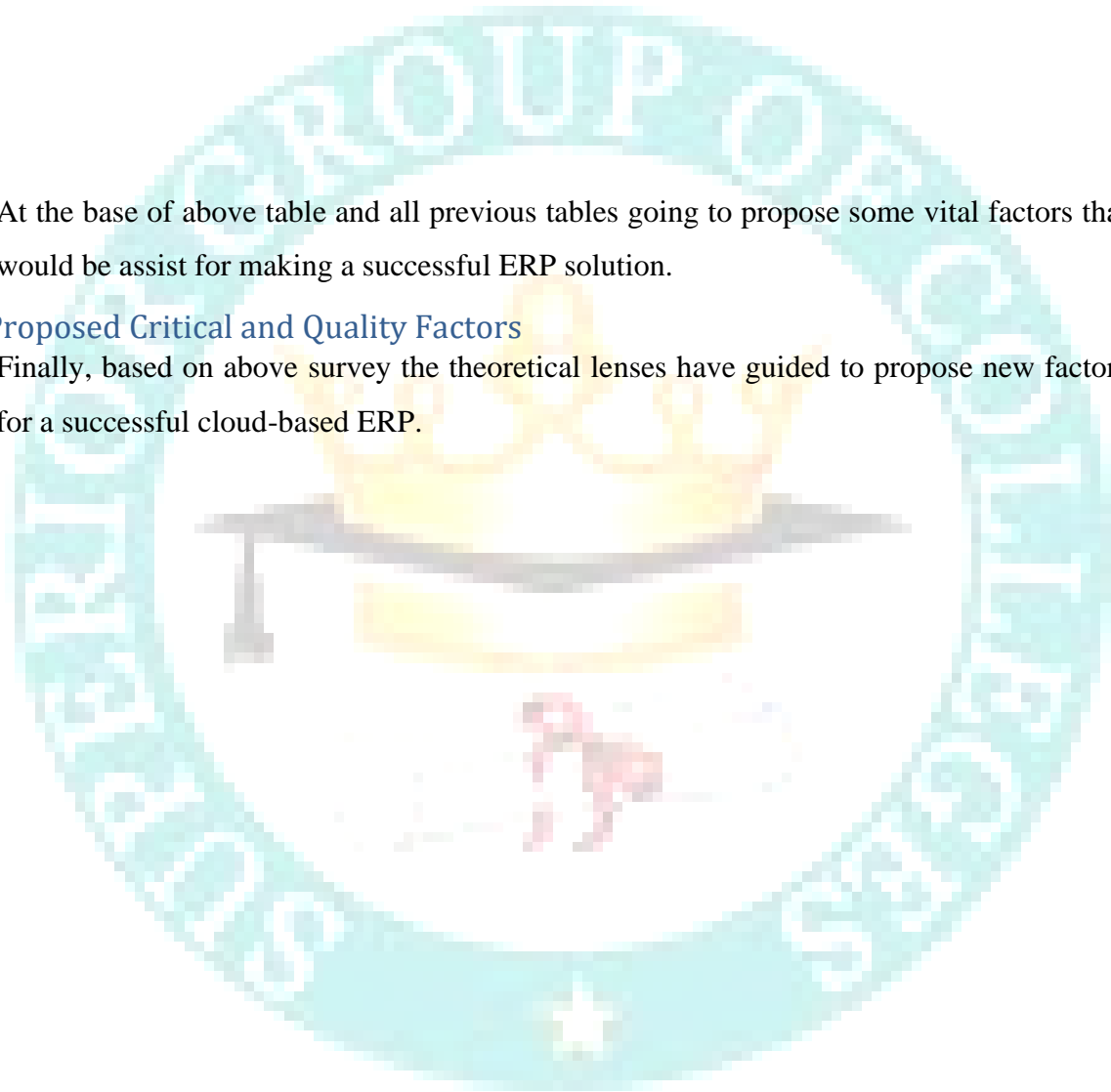
31. Pre-implementation analysis					✓
32. Motivation system					✓
33. Legacy systems					✓
34. Fast effect					✓

Table 12: Common CSFs catagorize

At the base of above table and all previous tables going to propose some vital factors that would be assist for making a successful ERP solution.

### Proposed Critical and Quality Factors

Finally, based on above survey the theoretical lense have guided to propose new factors for a successful cloud-based ERP.



(CSF) Critical success factors for ERP implementations	1. Critical Success Factors in (2005) [3]	2. Critical success factors (2010) [8]	3. Critical success factors for ERP implementation in SMEs (2016) [9]	4. Implementing lean practices (2018) [10]	5. Identifying the Critical Success (2018) [11]
	(2005)	(2010)	(2016)	(2018)	(2018)
External pressure	X	X	X	X	X
<b>Vision, scope, and goals</b>		✓		✓	✓
Review meeting (examination, inspection)	X	X	X	X	X
ERP strategy	✓	✓	X	X	X
Retain the experienced employee	✓	X	X	X	X
Problems anticipation (troubleshooting, bugs, etc.)	✓	X	X	X	X
Monitoring and evaluation of performance	✓	X	X	✓	X
Technical aspects	X	X	X	X	X
<b>Infrastructure environment</b>	X	✓	X	X	X
Quality factors	X	X	X	X	X
Communication	✓	✓	✓	✓	X
Roles and responsibilities	X	X	X	X	X
Committed employee	X	X	X	X	X
Selection of ERP vendor	✓	✓	✓	X	X
Project budget	✓	X	✓	X	✓

Table 13: Identified gaps in CSFs

## Chapter 3 RESEARCH METHOD AND DATA

The empirical part of this thesis aims to find the CSF for CB-ERP systems and which factors influence to this adoption process as successful and failure. Based on the research questions and theoretical part of this study, the author has conduct data from five entities working with ERP solutions in the software-house and companies to get insight into the subject field. In addition to that, the author has got interview data from its customers, which includes customers' overall view towards their current ERP solutions and how the whole solution and service could be improved. By leveraging the data, the target of this part is to gather view and understanding of company's customers' adoption of cloud ERP system. This chapter introduces research design, data collection and data analysis methods, also reliability and validity are explained.

### List of proposed CSFs

A list of proposed critical factors was provided to different 5 companies and software-houses, to authenticate the factors or to identify the factors that are useful to make the ERP solution successful. The provided list and the company or software houses list is given below.

<b>Critical Success Factors (CSFs)</b>
Top management support
Organizational factor
<b>Vision, scope, and goals</b>
Productive re-view meeting (examination, inspection)
Communication
Implementation ERP strategy
Hold the experienced employee
Problems anticipation (troubleshooting, bugs, etc.)
Project budget
Monitoring and evaluation of performance
Technological factor
<ul style="list-style-type: none"><li>• IT infrastructure</li><li>• Selection of ERP package</li></ul>
<b>Infrastructure environment</b>
Quality factors
<ul style="list-style-type: none"><li>• Regular updates</li><li>• Functionality</li></ul>

<ul style="list-style-type: none"> <li>• Integrity and system testing</li> </ul>
Roles and responsibilities
Committed employee
Concern factors in Cloud <ul style="list-style-type: none"> <li>• Compliance</li> <li>• Network</li> <li>• Security</li> </ul>

Table 14: List of proposed CSFs

On this bankruptcy study's methodology of this look at is described in high-degree. Empirical research desires to have a research layout, which has said to be "the logical series that connects the empirical statistics to a take a look at's initial studies questions and in the end to its' conclusions" [47]. Quantitative analysis is based totally on reading causalities and correlations often from numerical data. Then again, qualitative analysis targets to describe, recognize and explain a sure phenomenon taking place in our truth. Qualitative evaluation is frequently performed with interviews, perceptions, text reading and by way of combining techniques [48,49].

A qualitative look at can be completed in many ways, and all the studies techniques have some blessings and disadvantages. Following 3 situations affects to the selection of the method; kind of studies questions, manager of investigator and creator to real behavioral activities and focus of phenomenon – whether it's miles modern-day as opposed to ancient. Target of this have a look at is to gather, in depth records from a small sample and due to this requirement, the exploratory case study become selected as a technique to conduct this have a look at. Consistent with Robson [47,50], the case studied may be for instance organization, or whatever that creator is interested in, the phenomenon about ERP gadget shifting to cloud-based answers is the case of this study. The intention of the look at is to gather new insights and additionally check phenomenon within the new light, and based on those deductions, exploratory technique may be visible as appropriate for this examine. [50] by the usage of case look at, it's miles feasible to study "real existence" conditions and strategies and to reply questions "how," "why," and an exploratory examine also gives the opportunity to reply the "what." [51,50,47] in this observe, one specific phenomenon is studied, so the look at is the use of single-case design because the goal of the look at is to

affirm whether elements identified to power or prevent SaaS ERP adoption are widely widespread amongst practitioners too [50].

When the intention of the look at is to find solutions and factors to the “what,” “how,” and “why,” related to sure topic, non-established interviews which includes semi-established and in-intensity interviews are used [52]. In this observe, the target is to enhance expertise of the factors riding or stopping cloud ERP machine adoption decision-making via using semi-dependent interviews. This method enabled the interviewer to outline questions round subject matters but on the equal time during interviews discussions with interviewees had been able to float within the limit of the subject matters. This shape of interview supported the statistics series because it enabled to adapt questions along the interview and get insights from various elements, depending at the interviewee [52, 49].

In qualitative analysis, the suitable target institution for interviews is chosen, and all instances are handled as precise. There may be no absolute measure for sufficient quantity of data, but it's far regularly measured with saturation, that means that, for instance, interviews are continued till the author decides that any new records are now not added to the cloth [51]. In this have a look at creator considered that six interviews had been supplying enough records approximately the subject. In this thesis, interviews' target group turned into confined to few criteria. All the selected interviewees have labored with ERP systems to make certain that each one of the interviewees have an appropriate knowledge within the difficulty discipline. Secondly, interviewees were operating in exceptional roles within the consumer interface related to ERP structures, principally amongst sales and consulting, to permit exclusive views at the situation. One requirement was that they have got all been running amongst these answers at least 5 years assuring that they've enjoy with distinctive clients and evolution of solutions during their career. In table 4, interviewees are added.

Table 15: List of Interviews

<b>Interviews</b>	<b>Role</b>	<b>Experience in ERP system</b>
C1	Integration architect and team manager	7 year
C2	Solution sales	13 year
C3	Lead consultant	8 year
C 4	Project Manager	15 year
C5	Business consultant	15 year
C6	Consultant	7 year

Interview statistics from the clients are giving additional input to this thesis by way of displaying customers' actual factors with ERP systems and widening the knowledge of the elements driving and preventing the adoption of cloud ERP system. Interview records consists of 9 clients who are the usage of a few ERP solution now and function within the Nordic market, and issues protected inside the interviews may be discovered from. Issues protected within the patron interviews. Not one of the interviewed customers had been but using cloud primarily based ERP

Solution. Interviews had been conducted with the aid of consultants working in IT enterprise during 2016-2017. Interviewees had been selected by using the organization representatives. The aim of the interviews turned into to gather complete view approximately the issues which must be progressed with ERP structures from the clients' point of view.

Interview questions for the look at are based at the theoretical a part of this have a look at, studies questions and writer's mixtures of these. The goal of the interviews become to collect extensive sufficient view about the situation. Questions have been cautiously planned earlier, however extra specifying questions have been presented all through the interviews. Interview questions had been grouped beneath issues associated with cloud computing and cloud ERP structures in order that evaluation of the concepts associated with SaaS ERP structures might be covered. The third subject was the adoption of the cloud ERP structures and greater within the Nordic marketplace, which aimed to cover adoption system on this very marketplace and find out blessings and disadvantages associated with ERP

device adoption method on the organizational stage. Extra precise statistics about interview questions can be determine. The half-established subject matter interview. For the duration of interviews, slightly various things were emphasized which made every interview unique.

Interviews ultimate approximately an hour depending at the interview. All the interviews have been conducted in Finnish. Interviews had been recorded, transcribed and translated into English by using the writer, and after that gathered information turned into analyzed to and gathered into the equal report so that it became more honest to investigate the solutions, discover similarities and differences and finally go away inaccurate elements out from the observe.

### **Reliability and validity**

The goal of each studies is to produce correct and reliable consequences, and frequently look at's success with those issues are measured by means of reliability and validity. Reliability of the studies refers to the repeatability of the have a look at, meaning that which extent facts collection and evaluation practices will yield regular findings if someone else would repeat the look at. Reliability aims to degree how objective effects observe gives and are they independent of the researcher. The validity of the studies measures how nicely studies approach can study chosen elements and are the findings what they appear to be approximately.

With qualitative examine reliability and validity are extra challenging to measure due to the fact for example whilst conducting case observe approximately people or way of life, the author can bear in mind that study describes one specific scenario which cannot be repeated. No matter this, the writer can increase reliability and validity of the look at via defining precisely the course of the studies [52,49,47]. Even as doing this look at, the intention become to gather more in-intensity perception about the adoption of the surprisingly new solution with the exploratory case look at amongst few international locations and how drastically outcomes can be generalized is left to the target market of the have a look at to decide. The goal of the look at isn't always to provide an specific opinion on the difficulty, but to give new perspectives to folks who are inquisitive about the topic [51].

### **Adoption of cloud ERP systems**

This component provides discussion and findings of the empirical part of the look at. The empirical section includes the creation and deep dive to cutting-edge Nordic market of ERP systems and trends, based totally on research and market predictions. The chapter maintains with writer's observations from interviews held with ERP systems' customers, and after that six interviews with specialists of ERP structures' supplier are supplied. All the empirical findings are based totally on subjects associated with SaaS answers, ERP systems, adoption of ERP structures and Nordic market of them.

The bankruptcy starts by way of protecting cutting-edge traits among cloud-based totally solutions and ERP structures inside the Nordics based on marketplace surveys and predictions. After that, consumer information is supplied, bringing out modern pain points of the clients with their ERP answers. After that bankruptcy keeps with themes associated with adoption process and insights from interviewees to each topic. On the stop of this element consequences of the interviews are analyzed, and summary is given. Consequences are grouped based on TOE framework in a similar way as inside the literature overview a part of this look at to enabling coherent view about the giant elements of the cloud ERP adoption inside the Nordics [53]. It's miles obvious that customers now recollect SaaS primarily based ERP structures as one alternative, but that are the determinant factors for IT sourcing in trendy and in this situation for SaaS primarily based ERP within the Nordic nations? How do groups determine which systems or applications they undertake? This bankruptcy's purpose is to offer answers and insights to these open troubles by offering first the Nordic market of ERP systems followed with a quick evaluate to interview data from Nordic clients and eventually with the aid of offering results of the interviews conducted inside ERP answers' professionals inside the Nordics.

### **Cloud ERP systems**

Digital transformation is on-going, and it's far tough to predict exactly what affects this change can have, however what is for certain is that virtual disruption will influence nearly to all businesses and their enterprise methods and fashions, and in popular to the entire society [54]. KPMG's survey in the Nordics about shared offerings and outsourcing, anticipated already in 2015 that maturation and developing customer demand for revolutionary technologies like cloud can have a excessive high quality impact on clients. Nevertheless, at the equal time, they stated, that the most sizeable mission is how clients

effectively undertake these projects toward modern technology including ERP device's platform because these solutions also are the biggest investments related to technological improvements for agencies [55].

Call for cloud services is elevating in the Nordics, and in line with Radar's survey about cloud adulthood inside the Nordics in 2017, cloud offerings penetration has expanded appreciably amongst businesses in Finland, Norway, and Sweden. Nordic groups use one-of-a-kind kinds of cloud services (SaaS, IaaS, and PaaS) a whole lot more, compared to the year 2015, while a similar survey changed into finished. Among Nordic agencies there exists extra readiness to set up exceptional fashions of cloud, and cloud sources are utilized in greater complicated and in greater enterprise critical areas than in advance [54].

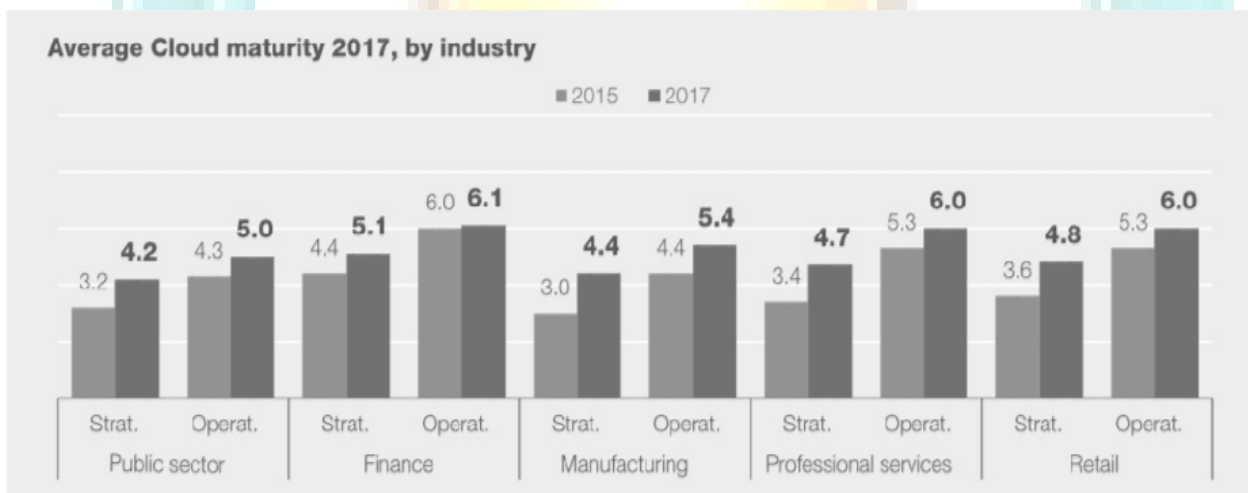


Figure 9: Cloud maturity by industry in the Nordics

On the five fundamental industries, which can be visible in picture 1, cloud adulthood has been developing amongst all of them and variations among industries have decreased. Inside the photograph 1, it can be visible that operational maturity is better than strategic adulthood, which shows that cloud offerings are used more for unmarried and impartial offerings than leveraged in strategical stage in the employer. In strategical level is meant that strategy and definition for cloud offerings within the corporation are virtually defined, and agency could additionally have competences and assets to implement cloud offerings.

The same form of troubles is indicated via Mowry, dealing with director commercial enterprise development EMEA of Amazon web services, who said that Nordic nations are keen to undertake cloud answers, but they nonetheless lack capabilities to undertake cloud, in businesses with more conventional IT structure [54,56].

There's growing hobby in the direction of all types of cloud primarily based services and answers within the Nordic companies and in keeping with [57], within the Nordic leading SaaS category is Finance and ERP in Denmark and Finland, however in Norway and Sweden Communications are in advance in the intervening time. This finding is likewise supported in the survey of in which Nordic businesses have been requested to determine, which packaged business packages they may enforce in 2017 and ERP system was ranked highest (sixty-nine%) amongst Nordic corporations in the IT priorities survey [59]. In step with studies from IDC and Gartner, one purpose why ERP systems are visible as a concern is that there may be wanting to renew middle ERP systems for digital transformation. Within the equal study, it become also cited, that Nordic organizations need to consider post-modern-day ERP, that means flexible ERP structures which combine on premise programs with cloud-based solutions and business procedure outsourcing, in preference to closely customized legacy systems [60].

### **Observations from the customers**

One accelerator for this thesis have been patron interviews associated with ache factors with their cutting-edge ERP systems, which turned into amassed during 2016-2017 with the aid of experts operating among cloud answers and ERP structures. In this thesis, that information is used most effective as a secondary supply and in this bankruptcy observations from the data are discussed. All interviewed corporations are handled anonymously in this study.

The most tough issue raised by all the interviewed clients were scalability troubles, in the intervening time with conventional ERP systems companies buy licenses which might be long-term, and the fee is depending on the amount of the licenses, because of this that it isn't efficient to buy just few new ones when needed. Customers are disturbing greater scalable solutions with the aid of customers and additionally data coping with capability and overall performance. Every other very complicated problem in the intervening time are improvements and releases due to the fact businesses want to take care of that by themselves

and in many cases, ERP systems are so customized that enhancements aren't even feasible to do. New solutions for release and upgrade management are welcome, and agencies seem to suppose that it can be outsourced to the seller. The third difficulty that most of the customer had been elevating as an ache factor become the implementation initiatives, the ones are time consuming and tough to deal with, handiest one respondent informed that that they had a success implementation project. A few customers even advised that they may be no longer now doing any massive implementation projects, but smaller tendencies time to time.

Exceptional practices and widespread techniques were visible as a great thing with the aid of all the customers. Several them have already taken nice practices into use, and they had been glad how the whole lot works and what sort of less complicated it is to do for example enhancements despite on-premise ERP systems. Preferred techniques had been also mentioned and seen as a bonus, but among the respondents introduced that enterprise isn't leveraging them. A few additionally informed that it's far not possible to get commercial enterprise requirements to in shape trendy processes due to the fact humans are reluctant to do the changes within the commercial enterprise gadgets. This became seen the most vital difficulty in the mean time because many of the interviewees noted that preferred strategies are the final reason of ERP structures. It became cited that feasible advantages from enterprise tactics and great practices could require exchange management at the organizational stage and greater aid for this is required from the vendor. Additionally, they referred to that once those quality practices and general strategies are in vicinity – all problems related to version management and enhancements could get simpler.

Information protection and privateers had been cited as ache points while speak me about cloud ERP systems however extra because it turned into doubtful to them how those are taken care with cloud solutions. A few clients additionally mentioned that the facts location is essential for them due to legislation, but otherwise they do now not see any fundamental issues with the public cloud. Customers additionally stated that they see non-public cloud as a very good alternative and they believe it has some additional fee compared to public one. Real-time visibility and stronger analytics with cloud ERP solutions were beneficial however referred to from the customers that there are not but that many commercial enterprise necessities for those. They said reporting and actual-time facts problems are developed already for the time being, however it isn't the most important element with ERP

systems in the intervening time. Only a few of the customers raised the dearth of actual-time facts and visibility as a trouble of their cutting-edge state of affairs.

All in all, clients had steady opinions approximately the discussed troubles and within the Nordic marketplace pain points with ERP systems appear to be similar despite the industry of the organization. Most of the customers already had a few smaller IT solutions as cloud based totally and hobby toward SaaS ERP structures turned into extremely good, and one purpose for the interest are the modern pain factors with their present-day ERP systems.



## Chapter 4: RESULTS

### Result provided by Company North-Bay Solutions

Critical success factors (CSF)	Strongly Agree	Agree	recommended	Neutral	Disagree
Top management support	✓				
Communication		✓			
Project scope	✓				
User training		✓			
Hold the experienced employee	✓				
IT infrastructure		✓			
Selection of ERP package		✓			
Integrity and system testing	✓				
Functionality		✓			
Regular updates		✓			
Committed employee		✓			
Project budget				✓	
Organizational factor		✓			
Implementation ERP strategy		✓			
Productive review meetings			✓		
Monitoring and evolution of performance				✓	
Project management	✓				
Technical aspects		✓			
Compliance	✓				
Network	✓				
Security	✓				

Table 16: Results about CSF by Company A

### Suggestion by North-bay

- Implementation / development of whole normally have high risk factor, consider those.
- Consider backup & Mirroring
- Modular approach is preferred

## Result from Open Sol Globals

Critical success factors (CSF)	Strongly Agree	Agree	recommended	Neutral	Disagree
Top management support	✓				
Communication	✓				
Project scope	✓				
User training		✓			
Hold the experienced employee		✓			
IT infrastructure					✓
Selection of ERP package		✓			
Integrity and system testing	✓				
Functionality		✓			
Regular updates	✓				
Committed employee	✓				
Project budget		✓			
Organizational factor		✓			
Implementation ERP strategy		✓			
Productive review meetings		✓			
Monitoring and evolution of performance				✓	
Project management	✓				
Technical aspects		✓			
Compliance		✓			
Network	✓				
Security	✓				

Table 17: Results about CSF by Company B

### Suggestion:

- Employee / developer commitments are most important and should have for long time.
- Because ERP take so much time to develop

## Results of Company TV2U Private Limited

Critical success factors (CSF)	Strongly Agree	Agree	recommended	Neutral	Disagree
Top management support		✓			
Communication	✓				
Project scope	✓				
User training		✓			
Hold the experienced employee		✓			
IT infrastructure					✓
Selection of ERP package		✓			
Integrity and system testing	✓				
Functionality		✓			
Regular updates		✓			
Committed employee		✓			
Project budget		✓			
Organizational factor				✓	
Implementation ERP strategy		✓			
Productive review meetings			✓		
Monitoring and evolution of performance		✓			
Project management		✓			
Technical aspects		✓			
Compliance		✓			
Network		✓			
Security	✓				

Table 18: Results about CSF by Company C

**Suggestion:**

- Developing ERP mostly took long time, it is very important to integrate the business rules with ERP system.
- So, ERP requirements should be clear, means business rules should be clear.

Results by Apps Geni

Critical success factors (CSF)	Strongly Agree	Agree	recommended	Neutral	Disagree
Top management support	✓				
Communication	✓				
Scope	✓				
User training	✓				
Hold the experienced employee		✓			
IT infrastructure		✓			
Selection of ERP package		✓			
Integrity and system testing	✓				
Functionality		✓			
Regular updates		✓			
Committed employee		✓			
Project budget	✓				
Organizational factor		✓			
Implementation ERP strategy		✓			
Productive review meetings	✓				
Monitoring and evolution of performance				✓	
Project management		✓			
Technical aspects		✓			
Compliance	✓				
Network		✓			
Security	✓				

Table 19: Results about CSF by Software-house A

### Results by Soft pyramid


Critical success factors (CSF)	Strongly Agree	Agree	recommended	Neutral	Disagree
Top management support	✓				
Communication	✓				

Scope	✓				
User training	✓				
Hold the experienced employee		✓			
IT infrastructure		✓			
Selection of ERP package		✓			
Integrity and system testing	✓				
Functionality		✓			
Regular updates		✓			
Committed employee		✓			
Project budget	✓				
Organizational factor				✓	
Implementation ERP strategy					✓
Productive review meetings	✓				
Monitoring and evolution of performance		✓			
Project management	✓				
Technical aspects	✓				
Compliance	✓				
Network	✓				
Security	✓				

Table 20: Results about CSF by Software-house B

### Summarize form of results

The results that provided by companies and software-houses in individuals form. By combining all the results in a single table form is given below. A color scheme is used to show the results. According to the color scheme Green color circle shows “Strongly agree” silver color shows “agree” yellow color for “Recommended” and sky color for “Neutral”, while red color showing “Disagree”.

	Strongly agree
-------------------------------------------------------------------------------------	----------------


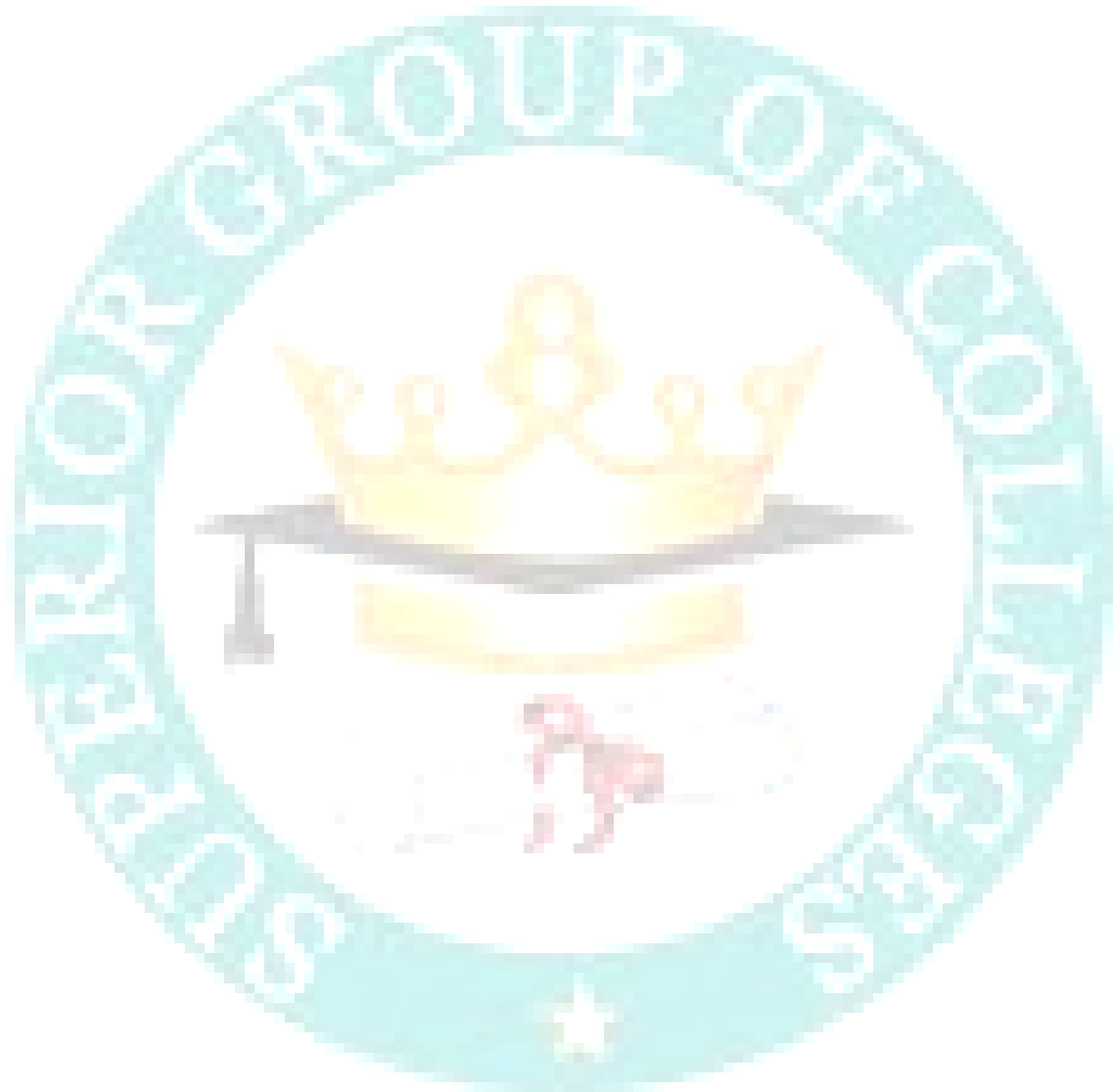
	Agree
	Recommended
	Neutral
	Disagree

Table 21: Color scheme to show the results



<b>Critical Success Factors (CSFs)</b>	<b>North-bay Solutions</b>	<b>TV2U</b>	<b>OpenSole Global</b>	<b>Apps Geni</b>	<b>Soft pyramid</b>
Top Management support	●	●	●	●	●
Communication	●	●	●	●	●
<b>Project scope</b>	●	●	●	●	●
User training	●	●	●	●	●
Hold the experienced employee	●	●	●	●	●
IT infrastructure	●	●	●	●	●
Selection of ERP package	●	●	●	●	●
Integrity and system testing	●	●	●	●	●
Functionality	●	●	●	●	●
Regular updates	●	●	●	●	●
Committed employee	●	●	●	●	●
Project budget	●	●	●	●	●
Organizational factor	●	●	●	●	●
Implementation ERP strategy	●	●	●	●	●
Productive review meetings	●	●	●	●	●
Monitoring and evolution of performance	●	●	●	●	●
Project management	●	●	●	●	●
Technical aspect	●	●	●	●	●
Compliance	●	●	●	●	●
Network	●	●	●	●	●
Security	●	●	●	●	●

Table 22: Summarize results about the CSFs

After deep analysis this study got the 18 critical success factor that could not be ignore during the implementation and after deployment of an ERP. By

keeping an eye on these factors, you can avoid an ERP from failure. These factors are following as:

- Top management support
- Communication
- Project scope
- User training
- Regular updates
- Hold experienced employee
- Selection of ERP package
- Integrity and system testing
- Functionality
- Regular updates
- Committed employee
- Budget plan
- Productive review meetings
- Project management
- Technical aspects
- Compliance
- Network
- Security

## Chapter 5 DISCUSSION

### Switching to cloud-based ERP makes sense

The cloud-primarily based ERP systems are taking over the conventional strategies of coping with statistics and approaches because of its diverse benefits together with:

- Offer superior statistics storage ability, protection and manipulate.
- Provide an actual-time get right of entry to from anywhere and facilitates in quick, but properly-informed decision making [64]
- Lessen prematurely investments in IT hardware and servers, without disturbing approximately dedicating substantial personnel sources to handling it.
- Are usually rapid and clean to install than on-website deployments. Additionally, upkeep is a good deal less difficult [66,69].
- Most importantly, with cloud generation, product upgrades are painless, customizations and integrations automatically replace with system upgrades which assure that the business is strolling with the maximum advanced abilities [70].

### Why CB-ERP training is better than On-Premise ERP systems?

ERP systems are today the primary choice of any academic organization. There are various motives for that. Agencies have now agreed that with changing times, converting the methodologies of running is crucial. But, there are types of ERP implemented. There are styles of ERP carried out, cloud-based training ERP and conventional or on-premise ERP. Agency resource planning is one of the most important matters an educational organization needs, therefore it's far important to choose the first-rate. Therefore, it is a commonplace query whether to choose a cloud-based schooling ERP, or a conventional or on-premise ERP [71].

Within the past few years, cloud-based schooling ERP has gained popularity. However, traditional ERP continues to be in use. Allow us to recognize what the distinction among the 2 is. The main distinction is that an on-premise ERP is installed on your server or host laptop. The server is as a result controlled through the IT staff of the business enterprise. However, the cloud-primarily based ERP is software program advanced by using the organization and the ERP is managed by way of the seller himself. There's no want to put together an IT team of workers to appearance after it. A few might wonder, what distinction it makes to the organization or agency. The choice of a standard ERP makes all the difference. Following are several the points that differentiate among the 2 and prove that

cloud-based totally ERP is certainly higher than conventional or on-premise ERP gadget. As stated above, the simple characteristic of a cloud-primarily based ERP is that it is hosted on both the seller's or consumer's server depending on the client's preference, but the supplier keeps the backup in view that information may get crashed each time and is accessed thru a browser. Then again, on-premise ERP software is hooked up on the company's server after which further maintained.

### Customized ERP

A cloud-based totally ERP can always be customized in step with the wishes of the affiliation. Therefore, the customized ERP gives customers a friendly consumer revel in. If the traditional ERP system is customized, the implementation time increases, and the gadget will become gradual. This isn't the case with the cloud-based ERP. It can be custom designed several instances keeping the identical efficiency and accuracy [73].

### Implementation problems

The implementation of a cloud-based ERP is easy, and the organization supervises implementation. The implementation of the cloud-based ERP is, therefore, managed by using the companies. This isn't the case with on-premise or conventional ERP. The implementation of this ERP takes a long term and till then the actual need for the ERP gadget is long past.

Restful: Cloud-based totally ERP is secure and relaxed, and no third celebration interference is authorized. However, because the on-premise ERP is hooked up at the server, there is the chance of protection breach. In case of cloud-based training ERP, the security lies within the organization itself. But, there's no such guarantee in case of the on-premise ERP. It cannot be omitted, even though, that the preliminary value of a cloud-based ERP is lower than that of the traditional. It is straightforward to apply, as its miles applied on a server after which accessed through an internet connection. Imposing a cloud-based ERP makes sure that the machine features smoothly. A supplier team works spherical the clock to make sure the group faces no issues.

The group of the seller allows organization to recognition on a good deal greater thing. Cloud-based totally schooling ERP makes things such as planning for the numerous sports of the organization easier. After planning via the software furnished by the seller, implementation becomes plenty simpler.

This does not maintain proper in case of the conventional or on-premise ERP. The implementation of whatever is a lengthy system and takes time. Its value, mixed with the

price of the implementation, is better. This makes the total price higher, counting within the range of resources hired to hold the ERP software. Hence, thinking about the number of benefits of the cloud-based ERP solution.

### Theoretical implications

The goal of the examine turned into specially to satisfy gaps in the literature by way of contributing to how the CSFs for ERP implementation is perceived by means of the operational users as well as why the CSFs are critical inside the phases of an implementation. The findings furnished an insight of the belief of the customers in the direction of 18 CSFs compared to previous studies in which eleven CSFs were investigated from a user perspective. Findings from the instances identified gaps and similarities between the interviewees as compared to users, senior managers and undertaking managers within literature. As variations between users on this examine and users in preceding studies were located, similarly studies are wanted to analyze why there are differences. Moreover, this observe supplied new reasoning of the two CSFs 'organizational exchange control,' and 'software checking out' as underlying reasoning from the perspective of the customers have now not been investigated within the literature. This presents a studies gap that needs similarly interest to get a greater thorough expertise of why the 2 CSFs are crucial for customers in an ERP implementation.

Furthermore, the findings make contributions to the distance of the user belief of the CSFs with regards to the stages of an ERP implementation, which has no longer been investigated in previous research. The findings display insights into why the customers believed the CSFs to be vital in the stages of an ERP implementation which may be used as a destiny reference for studies in the equal location. But, due to the vague reasoning of why the CSFs are critical inside the stages of an ERP implantation in literature, this gives every other studies gap. A more thorough expertise of the CSFs within the levels is wanted to get a more exact insight into why the factors of the CSF need to be triumphant with the ERP implementation [75].

### Barriers

This look at comes with sure obstacles that need to be taken into consideration. First, the time-restriction for this thesis ended in want of accomplishing a go-sectional study since it allowed us to look at the phenomenon for a selected time, which changed into

approximately. But, a longitudinal look at wherein the phenomenon is investigated for an extended time might permit inspecting the evolution of change, improvement, and acceptance of the customers regarding the CSFs.

2nd, the pattern of all the case corporations for this have a look at. The inclusion of users from different agencies out of doors of Pakistan might offer one-of-a-kind findings for the investigated CSFs because of having cultural differences affecting their perceptions. Moreover, the companies have now not been decided on regarding length, enterprise or IT understanding within this study. Via deciding on case companies concerning these criteria's, the findings might have been greater generalizable for a specific industry or several extraordinary industries with a similar length and experience. But, this turned into now not possible in this examine since the sample of possible participating organizations changed into small and therefore the selection of cases could not be based totally on those criteria.

There has been no comparability of the members on this study because their process positions had been not considered and matched throughout the instances. With the aid of such as individuals with the same process positions, more generalizable effects might have been done.

Fourth, the rating concerning the significance of the CSFs in standard and in the phases from the person angle is not considered due to the qualitative nature of this thesis. To rank the importance of the CSFs in preferred and inside the implementation levels, a quantitative approach, for example, a survey where charges of importance are ranked is needed.

### Future work

Due to the restrictions, similarly studies can be achieved on how customers rank the CSFs in the implementation degrees, combining it with its underlying reasoning by adopting a blended-method of qualitative and quantitative studies. This will allow information of what implementation levels the customers understand the CSFs to be most essential and the reasoning in the back of this significance.

To increase the reasoning of the customers, it'd had been interesting to test the perception of customers. Moreover, by using approach of selecting businesses based totally on organization, size and IT understanding and by means of including contributors with comparable project positions and obligations, generalizable outcomes may be accomplished. This can moreover result in the identity of similarities and differences compared to the findings of this thesis.

Even as this research was completed, no preceding studies had focused on why clients

understand the investigated CSFs to be critical inside the notable implementation stages. It would be thrilling to research in addition why the CSFs are supposed as essential within the phases of an implementation the use of a larger pattern of case companies, which incorporates more contributors that have been a part of an implementation project. This will add a greater difficult and rich mindset of the customers inner this component.

## References

- [1] A. Tarhini, H. Ammar, T. Tarhini & R. Masa'deh **“Analysis of the Critical Success Factors for Enterprise Resource Planning Implementation from Stakeholders’ Perspective: A Systematic Review”** International Business Research; Vol. 8, No. 4; 2015.
- [2] A. BAYKASOĞLU, İ. GÖLCÜK “Development of a two-phase structural model for evaluating ERP critical success factors along with a case study”\_Computers & Industrial Engineering (2017).
- [3] L. Fang “Critical Success Factors in ERP Implementation “Jönköping June 13, 2005
- [4] P. S. Bhati, M. C. Trivedi, S. S. Sarangdevot “Security Issues in Enterprise Resource Planning” 2016 Second International Conference on Computational Intelligence & Communication Technology.
- [5] P Chatzoglou D Chatzoudes L Frigidis S Symeonidis “Critical success factors for ERP implementation in SMEs” ACSIS, Vol. 8. ISSN 2300-5963 (2016).
- [6] S. Gupta, S. Kumar, S K. Singh, C. Foropon, C. Chandra, "Role of cloud ERP on the performance of an organization: contingent resource based view perspective", International Journal of Logistics Management, The, <https://doi.org/10.1108/IJLM-07-2017-0192>.
- [7] J. Ram, D. Corkindale “How “critical” are the critical success factors (CSFs)? Examining the role of CSFs for ERP” Business Process Management Journal Vol. 20 No. 1, 2014 pp. 151-174.
- [8] S. Gupta, Subhas C. Misra, Ned Kock, D. Roubaud “Organizational, technological and extrinsic factors in the implementation of cloud ERP in SMEs” Journal of Organizational Change Management, 2018.
- [9] M. Haddara **“ERP systems selection in multinational enterprises: a practical guide” International Journal of Information Systems and Project Management, 2018.**

- [10] V. Markkanen “Risk factors in ERP project” **International Business and Logistics, 2018.**
- [11] W. H. Knol , J. S. Roel L.J. Schouteten and K. Lauche “Implementing lean practices in manufacturing SMEs: testing ‘critical success factors’ using Necessary Condition Analysis” *International Journal of Production Research*, 2018
- [12] J. Wolters U. Y. Eseryel D. Eseryel “Identifying the Critical Success Factors for Low Customized ERP System Implementations in SMEs” *Proceedings of the 51st Hawaii International Conference on System Sciences j* 2018.
- [13] P Chatzoglou D Chatzoudes L Frigidis S Symeonidis Critical success factors for ERP implementation in SMEs ACSIS, Vol. 8. ISSN 2300-5963 (2016).
- [14] C. Doom, K. Milis, S. Poelmans and E. Bloemen “Critical success factors for ERP implementations in Belgian SMEs” *Journal Of Enterprise Information Management*, (2010).
- [15] N. Pavych O.Vovk “Formation of recommendations for quality assurance software” *CSIT 2017, 05-08 September, 2017, Lviv, Ukraine.*
- [16] T. D. Nguyen, T T. T. Nguyen, and S. Misra “Cloud-Based ERP Solution for Modern Education in Vietnam” *Springer International Publishing Switzerland* 2014.
- [17] I. Mahmud, T. Ramayah , S. Kurnia “To use or not to use: modelling end user grumbling as user resistance in pre-implementation stage of enterprise resource planning system” *Information Systems* (2017).
- [18] M. Ramasamy, J. Periasamy, “Explore the Impact of Cloud Computing on ERP Systems used in Small and Medium Enterprises” *International Journal of Advance Research in Computer Science and Management Studies* Volume 5, Issue 2, February 2017 pg. 87-91.
- [19] J. Kumar Arora, E. Erturk “An Exploratory Study on the Implementation and Adoption of ERP Solutions for Businesses” *East ern Institute of Technology, New Zealand* (2018).
- [20] L. Lasisi, M O, Owens, J D and Udagedara, S “Key Benefits of Enterprise Resource Planning Adoption within Small Family Businesses: A Conceptual Framework” *United Kingdom Academy for Information Systems conference, Oxford University, Oxford, UK, 4-5 April* (2017).

- [21] H. Sun, W. Ni, R. Lam “A step-by-step performance assessment and improvement method for ERP implementation: Action case studies in Chinese companies” journal 2014 Elsevier B.V.
- [22] S. Gupta and Subhas C. Misra “Moderating Effect of Compliance, Network, and Security on the Critical Success Factors in the Implementation of cloud ERP” IEEE transactions on cloud computing, vol. 4, no. 4, october-december 2016.
- [23] S. zubair, A.T. zamani “Critical Factors Affecting Oracle E-Business Suite Enterprise Resource planning (ERP) R12 Implementation: A Case Study of Saudi Arabia’s University” Volume 7– No. 3, May 2014 – [www.ijais.org](http://www.ijais.org).
- [24] W. She and B. Thuraisingham “Security for Enterprise Resource Planning Systems” Information Systems Security, 16:152–163, 2007.
- [25] Addo-Tenkorang, R. & Helo, P.T. (2017). Analysis of enterprise supply chain communication networks in engineering product development, International Journal of Logistics Management, Vol. 28(1), pp. 47-74.
- [26] Bruque Camara, S., Fuentes, J.M. & Marin, J.M.M. (2015). Cloud computing, Web 2.0, and operational performance: the mediating role of supply chain integration, International Journal of Logistics Management, Vol. 26, Iss. 3, pp. 426-458.
- [27] Fosso-Wamba, S., Akter, S., Coltman, T. & Ngai, E.W.T. (2015). Guest Editorial: Information technology-enabled supply chain management, Production Planning and Control, Vol. 26, Iss. 12, pp. 933-944.
- [28] Fosso-Wamba, S., Gunasekaran, A., Akter, S. Ji-fan Ren, S., Dubey, R. & Childe, S.J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities, Journal of Business Research, Vol. 70, pp. 356-365.
- [29] Ghosh, N., Ghosh, S.K. & Das, S. K. (2015). SelCSP: A framework to facilitate selection of cloud service providers, IEEE Transactions on Cloud Computing, Vol. 3(1), 66-79.
- [30] Gunasekaran, A., Papadopoulos, T., Dubey, R., Fosso-Wamba, S., Childe, S.J., Hazen, B. &

- Akter, S. (2017). Big data and predictive analytics for supply chain and organizational performance, *Journal of Business Research*, Vol. 70, pp. 308-317.
- [31] Gupta, S. & Misra, S.C. (2016). Moderating effect of compliance, network, and security on the critical success factors in the implementation of cloud ERP, *IEEE Transactions on Cloud Computing*, Vol. 4(4), pp. 440-451.
- [32] Han, J.H., Wang, Y. & Naim, M. (2017). Reconceptualization of information technology flexibility for supply chain management: An empirical study, *International Journal of Production Economics*, Vol. 187, 196-215.
- [33] [22] Hashem, I.A.T., Yaqoob, I., Anuar, N.B., Mokhtar, S., Gani, A. & Khan, S.U. (2015). The rise of “Big data” on cloud computing: review and open research issues, *Information Systems*, Vol. 47, pp. 98-115.
- [34] Jacobs, M.A., Yu, W. & Chavez, R. (2016). The effect of internal communication and employee satisfaction on supply chain integration, *International Journal of Production Economics*, Vol. 171, 60-70.
- [35] [23] Jeble, S., Dubey, R., Childe, S.J., Papadopoulos, T., Roubaud, D. & Prakash, A. (2017). Impact of Big Data & Predictive Analytics Capability on Supply Chain Sustainability, *International Journal of Logistics Management*, ISSN 0957-4093 (In press).
- [36] Jede, A. & Teuteberg, F. (2016). Towards cloud-based supply chain processes: Designing a reference model and elements of a research agenda, *International Journal of Logistics Management*, Vol. 27(2), 438-462.
- [37] Ji-fan Ren, S., Fosso-Wamba, S., Akter, S., Dubey, R. & Childe, S.J. (2016). Modelling quality dynamics, business value and firm performance in a big data analytics environment, *International Journal of Production Research*, Vol. 55, Iss. 17, DOI: 10.1080/00207543.2016.1154209.

- [38] Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach, *International Journal of e-Collaboration*, Vol. 11(4), 1-10.
- [39] Kock, N. (2016). Non-normality propagation among latent variables and indicators in PLSSEM simulations, *Journal of Modern Applied Statistical Methods*, Vol. 15(1), 299-315.
- [40] Lorentz, H., Töyli, J., Solakivi, T. & Ojala, L. (2016). The effect of a geographically dispersed supply base on downside risk: Developing and testing the N-shaped theory, *International Business Review*, Vol. 25(4), 872-882.
- [41] Maestrini, V., Luzzini, D., Maccarrone, P. & Caniato, F. (2017). Supply chain performance measurement systems: A systematic review and research agenda, *International Journal of Production Economics*, Vol. 183, Part A, 299-315.
- [42] Xue, L, Ray, G. & Zhao, X. (2017). Managerial Incentives and IT Strategic Posture, *Information Systems Research*, Vol. 28(1), 180-198.
- [43] Yu, Y., Li, M., Li, X., Zhao, J.L. & Zhao, Dingtao (2017). Effects of entrepreneurship and IT fashion on SMEs' transformation toward cloud service through mediation of trust, *Information & Management*, In Press (DOI: 10.1016/j.im.2017.07.001).
- [44] P. A. Buxbaum (2001). ERP is the phoenix of information technology. Retrieved July 10,2002 from [www.searchebusiness.techtarget.com](http://www.searchebusiness.techtarget.com).
- [45] R. Miranda (1999). The rise of ERP technology in the public sector. [Electronic Version] *Government Finance Review*, 15 94), 9(8). Retrieved July 12, 2002 from WilsonSelectPlus.
- [46] A Wali, A. Deshmukh, S.G. and Gupta, A.D. "Critical success factors of TQM: A select study of Indian organizations, *Production Planning and Control: The Management of Operations*" Vol. 14, Iss. 1, pp. 3-14.
- [47] Yin, R. K. (2003). *Case study research: Design and methods*. 3rd ed. Thousand Oaks, CA, Sage.
- [48] Metsämuuronen, J. 2008. *Laadullisen tutkimuksen perusteet*. 3rd ed.
- [49] Tuomi, J. & Sarajärvi, A. 2009. *Laadullinen tutkimus ja sisällönanalyysi*. 5th ed. Helsinki, Tammi.

- [50] Robson, C. 2002. Real World Research: A resource for social scientists and practitioner-researchers. 2nd Ed. Oxford, Blackwell.
- [51] Hirsjärvi, S., Remes, P. & Sajavaara, P. 2004. Tutki ja kirjoita. 10th ed. Helsinki, Tammi
- [52] Saunders, M., Lewis, P. & Thornhill, A. 2009. Research Methods for Business Students. 4th ed. Harlow, Pearson Education.
- [53] Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. 1990. Processes of technological innovation. Lexington books.
- [54] Radar. 2017. The benefits of Cloud maturity. Cloud Maturity Index 2017. [Online] Available at <http://pages.tieto.com/Cloud-Maturity-Index-2017.html>.
- [55] Abeleen, J. & Hall, T., L. 2015. Nordic Shared Services and Outsourcing Pulse Survey 2015. KPMG.
- [56] Haaramo, E. 2017. What are Amazon Web Services' Nordic plans? [Online] Available at <http://www.computerweekly.com/news/450423147/What-are-Amazon-Web-Services-Nordic-plans>.
- [57] Bilderbeek, P. 2016. Top 380 SaaS Providers. [Online] Available at <http://www.themetisfiles.com/2016/01/top-380-nordic-saas-providers/>
- [58] TechTarget. 2017. 2017 IT priorities survey – Nordics. [Online] Available at <http://www.computerweekly.com/ehandbook/2017-IT-Priorities-in-the-Nordics>.
- [59]
- [60] Haaramo, E. 2015. Top six enterprise IT priorities in the Nordics. [Online] Available at <http://www.computerweekly.com/news/4500247028/Top-six-enterprise-IT-priorities-in-the-Nordics>
- [61] F. Wamba, S. Ngai, E.W.T, “Importance of issues related to RFID enabled healthcare transformation projects: results from a Delphi study, Production Planning and Control,” The Management of Operations, Vol. 26, Iss. 1, pp. 19-33 (2015).
- [62] I.A. Hashem, I. Yaqoob, N.B. Anuar, S. Mokhtar, A. Gani, S.U. Khan “The Rise of “Big Data” on Cloud Computing: Review and Open Research Issues,” Information Systems, (2015), Vol. 47, pp. 98-115.
- [63] C. Utzig, D. Holland, M. Horvath, M. Manohar, “ERP in the cloud: is it ready? Are you?” Booz & Co , (2013).
- [64] P.F. Hsu, “Integrating ERP and e!business: Resource complementarity in business value creation,” Decision Support Systems, Vol. 56, pp. 334-347 (2013).

- [65] S. Li. Marston, S. Bandyopadhyay, J. Zhang, and A. Ghalsasi, "Cloud computing The business perspective," *Decision Support Systems*, (2011) Vol. 51, 176–189.
- [66] E. Ngai, T.C.E. Cheng, and S.S.M. Ho, "Critical success factors of web-based supply-chain management systems: an exploratory study," *Production Planning & Control: The Management of Operations*, Vol. 15, Iss. 6, pp. 622-630, 2004.
- [67] W. Ke, and K.K. Wei, "Organizational culture and leadership in ERP implementation," *Decision Support Systems*, Vol. 45, 208-218 (2008).
- [68] A.B. Douglas, C.W. Barry, K. Jongwoo, R. Balasubramanian, and S.R. Pamela, "Achieving dynamic capabilities with cloud computing: an empirical investigation," *European Journal of Information Systems* Volume 25, Issue 3, (2016), pp. 209–230.
- [69] E.M. Daniel, and H.N. Wilson, "The role of dynamic capabilities in e-business transformation," *European Journal of Information Systems* 12 (4), 282–296, 2003.
- [70] P. Hofmann, "Cloud computing: the limits of public clouds for business applications," *IEEE Internet Computing*, Vol. 14(6), pp. 90–93, 2010.
- [71] S.M. Salleh, S.Y. Teoh, and C. Chan, "Cloud enterprise systems: A review of literature and its adoption," *Proceedings of the 16th Pacific Asia Conference on Information Systems (PACIS 2012)*, Ho Chi Minh City, Vietnam.
- [72] P. Mell, P. and T. Grance, "The NIST Definition of Cloud Computing," *NIST Spec. Publ.*, 800, (2011), p. 7.
- [73] A.A Wali, S.G. Deshmukh, and A.D. Gupta, "Critical success factors of TQM: A select study of Indian organizations," *Production Planning and Control: The Management of Operations*, Vol. 14, Iss. 1, (2003), pp. 3–14.
- [74] K. Lyytinen, and G.M. Rose, "Information system development agility as organizational learning. *European Journal of Information Systems* 15 (2), 183–199, 2006.
- [75] A. Haleem, M.A Qadri, and S. Kumar, "Analysis of critical success factors of world-class manufacturing practices: an application of interpretative structural modelling and interpretative ranking process," *Production Planning and Control: The Management of Operations*, Vol. 23, Iss. 10–11, 2012, pp. 722–734.