Critical Success Factors (CSFs) in Enterprise Resource Planning – Commercial Off the Shelf (ERP COTS) Software Implementation

Master’s Thesis

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Critical Success Factors (CSFs) in Enterprise Resource Planning – Commercial Off the Shelf (ERP COTS) Software Implementation

Submitted by Muhammad Shoaib Siddique to the University of Skövde as a dissertation towards the degree of M.Sc. by examination and dissertation in the School of Humanities and Informatics.

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I hereby certify that all material in this dissertation which is not my own work has been identified and that no work is included for which a degree has already been conferred on me.

Signature: _________________________________
Critical Success Factors (CSFs) in Enterprise Resource Planning – Commercial Off the Shelf (ERP COTS) Software Implementation

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Abstract

The focus of the study is to identify ERP COTS software where custom made ERP and COTS software are different in product type and implementation process. The study further intensifies the focus on the factors which are critical for successful ERP COTS product selection and implementation by decision makers and ERP COTS implementers respectively.

The study involves decision makers, management and organizational actors (end users which are beneficiaries of ERP COTS system). The study tries to identify certain factors, which can lead to the success of the ERP COTS Software implementation and failure to identify those CSFs in selecting and implementing ERP COTS can lead to ERP COTS failure.

Key words: ERP COTS, COTS, CSF, CSFs, Critical Success Factors, Commercial Off the Shelf Softwares, Enterprise Resource Planning, Success Factors in ERP Implementation.
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Reading Note:
The term ERP represents custom made Enterprise Resource Planning software and the term ERP COTS represents Enterprise Resource Planning Commercial Off the Shelf Software in the report.
1. INTRODUCTION

1.1 Background

In the rapidly growing technology race and implementation of ERP COTS (Enterprise Resource Planning Commercial Off-the-Shelf) software by business organizations, companies are expanding their supply chains and engineering their business processes using COTS software. Due to less implementation time and end to end solutions offered by COTS software providers, companies are catalyzing their business with COTS software to manage and expand their business, which is technologically updated; process managed and well integrated (King & Burgess, 2006). Companies can manage their resources like time, manpower and supply chains more effectively by using Enterprise Resource Planning systems which is deemed to be critical for the success of organizations in the upcoming technology era.

In the above mentioned scenario there are often mistakes in product selection done by decision makers/owners which could lead to unsuccessful projects and investment losses to the companies over the COTS software implementation (Alves & Finkelstein, 2002). Other problems can also be observed at implementation level among different actors of organizations such as end users. One of the reasons is that COTS software implementation is often considered on same implementation process as ERP implementation which is not the right approach. It is because of the varied formation of custom made ERP and COTS, one of which is that typical ERP are custom made software and COTS software are ready made, available off the shelf.

An example is that in custom made software, user requirements are specifications for system developers and users can get the system they want, or, in other words, system can mold to user requirements because it is been built in front of them. On the other hand COTS software, which is already built on common business procedures, has less flexibility to accommodate specific user requirements. In other words we can say that users sometimes have to mold themselves according to the system.

Enterprise resource planning (ERP) system is the foremost choice for the manufacturing companies in the race of gaining competitive advantage in the industry (Zhang et. al., 2005). With the invent of information era, companies are saving their costs, manufacturing and operational time by harmonizing their information flow within and outside the business processes, but unfortunately the success rate is not as high as the number of initiated projects in the market.

The reason why the organizations are moving towards COTS usage is due to quicker implementation and shorter time to be ready for the use of end-users. Business organizations switching to ERP COTS software target many things at decision makers
and end users level (Ochs et. al., 1996). Decision makers sometimes select ERP COTS to catalyze their business needs by systemizing their business procedures and putting processes under certain command and control. Quick launch of ERP COTS and end to end solution offerings often provide decision makers with enough confidence to select the product. But in the same time they fail to identify and analyze their exact business procedure needs (Ochs et. al., 1996). They also fail to question themselves about end users system acceptance and needs. Due to lack of technical knowledge they often do not think about legacy systems and limitations in COTS which could serve as a deadlock once the project is on the way towards implementation.

The process of implementation of information systems starts with the managerial decision to implement an information system to automate the organization processes through an enterprise based model which later becomes an important part of the organization because once information system is implemented all the information and processes run through the implemented system (Zhang et. al., 2005). Apart from the process decision makers often select the COTS product by the presentations from Pre sales team and are unaware of their organizational behaviors that whether they are ready for a big change or not. Pre sales teams selling ERP COTS makes promises and ensure that they can make sure that the system will work allowing decision makers to select a specific product on the other hand it is a joint relationship between system implementers and organization actors (end users) to make sure that the system is implemented correctly and works correctly. So, the product selection involves few factors which should be identified, analyzed and incorporated by the decision makers while selecting any ERP COTS product.

According to Chang et. al. (2000) A survey of 100 executives of leading companies conducted by the Boston Consulting Group found that only one in three ERP initiatives was considered successful. Further, the article argues that the failure to implement ERP COTS is because organizations usually overlook the critical problems and issues which occur in the implementation of ERP COTS. However if the ERP COTS implementation is not done with proper planning then it becomes difficult to achieve a workable ERP COTS solution and is a big risk for a big investment and time loss as well. As ERP COTS implementation requires all the key resources of the organization in which the most important are the social response of the end users towards the system to make it successful (Lo et. al., 2005).

### 1.2 Problem

The focus of study is to identify ERP COTS software that differs from custom made ERP in product type and implementation process. The study further intensifies focus on the factors which are critical for the successful ERP COTS product selection and implementation by decision makers and ERP COTS implementers respectively.
The study involves decision makers, management and organizational actors (end users-which are beneficiaries of ERP COTS system). The study tries to identify certain factors, which could lead to the success of ERP COTS and failure to identify those CSFs in selecting and implementing ERP COTS can lead to ERP COTS failure. The following figure is plotted to demonstrate the graphical version of the problem space and it elaborates the focus area of the study.

The figure above shows the focus of the study that COTS software and custom made ERP are different from each other in product selection and implementation level, but they do however share some factors like that the analysts perform the analysis and investigation phase on both custom made ERP and COTS implementation. The study further intensifies focus on the factors which could be critical for the success of the ERP COTS implementation. Further the study divides those factors to Decision Makers and ERP COTS Implementers level. Decision makers and implementers often make the mistake to ignore them and implement the system on custom made ERP methods which ultimately does not fit in an ERP COTS selection and implementation scenario.

**Figure 1: Problem Space**
Lo et al. (2005) defines custom made ERP solutions as products that are more time consuming to implement but are more in accordance with the end user needs. Salter & Buede (2001) explains COTS by its different characteristics from ERP as they are the sort of products which are owned by the vendors and leased to the organizations and cannot be code modified, whereas ERP solutions are custom made, more likely in-house built, and with all the source code access to the organization and its right to use or reuse. COTS is, as its name says, Off the Shelf software which is available commercially; they are ready made software which costs less time to implement but are less flexible to the specified end users requirements. They however present some excellent command and control features as well as runs periodically with standard business procedures. We can say that some COTS softwares itself are ERP, considering that ERP as a wider term in the information technology and software industry. The COTS development process is different from traditional software or custom made ERP software development and poses many different challenges to the ERP COTS decision makers and implementers (Wu et al., 2007). Among which the major differences occur in selecting the COTS products, managing the project itself, aligning business processes with COTS procedures, command and control structure (authorization metrics), integration and final kick off to the new system and its post implementation change management.

Due to the above defined categorization of ERP and COTS, they form certain specific consideration in product selection and implementation level by the decision makers and product implementers. Often decision makers and implementers consider both products (ERP and COTS) at same level and try to apply ERP thoughts to COTS product selection and implementation which ultimately leads to unsuccessful COTS product selection and implementation. However the successful COTS component implementation requires a systematic approach, a framework or some guidelines which can be a running line for the COTS decision makers and implementers and also a good knowledge for the end users which are organization actors (end-users) to act and react in favour of the new system (Chung & Cooper, 2002). COTS software may seem or run the same to some extent, but it should be steered differently to make sure decision makers and end users get the right thing which they expect while selecting and implementing ERP COTS.

Chechich & Piattini (2005) explains that while addressing the factors of ERP COTS that ERP COTS selection and implementation is a complex activity within itself because of human users and intangible information which is hard to structure. The above mentioned factors could also be considered as social values which cannot be calculated or accessed by mathematical formulas or by some set procedures. The reason why is it difficult to handle human behavior in the ERP COTS selection and implementation is because of human behaviors are very hard to draw and measure according to some scenario. The process requires very careful analytical approach to analyze and draw the human values to some comparable mathematical formulation.
Dubois & Franch (2004) emphasized on COTS evaluation and considers it as one of the central activities for the successful development of COTS systems. Ghosh et. al. (2005) talked about the several approaches which are proposed for making a framework for ERP COTS selection, or structuring the ERP COTS selection process, which can be used to evaluate a certain product and its attributes like cost, time, implementation process, system changeover approach, security and functionality. Beckworth (2000) explained some implementation challenges and defined the spiral approach to develop the system. He also believes that the major problem in software deployment is managerial rather than technical. It actually is a reasonable combination of both but, more crucial, is considered as managerial due to the fact that managers have the right and resources to select, plan and move the process.

Critical success factors are defined as the set of activities, guidelines, act and procedures following which can ensure the success of an ERP COTS implementation. Although analysts have introduced the concept of critical sets of activities done by higher managers, managers, decision makers and end users who can lead to successful ERP COTS system implementation and can add to the business value of the organization. (Flynn & Arce, 1997).

1.3 Structure
The structure of the thesis is; Section 1 presents introduction, section 2 presents the Aims & Objectives of the study, Section 3 explains the detailed procedure carried out during the study, Section 4, 5 and 6 presents the discussion & conclusion, future work of the study and references respectively.
2. AIMS & OBJECTIVES

This section presents the Aims and objectives of the study. Section 2.1 describes the Aim of the study and section 2.2 describes the objectives. The objectives are further described in four parts, and are followed by their detailed explanation.

2.1 Aim

The research aim is to identify critical success factors (CSFs) of Enterprise Resource Planning (ERP) Commercial-Off-The-Shelf (COTS) software implementation.

According to the initial investigation of the literature some of the CSFs are reported in the literature but they are not listed comprehensively and explicitly in the form of listed critical success factors for decision makers and ERP COTS implementers (Ochs et. al, 1996, Seddon et. al, 1999). Much of the other literature only focuses on custom made ERP implementations and very few explicitly discuss only some of the ERP COTS factors (Chang et. al, 2000, Grabski & Leech, 2007, Zhang et. al, 2003). The aim of the report is to list down and categorize all the CSFs at one place as Listed Critical Success Factors, which no other literature list down in terms of IS development life cycle (Flynn & Arce, 1997, Kontio, 1996, Beckworth, 2000) and to categorize them as CSFs for ERP COTS Decision Makers and Implementers respectively.

2.2 Objective

The objectives of the study are as follows. Accomplishing objectives can serve to find out the critical success factors for ERP COTS implementation for decision makers and implementers at their respective level.

2.2.1 What characterizes ERP COTS software implementation?
2.2.2 What CSFs can be identified at decision makers and implementation level?
2.2.3 How does identified CSFs map to ERP COTS software implementation characteristics?
2.2.4 Which CSFs are best suitable for
   (a) Decision Makers (Top Managers, Owners)
   (b) Software implementers (ERP COTS consultants, Systems Analysts)
2.2.1 What characterizes ERP COTS software implementation?

ERP COTS implementation characterizes many things which are important to map the success factors. These characteristics are generically defined by Beckworth (2000) in a framework as the Success Factors in the Information System Development Process. These characteristics are identified as Assumed Critical Success Factors later in the study for Decision Makers and ERP COTS implementers.

Chow & Cao (2008) characterized that the ERP COTS software implementation is dependable on certain factors which can be counted as people and the processes upon which people acts, technical concerns. The project of ERP COTS implementation itself and some studies, Sun et. al. (2005) includes Data as well. Other developed the framework (Söderström & Lennerholt, 2005) which consists of three main areas: contract, culture and security. But the most comprehensive is the very first presentation, the one by Chow & Cao (2008). This objective characterizes the components which makes ERP COTS. All of the above factors are critical for the successful implementation of ERP COTS system and are comprehensively chalked as Assumed CSFs later in the study.

2.2.2 What CSFs can be identified at decision makers and implementation level?

The study further continues with the second objective to classify Assumed Critical Success Factors (CSFs), there are assumed to be some which are managerial CSFs and some are implementation CSFs. Managerial CSFs corresponds to factors at decision maker level and implementation CSFs corresponds to factors at ERP COTS implementation level. The characterization of CSFs as for decision makers and implementers would be the outcome of this objective and is presented in the detailed study in section 3.

2.2.3 How do identified CSFs map to ERP COTS software implementation characteristics?

The objective tries to establish a link between the Assumed CSFs and the actual findings which are carried out during the literature study. The outcome of this objective is to map the assumed CSFs with the study with extensive literature arguments provided by the authors. CSFs failing to gain the support of the authors will be eliminated and newly discovered CSFs can be added to the study as well depending upon their criticality and ability to have the same opinion with the focus of the study. The CSFs are distributed as CSFs for decision makers and ERP COTS implementers.
2.2.4 Which CSFs are best suitable for Decision Makers and ERP COTS implementers?

CSFs related to ERP COTS selection are suitable for Decision makers and CSFs related to ERP COTS implementation are related to implementers. The study tries to chalk out all the factors which are explained, experimented, surveyed and proved by the authors through extensive literature survey as Listed CSFs in the following detailed study section (section 3) and will be the outcome of this objective. It is important to note that ERP COTS lies within a very thin boundary between ERP and ERP COTS and share some factors as well which are common and critical in success and on the other hand some factors are different and even reversed. The study and listed factors will determine that which factors are a part of COTS criticality; the shared factors and will be the part of the findings as well.

Underlying assumption

Managers and implementers need different types of CSFs for ERP COTS software selection and implementation because both have to make decisions in their own domains and the activities which they perform to select and implement ERP COTS software are different. However few of the success factors could be common while managing the whole project.

2.3 Expected Results/Contributions

The derived CSFs for ERP COTS selection and implementation can contribute as a check list for ERP COTS decision makers and implementers to make sure these factors are identified at the right time and measures are taken to make sure identified failures are avoided for successful ERP COTS implementation.

2.4 Delimitations

The scope of the study is to capture the area which lies at the cross section of ERP and COTS software, and finding out CSFs for Decision makers and ERP COTS implementers. The study does not analyze custom made ERP critical success factors rather only focuses on success factors of ERP COTS.
3. THE STUDY

In the study section 3.1 describes the databases and keywords used to search articles. Section 3.2 describes the process of collection and selection of articles. Section 3.3 presents the Assumed CSFs which is the outcome of the first objective of the study. Sub distributed sections 3.3.1 and 3.3.2 serves as outcome of second objective. Section 3.4 maps the assumed CSFs with the study and thus fulfils the third objective and finally Section 3.5 – 3.8 fulfills the fourth objective of the study.

3.1 Database & keywords

In order to identify the CSFs around 150 articles were searched. After careful analysis 59 articles, which were considered to be most relevant for the study and provided relevant information about critical success factors for ERP COTS software implementation were selected. All databases were searched with the same list of keywords. The full list of keywords can be found in the supplements section. However, all the keywords were used in the search and those which produced repetitive or no results are not in the list below. Databases and keywords used in the study are listed respectively:

3.1.1 List of Searched Databases

- Google Scholar
- Google Search Engine
- Science Direct
- ACM Portal
- ELIN
- Academic Search Elite
- Scirus Portal
- CiteSeer
- Compendex
- HCI Bibliography
- Science Citation Index
- Science-reasearch.com

3.1.2 List of Keywords

- Critical Success Factors
- CSF
- CSF’s
- Enterprise Resource Planning
- ERP
- Commercial Off the Shelf Software
3.2 Collection & selection of articles

Articles found as a result of the keywords mentioned above were judged to be most closely related with the objective of the report and were selected. Literature research analysis was conducted to analyze and map Critical Success Factors of ERP COTS implementation and is divided in two categories. CSFs for ERP COTS decision makers and ERP COTS implementers.

3.3 Assumed Critical Success Factors (CSFs)

The study started off with the assumption of Critical Success Factors for the successful implementation of ERP COTS software for Decision Makers and Implementers. The assumed CSFs are chalked out during the initial investigation of the report which is based upon a small sample of the searched articles. The reason to select the assumption approach in the initial study and then trying to prove those assumed factors from the detailed study is to build some sort of sketch or framework as per the SDLC process and include as many critical factors as possible which could be a success reason for ERP COTS software implementation. One of the limitation or perspective dis-advantage of this approach is that when there are pre-assumed CSFs reader can be more focused on finding out arguments only for those factors which are in the assumption list and there is the possibility to overlook some of the factors which could also be critical for the success of ERP COTS and are not in the assumed factors list. To tackle this limitation the assumed success factors were also taken from a small sample of relevant articles (Almost twenty percent of the total articles) so that we can say that the assumed success factors are derived from the same literature but from a shorter sample and they on the other hand also served as the initial structure of the study. The assumed success factors were then proved from the rest of the collection of articles. However, during the detailed study, if any factor is not able to get enough argument support from the literature that would be eliminated from the final list. And additional factor can be found during the study and they can be added to the final list of CSFs in the study.

The list of the assumed CSFs is presented below (3.3.1, 3.3.2). The CSFs which are, in my opinion, well supported by the arguments presented by different authors in their respective articles as a result of conducting various case studies, experiments, interviews and literature research analysis are further presented in section 3.5 as
Listed Critical Success Factors. The next section (3.4) continues with mapping the assumed CSFs with the study by adding arguments from the literature. CSFs are presented in chronological order of the information systems development life cycle. The following factors are chalked out and consist of two categories.

3.3.1 CSFs for ERP COTS Decision Makers

3.3.2 CSFs for ERP COTS Software Implementers

3.3.1. CSFs for ERP COTS Decision Makers

a) ERP COTS selection
b) Pre-sales commitments and ground realities
c) End-users involvement in product selection
d) Technical evaluation and assistance regarding product functionality, integrations, value & limitations
e) Product evaluation
f) Identification and realization of tangible/non-tangible values
g) Costing & Return on investment (ROI)
h) Project scheduling
i) Formation of right project team
j) Risk analysis and contingency plans
k) Quick launch and end-user reaction
l) Project Monitoring and conflict resolution

3.3.2. CSFs for ERP COTS Software Implementers

a) Establishing working relationship and credit sharing among end-users
b) End-user orientation, motivation and training
c) Organization culture, norms and user behavior
d) End-user acceptance to technology and ERP COTS
e) Organizational processes and Business Process Reengineering (BPR)
f) Command & control and Authorization metrics
g) Data filtering, authentication and Data migration from legacy system
h) System changeover procedures
i) Post implementation support and change management

3.4 Mapping CSFs with the study

This section highlights the mapped critical success factors in the light of extensive literature. It consists of two main divisions which are the CSFs for ERP COTS Decision Makers and ERP COTS Implementers. ERP COTS Decision makers are sometimes organization owners so we consider both at same level and ERP COTS implementers includes consultant either in-house or outsourced.
3.4.1 Decision Makers

Below are the success factors which are critical for the ERP COTS selection process. Both Decision makers and Implementers form a joint platform to implement ERP COTS within an organization but share different responsibilities and sometimes same responsibilities. The reader may find few of the factors for decision makers and ERP COTS implementers same because they do share some common factors but their actions are not the same. Both decision makers and implementers have their own role, at times one may be requiring information and other would be assisting the same information and sometimes there is joint communication and decision in the selection and implementation of ERP COTS.

a) ERP COTS selection

ERP COTS selection is one of the important factors which can move you to the right or wrong path. Selection of appropriate ERP COTS product can be considered as an unstructured task and it however requires specific attention because a wrong product can lead to wrong results even if all the efforts are in right direction (Alves & Finkelstein, 2002). The decision makers obviously have enough information about the company procedures and it is necessary for the decision makers to conduct the requirement analysis and neutrally analyze the facts and figures according to the needs of organization actors (end-users) and processes and then make a decision (Zhang et. al., 2003). ERP COTS present different functional qualities and compatibilities so it is even more important for the decision makers to make a requirement fit-in analysis. A well developed specification for the organizational ERP COTS requirements can increase the chance of selecting the right product and also points out the re-designed operations if required (Grabski & Leech, 2007).

Organizations can also refer to the traditionally defined processes of adopting custom made ERP system to follow the analysis step, the only difference which occurs that the same requirement definition is done before the ERP COTS product selection and is compared with the perspective ERP COTS product for compatibility (Elgazzar et. al., 2005). Well defined and structured requirements can make the process relaxed and more guaranteed towards the right selection (Torchiano et. al., 2002).

A study conducted by Mohamed et. al. (2005), found that most organizations are using ad hoc manner to select ERP COTS software products and some defined to be using their own evaluation and selection processes. While buying ERP COTS products companies should acknowledge the vendors prospective and assumptions to change the companies required business processes (Arif et. al., 2005). The studies and experiences show that there is often a mismatch between the pre-sales assumptions and decision makers understanding which ultimately can result in wrong assumptions and wrong findings (Alves & Finkelstein, 2002). Thus it is worth to carry out a brief but comprehensive study which can question both sides about the benefits of the new
system, potential hazards of the new system, reasons of those hazards, potential gaps in the company’s processes and lack of communication among the end-users.

b) End-user involvement in product selection

This factor can be considered as one of the major factor of the product selection. But the issue is that it is not understood in this way. When we say end-users it includes all the organization actors who are perspective users of the new system and who are expected to take benefit or provide benefit to the organization. In his paper, Bhatti (2005), divides the involvement of end-users in two stages; one in defining the exact organizational needs and other participating the implementation of selected ERP COTS. Frequent involvement of end-users, managers and implementation consultants can develop a sense of project ownership and will result in better understanding, feedback and change of the system right from the selection to the final implementation (Grabski & Leech, 2007). An open and informational method should be established within the organization covering all the actors (end-users), including managers to communicate and disseminate the information and take feedback to identify the right needs to support the selection of the new ERP COTS (Al-Mashari et. al., 2003). It can be difficult to maintain but the organization should make all the decisions informed to the participants to make sure they agree or disagree or point out to additional issues related to them (Brown, 2004). Decision makers and managers should be aware of the low satisfaction level of the end users and the reasons of their low satisfaction to evaluate the fitness of the ERP COTS product (Wu & Wang, 2003). It’s not the race to evaluate the fitness of ERP COTS products individually rather it’s the measurement to find the level of fitness of ERP COTS with the organization needs.

c) Technical evaluation and assistance regarding product functionality, integrations, infrastructure requirements

IT managers and IT department who are trying their best to keep the existing system aligned with the business process. They should be having shouting questions over the new systems and their responsibilities. They understand it could be a tough ride switching one system to the other (Bhatti, 2005). IT infrastructure, hardware and software, network, existing systems, legacy systems are crucial to be identified analyzed for compatibility before making ERP COTS selection. There could be need of additional equipment from technical prospect. There could be many workarounds to settle legacy system and IT infrastructure issues. Decision makers need to consult their technical department to provide them with the plan and all the necessary technical information of ERP COTS to make sure right technical equipments procured. In the past lack to system support was lack of appropriate hardware, software and IT infrastructure (Poon & Wagner, 2001). Functional misfits may arise between the organizational requirements and ERP COTS packages, there could be
incompatibilities between various functional routines, it can also be in the form of presentation styles and report data formats (Soh et. al., 2000).

IT managers should give much of the attention to analyze all the technical aspects of ERP COTS and should be in expert hands (Sánchez & Pérez-Bernal, 2007). There is another complexity which is expected in cross-module integration nature of ERP COTS (Al-Mashari et. al., 2003). Although many middle ware technology are available to join the cross platform but they are not offered by all the ERP COTS vendors. Another solution is developing customized needs through Software Development Kit (SDK), SDKs are development tools provided by ERP COTS vendors to ERP COTS developers through which developers can make customized modules as per the customer needs but its costs are enormously high as ERP COTS will be developing a module for customers specified needs. A centrally coordinated system is required to gather end-user requirements and supports the process of integration if offered by ERP COTS (Park & Kusiak, 2005). Now the criticality is for the decision maker to understand and make sure they get the technical advice regarding new ERP COTS functionality, integrations issues and solutions, perspective values and limitations. Technical department can chalk out the new system compatibility with the business processes. They also need to make sure that the new system has enough integration capabilities to align with the existing business processes.

d) Product evaluation

Decision makers are lacking with any particular method to evaluate the ERP COTS product (Elgazzar et. al., 2005). Even decision makers go for assistance from the IT department there is still unavailability of any set procedure to evaluate the ERP COTS product. Major issue for the evaluation is customization and it could either be tailoring of the ERP COTS or developing a new module. The process of COTS identification can be carried out through web searches, product literatures, case studies, success stories, recommendation from other external sources (Morisio et. al., 2000), Torchiano et. al. (2002), made general characterization attributes which provides us with a framework to characterize the ERP COTS evaluation. Dean & Vigder (2000), found in their study that some of the ERP COTS evaluation methods are not successful due to their characterization in accordance with custom made traditional ERP systems.

In ERP COTS evaluation performance should reflect the beneficial and balanced approach towards the needs of the organization (Al-Mashari et. al., 2003). It also includes technical aspects like reliability of the system, speed, cost, integration and imports. Mohamed et. al. (2005) developed a RACE (Resources-based Approach for COTS Evaluation and selection) model to evaluate the ERP COTS benefits which includes analyzing the amount of customization required to implement ERP COTS, end user satisfaction, organizational requirements and expectations of decision makers.
and end-users. ERP COTS should be evaluated on different ground than custom made ERP systems because it has different product and implementation life cycle. Decision makers should emphasize to make detailed analysis to evaluate the goods and bads of the new system.

f) Costing & return on investment (ROI)

Here comes the interesting part, where ERP COTS is much different than custom made ERP solutions because this time decision makers have to plan long term implications in terms of costs and have to pay for the licensing every year and additionally for the maintenance and updates fee (Abts et. al., 2000). Be sure that implementation fee is separate from that cost (Al-Mashari M. et. al., 2003). Costing is critical because it has a direct relation and an indirect relation with the product implementation. Direct relation is in the form of licensing and maintenance fee and indirect relation is that if the project gets delayed decision makers have to bear additional implementation cost. So while selecting the product it seems to be low costs but if the critical factors are not addressed at the right time the costs of the project can exceed (Erdogmus et. al., 2000). The biggest dilemma is that decision makers while paid more than half of the funds often gets the news to pay more for due to any reason (Park & Kusiak, 2005). For example the detailed study reveals that we need 50 users rather than 40 so the additional cost of licensing fee and implementation fee is added to the actual amount. At that point of time decision makers are not in the position to just continue with the same no. of users because it cannot give the desired performance and similarly they cannot hold or back out the project.

According to Moon & Phatak (2005), a comprehensive costing procedure can then lead to a correct return on investment (ROI) measurement as well. However the issue of return on investment is very important, however it should be projected to make sure the organizations get maximum benefit from the new system. Here it is very important to note that benefits are both tangible and non-tangible and has a greater importance in the product selection and evaluation. Its worth to mention here that any of the ERP COTS products do not give direct value to the business it actually adds the value to the business process and return on investment should be analyzed keeping this in mind (Kamhawi, 2008). Although there is not much evaluation criteria available for the ERP COTS evaluation, Four in-depth case studies were conducted in HEIs that were in the process of implementing ERP systems and it was found that It is important for the decision makers to understand that when they will be able to see the projected return on investment (Allen et. al., 2002). ROI in software project is usually slow because it directly gives business value to the system rather than directly generating funds.
g) Project scheduling

Project scheduling and management is important for the decision makers to make sure a realistic schedule is achieved (Zhang et. al., 2003). The schedule must be trailed with the organization processes, depends on how big the organization is? How complex the processes are? How tough the pains of the old systems are? How fast the end-users reaction is? What is the integration level of the old and new system is? And lastly how competent the software implementers are to handle all the factors and keep the schedule up to the mark. The most realistic schedule can be the one which satisfies all the answers to the questions above.

A case study by Motwani et. al. (2005), compared four ERP implementations and found that project scheduling is critical that it has to be designed including all the critical and possible elements in mind because it can give the due time to the responders to come up with more fruitful information and feedback of the existing system. It can identify implementation process with all the elements like of organizational cultural acceptance, working relationships and effective change management can make ERP COTS a success. The ERP COTS project should be defined in terms of project plans with clear and formal deadlines and milestones and should be monitored and managed (Nah & Lau, 2001). Deadlines should be met to stay within the project schedules and budget as well. It can effectively be achieved by forming a steering committee and a leader from all the departments representing end-users point of view (Sumner, 1999). Decision makers should form well defined strategic targets to keep the project team focused and running on the system (Al-Mashari et. al., 2003). It eventually will help keeping up the business goals and benefits (Nah & Lau, 2001).

h) Formation of right project team

Formation of the right project team and including the people in the team which exactly understands the business process and are experienced in the organization is critical as well. While formation of the project team by the decision makers it’s sometimes comes up with two races. One is those people who try to avoid any additional responsibility of the system and are those who actually force to get in the maximum credit. However a formal and balanced approach is necessary to form a project team. Decision makers should understand the induction of right people at the right place. Project team is very healthily if it is formed within the selection of the new product. Steering committee and at least one manager from every department or at least seven to nine people in the team (Yu, 2005), which can give the equal representation to the users and gives access to the top management to monitor the project team performance (Grabski & Leech, 2007). It also shares the responsibility and establishes equal credit among the departments to make sure everyone pushes the new system and gets maximum involvement. Nah & Lau (2001), explained that building a cross functional team is important with a healthy mix of consultants and end-users who could be managers as well in a particular department settings. Cross
functional teams and bottom up development is more in accordance with organizational practices (Gowan & Mathieu, 1996). Core part of the team is IT department which would be working on ground with the product implementers who are usually consultants from the vendor sides (Woo, 2007). However Sumner M. (1999), said that successful team requires external aid of expertise, selection of an experienced project manager and team members. Project manager in particular should be knowledgeable about all technical and business procedures (Allen & Havenhand, 2002).

i) Risk analysis and contingency plan
Decision makers (Bhatti, 2005), must make sure that risk analysis is done and ERP COTS team follow the risk analysis guidelines to minimize the impact of unplanned incidents. Although the new system of ERP COTS shines with many benefits in it but there is a big jump before that which is its correct implementation. And there are number of risks involved in it. Typical risks are system down/crash once it’s switched to the new system which can lead to business process halt and in turn can jam the business. Other risks are losing all the investment in case the system is not up to the mark; there is also a risk of additional resources required during the project which have to be fulfilled once the project is under way. There could be technical risks of system integration when it’s mapped with the databases. There could be another risk of inadequate performance by the end-user which might be lacking training or motivation. All the possible risks factors (Allen et. al., 2002), have to be identified and analyzed for their intensity. There could be un-seen risks according to the external environment of the business, competitors and risks related to the vendors as well. All of the risks should be covered with their projected and expected contingency plans to make sure in any un-seen or un-expected situation, decision makers are ready to react in the right direction to avoid the loss.

j) Quick launch and end user reaction
ERP COTS product comes with the bounty of quick launch approach, even in months which is assumed to be one of the major reasons for the decision makers to launch the project but it can turn out to be an ultimate failure when end-users are surprised by the decision of implementing a new product. The reason is the push from the decision makers to meet the deadline (Zhang et. al., 2003). It actually is the push to the implementation team which is been placed on the promise of quick launch. But even if the implementation team is doing more than 100 percent and end-users are not up to the required or expected performance. It can delay the schedule and trying to meet up the schedule implementers can leave the issues, requirements un-addressed and that can ultimately cause project failure or partial damage to the system. Even if they are able to meet the expected deadlines, the outcome is not visible until the system starts putting up the results in terms of reports and performance (Al-Mashari et. al., 2003).
It is important to keep the deadlines to some realistic and achievable limit is as well as project milestones can give team and the decision makers at least a sense of achievement, if they are planned and achieved frequently (Zhang et. al., 2003). It also confirms that if the project is going in the right direction. Thus quick launch although could be a buying factors of ERP COTS but the settled deadlines should be achievable. Many case studies suggest that companies usually are sensitive to implementation time and budget. Due to limited resources decision makers choose the quick launch approach to compete in the market despite of fever resources in the backup to support the project once it is under way (Mabert et. al., 2003).

**k) Project monitoring and conflict resolution**

Project monitoring by the decision makers is important and is also important for them to get daily and weekly reports on project status. S´anchez & P´erez-Bernal (2007), analyzed that management support is the second most critical factor for the decision makers to make project a success and also Al-Mashari et. al. (2003), termed it critical for the ERP COTS project success. Reporting mechanism can be set up while setting up the project team that who should be collecting and sending the compiled updates to the decision makers. Continuous involvement of decision makers is necessary to make sure they get the expected and projected result and are aware of the exact situation of the project (Aladwani, 2001). Decision makers and top management should create ERP implementation environment and should be an active actor of the process and be a part of regular meetings and monitoring of the project (Zhang et. al., 2003). According to the study carried out by Brown (2004), initially the ERP COTS project was equipped with the reasonable support with the decision makers but eventually the project lost the support and found itself in crises. A company named ElectronicCo. also suffered the same dilemma and the study carried out found that organizations did not deem the ERP COTS implementation as a priority project in their books (Woo, 2007). They rather were more focused on business making and keeping ERP COTS as normal technical routine which will implement and start benefiting them.

It is also a matter of criticality for the decision makers to manage the conflicts within the organization on the issues raised during the ERP COTS implementation. A successful approach can be considered as which fully addresses the conflicts and settles them swiftly (Wang & Chen, 2006). Strong management commitment is the ultimate strategy which can lead to better understanding of the issues and can pose resolving solutions (Aladwani, 2001). Often the conflicts could be of many types ranging from conflicting business procedures, departmental interests, organizational cultures and individual authorities breach, resulting in the implementation of ERP COTS. First issue which decision maker’s needs to sort out is while making a decision of ERP COTS implementation to make sure every end-user is in favour of the top project (S´anchez & P´erez-Bernal, 2007).
3.4.2 ERP COTS Implementers

Following section represents the factors which are critical for the success of ERP COTS at implementation level for the ERP COTS implementer and systems analysts. Some critical factors however may seem similar to the factors presented above but they are explained in different prospect. This is because both Decision makers and implementers are a part of the same process.

a) Establishing working relationship and credit sharing among end-users

The first and foremost relation of the ERP COTS implementers is with the end-users when they practically jump in the implementation phase (Wang & Chen, 2006). Effective communication is the key to form a healthy working relationship between client, consultants and end-users. The ERP COTS project Managers should have the ability to communicate with the senior management (Poon & Wagner, 2001). ERP COTS consultants should make sure they get the right person on these key positions to make sure proper and informative communication is established and they get a good relationship with all organization actors (Nah & Lau, 2001). According to Bhatti (2005), a survey the most important thing for ERP COTS project success is competent team members who can form a good working relation with the ERP COTS consultants. With a good communication ERP COTS consultant can access the end-users working norms and behaviors towards ERP COTS and normal working routine. End users can react in any way so it’s very important for the implementers to tackle it on case to case basis (Nah & Lau, 2001). Motivational support is necessary for the end-users to provide quality feedback; this can be done in the form of management bonuses and equal credit sharing.

b) End-user orientation, motivation and training

A factor of criticality is the end-users motivation which could be invoked by presenting demo of the new system at the initial level (Yu, 2005). It is also critical that in a short time of ERP COTS implementation the implementers can mobilize the end-users by initiating the training of the product in the early stages (Aladwani, 2001). It can help end-users to practically see and use the system and file their feedback on it. End-user orientation can also help to prepare them for the future work and can also evaluate their capacity of workability with the implementation project (Grabski & Leech, 2007). It also notifies end-users about the potential benefits of the new system and makes them work comfortably with the new system (Bhatti, 2005). This factor can greatly help the implementers to know each and every possible question, expectation and potential threat which could be in the minds of end users and vice versa. The main goal of the training should be to orientate the end-users about the new systems procedures (Al-Mashari et. al., 2003). The resulting input can be managed to get the end-user requirements, reactions and feedback (Nah & Lau,
ERP COTS implementers should initiate to recommend upgrading the IT people knowledge if required other than the product training (Sumner, 1999).

c) **Organization culture, norms and end-user behavior**

ERP COTS implementers face a lot of business environments to work on so they should be experienced to settle in quickly. But it’s very important for the ERP COTS implementers to realize the organization culture, norms and end-user behavior and they should be dealt in a way that maximum results and commitment could be achieved (Nah & Lau, 2001). Organization culture however differs from country to country and often ERP COTS consultants try to impose the same theme of work in different country environment (Woo, 2007). Organizational norms could be considered as working attitude of the organization, which in some cases could be very professional and supportive and could also be less supportive. Organization politics according to Poon & Wagner (2001), by the end-users to gain maximum credit in the scenario can affect the ERP COTS implementers work. So, understanding organizational behavior by the ERP COTS end-users is important to make sure they move the project in the right direction by changing their organizational culture (Willis & Chiasson, 2007). In the four case studies conducted by Allen et. al. (2002), found there is a great impact of the organization culture on the success of ERP COTS implementation and it more likely appears in ERP COTS implementations where the end-users can try to push a project in a particular direction to service their own goals.

d) **End-user acceptance to technology & ERP COTS**

End-user acceptance to the new technology is important and is not an easy task until they are convinced that the new system is beneficial for them and the company (Woo, 2007). ERP COTS implementers should configure and implement the system in a way that it is acceptable for the end-users. Motwani et. al. (2005) says that eight out of nine times faulty technology is been blamed but it’s the inability of the end-users to accept the technology change. Also the technology fear keeps most of the end-users away from the new system. To keep up to the end-users acceptance and satisfaction (Poon & Wagner, 2001); is only possible once ERP COTS implementers understands end-users expectations and then aligning those expectations with the ERP COTS configured structure (Kamhawi, 2008). It can be helpful to hit the point of interest and satisfaction of the end-users.

e) **Organizational processes and business process reengineering (BPR)**

ERP COTS implementation can change the whole organizations working procedures (Grabski & Leech, 2007). Coming to the overall business process, it is very important to consult the end-users while designing the exact work and information flow of the process. It may also involve re-engineering many business processes (Alves & Finkelstein, 2002), which could break the working routine of the end-users and force
them to change their working procedures (Zhang et. al., 2003). It is important for the ERP COTS implementers to convince the end-users to use the new engineered process. It is sometimes authority and individual interests of the end-users which could breach the original ERP COTS configuration, and sometimes organizations are structured in this way. So, it’s critical for the ERP COTS implementers to identify the need of the BPRs and implementation where necessary through available process modeling tools (Nah & Lau, 2001). They might have to be lenient in some occasions were a set workout is beneficial for the whole system and they should be hard in the cases where personal interests can breach the original configuration of ERP COTS. The ERP COTS implementers should try to change the procedures rather than the software (Sumner, 1999).

f) Data filtering, authentication and data migration from legacy system

Once the analysis is over; The ERP COTS implementers have to focus on the technical issues related to the implementation of the product in which there is a need of very strong communication with the technical department. Although it actually starts with the analysis phase and has to be planned with the technical team to get new license, hardware and any additional software’s required (Al-Mashari et. al., 2003). It has to be planned ahead because purchasing and setting up of software and hardware and communication infrastructure can take time. Ordering them before is important to meet the implementation deadline. While designing the business procedures data migration or moving records from the legacy system to the new system should be planned and tested to make sure it works out in accordance with the plan (Poon & Wagner, 2001). The master record needs to be check and purified because ERP COTS cannot give the desired results until and unless the data provided to it is purified, tested and authenticated (Soh et. al., 2000). Data migration is the most critical task in technical workings while implementing ERP COTS; because all the system has to be run on that. Suitable and reasonable checks and balances should be the part to achieve data quality for authentication and right authorization metrics to make sure data is recorded at the right time, right place, by the right person (Kamhawi, 2008). Poor quality of data can lead to wrong results in the system even if all the business procedures are correct (Park & Kusiak, 2005).

g) Post implementation support and change management

ERP COTS consultants have to design the post implementation procedure. In normal practices there is usually couple of weeks or months for the end-users to get in-house support when they start using the system. Post implementation planning is necessary because once the new system is actually implemented and its reports are generated it can require many corrections (Motwani et. al., 2005). However the literature has shown that inflexible post implementation process can restrict the system to adopt the changing market needs (Mohamed et. al., 2005). The reports and business procedures are running on the actual data for the first time. It can include from minor designing
and editing of the report to changing a particular business procedure. Sometimes end-users performs the transactions incompletely following the old system practice which in turn can reduce other users performance because the whole system depends on data from one and information to the other (Park & Kusiak, 2005). So it’s critical to have ERP COTS implementers on the same floor when the system is actually runned and the reports has to be verified to make sure that end-users get the correct reports from ERP COTS.

Change management means to manage the technological and organization change throughout the system implementation process (Nah & Lau, 2001). Generally there is resistance to the change because of end-users working style; end-users have to change their behavior, expectations of results and the way they get the new results (Bhatti, 2005). It is because end-users need time to get the things in different ways than before (Sánchez & Pérez-Bernal, 2007). It can sometimes create conflicts as well which can lead to change in authorization matrices and policies of the software. A senior team player should be given the charge to disseminate the change information in the system and manage it throughout the process (Brown, 2004).

3.5 Results & Findings
The results of the detailed literature analysis showed that few of the CSFs are not supported by the literature. Those CSFs are presented in section 3.6 as Eliminated CSFs. These CSFs are called eliminated CSFs because they are not included in the final listed Critical Success Factors presented later in the section 3.8. However during the study one CSF was discovered which states the importance to measure the knowledge and competitiveness of ERP COTS consultants for the decision makers and is presented as added CSF in section 3.7. Finally section 3.8 presents the Listed CSFs for successful implementation of ERP COTS.

3.6 Eliminated Critical Success Factors (CSFs)
A few of the assumed CSFs were not supported by the arguments in the literature. Two of them are from the Decision makers and two are from the ERP COTS implementer’s perspective. From the Decision Makers point of view assumed CSF “b” (Pre-sales commitments and ground realities) & “f” (Identification and realization of tangible/non-tangible values) were lacking support of the literature. Similarly from ERP COTS implementer’s point of view CSF “f” (Command & control and Authorization metrics) and “h” (System changeover procedures) were also lacking support in the literature. These CSFs are not included in the listed CSFs.
3.7 Added CSF during the study

During the study a CSF was uncovered in the literature which is lying within the scope of the study. The discovered CSF is relevant as CSF for Decision Makers and is critical for the success of ERP COTS. CSF will be added finally in Listed Critical Success Factors and is explained below.

Consultant’s knowledge and competitiveness

There is often not such evaluation about the ERP COTS consultants. Consultants are usually provided by the ERP COTS vendors and decision makers are not concerned about their competencies (Wang & Chen, 2006). As consultants are the back bone drivers of system implementation and it is necessary to make sure consultants have right domain and technical knowledge. They should be experienced with the project management and should possess problem resolving skills.
3.8 Listed Critical Success Factors (CSFs)

Following are the listed critical success factors, based on the literature analysis. These factors are critical for the successful implementation of ERP COTS for Decision Makers and Implementers. The success factors are stated below under separate headings and they do not include the eliminated CSFs which are explained under heading 3.5 of the chapter. One CSF is added as explained in section 3.6.

3.8.1 CSFs for ERP COTS Decision Makers
3.8.2 CSFs for ERP COTS Software Implementers

3.8.1. CSFs for ERP COTS Decision Makers

- ERP COTS selection
- End-users involvement in product selection
- Technical evaluation and assistance regarding product functionality, integrations, value & limitations
- Product evaluation
- Consultants knowledge and competitiveness
- Costing & Return on investment (ROI)
- Project scheduling
- Formation of right project team
- Risk analysis and contingency plans
- Quick launch and end-user reaction
- Project Monitoring and conflict resolution

3.8.2. CSFs for ERP COTS Software Implementers

- Establishing working relationship and credit sharing among end-users
- End-user orientation, motivation and training
- Organization culture, norms and user behavior
- End-user acceptance to technology and ERP COTS
- Organizational processes and Business Process Reengineering (BPR)
- Data filtering, authentication and Data migration from legacy system
- Post implementation support and change management
4. DISCUSSION & CONCLUSION

The detailed study backed up and proved the argument that although some of the CSFs were already reported in the literature but they are not listed comprehensively and explicitly in the form of listed critical success factors for ERP COTS decision makers and implementers (Ochs et. al, 1996, Seddon et. al, 1999). The study lists down all the CSFs at one place as Listed Critical Success Factors, which can serve as the running line for the ERP COTS Decision makers and implementers. In the process of ERP COTS selection and implementation, Decision Makers and Implementers do carry out some activities to make sure appropriate product is selected and implemented but at the same time they fail to ask themselves many critical questions; For instance while selecting an ERP COTS product; Decision Makers are more convinced to the benefits of the new system rather inquiring about the potential constraints in implementing the new system. Similarly ERP COTS implementers fail to identify the key issues of the end-users regarding new system and they put more focus on quick launch. The unstructured focus of ERP COTS Decision Makers and Implementers ultimately leads to unsatisfied and unworkable system settings. The Listed CSFs in the study forms some sort of structured approach for Decision Makers and Implementers. Although they share some CSFs but they work in two different domains within the project. The study presents CSFs in two categories as for Decision Makers and Implementers. Categorization can be very useful to structure the domain areas and critical break points within the project. The detailed study differs from the other studies as it focuses on the CSFs of ERP COTS; on the other hand much of the other studies only focuses on custom made ERP implementations and very few explicitly discuss only some of the ERP COTS factors (Chang et. al, 2000, Grabski & Leech, 2007, Zhang et. al, 2003).

The study also revealed that some of the CSFs which failed to get concrete explicit argument support from the literature were not considered critical for the ERP COTS project success. For instance Assumed CSF for Decision Makers “f" (Identification and realization of tangible/non-tangible values) lacked explicit support from the detailed literature study. Although all CSFs which were lacking enough argument support from the detailed literature study were eliminated from the final listed CSFs, but they are indirectly addressed within other CSFs. For example eliminated CSF (Identification and realization of tangible/non-tangible values) is addressed within the CSF “Costing & return on investment (ROI)”. During the study a CSF was identified in the literature which is lying within the scope of the study. The discovered CSF “Consultant’s knowledge and competitiveness” is relevant CSF for Decision Makers. It got enough explicit argument support from the literature and thus is considered to be critical for the success of ERP COTS. CSF is added and presented in the Listed Critical Success Factors.
Among Listed CSFs much emphasis is required to draw an approach on ERP COTS selection (Alves and Finkelstein, 2002). ERP COTS selection is often done by the Top Managers, Decision Makers/Company Owners but the selection of ERP COTS surely requires some sort of initial study before any company can engage into an agreement of getting ERP COTS (Grabski & Leech 2007). Technical Staff, End-users, Senior Management are crucial to be consulted by the Decision Makers before making any selection. All actors involved in the ERP COTS selection should equally focus on the obstacles which need to be jumped before they can enjoy the benefits of ERP COTS (Yu 2005). A lot more focus is required to test the credibility of the ERP COTS vendors, domain and software knowledge of the consultants (Wang & Chen, 2006). These factors according to literature are not even in the books of Top Manager or Decision Makers. These things needs to be clarified and authenticated to make sure project is managed by the professional handlers (Nah & Lau 2001). Project Scheduling do take place in the process but it needs more structure in the form of steering committees and departmental heads involvement (Al-Mashari et. al. 2003). Return on Investment is also critical because it’s not been analyzed with proper evaluation methods (Erdogmus et. al. 2000). No one considers the overall business value which ERP COTS gives to the system (Kamhwai 2008). ROI indicators must be developed by the people who posses good analysis skills and have enough domain and product knowledge. Top manager’s involvement is important throughout the project in order to get necessary support and resources and also to make sure top managers are aware of the project status and achievements from time to time. The study shows that some projects failed due to lacking support from the top managers as the projects proceeded. Calculating risk is very important to deal with un-expected situations which may arise at any time due to any reason (Bhatti, 2005). ERP COTS implementers are believed to be the actual movers in system analyze and implementation. At that level many authors emphasized on creating good communication level with the end users (Wang & Chen, 2006). ERP COTS Implementers should settle in quickly and must realize the working environment of the organization. Suitable project controls must be introduced to cope with the organizational culture and politics. Enough information should be provided to the end-users while the ERP COTS is selected and implemented (Nah & Lau, 2001). Many authors advised to start early trainings to give a sense of ownership and motivation to the end-users (Yu, 2005). Business process re-engineering is important and critical as well because it can change the working style and authorization level of the end-users (Zhang et. al. 2003). It can face retaliation as well; which should be dealt in professional way (Alves & Finkelstein, 2002). According to literature it is very important to make the end-users realize the actual ERP COTS value. Technical aspect by most authors should be planned ahead because of delivery and setup time of software and hardware infrastructure (Al-Mashari et. al. 2003). According to study legacy system and data migration are extremely critical as whole system has to run on the data (Soh et. al. 2000). Data purification and authentication is very important (Park & Kusiak, 2005). Lastly once the system is changeover, the change management thereafter is important as well (Bhatti, 2005). It’s critical that
implementers stay on the same place as end users after the implementation for a certain period of time because there is always a room for corrections and improvements in the system (Motwani et. al. 2005). Finally all the CSFs listed in the study share an amount of importance within the selection and implementation of ERP COTS, following which can lead to successful ERP COTS implementation.

Finally the Listed Critical Success factors (CSFs) can act as guideline for the ERP COTS Decision Makers and Implementers to structure their actions towards ERP COTS product selection and implementation. The outcomes of the report can serve as the framework or checklist for Decision Makers and ERP COTS Implementers to make sure they identify the critical points and potential risks of the ERP COTS selection and implementation project at the right time and act appropriately to avoid the identified potential risks and gain maximum productivity in the project. The focus on Critical Success Factors can make sure implementing the ERP COTS product at the right place, at the right time and among the right people.
6. FUTURE WORK

The study is limited to the extraction of Critical Success Factors which are identified, surveyed, experimented and experienced by the authors in the articles. The study tried to focus on the small overlapping area between ERP and ERP COTS.

The study can be carried forward by taking the listed Critical Success Factors and analyzing them in actual business scenarios. The study lacks the unseen or unexpected challenges which can arise in different ERP COTS implementation environments which may differ from case to case basis, different countries, business industries and different ERP COTS software brands. These factors can increase or decrease as well on case to case and scenario bases. Thus the listed Critical Success Factors can only be deemed in most usual scenario in ERP COTS implementation. The Future work can also include implementing a mathematical model on the listed Critical Success Factors and also dividing them individually as per all of the SDLC process. The CSFs can also be used to design a framework which can also define the exact approach in the form of detailed activities which could be adopted by the Decision Makers and Implementers while selecting and implementing ERP COTS software.

The outcomes of the report can also be used by the ERP COTS Decision makers and Implementers to practice and focus those factors in the practicle ERP COTS implementation and analyze the degree of intensity involved in each Critical Success Factor, further these CSFs can also be categorized in terms of their importance and also for calculating the risks involved if these CSFs are not followed by the Decision Makers and ERP COTS software Implementation.
7. REFERENCES


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SUPPLIMENTS

Report Search Keywords & Databases

Report Search Keywords:

- Critical Success Factors+
- CSF+
- CSF’s+
- Enterprise Resource Planning+
- ERP+
- Commercial Off the Shelf Software+
- COTS+
- SAP+
- Systems Applications and Products+
- Oracle+
- Off the Shelf+
- ERP Implementation+
- Critical Success Factors for Commercial Off the Shelf Software-
- Critical Success Factors for ERP COTS-
- CSF for ERP COTS-
- ERP COTS-
- Critical Success Factors for Enterprise Resource Planning Commercial Off the Shelf Software-
- Success Factors of ERP-
- Success Factors of ERP COTS-
- Success Factors for Enterprise Resource Planning Commercial Off the Shelf Software-
- CSF for ERP COTS Implementation-
- CSF for Managers-
- CSF for Decision Makers-
- CSF’s for Managers-
- CSF’s for Decision Makers-
- CSF for Implementers-
- CSF’s for Implementers-
- CSF for Analysts-
- CSF’s for Analysts-
- CSF for Systems Analysts-
- CSF’s for Systems Analysts-
- Success Factors for Managers in Software Implementation-
- Success Factors for Implementers in Software Implementation-
• Success Factors for Managers in ERP Implementation-
• Success Factors for Implementers in ERP Implementation-
• Success Factors for Managers in COTS Implementation-
• Success Factors for Implementers in COTS Implementation-
• Success Factors for Managers in ERP COTS Implementation-
• Success Factors for Implementers in ERP COTS Implementation-
• Factors in ERP COTS Implementations-
• COTS Implementation-
• ERP COTS Implementation-

Note: (+) = Returned Results, (-) = Returned repetitive or no results

**Report Search Databases:**
- Google Scholar+
- Google Search Engine+
- Science Direct Database+
- ACM Portal+
- ELIN+
- Academic Search Elite+
- Scirus Portal+
- CiteSeer+
- Science Citation Index+
- Science-reasearch.com+
- Compendex-
- HCI Bibliography-

Note: (+) = Returned Results, (-) = Returned repetitive or no results
FIGURES

Figure 1: Problem Space (P 5)