

Project Submission Pro-Forma

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Project definition for my degree (as copied from

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A suitable project should relate to, or be applicable to, the management of projects or programmes. Topics can include methods, methodologies, tools, processes, human factors, multi-project scenarios, collaborative projects, in-company applications, or new product or service introduction. The application or research can be in any industry, including but not restricted to, engineering, service industry or IT

My project relates to this definition in the following way: This project is regarding to the project management process of Enterprise resource planning systems into organisations.

It focuses on potential benefits and dis-benefits, risk factors, critical success factors for successfully implement system and change management strategy for supporting this implementation. Therefore, this project's purposes are directly related to the definition above. It provides a change management strategy for a specific type of project and also a critical success factors framework which is a very important method in project management history.



Appropriate process for developing and implementing ERP systems.

by

Arda Sarven Balci

Dissertation submitted in partial fulfilment for the

Degree of Master of Science

In

Programme and Project Management

WMG

University Of Warwick

Submitted August 2014

Abstract

Enterprise resource planning systems have become more and more popular across many industries. Today, organisations invest serious amount of money to design and implement these systems. From MRP to ERP, these systems changed significantly and became complex software that can provide almost all needs of companies in one system. Today ERP system became a phenomenon for professional business life. For example, SAP which is the market leader in Europe, serves these systems for more than sixty percent of multinational companies.

But, every ERP trail does not end with a good story. In fact, Failure rates are significantly high for these projects. Almost 80 percent of ERP project cannot meet organisational requirements or satisfy customers. In ERP implementation history, there exists many bankruptcy, project failures, delays and problems. In addition, at the end of failed projects, all investments made by sponsors are wasted and cannot bring any return to sponsors.

The aim of this research was to identify an appropriate process for developing and implementing ERP systems. In details, this project will focus on the reasons of developing and implementing ERP, benefits, dis-benefits of ERP systems, main risk factors in implementation process, critical success factors that project team and manager should consider and finally to identify an appropriate change strategy to support implementation.

The study conducted firstly a literature review and then qualitative study by using face-to face interviews with experienced project managers and customers.

The implication of this research should lead the ERP project managers and customers involved the ERP implementation process to consider several factors that facilitates implementation and ensures a high performing system both in short and in long run. According to the findings of this study, main recommendations are establishing a clear vision, building a competent team with necessary skills, allocate enough time and resources for project and generate a comprehensive change management plan for these projects.

Acknowledgements:

I would like to express my most sincere thankfulness to my project supervisor Mr. John Gurnette. He was always supportive, kind and warm to me and guided me with his expertise and constant availability through this academic year.

Also, I would like to thank all interviewees who participated in interviews and spent some of their precious time with me without any provision.

I would like to thank also my parents Melkon and Hilda Balci, who gave me this opportunity to develop my knowledge with master science and always supported me during this difficult academic year.

Finally, I would like to thank my girlfriend Erlin Ohanyan. She was always understanding and patient even in most difficult times.

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Chapter 1: Introduction

1.1 Background:

ERP or Enterprise Resource Planning systems are packaged software which allows companies to support and integrate many facets of the business such as manufacturing, planning, sales, Human Resources and supplier and customer relations by providing data share and visibility (Fang Hsu, 2013). These systems become more and more popular in business world day after day. Companies are spending serious amounts of money to design, implement and operate these software systems into their organisations. For the ERP market, it is claimed that the ERP sector started to gain momentum after 1990's especially in the industrial sectors such as chemicals, electronics, textile and IT (Holland *et al*, 1999 cited in Fang, 2005). Madsen argued that the market size of the sector became 13.4 billion US\$ in 2003 (Madsen *et al*, 2005). Today the estimation about the whole market size is reported around 47.7 billion US\$ (Davis, 2013) and many companies such as Cisco systems, Kodak and Tektronix are reported as the successful users of these systems (J. Chen, 2001). Another good example of ERP success is the SAP case. Bowley (1998) cited in O'Leary (2000) SAP Company, which is one of the famous ERP vendors, provides ERP systems to 60 percent of multinational companies globally. In reality, this is just a single ERP firm; one can argue that this number would increase after considering all ERP providers in sector.

The main purpose of designing ERP systems is for providing a comprehensive integrated resource to companies that allow them to manage their business processes efficiently and effectively (Fang, 2005). Moreover, Shang and Seddon (2000) argued that ERP systems provide enormous advantages to organisations such as better customer service or business growth. With all of these potential advantages ERP system implementation became a phenomenon for business life.

However, not all ERP implementation stories have a happy ending. Jarrar *et al* (2000) stated that at least 90 percent of ERP implementation trails conclude late or over budget. In literature there are many other statements and examples about failed ERP implementation trails that were costly for companies. It is stated that according to a research constituted 117 companies, 40 percent of ERP project failed to meet intended requirements at the end of the implementation (C. Yang *et al*, 2009). According to another survey involved companies from various industries generated by an important IT management consultancy firm Robbins-Gioia, 51 percent of ERP implementation were considered as unsuccessful (C. Yang *et al*, 2009). Trunick (1999) cited in (Chen, 2001) reported that 40 percent of ERP installations projects ended by partial implementations by meeting very few goals and 20 percent were totally failed. Also, it is claimed that the figure of failure could increase to 50 percent depending on the definition of failure. Ehie and Madsen (2006) emphasized that according to a survey done by Harvard business school despite of the high investment in ERP systems, implementation project cause many problems to organisations such as unexpected high cost, overdue of schedule, resistance to change, conflicts and dissatisfied employees.

Many other authors such as Shanks *et al* (2000), Yingjie, J. (2005) and Shehab *et al* (2004) cited in Jafari (2006) and Musaji (2002) stated that ERP implementation project are prone to fail and costly, many organisations had problems to implement these systems into their businesses and failed in implementation process. There exist even worse cases such as FoxMeyer drug, which was a 5 billion pharmaceutical company, bankrupted by incorrect orders and excess shipment because of their failed ERP system (J. Chen, 2001). Therefore, implementing these systems can be challenging for companies and may cause a significant cost and problems. In fact, 30 percent of the total revenue in ERP market (47.7 billions US\$) comes from implementation costs paid by companies (Davis, 2013). One can argue that these results means 7 billions lost for companies' perspective that intended to implement an ERP system with a 50 percent of failure rates. Mabert *et al* (2003) claimed that even after a remarkable investment in terms of time as 'many years' and resources as ten of millions of dollars to medium size and more than 100 millions for large international size companies, the success of the outcome is not guarantee for companies.

1.2 Research Purpose:

The main purpose of this research is to identify critical points and considerations in ERP implementation and development process that would bring a guideline to ERP project managers to follow and implement these systems successfully into companies. In order to do that, this research will focus on the critical success factors for ERP implementation process because it is stated that critical success factors method is useful for improving project management problems (Pinto & Slevin, 1987) cited in Fang (2005). Before CSF, this work will analyse reasons which drive companies to implement these systems, benefits and limitations of these systems, potential risks and issues for ERP projects. Then, the study will give more detail about change management which is considered as one of the critical success factors for ERP implementations in order to set a proper change strategy to follow by project managers.

1.3 Research Question and Objectives:

The question and objectives above are constructed as a framework in order to obtain the purpose of the study.

'What processes should a project team follow when developing and implementing a successful ERP system?'

1. To map the business development elements which typically drive companies to implement ERP systems.
2. To identify benefits / dis-benefits and risks of developing and operating ERP systems.
3. To propose critical success factors of developing and implementing an ERP system.
4. To propose an organizational change strategy to support ERP system operation.

1.4 Dissertation Structure:

Chapter 1 gives background information about the subject and states problems to justify the significance of this research. It identifies also the purpose, research question, objectives and general structure of the dissertation. The next three sections of the dissertation will review the literature to set a comprehensive answer to research objectives.

Chapter 2 gives general information about ERP, its functions and advantages or benefits that makes it preferable for companies, limitations and also risk factors in ERP projects. **Chapter 3** provides literature information about critical success factors for ERP implementation by also defining the success for ERP projects. **Chapter 4** will focus on generating a change strategy in order to support ERP system operation.

Chapter 5 informs reader about the data gathering process and research methodology by justifying the selected research approach, method and data choice.

Chapter 6 represents the qualitative survey results by using tables and interview reports. Then, this chapter analyses and compares the findings of literature review with the survey results from interviews.

Chapter 7 provides a conclusion about the outcome of this research and answers for each research objectives clearly. It will state also recommendations for ERP companies and project managers for successful ERP implementations.

Literature Review: ERP

2.1 Definition of ERP:

As partially stated in chapter one, ERP systems are packaged software systems which automate and integrate business process and connect different components of an enterprise with a common data sharing (Norris *et al*, 2000, Chen *et al*, 2009). Another point, ERP is stated as a structured approach in order to optimise the value chain of an organisation (Norris *et al*, 2000). Also, it is stated that these systems were designed to provide a perfect integration of processes between functional components with developed workflow, standardized business practices, and accessible up to date real time data (Mabert *et al*, 2003). Klaus (2000) stated that ERP is a key infrastructure that brings a solution to the business problems. Besides, it is claimed that a successfully integrated ERP enables innovative practices to organisations for their problems (Chen *et al*, 2009). Therefore; one can argue that ERP systems are not only products in form of computer software but also a strategic business decision which bring a solution to organisational problem and integrate business components.

Nah *et al* (2001) and O'Leary (2000) stated the most important attributes of ERP systems as;

- The ability of automating and integrating business processes of organisation,

- The ability of sharing common data and practices across the whole enterprise
- The ability of creating and accessing information in a real-time environment.

O'Leary (2000) also claimed that ERP systems increasingly gain more characteristics such as;

- Supporting for multiple currencies and languages especially for multinational companies.
- Supporting specific industries such as SAP for banking and oil and gas
- The ability of customizing without programming (Switch settings).

It is claimed that organisations prefer to implement an ERP because of its abilities to integrate the flow of material, finance and information and also reinforce organisational strategies (Wei, Chien *et al.*, 2003).

However, Xue *et al.* (2004) emphasized that ERP systems provide a full range of operating and management services to organisations in order to fulfil their needs. Also, it is stated that recently web based systems brought a new concept to the business environment by providing these abilities to customers, suppliers and partners of organisations (Kamisky *et al.*, 2009). In fact, Klaus *et al.* (2000) sorted main features of ERP system which make it a business phenomenon, as its business solutions elements, high functionality in terms of procurement, material management, production, distribution, financial accounting, asset management, cash management, controlling, strategic planning, and quality management and its ability to provide industry specific functions such as patient management to hospitals.

Moreover, Al-Mashari *et al.* (2002) Nah *et al.* (2001) and Myerson (2002) cited in Fang (2005) stated that these systems allow companies to focus on core and real value-added activities such as financial management, HR, logistics, sales and marketing and customer relationship management. Besides, recent systems can also provide project management services such as risk management or scheduling tools (Magal and Word, 2012). Al-Mashari *et al.* (2002) also stated that providing these services with automated and developed incorporating best practices, ERP systems facilitate managerial control, making rapid decisions and reducing operational costs.

Umble *et al.* (2001) stressed that because of changes in business environment companies face several challenges such as rising competition, increasing customer expectations and expanding markets. It is also stated that this new business world necessitates many points such as reducing inventories and total cost in the supply chain, providing more reliable delivery dates, moving collaborative model and upgrading capabilities to stay in the market and remain competitive (Ptak *et al.*, 2000). It is claimed that ERP systems provide many opportunities such as improving business integration, business processes, connection with supplier or customers and information sharing and recording for companies to maintain their market power (Umble *et al.*, 2001).

In conclusion, ERP systems are commodities to change organisation and business process in order to gain competitive advantage against rivals. They improve integration between departments in a business and also modern web based systems develops customer, supplier and partner integration to business. They also collect data in one source for analysis and transformation into useful information in order to use decision making.

2.2 Evolution of ERP:

The purpose of this section is to summarise the evolution of ERP systems from the beginning to the modern days in order to set a better picture about these systems. Fang (2005) claimed that the name of ERP was a derivation from MRP or material requirement planning and MRP II or manufacturing resource planning which were ancestors of ERP systems.

It is stated that MRP systems were created to satisfy the need to know what to buy and when it would be delivered (Hardwood, 2003). The first MRP system was developed to calculate the material needs in a more efficient way (Klaus *et al*, 2000). In fact, this method provided ability to better control their material purchases and determine what was needed and when. It also improved the quality and productivity in organisations and decreased the inventory assets cash flow (Ptak, *et al*, 2005).

But in time, organisations realised other needs and gaps to improve customer satisfaction and maintain profitability. For instance, it is stated that companies realised that each movement in inventory influences also finance (Ptak, Carol *et al*, 2005). Therefore, the logic of considering the profitability and customer satisfaction as an objective of the entire enterprise has occurred (Klaus *et al*, 2000). This wider approach enlarged MRP from a material planning and controlling system to a wider system, that was able to control and plan all resources of an organisation virtually (J.Chen, 2001). This new concept called as MRP II which is manufacturing resource planning (Fang, 2005). Klaus stated that with computer aided manufacturing, companies gained a conceptual framework that integrated all business administrative and technical functions in the business like finance, sales & distribution and human resources (Klaus *et al*, 2000).

J.Chen (2001) claimed that ERP systems have evolved from its ancestors in order to support the creation of a value chain in companies. Fang (2005) stated that today data and process modelling techniques are based on the integration of information systems that is a combination of process, function, organisation and output. It is also stated that ERP systems are generally preferred to support this integration in order to model the data and process in enterprise wide (Fang, 2005). A modern ERP system such as SAP can provide financial, sales and marketing, operation and logistics, Human resources and production functionalities (Magal & Word, 2012) and (Hamilton, 2013).

2.3 Benefits of ERP:

This sub-chapter will state necessary information about the benefits that ERP systems provide to organisations after implementation. In order to do that, two different approaches in the literature from different authors will be analysed. In literature, benefits of ERP are generally divided into two dimensions which are quantifiable and intangible or non financial benefits. This section will be based on this approach. Then, an ERP system framework that looks the point from a wider perspective such as operational, managerial and strategic benefits, stated in Shanks, Seddon and Willcocks (2003) will be analysed.

It is stated that potential benefits of Enterprise resource planning are enormous (Chung and Skibniewski, 2007). In reality, many authors stated many different benefits for ERP systems but as stated above, the main focus of the first part will be the direct quantifiable and intangible benefits that an organisation receives directly after implementing ERP systems successfully. In addition, it is proposed that benefits of ERP systems on organisation performance are independent from the company size or industry (Hamilton, 2003). Therefore these benefits can be achieved by companies from all sectors and all sizes.

The first common tangible benefit in literature is inventory reduction. Umble *et al* (2003), Mahesha & Akash (2013), Hamilton (2003) and Shanks, Graeme, et al (2000) stated that ERP systems help companies to reduce their inventory with their improved planning and scheduling practices. In fact, it is stated that ERP is a tool to create valid plans and schedules in terms of materials, production, shipment to customers, personnel and equipment requirements, resources and cash flow (Wallace & Kremzar, 2001) and most of the benefits of ERP systems are related to these effective planning & scheduling techniques.

Hamilton (2003) argued that this inventory reduction consists of decrease in assets and also ongoing savings of the inventory carrying costs such as warehousing, handling, insurance, interest and damage. For instance, Umble *et al* (2003) claimed that Toro CO. Company saved 10 million dollars due to inventory reduction with an ERP system providing new warehousing and distribution methods.

Another point is material cost reduction argued by Hamilton (2003), Umble *et al* (2003), Chung & Skibniewski (2007) and Mahesha & Akash (2013). Hamilton (2003) argued that with its developed procurement practices companies can prepare valid schedules that allow them to focus on vendor negotiations and quality improvement rather than purchasing the material at highest cost to expedite material shortage. Moreover, ERP tools provide also information for negotiations like supplier statistics and foreseen material needs for each commodity group, so providing vendors a clear visibility of future needs may decrease the material cost by helping vendors to achieve efficiencies (Hamilton, 20003). Also, Owen Corning argued that ERP systems helped it save 50 million dollars in managing material, outsourcing and logistics (Umble *et al*, 2003).

Also, ERP systems are claimed to provide labour cost reductions to organisations (Hamilton, 2003), (Umble et al, 2003), (Chung & Skibniewski, 2007), (Stein, 2003) and (Mahesha & Akash, 2013). It is claimed that ERP systems decrease interruptions and shortages and also provide less rework and overtime due to its improved manufacturing practices (Hamilton, 2003). It is also stated that ERP systems minimises rush jobs and material shortages therefore less time is required for expediting, material handling, extra setups, disruption and tracking split jobs (Hamilton, 2003).

Besides, ERP systems also improves customer service and sales by improving coordination of sales and production that leads to better customer service and more sales (Stein, 2003), (Umble et al, 2003), (Mahesha & Akash, 2013), (Hamilton, 2003), Chung & Skibniewski (2007) and Shanks, Graeme, et al (2000). It is argued that ERP systems improve customer contact management, performance of making and delivering order promises and order-to-ship lead times that provides high customer satisfaction to companies and brings reputation, more sales and customers (Hamilton, 2003). In addition, ERP systems are claimed to solve quality problems and decrease lead times which also

improve the customer service of a company (Wallace & Kremzar, 2001), (Mahesha & Akash, 2013) and (Chung & Skibniewski, 2007)

Another important benefit is developing accounting controls of organisations stated in Hamilton (2003) and Mahesha & Akash, (2013). It is stated that an ERP system provides an improved collection procedures that reduce the number of delays of receivables therefore increases available cash Mahesha & Akash, (2013).

Many points in literature are stated above, in order to summarise this section a comprehensive framework about benefits of ERP is stated below. Shanks, Seddon and Willcocks, (2003) categorized the practical benefits of ERP systems including indirect benefits into 5 groups which are: Operational, Managerial, Strategic, It infrastructure and organisational. Table (2-1) below summarises these dimensions in detail;

Dimensions:	Sub- Dimension:
1) Operational	1.1) Cost Reduction 1.2) Cycle Time Reduction 1.3) Productivity improvement 1.4) Quality improvement 1.5) Customer Services Improvement
2) Managerial	2.1) Better Resource Management 2.2) Improved Decision Making and Planning 2.2) Performance Improvement
3) Strategic	3.1) Support Business Growth 3.2) Support Business Alliance 3.3) Build Business Innovations 3.4) Build Cost Leadership 3.5) Generate Product Differentiation (Including Customization) 3.6) Build External Linkages (Customers and Suppliers)
4) IT Infrastructure:	4.1) Build Business flexibility for current and future changes 4.2) It Cost Reduction 4.3) Increased IT infrastructure capability
5) Organisational	5.1) Support Organisational Changes 5.2) Facilitate Business Learning 5.3) Empowerment 5.4) Built Common Visions.

Source: Shanks, Seddon and Willcocks (2003) p,79

Operational Benefits: In their framework, authors used many references to state the evidence of investing IT technology leads to decrease costs of operation. Also by automating processes, it accelerates processes, substitutes labours and increases operation volumes which provide business benefits to organisation. Therefore, they conclude that, ERP systems can provide operational benefits such as cost reduction, cycle time reduction, productivity improvement, quality improvement and customer service improvement by automating business processes and enabling process changes. Examples of this type of benefits were stated in the table 2-2 from 1.1 to 1.5. For instance for customer service improvement, ERP is claimed to give CRM service which facilitate to access customer data and also resolve customer inquiries. Also, with successful BPR, it improves

organisational processes that result error rate reduction, duplicates reduction, improvement in reliability rates and accuracy rate.

Managerial Benefits: It is stated that ERP systems may provide an opportunity for organisations to improve their resource management, decision making and planning processes and improve performance of employees. In the table 2-2, the second section gives examples of this kind of benefits from 2.1 to 2.3. For example, ERP provides a better performance control with its tools to monitor financial performance by lines of business, by clients, by product, by regions or geographies. For same point, it also helps to control and manage efficiency and effectiveness.

Strategic Benefits: It is argued that ERP systems may ensure business growth, alliance, innovation, cost leadership, differentiation and external linkages thanks to their large-scale business involvement and internal and external integration capabilities. Points 3.1 to 3.6 state examples for these dimensions. For example ERP is claimed to support business alliances by providing effective and efficient consolidation of newly acquired companies into standard practice of business or building business innovations by building new process chain, creating new business and providing a new strategy for market. Finally some ERP systems can provide B2B or B2C portals that improve the external linkage with customers, distributors and other business parties.

IT Infrastructure Benefits: Authors claimed that ERP systems bring integrated and standard application architecture which provides an infrastructure to ensure business flexibility for future changes, reduced IT costs and marginal cost of IT units in business and increased capability in order to implement new applications quickly and economically to organisations. Points 4.1 to 4.3 state examples for these dimensions. Author claimed that ERP brings IT cost reduction by replacing mainframe or hardware, designing and developing system architecture and providing reconciliation and consolidation of information.

Operational Benefits: Authors supported that IT was based on the integrated processes and coordination of flexible system in terms of employee support communication or improving organisational structure and empowering users. It is also stated that IT systems facilitate organisational learning behaviour with their tools, accumulated information and application knowledge. Therefore, Authors claimed that integrated information processing capabilities of ERP systems may help organisations to support structure changes, facilitate employee learning, empower workers and build common vision. ERP is claimed to provide empowerment by BPR that leads improvement in accountability and more value-added responsibility and higher employee involvement in management of business and also by working autonomously. It is also claimed to improve staff morale and satisfaction with its efficient problems solving and decision making tools, its high system performance and increasing efficiency of staff in field operations and services with BPR.

2.4 Dis-Benefits of ERP:

Although they provide many benefits to organisations, ERP systems cause also dis-benefits to during and mostly after implementation. As mentioned before, ERP systems cases generally do not have a completely “happy ending” for organisations. This section will clarify disadvantages or limitations of ERP systems that causes problem or dissatisfaction to organisations.

The two main dis-benefits of ERP systems are stated as its cost and time-consuming nature. As partially stated above, ERP projects are highly expensive and take a significant time for implementation. It is a fact that ERP systems are beneficial if it can be implemented successfully but in reality companies generally overspend their resources in terms of money, time and people. It is stressed that approximately 90 percent of ERP implementations end up late or over budget (Umble *et al* (2003). As mentioned in introduction, in some cases these overspend causes bankruptcy such as FoxMeyer. Moreover, success is not guaranteed in ERP projects and even well planned and highly supported project may fail (Barker and Frolick, 2003).

It is argued that their durations especially by being prone to delay and high costs are two of the most important disadvantages of ERP systems (Rashid, Hossain and Patrick, 2002). Further, these implementation projects are different than construction or production projects because even if they delay or exceed budget, at the end stakeholders get the intended outcome but ERP projects have significant failure rates which mean that stakeholders waste their resources and get nothing at the end.

On the other hand, it is claimed that ERP projects never totally end because systems should be maintained and reorganised according to new needs of firms (Workcube, 2013). It is a fact that maintenance and upgrades consist of an important part of ERP operations. It is stated that maintenance costs of ERP system are remarkably high and constitutes an important income for ERP vendors (Chung and Skibniewski, 2007). It is reported that application software maintenance generates 36% of the total market size for ERP sector (AMR, research, 2007 cited in Davis, 2013). This situation means that the cost of ERP after fully implementation to maintain and develop it, is also high for organisations. Gurnett (2014) stated that after implementing an ERP system at a large multi-national company over 6 years at a cost of some sixty million dollars, it also cost 3 million dollars per year in maintenance and upgrade costs.

Besides, ERP vendors generally claims a pay-back period from one to three years, but in reality ROI period can be significantly long for companies (Umble *et al* (2003). A research conducted with 63 companies showed that companies averagely spent 10.6 million dollar for implementation, 2.1 for two year maintenance and finally although they were expecting a ROI period around one to three years, the average results indicated a ROI loss of 1.5 million dollars over a six years period (Umble *et al* (2003). Therefore it can be said that implementing these systems is an endless process which requires always resources of organisations.

Moreover, developing and implementing ERP systems are not single IT projects, they are business management projects that are highly complex and challenging (Workcube, 2013). Therefore as a result of these highly challenging and demanding projects, expectations from the system become

remarkably high (J.Chen, 2001). It is argued that companies generally come with high expectations and intend to solve all their problems with ERP but in reality it is not possible. It is also argued that this can cause dissatisfaction for companies and damage their reliance on system (Workcube, 2013). In fact, although ERP has its strengths, it generally fails to meet all business requirements of companies (Smith and Fingar, 2003). Also according to a comprehensive research about disadvantages of ERP systems, Expectations of 42.37% of companies were not fulfilled (Helo *et al*, 2008).

In fact, Workcube is an ERP supplier therefore explaining this situation by unrealistic expectations of companies is not valid. One can argue that this statement is not objective and the company can hide problems or limitations of its system such as internal focus or not supporting customisation by blaming customers. It is argued that customizing ERP systems is a problematical solution for companies especially in terms of upgrading system and this situation obstructs the realisation of benefits and meeting business requirements (Barker and Frolick, 2003). Also, Lee *et al* (2003) argued that some systems fail to meet some business requirements because of their internal focus which prevent for companies to respond the increasing need of focusing external changes. But, Workcube (2013) claimed that new web-based systems mitigates this limitation and allows companies to strengthen its relations with external business world. However, it is a fact that there is an incompatibility between system performance and customer expectations in some extent and this can be considered as a strong disadvantage for ERP systems.

As partially argued above, limited customisation is also another disadvantage of ERP systems. It is stated that highly customisation causes significant problems to organisation after each upgrade hence organisations are obliged to change their business processes to implement the system precisely (Barker & Frolick, 2003) and (J.Chen, 2001). One can argue that ERP implementation is a process of fitting organisation to the system with limited modification to the original system. Besides, J.Chen (2001) argued that reengineering their processes brings a significant change to organisations and this change can be problematical. It is claimed that implementation with process reengineering will change significantly some jobs and dependently all compensation programs, reward systems and job evaluation criteria would be modified. Therefore, this situation will influence employee behaviours in organisation and can cause disagreements and problems during and after the reengineering process (J.Chen, 2001). Another point is the company culture; these major changes can also disrupt the company culture and damage peaceful working atmosphere (Umble, 2002).

Another important point is the complexity of systems and difficulty to learn to use them. ERP systems stated as complicated to use and understand the logic in many articles such as Helo *et al* (2008), Rashid, Hossain and Patrick (2002) and Kumar *et al* (2002). They claimed that this difficulty can damage their performance and efficiency. In fact, results show that a significantly high percentage of responders between 30- 48 percent claimed this point as one of the most important limitations of ERP systems. It is a fact that adopting a new system may be difficult for people but it is stated that one of the main reasons of this situation is the lack of enough customisation and not generating a user intended system. (Helo *et al*, 2008). In fact, Workcube (2013) stated that candidate users have a tendency to assimilate new system to the old one by modifying in order to not change their habit. As stated above these systems do not allow such modification and this brings a significant

change for organisations. They also argue that inadequate management of this change can cause a dissatisfaction of users and create a resistance against system by employees.

Finally, it is argued that ERP projects make organisations dependent to vendors. Workcube (2013) stated that ERP systems are not “plug-and-play” software and they require significant help of professional consultants from vendor companies. ERP implementations consist of many different tasks such as “key user training” or process reengineering and generally these projects allow consultants to become a part of companies and access all information. Some authors stated that this relationship could cause some risks for companies such as losing talented people as consultant firm can offer jobs to talented people in organisations (Helo *et al*, 2008). In fact, this situation is possible for both sides, which means the client can also offer job to consultant. Another problem of vendor dependence is its duration. Harwood (2003) argued that the customer must work with the vendor for the lifetime of the system and in this relationship client is fairly dependent to vendor. Besides, it is argued that once system is implemented the situation becomes a single vendor lock-in in terms of further upgrades or customisation and this can create discretion to discuss effectively about issues and new services (Rashid, Hossain and Patrick, 2002). They also claimed that companies should consider working with multi-vendors in order to get best service in long run.

Table (2-2) below summarises all points stated in this section;

Dis-Benefits of ERP systems:

- High Implementation Cost
- Prone to Delay
- High maintenance cost
- Long ROI period
- Cannot meet high expectations of customer
- Limited Customisation for Users
- Difficult to Learn and Understand the Logic
- Bring a Significant Change and May Disrupt Company Culture or processes
- May Cause Dissatisfaction or Resistance of Users and Discussions
- Vendor Dependence

These points stated on the table above are main dis-benefits of implementing ERP systems for companies. In fact, it does not mean that all these disadvantages will occur in each implementation case, but in reality, these are the most common limitations of ERP systems in literature and some of them will definitely damage companies.

2.5 Risks in ERP Projects:

The main purpose of this section is to identify main risk points in ERP development and implementation projects that a project manager should pay attention and make contingency or mitigation plans to minimise their impacts. In addition, some of them would provide a basis for Chapter 3 which will state the critical success factors of ERP implementations. Before going through the literature about risks and issues in ERP projects, a definition of a risk and an issue will be stated in order to clarify their differences and provide a basis for discussion.

2.5.1 Definition of a Risk:

According to Project management institute (PMI) risk is an uncertain event or condition whose occurrence will affect the obtainment of objectives in a project or a programme (Chapman and Ward, 2003). It is claimed that risks are considered generally as bad events for projects but in fact the outcome of these uncertain events can influence objectives either in a positive or a negative way (PMBOK, 2008). When it comes to issues, an issue is an uncalculated and occurred event which is affecting the project and may block stakeholders to obtain project objectives (MSP, 2011).

An issue can be a concern, a request of change or a happened risk (MSP, 2011). In order to distinguish a risk and an issue some authors are using a probabilistic approach. It is argued that a risk is a determined uncertainty that have a likelihood less than 50 percent, besides an issue is an identified uncertainty that have a probability of occurrence greater than 50 percent (WMG, 2003) and (Rausand, 2013). Therefore, it can be concluded that both risks and issues are uncertain events but impacts of risks can be either good or bad but in terms of issues, they generally threats the success of programmes or projects. In fact, in ERP projects there are a high level of uncertainty from many different sources. As stated above the next chapter will identify risks and issues in ERP development and implementation projects.

2.5.2 Risk Factors in ERP Projects:

It is stated that developing and implementing ERP systems are inherently risky (Dey, Clegg and Cheffi, 2013). In fact, Aloini *et al* (2007) stated that ERP projects are not only a “computer projects” or a simple IT projects in other words, As partially explained above, implementing an ERP system is a strategic decisions because these systems are integrated applications and they influence entire organisation (Aloini *et al*, 2007). It stated that identifying risks and establishing effective risk management systems are key responsibilities of project managers and also crucial for ERP project success (Shields, 2001). In fact, Harwood (2003) claimed that even a very well planned project can go astray and fail to meet the business requirements because of events that could have been identified and mitigated. Therefore, one can argue that an ERP project manager should master risk factors in ERP projects in order to manage them during projects.

In literature, there are many articles about risks in ERP projects but they are generally focused on to the management side rather than identification of Risks. Authors who worked on risk identification, generally considered ERP project risks as threats rather than opportunities. Aloini *et al* (2007) argued that the main effects of risks in literature were exceed of budget, exceed of time, project stop, poor business performance, insufficient system reliability or stability, low organisational process fitting, poor user performance, low degree of integration and flexibility, low strategic goals fitting and poor financial performance. These are possible consequences of occurred risks for ERP implementations. The rest of this section will state risk factors in literature and explain them.

Failure to Re-Design business processes to fit the software: Huang *et al.* (2004), Dey *et al.* (2013) and Sumner (2000) stated that project managers generally avoid customisation and prefer to reengineer business processes of organisations. Failing to re-design these processes appropriately is stated as a risk for project success. Aloini *et al* (2007) argued that some companies are neglecting business process redesign or focusing on modifying their system. These also constitute also a high risk for projects. It is argued that companies should combine their ERP implementation with BPR activities and look for continuous improvement.

Lack of Senior Management Support: Aloini *et al* (2007), Sumner (2000), Huang *et al.* (2004) and Dey *et al.* (2013) stated that top management support is crucial for ERP project success. Sustained top management support, participation and commitment are essential for the success of ERP adoption and lacking these points creates a risk for Project (Aloini *et al*, 2007).

Insufficient Training and Re-skilling: Sumner (2000) argued that investment in training and re-skilling the IT workforce and infrastructure is generally higher than expected. It is argued that this situation creates a risk of lacking enough resource for funding those needs and threatens the project success (Sumner, 2000). Companies generally intend to grow internal Staff to gain required technical skills especially for app specific modules to decrease this high cost but one can argue that this is generally time consuming for companies.

Ineffective Consulting Services: It is stated that companies generally use consultants for implementation. But it is stated that recruiting and retaining good ERP consultants is difficult because the market rates and demand are high for these people and there is a turnover for highly skilled people (Sumner, 2000). Having an ERP consultant with limited experience, technical, organisational and software knowledge constitutes a risk for companies (Sumner, 2000), (Dey *et al.* 2013), (Aloini *et al*, 2007) and (Musaji, 2002). It is also stated that this situation aggravates the situation and increases likelihood of other risks (Aloini *et al*, 2007).

Lack of User training or Inadequate Training for Key-Users: It is claimed that user training programs for re-skilling key users in new technologies and applications have a key role for project success (Sumner, 2000). It is claimed that lack of appropriate training that fail to create knowledge and

understanding of key users about system, creates many problems and threatens the project success (Sumner, 2000), (Musaji, 2002) (Huang *et al.* 2004) (Dey *et al.* 2013) and (Aloini *et al.* 2007).

Ineffective Project Management: It is claimed that inadequate usage of project management tools and techniques may endanger the project success (Aloini *et al.* 2007). Aloini *et al.* (2007), Sheldon (2005) and Huang *et al.* (2004) argued that it is important for project stakeholders to use an effective project management methodology from project initiation to its end, in order to plan and control the project and manage change or risks. In fact, it is stated that some ERP vendors such as SAP provide their own methodologies and tools for risk or change management but Sumner (2000) claimed that customers also must contribute these activities and unable customers to fully support project management activities cause a risk of ineffective project management and threatens the project success (Sumner, 2000).

Lack of Integration: It is stated that ERP project requires an enterprise-wide approach which enables organisation to define critical requirements of enterprise and take action to make them happen (Sumner, 2000). Huang *et al.* (2004), Musaji (2002) and Dey *et al.* (2013) claimed that lack of integration between departments or in other words conflicts between them is a high risk for ERP projects that may conducive to project failure.

Lack of a Proper Management Structure: Sumner (2000) argued that proper management in terms of central project leadership is a must for ERP project success. Lack of a proper management structure such as a centralized structure causes many problems such as unclear vision, duplication of effort and task failure (Sumner, 2000). Other authors also stated similar risk factors such as “bad managerial conduct” of project (Aloini *et al.* 2007) and (Dey *et al.* 2013). It is stated that an effective managerial conduct is a must for successful project implementation especially to set clear goals, objectives, vision, user engagement and planning. Therefore it can be said that an appropriate management structure with structured methods for project development and implementation is a must for project success and lack of these points are risk factors. Besides, Shields (2001) defined “having a slow decision process” as a risk factor that causes a time exceed for project and lack of a proper management structure is stated as one of its mainsprings.

Poor Leadership: Aloini *et al.* (2007) stated that lack of effective leadership in ERP projects is significant risk factor that aggravates conflicts and may cause loss of direction of project. It is stated that project leaders should effectively solve problems, create strong communication environment, and create the vision of project (Aloini *et al.* 2007) and (Sheldon, 2005).

Lack of Project Champion: It is stated that leader of an ERP project is also the champion of the project, which is a crucial role for marketing the project throughout the enterprise (Sumner, 2000). Therefore, it can be said that poor leadership also affects the marketing of project in organisation.

Ineffective Communication: It is stated that effective communication is a necessity for ERP project success (Aloini *et al.* 2007). Many authors argued that it provides a link between all stakeholders about what is happening, scope, objectives, necessary activities and changes, and lack of an effective communication system threatens the successfully achievement of objectives (Aloini *et al.* 2007), (Sumner, 2000), (Huang *et al.* 2004) and (Dey *et al.* 2013).

Inadequate System Selection: It stated that adequate selection of ERP software plays a key role for project success. Incorrect system and project selection that could not satisfy needs of organisations needs would cause a failure or weaken the company performance (Aloini *et al*, 2007) and (Dey *et al*, 2013).

Lack of Business Analysts: Sumner (2000) argued that business analysts, with high knowledge of business and technology, are one of the crucial workforce requirements for successful ERP development and implementation. It is written that instead of 200 average-skilled programmers, 20 business analysts, with specialized expertise, ability to learn quickly and strong communication skills, can better implement an ERP system (Sumner, 2000).

Existing Legacy System: It is stated that having different legacy technology systems in same organisation can cause many problems such as poor coordination or establishing consistency (Wallace & Kremzar, 2001). In fact, one of the most important risk factor is defined as attempting to build bridges between ERP system and old legacy application (Aloini *et al*, 2007), (Dey *et al*, 2013), (Musaji, 2002), (Sumner, 2000), (Sheldon, 2005) and (Huang *et al*, 2004). Umble *et al* (2003) claimed that old legacy systems should be removed from organisations to avoid problems but Holland and Light (2003) argued that this legacy systems cases must be carefully managed. Depending on specific process and company needs, some treatment strategies such as “migration” or “wrapping” can be used. But it is a fact that attempting to use new ERP system with old legacy system creates a significant risk for project success and except some exceptional cases old legacy systems must be removed.

Lack of an Integrated Technology Strategy: Musaji (2002) and Sumner (2000) stated that lack of a strategy to avoid technological bottleneck of organisation and support customer-server implementation is a threat for ERP success. Therefore, a comprehensive technology strategy should be generated by companies to avoid all technological bottlenecks for organisation such as existing of legacy systems. Dey *et al*, (2013) also stressed lack of a synergy between this technology strategy and competitive business strategy is also a risk factor for organisations.

Bad Change Management: It is stated that ERP projects are not purely technological implementations. They bring a significant change to the way that organisation operates (Aloini *et al*, 2007). Therefore understanding the impact of this change and successfully manage it becomes significantly important to reach project goals. Besides, it is suggested that having a comprehensive understanding of the nature of change as one of the three basic requirements of successful implementation (Mandal and Gunasekaran, 2003). Some authors like Appleton (1997) argued that underestimating the importance of change management or misunderstanding its requirements may cause a project failure especially at the beginning of the projects. In fact, having an inappropriate change management is stated as a risk factor by Dey *et al*, (2013), Huang *et al*, (2004), Sheldon (2005) and Aloini *et al*, (2007). Dey *et al*, (2013) also stated that companies must establish an appropriate change strategy with clear requirements.

Failure to Get User Support: Lack of getting enough support from key users is stated as a risk for ERP projects (Huang *et al*, 2004), (Aloini *et al*, 2007) and (Musaji, 2002). It is argued that user involvement is crucial to meet expectations (Aloini *et al*, 2007). It is also argued that key users should be convinced about the utility of the system to avoid resistance (Aloini *et al*, 2007) and Shields (2003). It

is also important that key users feel confident and become expert of the system in order to train and help effectively to future users (Aloini *et al*, 2007).

Failing to Create an Effective Project Team: It is stated that creating a balanced team in terms of managerial skill, deep process knowledge, IT skills and some attributes, is remarkably important because adequacy of this team will directly contribute to the project success or failure (Aloini *et al*, 2007). In fact, many authors such as Huang *et al*, (2004), Aloini *et al*, (2007) Sumner (2000), (Dey *et al*, 2013) and Shields (2003) stated to create an ineffective project team as a risk factor for ERP projects. Another point is mixing internal and external staff also allows companies to grow some technical skills among internal staff for ERP design and implementation (Sumner, 2000) and it can be said that failing in the composition of a project team also threatens to cultivating some skills in organisation. Another important point is stated as the difficulty to maintain a consistent project team over a long period of time because of employee turnover, departmental changes or promotion. This brings its own instability and lack of reliability, stability and harmony for project team (Kumar *et al*, 2003) and Fang (2005).

Inadequate Financial Management: Aloini *et al*, (2007) argued that although the focus of ERP vendors on SME's increased, these systems are still expensive for all size of companies. Chen *et al*. (2009) argued that these projects necessitate an economic and financial justification before installation because wrong cost analysis can cause a project failure or even worst consequences such as bankruptcy (Markus and Tannis, 2000) and (Chen *et al*, 2009).

Lack of System Supplier Stability and Performances: As stated above, ERP projects never totally ends. It is stated that in order to maintain and improve the fit and functionality of system to business, ERP systems need continuous support in terms of upgrades and new modules (Kendall *et al* (1999). Aloini *et al* (2007) argued that instable vendor performance forms a risk for ERP success in terms of implementation process as well as long run.

Inadequate Strategic Thinking and Planning: Umble *et al*. (2002) suggested that customers have to determine the reasons to implement an ERP system into their organisations and also critical business goals that will be intended from the system. In fact, Aloini *et al* (2007) and Wallace & Kremzar, (2001) argued that determining these business goals, business issues and strategic needs are crucial factors that must be done in the early planning phases of project. Aloini *et al* (2007) also argues that every trial may become a disaster without determining these points and creating a clear vision about company's future.

As some of them partially stated above, Shields (2001) also brought six more risk factors into discussion. In fact these risk factors are claimed as barriers to a rapid implementation but in fact one can argue that these factors cause a time loss for companies and this is a general problem in ERP projects. The rest of this chapter will explain those factors.

Slow Decisions: Shields (2001) argued that having a slow decision process is a risk factor for ERP implementation. It is claimed that companies spend time to build consensus or getting approval for some decisions and this cause a significant time loss for project team and holds up tasks (Shields, 2001). The author also claimed that it is equally important to build a project team that is able to recognize decisions that are made by executive sponsor, top management or steering committee. In

fact these kinds of decisions are generally about major scope modifications, deployment strategies, changes about budget or schedules and team personnel replacement (Shields, 2001). Therefore it can be said that not having an effective decision making process in all level of organisation, that enables project team and other stakeholders to take decisions and apply them against new situations as soon as possible, is a risk factor for ERP projects.

Bad Technical Support: Some sub-elements of this point are already stated above. This risk factor stated by Shields (2001) constitutes a series of issues of technical support which hinder project team to work effectively and progress. For instance, not having the project environment ready on time for development is a sub element of this factor. It is stated that systems, which the project team are using, must be available all time to support them. If a system fails or the LAN falls down for two or three day or the network goes down in the middle of the project, it will be challenging for project team to access accomplished works or project deliverables and maybe these deliverables will be lost (Shields, 2001). Similar points stated by Sheldon (2005) or (Musaji, 2002), it is claimed that during integration testing team will require technical support from personnel to migrate system parameters or prepare test databases before each test cycle start. Therefore, one can argue that if the project team cannot get enough support to execute some tasks this can cause a significant time loss for project and maybe failure, so an appropriate responsive support team must be ready to help project managers.

Buggy Software: Another risk factor is buggy software; Shields (2001) argued that it is not possible for vendors to their system against every possible scenario for how a package would be used by clients. It is also claimed that programming problems can take weeks to solve and especially at the final testing stage the project team cannot afford cope a delay for weeks (Musaji, 2002) and (Shields, 2001).

Complex Project Architecture and Tasks: It is stated more modules increase the level of complexity in projects (Francalanci, 2001), for this reason Aloini *et al* (2007) argued key architectural considerations should be well planned to minimise the need for additional software and lack of a good planning phase for these issues could cause problems about personalisation and adaptation of tools for organisations. In fact, as partially stated above “unrealistic expectations” is also stated as a risk factor (Shields, 2001) and this factor is a sub element of high complexity because it is claimed that high expectations brings more workload to project team such as unnecessary modules (Workcube, 2013).

Shields (2001) also claimed that in each implementation, some tasks are more challenging and complex than others and if the complexity becomes significantly high the learning curve can be extremely steep, so the team can spend days and weeks to accomplish those tasks. But in fact, such delays may cause dramatic outcomes in a tight-schedule. Therefore, bad or wrong planning of project complexity and tasks are also a risk factor for ERP projects.

Resistance and Sabotage: Dey *et al*, (2013) and Shields (2001) and Workcube (2013) claimed the resistance against change and sabotage as risk factors for ERP projects. It is claimed that significant changes brought by ERP projects create winners and losers in organisations such as gaining or losing responsibilities, access to information and perceived power (Shields, 2001). Workcube (2013) and Shields (2001) claimed that these changes might result a resistance off staff against change. They

argue that employees who do not want the success of project, usually will not contribute to the project in order to delay the “go-live”. Besides, Shields (2001) stated that in some extreme cases, employees can even sabotage the project in the hope of preventing the change in organisation.

Personnel Problems: According to Shields (2001), “personnel problems” is also a risk factor for ERP projects. In fact this is a wide range of risk source for ERP projects, it is claimed that human resource problems such as jealousy, personal conflicts, family affairs or illness can have cause a tremendous influence on the failure or success of ERP projects. Therefore, problematical people should be replaced by new employees to maintain project team performance Shields (2001).

The table (2-3) will put together all risk factors founded in literature below;

- Failure to Re-Design business processes to fit the software
- Lack of Senior Management Support
- Insufficient Training and Re-skilling
- Ineffective Consulting Services
- Lack of User training or Inadequate Training for Key-Users
- Ineffective Project Management
- Lack of Integration
- Lack of a Proper Management Structure
- Poor Leadership
- Lack of Project Champion
- Ineffective Communication
- Inadequate System Selection
- Lack of Business Analysts
- Existing of Legacy System
- Lack of an Integrated Technology Strategy
- Bad Change Management
- Failure to Get User Support
- Failing to Create an Effective Project Team
- Inadequate Financial Management
- Lack of System Supplier Stability and Performances
- Inadequate Strategic Thinking and Planning
- Slow Decisions
- Bad Technical Support
- Buggy Software
- Complex Project Architecture and Tasks
- Resistance and Sabotage
- Personnel Problems

Table 2-3

This sub-chapter showed that ERP projects are significantly risky and without an effective risk management, the success of project is very hard to achieve.

Chapter 3: Critical Success Factors Of ERP

The purpose of this chapter is to answer third objective which is “**To propose critical success factors of developing and implementing an ERP system**”. In details, firstly the definition of success in ERP projects will be identified from literature, then the critical success factors will be introduced and finally critical success factors stated by various authors in literature will be proposed and explained.

3.1 Success of ERP Projects:

Project success or failure is generally depending on its definition and by whom it is defined (Wallace *et al*, 2004). In fact, definition of success is slightly changing in different sources. Some authors preferred a classical approach based on time cost and quality but others slightly alter it. Fang (2005) claimed that project managers and ERP consultants generally consider a project as successful if it meets the time, cost and quality requirements. In fact, the project management literature generally is often based on this classical approach. Authors such as Atkison (1999), Turner (1999) cited in Aloini *et al* (2007), Camilleri, (2011) and Kerzner (2013) have linked project success to satisfying time, cost and quality requirements of the project. Lock (2013) argued that although project managers define success as meeting these three basic requirements, the perception of success or failure will be different for other stakeholders. Besides, Fang (2005) stated that this perception of success might change for people whose job is to adopt ERP system into organisation and use it. In fact, it is argued that it is affordable for project managers to define project success with a short run approach but from investors or executives perspective, it should be based on a long run approach (Axline *et al*, 2001). Also Axline (2001) cited in Fang (2005) claimed that ERP customers which intended to adopt ERP systems should be concerned with the success not only at the adoption time but also in down the road. According to some other authors such as Umble *et al* (2003), Davenport (1998) and Oden *et al*, (1993) cited in Umble *et al* (2003) define an ERP project as successful if the system achieves a significantly high proportion of its potential benefits. A similar definition of successful ERP implementation is linked to the ROI of the system. It is claimed that if the system reaches the ROI decided at the project planning phase, the project is successful (Ptak, *et al*, 2005). However, Markus and Tanis (2000) claimed that optimal success is the realisation of the best outcome, which the organisation could possibly get with enterprise system, measured against a project portfolio in terms of operational metrics in short run and business metrics in long run, by concerning with the business situation.

On the other hand, one can argue that in order to understand and establish an acceptable definition of “success” for both customers and project managers or vendors, it is crucial to understand also the failure of project. Aloini *et al*, (2007) classified the ERP project failure as four different levels that are;

- **Process Failure:** If the project exceeds time and budget restrictions.
- **Expectation Failure:** If the system could not meet the customer expectations.
- **Interaction Failure:** When users have a negative attitudes against the ERP system
- **Correspondence Failure:** When the implemented IT system and planned objectives are not matched.

Hence, it can be said that an ERP is successful if it meets the time, cost, customer expectations, and business requirements or planned objectives and also create a positive attitude of customers. It is equally important to maintain customer satisfaction in long run. Lock (2013) and Hartman (2000) claimed that the success or failure of a project depends on the perception of the outcome by all stakeholders and if all of them are happy, the project can be considered as successful. In reality, the ideal outcome is not always achievable and sometimes some stakeholders can be happier than

others but it is important to hold harmless all stakeholders and use the best project management practices to meet all stakeholders concerns.

3.2 Definition of Critical Success Factors:

According to Jafari (2006), Critical success factors concept firstly introduced in 1979. Then, it is stated that Rockart (1982) published a seminal study about critical success factors within the context of project management and information systems (Panda and Sahu, 2013). The scope and usage of this framework have been linked to subjective ability, style and executive's perspective (Fang, 2005). Rockart (1982) also added that the shaping of this CSF framework could be analysed from four different perspectives which were formed by structural changes and industries, by operational strategies of organisations, perceptions of managers and environmental changes (Fang, 2005). Afterwards, many authors used this critical success factors concept for various sectors for not only the managerial perspective but also construction, education or health (Panda and Sahu, 2013). For instance, CSF concept is used by Pinto and Slevin (1987) in order to link project success to CSF and in their work they have defined successful implementation of project as a function of CSF contribution (Panda and Sahu, 2013). A recent example is Low (2014) which is used CSF framework for construction sector. In fact, Hossain and Shakir (2001) suggested that CSFs concept has been frequently used for determining and indicating the key elements needed for the operational success of a business.

In terms of identification of these points, Williams and Ramaprasad (1996) cited in Panda and Sahu (2013) claimed four types of criticality for these elements in order to identify these points. Those were;

- Factors related to the success by a known casual mechanism;
- Factors necessary and sufficient for success;
- Factors necessary for success;
- Factors associated with success.

The purpose of using this concept in this research is to establish key elements to consider in ERP projects for successful system development and implementation.

3.3 Critical success Factors Framework:

As stated above, critical success factors are few crucial areas that things have to go right in order to improve the project successfully. In reality, various authors in literature used a different approach for critical success factors, for instance, Sarker & Lee (2002) about social enablers of implementation such as leadership. Holland and Light (1999) focused on tactical and strategic factors of ERP projects and identified 12 factors. Kuang, Lau, and Nah's (2001) also determined practical suggestions about 11 critical points for companies to develop and implement ERP systems. In fact, this article is not based on an empirical study or a primary data to justify these factors. But these factors had been

included to other studies and have been justified by other authors. Another important study is Gargeya and Brady (2005) cited in Swaminathan (2011) which is including 6 comprehensive factors for ERP project implementations. Huang (2010) look over 524 articles sources and identified 37 possible success factors for ERP projects. Hedman (2010) also made a survey on this point and identified 95 critical factors for successful implementation.

As a result there are many different approaches for ERP projects and enormously stated critical success factors in literature. Some factors are same for almost all authors but some of them are not. For this reason, this research will state the most-cited critical points in literature. In order to do that Al-Fawaz et al. (2008) and Somers and Nelson (2001) will provide a basis for this section because their work identified the most cited CSF by authors in literature and also by companies but some other critical points which were considered by different authors will also be explained below. Besides, Al-Fawaz et al. (2008) claimed that understanding these factors in ERP implementation is a challenging and creates a worldwide problem for organisation. Fang (2005) claimed that in order to facilitate this understanding process, it is useful to classify these factors under specific criteria. In fact many others preferred the same way. Therefore, after stating these factors, a classification will be made to specify in what phase these factors should be considered by managers and consultants.

3.3.1 Top-Management Support:

The top management support is stated as a critical success factors by many authors such as Holland and Light (1999), Ehie and Madsen(2006), Finney and Corbett (2007), Jafari et al. (2006), Jarrar et al. (2000), Plant and Willcocks (2007) Shaul and Tauber (2013), and Sumner (1999).

It is stated that top management support is one of the most important success factors for ERP projects (Al-Fawaz et al., 2008). According to Bhatti (2005), top management support is to provide necessary resources, effort and authority or power for project success. Zhang et al. (2005) argued that this factor constitutes of two main aspects; leadership and providing necessary resources for project which involves providing the required people for the implementation and allocating appropriate amount of time to get the job accomplished (Shanks et al., 2000), It is also stated that top management must also commit to enterprise integration, understand ERP and provide fully support to project champion (Umble et al., 2003). Nah and Delgado (2006) claimed that existence of an effective top management support is also important for driving consensus and motivate other employees and reinforce energy and creativity of employees. Jafari et al. (2006) suggested that top management should behave as a coach in order to keep its staff motivated and ensure their harmony.

On the other hand, it is argued that having this factor also support change management and ensures a smooth change for organisations (Al-Mashari et al., 2002). Finney and Corbett (2007) stated that top management has to participate each phase of system implementation and commit with by personally involving and also by allocating valuable resources to the implementation process. Fang (2005) claimed that by doing this management become able to monitor the project and provide direction if it is necessary. It is also suggested that senior managers must determine the project as a

top priority publicly and explicitly in order to create a competent and appropriate project team, to share the role of new system and structure and set the record straight (Wee, 2000).

Another aspect of this factor is claimed as legitimizing new company goals and objectives. It is stated that senior managers have to communicate with employees about the new vision of the organisation, new system, changes of structure, roles and responsibilities in order to establish a common vision into organisation and ensure a positive tendency of employees against system (Nah et al., 2003). In fact, Fang (2005) emphasised that top management must play an active role in the processes of preparing a business plan and also financial budgets. The first point will be mentioned in next chapter, for the budget preparation it is stated that as stated above, ERP systems are highly demanding and requires a significant budget for implementation. Moreover, Fang (2005) claimed that top management must ensure that the project has sufficient budget to fund tasks such as training or consultant hiring.

One can be said that top management support is a crucial point for successful ERP implementation. Therefore, it is crucial for organisations to have a senior management team that believe the project and ready to support it in several ways.

3.3.2 ERP Strategy:

Vision and Business Plan:

This sub-chapter consists of three points; Planning and Visioning, Customisation and implementation time. In fact, these points are handled separately by some authors but the author found it useful to combine them.

It is stated that before starting to implementation the project goals must be defined clearly and understood by all stakeholders of the project (Shanks, Graeme, *et al.*, 2000). In fact many authors stated in the table above are stated the importance of having a clear vision and goals for ERP project success. It is argued that ERP projects necessitate a clear and persuasive vision of how the organisation would operate in future in order to satisfy all stakeholders (Umble et al., 2003) and Jafari et al., 2006). Somner&Nelson (2004) claimed that the first stage of the project should be the creation of a vision, identification of goals and possible ways to achieve them.

Also, it is claimed that preparation of a business plan which specifies intended strategic and tangible benefits, resources, costs, risks and timeline, is extremely important for project success (Nah and Delgado, 2006) and (Wee, 2000). It is also critical that there must be a consistency between the business plan, organisations needs and selected ERP system (Nah et al., 2003). Parr and Shanks (2000) suggested that the scope and objectives of the project must be determined by steering committee before the project takes-off and adhered during the implementation. It is also argued that smaller scope projects have a higher chance of success because fewer modules and less functionality decrease the complexity of project (Parr and Shanks, 2000). Therefore Shaul and Tauber (2013) claimed that organisations must determine their key needs and primary problems to solve rather

than implementing a much more complex system. Besides, it is claimed that many ERP projects have faced scope creep because of lacking a comprehensive business plan (Somner&Nelson, 2004).

In fact, Al-Mashari et al. (2002) emphasised that without a clear and understood vision and meticulous strategic business plan, ERP implementation projects may cause complete disasters and organisations may suffer from business damages.

Minimum Customisation:

On the other hand, as explained in the risk chapter, customisations may cause significant problem for ERP system implementation and maintenance. Parr and Shanks (2000) claimed that uncomplicated option selection and keeping customisation as minimum are important factors that increase the likelihood of project success. Fang (2005) argued that limited customisation might be useful for organisations to create user-friendly system and enhance its capabilities but too much customisation creates a complex system that is difficult to support and almost impossible to upgrade. In reality, Axline et al. (2001) suggested that companies often cannot omit customisation because ERP packages are not made for specific types of businesses and requires some functionality to work effectively.

Also it is stated that the extent of customisation also designates the length of project, implementation and maintenance cost of the system (Fang, 2005). As stated above, the project success constitutes also post-implementation period from user perspective and one can argue that high customisation can cause a failure in long run even the system is implemented successfully. Also high customisation of system to fit the organisation obstructs achieving potential benefits of BPR by organisations (Holland and Light, 1999). Therefore, keeping customisation in a certain level could be beneficial for organisations and a critical success factors for ERP projects. In fact, Axline et al. (2001) argued that organisations generally decide unnecessary modifications at the early stage of the implementation when the system is not fully understood by people. It is also claimed that by understanding better the system, they can find a way to implement it without too much customisations (Axline et al., 2001).

Time Frame:

It is stated that establishing a realistic and adequate implementation time is another critical success factors for ERP projects (Rosario, 2000), (Parr and Shanks, 2000) and (Holland and Light, 1999). Parr and Shanks (2000) claimed that it is extremely important to have realistic milestones and end date for ERP projects. Fang (2005) declared that companies occasionally intend to speed up the project for some reasons such as competing with their rivals or meeting some urgent needs. But in fact, it is written that managers must consider their available organisational resources and implications in order to create an adequate schedule for implementation (Fang, 2005) and (Finney and Corbett, 2007). Davenport (1998) stressed that it can be wise to implement an ERP system with a speedy implementation schedule to solve some problems or meet some needs but rushing the project can cause even larger problems for companies in long run.

3.3.3 Business Process Reengineering:

Another important success factors is stated as business process reengineering. As mentioned above because of the limited modification availability of ERP systems, BPR becomes vital for organisations in order to adopt the software. Holland and Light (1999) argued that BPR is a precondition for taking full advantage of the ERP software. It is also claimed that organisation should be ready and willing to modify their business processes in order to minimise the customisation (Nah et al., 2001).

Fang (2005) claimed that BPR is strongly depending on how the selected system accords with current business process of the company. It is claimed that companies should make a comprehensive analysis to determine possible occasion of reengineering (Al-Mashari et al., 2002). Zhang et al., (2005) added two more dimension of successful BPR except willingness and readiness of reengineering of organisational people. Those dimensions are organisation's capability of reengineering and communication. It is stated that the company has to be capable to conduct reengineering process in terms of time, capital and sustainable leadership (Zhang et al., 2005). Besides, it is claimed that communication plays a vital role for successful reengineering because reengineering process are radical redesign of an organisation's existing culture, process and structure. If people are not informed about the changes in the system and their purposes, they could feel uncomfortable about their future job (Zhang et al., 2005). In fact, Al-Fawaz *et al.* (2008) stated that BPR generally requires a significant job changes in terms of descriptions and essential skills. Wee (2000) also argued that reengineering process must continue once the system in use to improve the system performance.

3.3.4 Effective Communication:

Another critical success factor for ERP projects is effective communication among functional levels. Fang (2005) stated that convenient environment for effective communication is a must for successful ERP implementation. Amoako & Gyampah (2004) claimed that lack of effective communication is one of the main reasons of project failures in project management history. They also claimed that communication creates a channel which allows to employees from different functional places to share crucial information for the project success. Jafari (2006) identified two dimension of communication as; inwards communication among project team and outwards communication among whole organisation. Al-Mashari *et al.* (2002) and Bhatti (2005) claimed that creating an effective communication environment is not an easy task for organisations. Carton *et al.* (2008) suggested that in these kinds of projects, departments generally are reluctant to share their information with other departments because of organisational structure, appropriation of information or secret agenda. It is suggested that a communication plan that state information such as the reasons of implementing ERP, details about BPR, demonstration of software module and change management strategy, training and expectations (Wee, 2000) and (Al-Mashari *et al.*, 2002). Sumner (1999) communication has to cover also the scope, objectives and necessary tasks for successful implementation. Nah and Delgado (2006) also added that communication must explain the capabilities and limitations of the system to all stakeholders during implementation. In fact, Amoako & Gyampah (2004) argued that effective communication develops trust facilitate the acceptance of technology by employees and build the trust of staff on system.

3.3.5 Project Management:

Another factor stated by many authors in literature is effective project management (Kapur et al., 2014). Nah et al. (2001) stated that good project management is a must for ERP projects. Rosario (2000) argued that a person or a group of people must take the responsibility of conducting the project for achieving intended benefits. Zhang et al. (2005) argued that ERP projects consist of a set of complex tasks therefore having an effective project management strategy in order to control the implementation process is crucial for organisations. Jafarri (2006) determined five major components of effective project management. Those are; having a formal project plan, a realistic time frame, periodic project status meetings, existence of an effective project leader or champion and including stakeholder into project team. In terms of process, it is stated that the project team must firstly define the scope (Holland and Light, 1999) and controlled (Rosario, 2000). Nah et al. (2001) stressed that the scope has to contain the amount of BPR required, implemented system and involvement of business units. Holland and Light (1999) suggested that defining project milestones and critical path are other tasks of project team.

Wee (2000) claimed that effective usage of project management helps team to meet project deadlines in order to stay within the budget and schedule which bring credibility to project team for next phases. Nah et al. (2001) suggested that it is also important to discipline the project management with coordinated training and involvement of human resource department. Also good project management must provide well planned and defined tasks and accurate estimation of needed effort. Wee (2000) added that measures of success and escalation system about conflict and issues should be established. Finney and Corbett (2007) argued that cost management is also an important part of project management and it is important to determine the exact cost of the project. Besides, it is claimed that the project plans must contain some mitigation activities against a- unexpected additional costs (Finney and Corbett, 2007).

3.3.6 Good Project Team Composition:

ERP project success has been linked to the knowledge, skills, abilities and experience of the project team as well as project manager (Al-Mashari *et al.*, 2002). It is stated that composition and teamwork of the project team plays an important role throughout the project life cycle (Nah et al., 2001). Parr and Shanks (2000) and Shanks, Graeme, et al (2000) argued that the team must consist of best people at full-time with a right mix of business analysts, technical experts, external consultants and end-users in order to establish the right balance. Somner and Nelson (2001) claimed that the project team should not be competent only for technological points but also must have necessary knowledge to understand the company and business requirements. Nah and Delgado (2006) suggested that allocating best people to implementation team also fosters innovation and creativity which are crucial for ERP project success.

Sumner (1999) claimed that the team should be cross functional. Sumner also added that mixing internal and external staff in a team can allow internal employees to build some necessary skills to design and implement the system. It is also argued that the ERP project must be the top and highest

priority job of team members (Wee, 2000). In fact, Fang (2005) stressed that functional departments are often reluctant to give up their best people for a project so the top management and other stakeholders must overcome this issue.

Moreover, it is important to keep their workload manageable and the team members must be allocated full-time to the implementation project (Wee, 2000). Wee (2000) also argued that team members must get compensation and incentives for implementing the system on budget, time and meeting requirements.

3.3.7 Having a Project Champion:

Al-Fawaz et al. (2008) stated that having a project champion is one of the most important success factors for ERP projects. Shanks, Graeme, et al (2000) defined the champion as an individual sometimes a senior manager who permanently stands up for the system and its benefits. It is stated that existence of a project champion who performs as a transformational leader has been linked to technological innovation success (Somner and Nelson, 2001). The project champion should also take the responsibility of change champion during the project and understand the technology as well as the context of the business and organisation (Somner and Nelson, 2001). Rosario (2000) asserted that effective champion commitment is important to drive consensus into organisation and to control the whole project during the life cycle. Nah et al. (2003) argued that the leader must always make an effort to manage the resistance and solve conflicts. Somner and Nelson (2001) added that it is useful to choosing a champion from a high position of the company because he or she is associated with the authority in order to drive complex projects to success. So, it can be said that an ERP project should have a project champion to have a higher chance of success.

3.3.8 Change Management:

In fact this point will be discussed also in detail in chapter four. Therefore, this section will only justify that change management is a CSF. Many authors stated that organisations have to pay attention to the management of change because ERP implementation projects will bring a significant change in terms of organisational culture and business processes (Shanks, Graeme, et al., 2000). Umble *et al* (2003) explained that even the most flexible ERP system necessitates a change to company's strategy, organisation and culture. So this process often requires a reengineering of key business processes and developing new processes in order to support company's goals (Umble *et al*, 2003). It is stated that this process should be carefully managed and controlled for ERP project success (Allen *et al.*, 2002). Umble *et al* (2003) indicated that consequences of these changes may significantly affect a company's processes, employees, structures and policies.

Somner and Nelson (2001) stated that ERP project can cause resistance, confusion, redundancies and errors in an organisation because of the large-scale changes introduced by new system. According to Appleton (1997) fifty percent of ERP project could not meet the intended benefits because of underestimating the importance of managing these changes. Therefore, it is argued that organisations have to establish a comprehensive change management strategy in order to manage large-scale changes of system and processes associated by ERP projects (Somner and Nelson, 2001) and (Nah *et al*, 2003).

3.3.9 Consultant and Vendor support:

Consultant and vendor support is stated as another important factor of ERP implementation. As partially stated above, external consultant's usage in terms of knowledge and experience is important for driving ERP project to success (Ehie and Madsen, 2006) and (Kapur et al., 2014). Fang (2005) argued that companies generally need an external support because of their lack of necessary knowledge or skills and highly centralised company structure. In order to remove these barriers organisations require an effective support of IT vendor firm (Finney and Corbett, 2007). Zhang *et al.*, (2002) identified three dimensions of qualified vendor support as; low service respond time of the vendor, providing qualified and educated ERP consultant who have high knowledge of enterprise business processes and IT technology and finally effective participation in ERP project implementation process.

Fang (2000) suggested that Vendor support can help organisations in various points such as analysing IT system requirements by blueprint analysis, hardware and IT infrastructure development. Ehie and Madsen(2006) stressed that having close relationship with vendor firms and consultants can provide a valuable knowledge transfer in terms of various disciplines such as BPR, risk management and change management. In fact, Davenport (1998) argued that the importance of vendor support for ERP projects is higher than other IS project because ERP implementations require an effective usage of wide range of skills and disciplines such as BPR, change management, risk management as well as technical knowledge about implementation. Holland and Light (1999) stressed that companies have difficulty to provide all these internally. Besides, Al-Mashari et al., (2002) asserted that Vendors can also help customers to organise effective training to all employees which is a valuable source to develop necessary skills in house. Also, Fang (2005) stated that companies should not totally rely on vendor firms because consultant may also have limited knowledge in some points. Also, relying totally on vendor can cause a vendor dependency in long run. So, Finney and Corbett (2007) suggested the customers should transfer necessary skills and knowledge from consultant to decrease this dependency in some degree. Moreover, Finney and Corbett (2007) and Swaminathan (2011) argued that vendor selection plays an important role for this point. They stated that customers must consider vendor support and system performance of previous implementations as well as ERP system specifications and its convenience to the organisation.

3.3.10 Retain the Experienced Employee:

Some authors also gave an importance to retain experienced employees into the company. It is stated that there is an acute shortage of skilled and experienced ERP because of the high demand in the market (Kumar et al., 2003). Fang (2005) argued that it is critical for project success to recruit and retain talented and qualified ERP consultants. Kumar et al. (2003) claimed that some employees with high ERP knowledge often continue his or her career as an ERP consultant and this situation cause a high turnover of experienced employees and leads an time overdue of project because of training new employees without any ERP knowledge or necessary skills. Fang (2005) claimed that companies must pay attention to the effectiveness of their recruitment process and to provide career

opportunities for experienced staff. Bingi *et al.* (1999) finding right people and retaining them into the company constitutes a remarkable challenge for ERP projects because implementing these systems necessitates various set of skills such as technical, interpersonal and managerial.

3.3.11 System Selection:

Selection an appropriate ERP package, which can be easily fit and meet business needs, is claimed as another CSF for ERP implementation. Davenport (1998) argued that customers generally forget to consider whether the selected system will be convenient to their business strategy or processes. So, Al-Mashari *et al.* (2002) and Somers and Nelson (2004) stressed that companies must pay a particular attention on their ERP package selection process because Chen (2001) argued that ERP package has to match company's business process. In fact, it is difficult to find a system which totally matches with all business processes but it should match in some degree to decrease the complexity. Everdingen *et al.* (2000) cited in Al-Fawaz *et al.* (2008) and Jafari *et al.* (2006) stated that ERP system must closely fit with the current processes of the company. In reality this is also important for minimising the customisation and BPR requirements (Nah and Delgado, 2006). It is also stated that the system should be flexible, user friendly and easy to implement (Al-Fawaz *et al.*, 2008).

In order to establish an effective selection process it is stated that all functional areas of the company must participate into the selection process (Nah and Delgado, 2006). Also, the choice must be evaluated in terms of budgets, timeframes, goals and deliverables that are important factors for giving a shape to the project (Somers and Nelson, 2004). Besides, it is argued that integration, adaptability, applicability and ease of customisation are important points that have to be considered in selection process (Jafari *et al.*, 2006) and (Al-Fawaz *et al.*, 2008).

3.3.12 Monitoring and Evaluating Performance:

Monitoring and evaluating the performance is determined as another success factors by many authors such as Rosario (2000), Sumner (1999) and Umble *et al.* (2003). Fang (2005) stated it is very often to have system glitches, which may disturb the work, during the ERP implementations. So it is argued that the management must put effort to eliminate these significant glitches of system (Fang, 2005). Umble *et al.* (2003) argued that monitoring constantly the system performance is useful to determine any possible which may be occurred and damage the project.

Nah *et al.* (2001) and Kuang *et al.* (2001) argued that targets and milestones are useful to keep track of progress. They also added that obtainment should be measure against targets or goals. Roberts and Barrar (1992) cited in Nah *et al.* (2001) determined two different criteria to monitor ERP projects. Those are project management based criteria which is used for measuring the work against cost, actual quality and termination dates of each phase. It is suggested that project goals should be measurable and logical. Also the monitoring process has to contain the information exchange between member of the project team and analysis of user feedback (Holland & Light, 1999).

On the other hand, Rosario (2000) argued that proofs should be provided in order to manage scepticism and negativism. In fact, Fang (2005) emphasised that team morale is crucial for project success. By constantly evaluating the progress, these motivating proofs can be provided to project team (Fang, 2005). Umble *et al.* (2003) also suggested that when the team reaches a goal, rewarding them visibly is also another useful method to keep them motivated.

3.3.13 User Involvement:

Involvement of users is also identified as another CSF in ERP literature. It is stated that user involvement purposes a psychological state of employees which is defined as the criticality and personal interest of a system to a user (Bhatti, 2005). Al-Fawaz *et al.* (2008) argued that user involvement provide realistic expectations about the new system abilities which leads an increase of the acceptance and satisfaction of users about the new system. It is argued that user involvement also develops perceived control by attending the whole project plan (Al-Fawaz *et al.*, 2008). According to Jafari *et al.* (2006) and Zhang *et al.* (2005) user involvement comprises of user involvement in the identification phase of the company's ERP requirements and user participation of the implementation of ERP system.

3.3.14 Problems Anticipation and Troubleshooting:

Many authors like Holland and Light (1999), Rosario (2000) and Fang (2005) emphasized that anticipation of problems and effective troubleshooting consist an important factor for ERP project success. Holland and Light (1999) argued that troubleshooting errors during implementation and testing is crucial for project success. It is claimed that problems such as bugs and errors may appear during the testing stage and solving them effectively plays a vital role for the future of the project (Fang, 2005). Fang also argued that modified systems are more risky in terms of having bugs and troubleshooting.

So, Finney and Corbett (2007) stated that companies should be flexible in the ERP implementation project and take lessons from unexpected circumstances. Mandal and Gunasekaran (2003) stressed that companies must always be ready to handle unforeseen crisis and problems. In fact, it is claimed that these troubleshooting skills will be required in every phase of the implementation (Al-Mashari *et al.*, 2002).

For this purpose Nah *et al.* (2001) stated that customers must work well with vendors and consultants to solve software problems and get support for other issues. Rosario (2000) also argued that being patient, responding quickly, perseverance and having firefighting capabilities are essential for troubleshooting successfully during the project. It is also claimed that effective and sophisticated testing the system is also crucial for problem anticipation.

3.3.15 Training and Education:

Another critical factor for ERP success is the training and education of employees. Authors such as Sumner (1999), Bhatti (2005), Somers and Nelson (2004) and Shanks et al. (2000) consider training of employees as a critical success factor of ERP projects. It is stated that many ERP trail failed due to the lack of appropriate training to employees (Bhatti, 2005). Somers and Nelson (2004) emphasized that effective training facilitates software implementations into organisation. Some authors like Kumar *et al.* (2002) mentioned that the training must contain project management education to improve this point but generally authors focused on user training so it is argued that these education processes must provide necessary IT skills, organisation knowledge about new structure, process and culture and also other needs such as changes about their jobs (Finney and Corbett, 2007), (Bhatti, 2005) and (Somers and Nelson, 2004). It is argued that successful education is also useful to decrease the resistance of change and motivate all users about the system.

Table 3-1 will categorise all critical success factors identified in this chapter;

•Strategic Factors:	•Tactical Factors
Top-Management Support	Business Process Reengineering
Vision and Business Plan	Retain the Experienced Employee
Minimum Customisation	Monitoring and Evaluating Performance
Adequate Time Frame	User Involvement
System Selection	Problems Anticipation and Troubleshooting
Project Management	Training and Education
	Effective Communication
	Good Project Team Composition
	Having a Project Champion
	Change Management
	Consultant and Vendor support

In total, this chapter identified 17 critical success factors in literature and explained them briefly. Next chapter will focus on change management and some other points stated in this chapter.

Chapter 4: Change Management Strategy:

The purpose of this section is to answer objective four which is “**To propose an organizational change strategy to support ERP system operation**”. The importance of change management for ERP implementations is stated in chapter two as a risk factor if organisations fail to manage change effectively and in chapter three as a critical success factors which ERP implementers must consider

when planning and implementing ERP systems. This section will analyse some references in literature to generate a change strategy for companies.

In reality, Musaji (2002) claimed that there is no a general change management strategy or framework for ERP projects. But in fact, it is stressed that there is not a definitive route map or guidance about how to change a company and its employees at all levels to a future point (Paton and McCalman, 2008). They also claimed that companies should establish a way for management of change by paying attention to examples of change management cases and analysing how benefits were achieved in other organisation. So, one can argue that this strategy can not fit totally for a company but it can provide a basis for ERP customers to generate their own way.

Change management is defined as a set of activities which a project team must use to prepare the company for realising and accepting all changes which are required of an implementation (Shield, 2001). Another statement of change management is a structured approach that allows organisations to realise the transition from current situation to an intended future point situation (Liu and Seddon, 2009). Sengupta, Nilanjan *et al.* (2006) stated that management of change in ERP implementation context is an establishment of an understanding throughout the business components in order to prepare them to accept the change and understand clearly possible impact of these changes on them.

In fact, the importance of change management has been already mentioned above but to repeat it; Al-Mashari *et al.* (2002) argued that many ERP implementations fail because of the resistance of employees to change. In order to solve this issue, organisations must care about people issues and prepare a change strategy to motivate and prepare to new system (Leon, 2008).

Change Strategy:

Sengupta, Nilanjan *et al.* (2006) summarised critical activities that a change management strategy must include, those are;

- Ensuring support of key executives;
- Explaining the objectives and possible benefits of the implementation in details in order to motivate staff and ensure their engagement and support for the implementation.
- Gauging potential consequences and organisational readiness to change. They stressed that a change management plan must contain activities to analyse the worst possible scenario and its influence to the business. Also the current situation and readiness of the company in terms of reserved capital, HR capacities, clarifying stakeholders and their level of support to the project.
- Enhancing and implementing strategies to realise the change and benefits, also counselling and advising activities to mentally support employees.

In change strategy and activities that will be stated above, will be established according to these points.

Phase1 Diagnosis

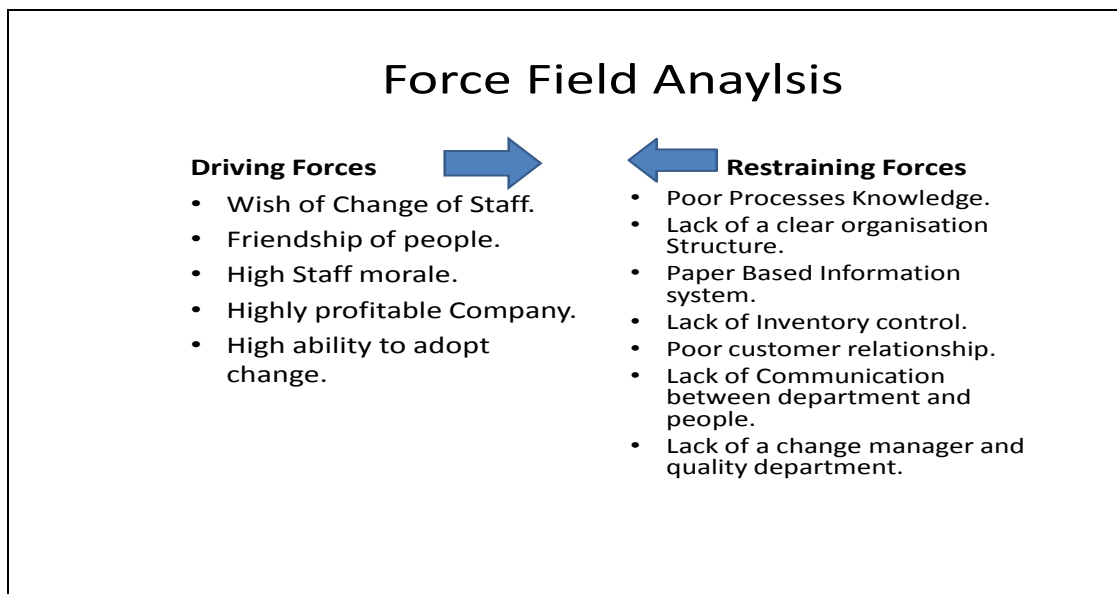
Sankar & Rau (2006) argued companies should analyse their current situation and identify their lacks and needs. It is stated that if there is a huge gap between current situation and the intended future point, the organisation's need for change is obvious (Burnes, 2009). Musaj (2002) and Sengupta, Nilanjan *et al.* (2006) claimed that companies also analyse their current capabilities to ensure that they have enough resources and knowledge to reach the future point. Aladwani (2001) stressed that organisations must also analyse their internal staff's needs, beliefs, values and interest in order to determine potential resisting groups and individuals. Shields (2001) stressed that there are some important points that may obstruct managing change in ERP projects, these points are stated in table (4-1) below;

Problematical situations for Change management: Source: Shields (2001) p,144	
Lack of a visible top management support or commitment to the project.	A critical business imperative has not been established for the project.
The implementation will cross multiple boundaries of the organisation.	The implementation will be done in different locations.
The organisation failed with similar projects.	There are a significant number of initiatives continue at the same time.
Top management disagreement on the value of the project.	Financial benefits of the project are not significant.
Lack of a strategic initiative	Expected the tangible benefits are extremely aggressive.
Positioning of management to protect their turf even before the project starts.	Difficulty to determine an executive sponsor for the project
Project managers and sponsors have problems to delegate right people for the project	Having indications to face difficulty to get key users support.

Shields (2001) stated that it is not usual to get all of these points into a company but if the ERP project manager realises that three or four of these points exist in the customer organisation, they have to take more formal and extensive approach for managing change for the implementation. It is claimed that fore-field analysis can be used by an organisation to determine:

1. Its driving forces that can push the company towards future point and
2. Restraining forces that obstructs to reach future point (Hayes, 2010).

It is also mentioned that a company must focus on reducing restraining forces and increasing driving forces to reach its goals (Hayes, 2010). Figure (4-1) below shows a force field analysis;



Therefore, one can argue that this method can be used for ERP implementations to determine negative and positive points of companies to build their strategies.

Phase 2: Change Decisions

It is stated that change can be implemented in two different ways; incremental and fundamental (Sankar *et al.*, 2006). It is stated that incremental change consists of many smaller change steps which provides an opportunity to evaluate each phase's outcome and adjust them if necessary (Hughes, 2006). Sankar *et al.* (2006) argued that this approach is more visible and flexible because employees can participate more and give appropriate feedback about the each phase.

Fundamental change approach is focusing on completely transforming the organisation by assuming that company has changed (Hughes, 2006). Sankar *et al.* (2006) claimed that this approach provide a better planning process but sometime could not tolerate an additional planning opportunity in case of a problem. It is stated that minor changes can be successfully managed under responsibility of project team but if the change is major it may be useful to delegate a sub team with change experts to focus only managing change (Shields, 2001)

Therefore in second phase the company must identify its strategy for how to implementing the change. Musaji (2002) and Vaman (2007) argued that situation of company's major six elements which are people, strategy, technology, structure, culture and tasks, and potential impact of intended the strategy on project and organisations must be considered.

Kotter (1996) and Sengupta, Nilanjan *et al.* (2006) also argue that lack of a clear vision and strategy is one of the worst situations for ERP implementation. They stated that this case will cause a lack of understanding of the whole strategy and how the organisation will achieve its goals. As mentioned above it is argued that creating a clear vision and strategy to obtain the vision will explain benefits of new system (Sengupta, Nilanjan *et al.*, 2006) and also employees will understand the necessity of change and will support it (Burnes, 2009). Kotter (1996) also claimed that it is crucial to make people

understand the pressure of the business environment on the organisation for implementing these systems and create a sense of urgency in organisation in order to bring together all elements of the company.

Phase 3: Planning

It is stated that for an effective change planning, organisations should analyse and align their existing policies, procedures, programs and practices because a change in these points will influence directly the six elements stated above (Sankar *et al.*, 2006). In order to do that, a qualified change team must be established. This team should be a pioneer or an example of required changes and show other people that changing is possible (Hughes, 2006). Sengupta, Nilanjan *et al.* (2006) also stated that this team must act as one body and carry definitively one voice to reach all interested parties.

Shields (2001) identified four important points that the project team needs to focus and generate activities to address them. They are communication, involvement, training and job design. These points will be explained above to create a good change plan.

Communication:

As also mentioned in previous chapters communication is vital for ERP implementations. Aladwani (2001) claimed that communication is also important for managing change. It is stated that the management's first task should be the influencing cognitive component of key employees' attitude and communication plays a vital role for succeeding that (Aladwani, 2001). Shields (2001) emphasized that effective communication helps managers to create awareness about objectives, activities and status of the change plan and also the whole project. Shields (2001) also argued that people can understand different things from the vision and its may cause different expectations. If the gap between their expectations and planned or achieved objectives are too high, they could be dissatisfied. So it is also crucial for managers to use communication with employees about vision and strategy for managing their expectations and move them closer to real goals (Shields, 2001), Kotter (1996) and (Sengupta, Nilanjan *et al.*, 2006). For this purpose companies can use different channels and tools presentations, project web sites, e-mails and meetings (Shields, 2001).

Involvement:

This point is also mentioned above, in change management perspective user involvement is also important. Shields (2001) stated that change management strategy must contain plans to ensure employee involvement especially key users. As stated above these changes will influence some people's job and authority, Sankar *et al.* (2006) claimed that people may fear or feel unconfident of change because of uncertainty, mistrust and risk aversion. Shields (2001) argued that making internal staff especially key users involved into the change process will facilitate for managers to deal with this problem and create a sense of ownership of employees to the new system and needed changes. In fact, involving key people who will be affected by change is useful to get feedback and other necessary input from them (Hayes, 2010). Another point is that user participation is a good way to keep all staff informed (Shields, 2001). So, Al-Fawaz *et al.* (2008) stressed that employees must involve whole change process in terms of defining requirements, designing, prototyping, testing and training. Therefore, it is vital for a change strategy to ensure user involvement.

Training:

Wallace and Krezman (2001) suggested that in an ERP implementation at least 80 percent of internal staff should get an education in order to understand the new system, business structure and processes. Zhang *et al.* (2002) stated that the main purpose of the training is to improve the level of knowledge and expertise of internal staff about the changed company and especially help key users to gain their self-confidence about the system. In fact, as stated above if people do not understand the reasons and scope of change, they may fear it (Hughes, 2006). Also, Shields (2001) claimed that they may question their abilities to adapt and learn a new way of doing things.

Shields (2001) claimed that training can ease these fears, concerns and doubts of staff about the system. It is stated that effective training enables users to interact with the new system by providing an opportunity to develop and test inferences of ERP system and its influences on the organisation (Amoako & Gyampah, 2004). Many authors such as Bhatti (2005), Shields (2001), Wallace and Krezman (2001) and (Leon, 2008) stated that the training of ERP implementation must be hands on. Key users need to perform their normal jobs with help of new capabilities of ERP systems. Shields (2001) argued that it is not useful to spend a significant time to organise class training where users read documents or manuals to understand the system. It is suggested that these documents can be used with hand-on training to support its effectiveness (Shields, 2001) and (Wallace and Krezman, 2001).

For other staff except key users Bhatti (2005) and Musaji (2002) claimed that related concepts and features of the system should be taught also by workshops or group sessions. It is also suggested that vendor representatives and consultant must also participate to the training sessions to answer technical questions of users but it is important to not allow them to lead the training (Shields, 2001).

Job Design:

As stated above, implementing these systems will necessitate new business processes and maybe departmental changes. These kinds of modifications in the company will also significantly change people's jobs (Shields, 2001). Adopting a new system generally creates a requirement of Job design (Musaji, 2002). Shields (2001) claimed that these job changes also change the relationship between staff and company and also structure of the business. In details, as a result of additional responsibilities people's job might expand or people can lose their position, authority or responsibility (Leon, 2008).

For successfully managing these changes, the team should document modifications which have been made to individual jobs and generate some plans and solutions to support people transition to their new job (Hardwood, 2003) and (Shields, 2001). As state above, these changes generally comprise special majors or areas so may also require training but this education process cannot be managed or executed by consultants (Hardwood, 2003) and (Shields, 2001). User involvement is also vital for this process to get feedback from employees and deal with resistance (Hardwood, 2003). It is also important to support these changes with new recruits to get necessary skills and expertise in short run (Hardwood, 2003) and (Leon, 2008).

Phase 4: Create Readiness:

Burnes (2009) argued that change management is the responsibility of leaders not employees and all initiatives should be supported by leaders. It is claimed that leaders of change are one that everybody focus on (Sankar *et al.*, 2006). Therefore it is important to be credible for leaders to 'walk the talk' when they lead the change (Sankar *et al.*, 2006). Being a role model is mentioned partially above for change team but the main responsibility is on change leaders. They must align their behaviours, attitudes and appearance with the goals of the change process (Sankar *et al.*, 2006).

On the other hand, Burnes (2009) stated that change leaders are responsible to create an appropriate or conducive environment for change. This consists of reorganising reward and benefit systems and the process of selection or promotion (Sankar *et al.*, 2006). Sengupta, Nilanjan *et al.* (2006) stated that it is important to establish short term goals for change rather than focusing on long term aims. In fact, this point stated as a common reason of project failures by Kotter (1996). Sankar *et al.* (2006) also stressed that celebrating the obtainment of each short term goals or success i.e. 'low hanging fruit' will motivate employees about the next step therefore, celebrating and recognition are useful for staff motivation.

Phase 5: Change Evaluation:

Sengupta, Nilanjan *et al.* (2006) claimed that companies generally overlook this stage of change process. In fact, it is stated that evaluating the change and reflecting about the consequences and the process would extend the knowledge of the company about change management and provide a basis for future change trails (Sankar *et al.*, 2006) and Motwani *et al.* (2002). Also, it argued that successfully management of resistance will provide also flexibility to organisations, because it will reduce bureaucracy and develop communication between management and employees and also among employees themselves (Sengupta, Nilanjan *et al.*, 2006).

In conclusion, change management is an important determinant of the ERP project outcome. In chapter 2.3 it is claimed that ERP systems bring organisational benefits such as supporting organisational changes, Facilitate business learning, built common visions and empowerment. In contrast, in chapter 2.4 it is argued that these systems can also bring disagreement, conflict and damage on company culture. In fact, these two statements are two extreme consequences of ERP projects and the determinant are generally successful BPR and an effective change management that communicate people about their impacts of changes on them, get feedback and execute plans about it. If the company really delegate people who are expert on change management and top management support will provide a common vision for all departments, successful generation of education and re-skilling plans to facilitate and support organisational learning, provide knowledge for next change trials (Shang and Seddon, 2002), (Shields, 2001), (Hardwood, 2003) and (Sengupta, Nilanjan *et al.*, 2006).

But if change management is ineffective this will lead to all departments caring only about their own benefits, chaos and conflicts and company will lose its peaceful working environment (Umble, 2002), (J.Chen, 2001) and (Barker & Frolick, 2003). In addition, one can argue that where change is managed successfully it will change the company culture. But in reality, this change strategy will support employees to adapt softly to these changes and allow them to gain their motivation in the new order.

Chapter 5: Research Methodology

This section will provide information about selected research strategy in order to identify a set of process for ERP implementations. Then, the method for data collections and data analysis techniques will be discussed to clarify these points. Finally, some limitations of this research and corresponding actions which are taken by the researcher to address these points will be stated.

5.1 The Aim of Research:

This research has been conducted for studying processes and consideration in an Enterprise Resource Planning system's project which a project team must pay attention to successfully developing and implementing these systems. For this purpose, four objectives were defined;

- 1. To map the business development elements which typically drive companies to implement ERP systems.**
- 2. To identify benefits / dis-benefits and risks of developing and operating ERP systems.**
- 3. To propose critical success factors of developing and implementing an ERP system.**
- 4. To propose an organizational change strategy to support ERP system operation.**

In fact, the first two objectives were generally built to provide a basis for ERP systems and create and understanding about their implementation projects. The final part of the objective two and the rest were designed for and in-depth analysis about risks, critical consideration and supporting change issue of ERP projects. In details, the purpose of objective one was to identify the business development elements of ERP system which make it attractive for companies. Objective two consisted of two purposes; the first one was to continue to provide more information about ERP system by identifying its benefits and dis-benefits of these systems. The second aim was to determine important risk factors that may affect the success of ERP project in terms of cost, time and quality. The third objective was determining the critical success factors which a project manager and his or her team must ensure for a successful project outcome. While the fourth objective aimed to propose a change strategy to support implementation and transform the company for an appropriate place to system implementation.

A useful diagram has been suggested by Saunders *et al.* (2009) in order to visualise issues that a researcher has to consider for designing his or her research;

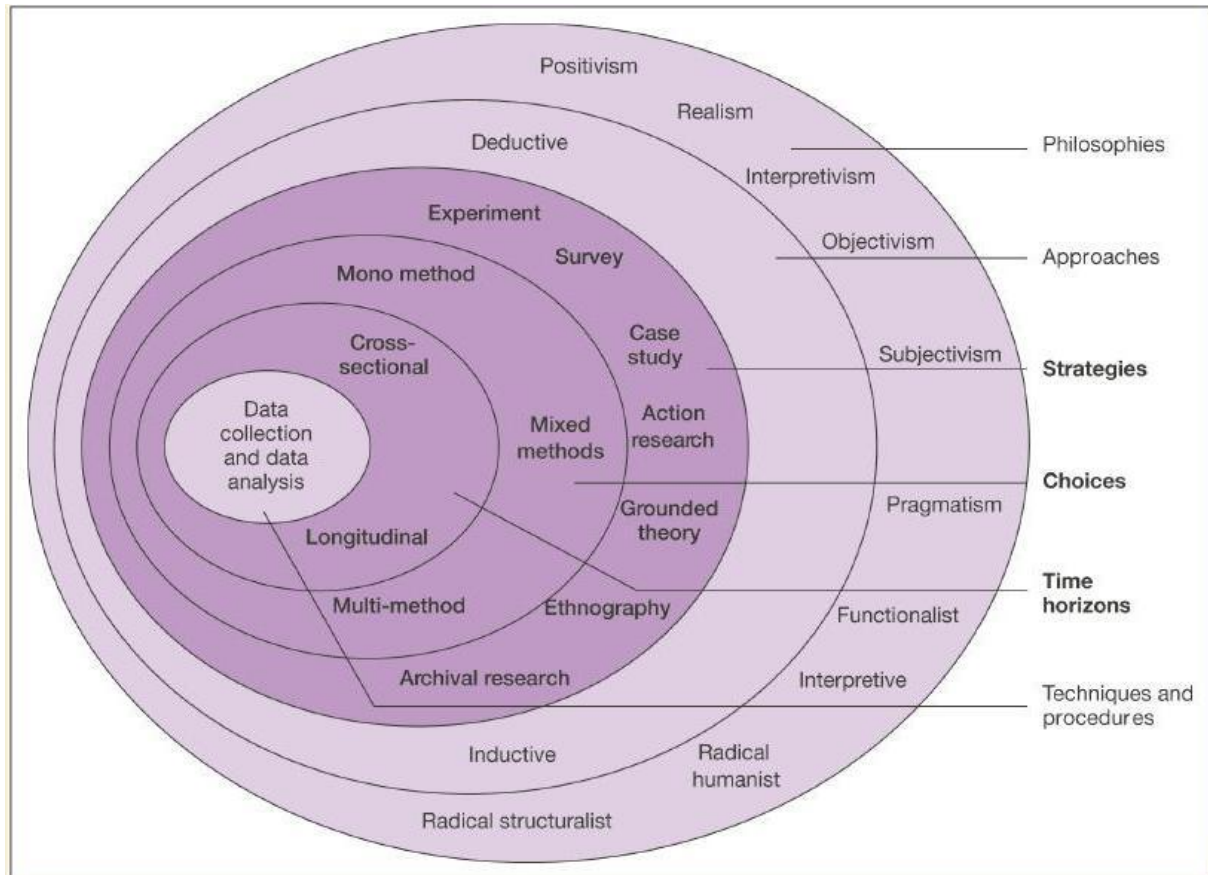


Figure 5.1 Process Onion of Research Saunders *et al* (2009), p, 108

In fact, this chapter will follow this diagram by starting from general issues such as research paradigms to a special research strategy and data collection methods.

5.2 Research Paradigm:

Babbie (2007) argued that the research paradigm is a viewpoint of researchers for looking at the reality. A research paradigm can be considered as a method or framework for people in order to understand a social reality. The literature generally states two research paradigms; positivism and interpretivism (Mason, 2002) and (Collis and Hussey, 2003). Besides Orlikowski and Baroudi (1991) argued an additional category for research paradigms; critical paradigm.

Positivism or positivist paradigm is generally considered as a scientific approach for studies. It is based on the importance of observations and reasons to understand the reality. It assumes that reality is objective and measurable because the researcher cannot affect or change it. This idea makes this approach the basis of quantitative research which is a method of measuring the reality (Hennik *et al.*, 2011). This method necessitates a large amount of data in order to conduct an analysis

and derive a successful conclusion and sometimes outnumbered data cannot allow using this approach. Hennik *et al.* (2011) also argued that this method fails to consider contextual impacts and interactive process of collecting data.

The interpretivism or interpretivist paradigm is based on the idea that interpretation of reality is a subjective process because of the different experiences of individuals, context and time. Cohen *et al.* (2000) stressed that researcher who are preferring interpretivist analysis believe that from a single phenomenon various interpretations may occur for researchers because of the complex reality. Snape and Spencer (2008) stated that researchers, who are using a paradigm view, must pay attention to understand past experience of people by their viewpoint, studying subjective meanings of individuals and organisations that are related to their behaviours within their context.

The final point is critical paradigm that is based on the idea that people are under influence of social, political and cultural environments. In other words, an individual can be consciously influenced by socioeconomically situations which lead a influence of reproducing a social reality. It is stated that according to the critical paradigm reality can be biased so the research can be overlapped with these historically influencing forces (Myers, 1997). Therefore, Myers (1997) claimed that in order to find out the human potential a researcher must eliminate these forces.

In conclusion, this research was based on interpretivism paradigm in order to identify important processes to consider in ERP projects. In fact, the reality can vary and be subjective by experience, perspective and complexity. Also, this approach fitted more with the researcher's understanding of reality and his approach with the data collection because ERP system projects constitute a vendor and also a customer perspective, therefore this approach was more appropriate for data collection.

5.3 Research Approach:

In literature, there are two research approaches; deductive and inductive. It is stated that deductive approach is based on developing theories and verifying these theories with an empirical study by drawing a conclusion. Reversely, Inductive approach starts with an observation then goes through explanation to draw a conclusion (Saunders *et al.*, 2009). This research will be based on deductive approach which will firstly identify theories in literature than verify it with an empirical study.

5.4 Research Strategy:

This chapter stated necessary information about data collection strategies that can be used for empirical studies.

It is stated that there exist three different strategies for data collection which are quantitative, qualitative and mixed method (Kumar, 2001). In fact, this research was based on qualitative research method which is defined as a research approach concerning to assess behaviours, opinions, attitudes subjectively (Kothari *et al.*, 2009). It enables researchers to investigate issues in-depth and research points within their natural settings in order to interpret and determine issues and phenomena with

regard to the perspective of the participants (Denzin & Lincoln, 2008). Shanks (2002) argued that qualitative research method is based on rules which are set to understand how participant explains the meaning of an issue with his or her experience. Supino *et al.* (2012) stated that qualitative data is useful for presenting experience of participant and understanding a point in deep with key reasons.

Besides, it is argued that qualitative research is appropriate to ask “how” questions in order to analyse behaviours and processes like managing business or decision making processes. In fact, the aim of this research was to propose a set of processes for ERP project manager. So basing the research strategy on qualitative data was an appropriate decision. Also, in objectives two and three some risk, benefits and disbenefits and critical success factor have been identified in literature and need to be verified. Rudestam and Newton (2001) argued that the qualitative method is more useful to verify and test issues and things because of its descriptive and reflective nature. It is also argued that a qualitative method is more convenient to research sensitive topics for creating a comfortable atmosphere for disclosure (Hennik *et al.*, 2011). For an ERP implementation project, the data is highly sensitive because different parties have different perspectives and also an ERP implementation touches almost all department of an organisation and contains important information about processes or changes of organisations. Therefore, efficient data collection and considering issues such as confidentiality for data security and sensitivity of data are crucial points for research success and ethics.

On the other hand, in order to reach research objectives, for some points it was necessary to have interpretive data such as critical success factors or reasons of implementing ERP because the definition of success or reasons may vary from person to person. Also, for some points such as risks or benefits the research necessitated a retrospective data with deeply explanation of previous project.

The table (5-1) differentiates qualitative and quantitative methods in several categories and also provide a basis for justifying the selection of qualitative approach.

	Quantitative Research:	Qualitative Research:
Objective:	In order to increase the sample size of the research and collect data from a large population.	In order to determine key points and provide a deep understanding to author.
Study Population:	Large	Small
Purpose:	In order to quantify a problem.	For understanding the process and generate useful information about planning or design.
Type of Data:	Numerical or statistical data	Words data.
Data Collection methods:	Population survey with questionnaire or telephone survey	In- depth interview such as personal, group and focused interviews.
Analysis	Statistical analysis	Data interpretation
Outcome of the work	Determination of patterns	Creating an understanding of behaviour, opinions and attitudes.

Source: Hennink *et al.* (2011).

As partially stated above the aims of this research was to identify the business development elements of ERP system which make it attractive for companies. Objective two consisted of two purposes; the first one was to continue to provide more information about ERP system by identifying its benefits and dis-benefits of these systems. The second aim was to determine important risk factors that may affect the success of ERP project in terms of cost, time and quality. The third objective was determining the critical success factors which a project manager and his or her team must ensure for a successful project outcome. While the fourth objective aimed to propose a change strategy to support implementation and transform the company for an appropriate place to system implementation.

In fact, gathering these data with quantitative analysis was quite difficult to achieve because each point requires a deep focus and explanation about meanings, process and situation. Also some points consisted of strategies for successful implementation which was also necessitating in-depth interviews with experienced professional on these fields. Therefore, the primary data was collected with qualitative research approach by using in-depth interviews.

5.5 Data Collection methods:

Two approaches for collecting appropriate data and information was stated by Kumar (1996) as;

1. Information from secondary sources which are available in many literature source and can only be extracted,
2. Information from primary sources which can be collected with a convenient data collection method.

Kothari *et al.* (2009) also suggested different methods to get different types of data shown in figure (5-2);

Type	Methods	Techniques
1. Library Research	(i) Analysis of historical records	Recording of notes, Content analysis, Tape and Film listening and analysis.
	(ii) Analysis of documents	Statistical compilations and manipulations, reference and abstract guides, contents analysis.
2. Field Research	(i) Non-participant direct observation	Observational behavioural scales, use of score cards, etc.
	(ii) Participant observation	Interactional recording, possible use of tape recorders, photo graphic techniques.
	(iii) Mass observation	Recording mass behaviour, interview using independent observers in public places.
	(iv) Mail questionnaire	Identification of social and economic background of respondents.
	(v) Opinionnaire	Use of attitude scales, projective techniques, use of sociometric scales.
	(vi) Personal interview	Interviewer uses a detailed schedule with open and closed questions.
	(vii) Focused interview	Interviewer focuses attention upon a given experience and its effects.
	(viii) Group interview	Small groups of respondents are interviewed simultaneously.
	(ix) Telephone survey	Used as a survey technique for information and for discerning opinion; may also be used as a follow up of questionnaire.
	(x) Case study and life history	Cross sectional collection of data for intensive analysis, longitudinal collection of data of intensive character.
3. Laboratory Research	Small group study of random behaviour, play and role analysis	Use of audio-visual recording devices, use of observers, etc.

In fact, this research used almost similar approaches as point ii in library research or literature review and point vi on field research or primary data collection.

5.5.1 Secondary Data:

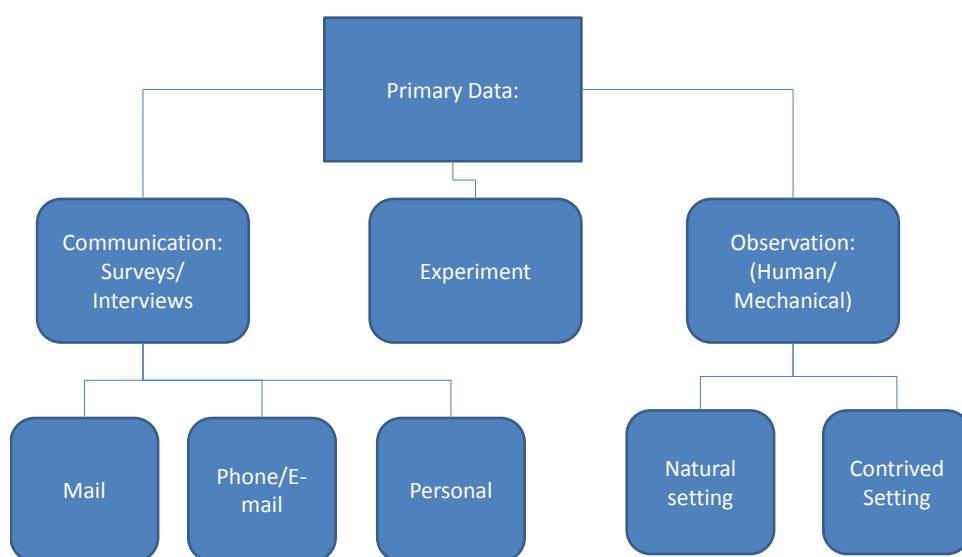
Firstly a literature review has been conducted to analyse past researches for understanding the background information and knowledge of ERP implementation projects in terms of reasons of implementation, risks, limitations or benefits of systems, critical factors to consider and change management approach of authors. In order to collect this secondary data, many different kinds of resources used in literature have been such as books, published papers, journals, company documents from their website and magazines. Some studies on similar topic were also considered to define the scope of the work and develop theoretical background. But in fact, the lack of direct information or primary data was noted and it was decided to collect primary data from direct sources.

5.5.2 Primary Data:

As partially stated above, primary data is the original data which are collected by users from different field of investigations by using different types of methods, in order to answer a question with specific objectives in mind (Sahu, 2013). According to Ghauri and Gronhug (2002), there exist many types of primary data such as opinion and attitude, intentions, state and status of affairs and knowledge and awareness.

Kothari *et al.* (2009) stated that researchers need this kind of data when the secondary data sources are inadequate or unable to answer the research problem. Although, there were many articles about ERP implementation projects, most of them were based on single ERP program which is SAP, and some of them also were not verified with an empirical study. For this research primary data were collected from 3 different ERP systems customers or project managers. This research created also an important opportunity to check some common claims about ERP systems in literature which were not based on empirical data.

According to Ghauri and Gronhug (2002) there are three main ways to collect primary data stated on figure (5-3);



Advantages:

According to Kothari *et al.* (2009) primary data is the most relevant data type for a particular study because it generally provides highly consistent information about the research topic. Also, Ghauri and Gronhug (2002) argued that collected data is appropriate to reflect intentions and human attitudes by also providing reasons behind management decisions.

In fact, this research was designed to recommend important points to manage ERP projects successfully in terms of identifying implementation reasons, managing change and decision making and planning for project. These advantages of primary data highly fit with these points because deciding to implement an ERP, change management process or managing critical success factors necessitates many management decisions, human behaviour and approaches. Another important point is the actuality of data, it is claimed that primary data consist of up-to date information from experienced people who are participating several business areas and have knowledge and observation about the business processes (Ghauri and Gronhug, 2002).

Disadvantages:

Ghauri and Gronhug (2002) claimed that data collection for primary data is generally a time consuming process. In fact, it is also difficult to find people who are willing to answer research questions or share available data because of confidentiality or lack of time (Kothari *et al.*, 2009). Ghauri and Gronhug (2002) argued that in primary data collection process, the researcher cannot control responders so the willingness of responders generally determine the quality and scope of the data and in some cases the quality of data may be low.

1.6 Interviews:

(Sahu, 2013) stated that interviewing constitutes one of the most effective methods of collecting data for a qualitative research. As also mentioned above for interviews many different methods can be used such as face to face or personal, group, telephone or focused interviews (Kothari *et al.*, 2009). In terms of structure, Yin (2011) argued that interviewing technique consists of two different types of interviews; structured and qualitative interviews. Structured interview is defined as formal, scripted and one way communication interviewing method in which interviewers elicit the response from responders. In contrast, qualitative interview is defined as informal, two ways communication and not scripted interview type in which the interviewers and responder have an interactive conversation.

In fact, Kothari *et al.* (2009) claimed some advantages of this type of interview as;

1. Significant amount of information and in greater depth can be collected.
2. Interviewer gets the opportunity to overcome resistance by his or her own skill, if any. In fact, the interview method may be formed to yield a quite perfect sample of the general population.
3. The researcher has the opportunity to restructure questions which brings flexibility under this method. This point is important especially in case of unstructured interviews.
4. Observation method is also applicable as well as recording verbal answers to various questions.
5. Personal information about responders may also be collected easily under this method.

6. Easier to control Samples effectively as there is not any difficulty of the missing returns and non-response amounts are generally low.
7. The interviewer can usually control which question will be answered by which person(s). In fact, this is not possible in questionnaire approach. Also if it is required, group discussions may also be held.
8. The interviewer may secure the most spontaneous reactions by catching the responder's off-guard moment which is not possible if mailed questionnaire is used.
9. The language of the interview can be determined according to the ability or educational background of the interviewee and misinterpretations concerning questions or points can be avoided.
10. The interviewer can also collect significant supplementary information about the interviewee's personal characteristics and environment that is often of great value in interpreting results.

In terms of disadvantages;

1. It may be very expensive method for researcher, especially when selected sample consist of people from large and widely spread geographical regions.
2. There is a risk of the bias of interviewer as well as that of the respondent which is the main problem of supervision and control of interviewers.
3. For some research topics certain types of respondents are required such as important officials or executives or people in high income groups but these people may not be easily approachable which may cause a poor extent or low quality data.
4. This method may be significantly time-consuming, especially if the sample size is large and recalls upon the respondents are obligatory.
5. Sometimes the presence of an interviewer on the spot can over-motivate the interviewee and even may cause imaginary information just to make an interesting interview.
6. Interviewing at times can cause systematic errors.
7. Proper rapport with respondents is prerequisite for effective interview in order to provide free and frank answers but in fact it is a difficult requirement to achieve.

Therefore interviews method may provide many advantages but also some disadvantages to researchers for their primary data collection. For this research personal or semi-structured face-to-face interviews were used to collect the primary data in a qualitative interview form. Supino *et al.* (2012) argued that qualitative interviews allow responders to query the interview content and questions which is an advantage for deriving intended responses and information. Asking open-ended questions which are not restricted to predefined words provide interviewee to use his or her own sentences to explain the answer.

For interviewing process, firstly a set of open-ended and close-ended question were prepared as an interview guide to ask responders. Questions on the interview guide were generally prepared with similar words for all interviewees. The interviewing sessions were directed by non-restricted queries in order to increase the interviewee contribution until the conversations deviated to irrelevant points. Questions in the semi-structured interview guide were prepared according to the concepts that were identified in literature review section. Semi-structured interviews allowed controlling the

direction of interview process with its flexible nature. Questions which were prepared to answer objective one and four were open-ended questions that were asked for providing necessary information from author in terms of its behaviours, decisions or important point or processes. For objective two and three, question were both open-ended and close-ended if the responders do not mention on an important point in literature. In fact for objective two and three many points were identified and it was urgent to review these points for successfully answering these objectives. Lancaster (2005) argued that in semi-structured interviews, it is beneficial to steer questions into specific areas which could provide further information. In fact, due to the flexibility of interview method during sessions, some unplanned questions were asked to responders according to the information given by the responder to go further on some points for deeper explanation and knowledge.

Three interviews were conducted in a quite and peaceful environment in order to eliminate disruption of other people and also record them clearly by permission of interviewee to ensure the credibility of data. Besides, some interviews were conducted on Skype by using webcams for saving cost and time. For some responders desired to read literature review part of the research to get ready for interviews. For other responders some particular points were explained and asked to direct the process and enrich the discussion. All interviews were made on Turkish and translated to English by researcher. Also its transcriptions can be found in Appendix section to facilitate the analysis and validate findings.

5.7 Data Analysis:

After conducting interviews, recordings were analysed according to six points which are;

1. Reasons of implementing and ERP system into organisations.
2. Potential benefits of ERP
3. Potential disadvantages of ERP
4. Risk factors in ERP projects
5. Critical success factors to consider
6. Change strategy

In order to analyse data according to these points' two analysis methods were used; content and qualitative comparative analysis.

5.7.1 Content Analysis:

Content analysis is claimed as a method of analysing the contents of documentary sources like magazines, books and newspapers as well as all verbal materials in terms of verbal or spoken or printed (Kothari, 2004). Another statement about content analysis is a method of data interpretation by implying different phases of text data (Hsieh and Shannon, 2005). In reality, Kumar (2011) suggested that identifying core themes, concepts and ideas which explain the real content of data. (Sahu, 2013) argued that this method can be used by researchers to categorise and present information stated in data appropriately. In fact, analysing the actual content of primary data interviews was an important process for presenting the data and making a discussion with it.

Important concepts, themes and ideas from responders were identified and analysed to determine answers for research objectives.

5.7.2 Qualitative and Comparative Analysis:

It is stated that comparative analysis constitutes one of the major processes for qualitative researches (Boeije, 2002). It is also argued that this analysis method allows researcher to identify similarities and collisions in order to determine (Boeije, 2002). This type of analysis is claimed to have two main purposes;

1. To become capable to generalise an specific case or situation
2. To gain a strong perception about sole elements (Ragin, 2009).

This method was used to identify collisions and similarities to make a discussion about research objectives to answer them. In fact, this approach provided an effective way to connect ideas from different sources from primary or secondary data and compare main characteristics stated about ERP projects and their management for bringing a final conclusion to research question.

5.8 Reliability and Validity:

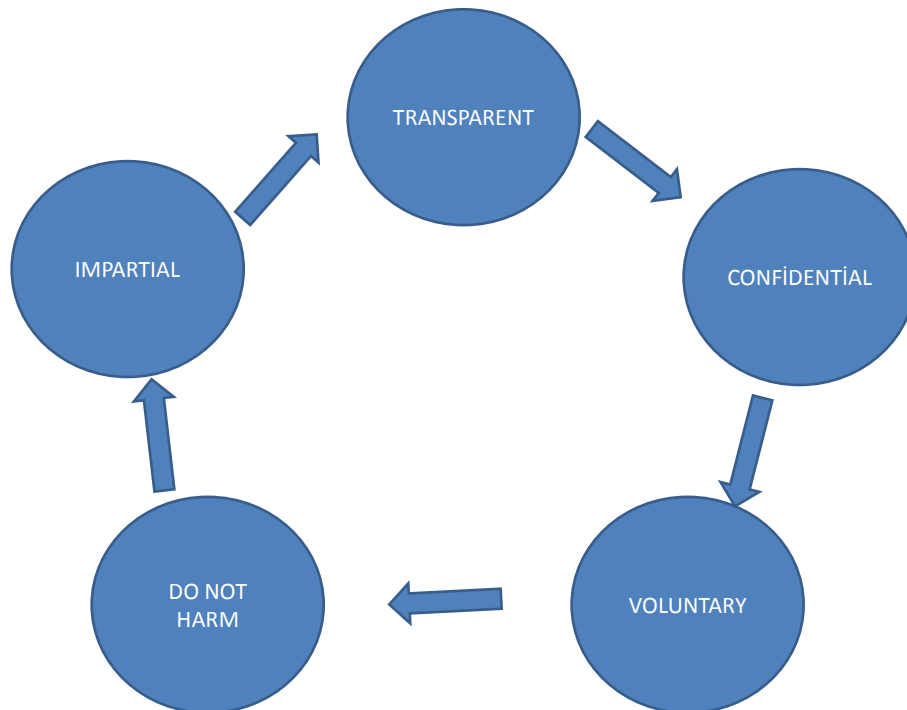
Lancaster (2005) stated that reliability and validity are two important points for quality of collected data in terms of consistency and accuracy. In order to achieve valid information, relevant materials and publications to the research topic were used in literature review. All interviewees were professional business people who involved in ERP project implementation directly or indirectly and had a significant experience for ERP systems and projects in terms of consultant or customer perspectives.

For Reliability, both customers and consultants were interviewed to increase the level of reliability of data. Also, a significant number of literature resources were analysed and combined with primary data to increase consistency level. Besides, recordings were tested in terms of quality and as stated above, all interviews were conducted in quite and peaceful places to achieve a high concentration.

5.9 Ethical Consideration:

The Biomedical and Research Ethics committee (BSREC) process was followed which is required by university of Warwick and the signed approval can be found in Appendix Section. Ethical considerations necessitate that the study should be voluntary, confidential and cause no harm to any sides. All ethical issues and considerations were respected by researcher during the primary data

collection process. All issues and considerations were discussed with participants and all points were clarified before conducting interviews. Figure (5-4) summarizes those points;



First of all, the research topic and purposes were explained to all responders and an agreement reached with them about voluntarily participating to study. Once the literature review was finished some of responders wanted to read the secondary data to better understand the research aims. Then, issues about confidentiality were discussed and if requested, personal details and company names were not mentioned to avoid identification. Finally all participants were business professionals and do not have any personal or family connection with researcher that could cause a bias.

Chapter 6: Findings and Discussions:

This chapter will firstly summarise necessary information about the primary data which were collected from different professionals by interviews. Then, a discussion will be done to compare primary data and secondary data to analyse important points of the research objectives which are stated above and draw a conclusion for research question. Research objectives are;

1. To map the business development elements which typically drive companies to implement ERP systems.
2. To identify benefits / dis-benefits and risks of developing and operating ERP systems.
3. To propose critical success factors of developing and implementing an ERP system.
4. To propose an organizational change strategy to support ERP system operation.

6.1 Overview of Results:

In order to identify similarities and differences of different primary data sources, a content analysis firstly were used to determine similar statements of each interviewee and then comparative analysis were used to state similar and different points in primary data and also between primary and secondary data which will provide an answer to the research objectives.

6.1.1 Elements which Drive Companies to ERP Systems:

In literature we have identified many points that drive companies to implement ERP systems. From interviews the first common point stated is the need of all-in one system. All interviewees argued that one of the most attractive points of ERP systems is the ability of providing many different functions in one system such as HR, finance, CRM, procurement, production and project management. First interviewer argued that the main reason behind ERP success is the all-in one system which facilitates managerial control and monitoring for organisations. Second interviewee also argued that all in one system also cause less cost and problems than combining many different systems to meet business needs. Therefore the first important point for ERP driving forces is the ability to provide many functions together.

Another point is data integration, security and ability to create and share data with internal employees and external partners. In fact all participants mentioned this point, second interviewee argued that storing their data in excels or PDF files can cause data loss or can be time-consuming to find necessary information. This manager argued that implementing ERP also secures available data and facilitates data sharing and creation with internal and external partners. Third interviewee claimed that some web-based systems allow all these functions outside of office with tablets and cell phones.

Responders also stated that companies are implementing ERP for improving, automating and integrating business processes of the organisation. First interviewee stressed that ERP implementation gives an opportunity of Business process reengineering for companies to improve their problematical or redundant processes in order to create a better integrated system with developed workflow and improve departmental integration. Third interviewee argued that this point provides companies to better manage their resources. This manager also argued that this process automation and integration minimise errors and improves monitoring and controlling of business functions for managers. First and Second participant said that implementing ERP provides also supply chain integration and maximises the performance of SC partners. Third manager stated that with B2B and B2C portals organisations can improve their linkage with customers and suppliers in the supply chain.

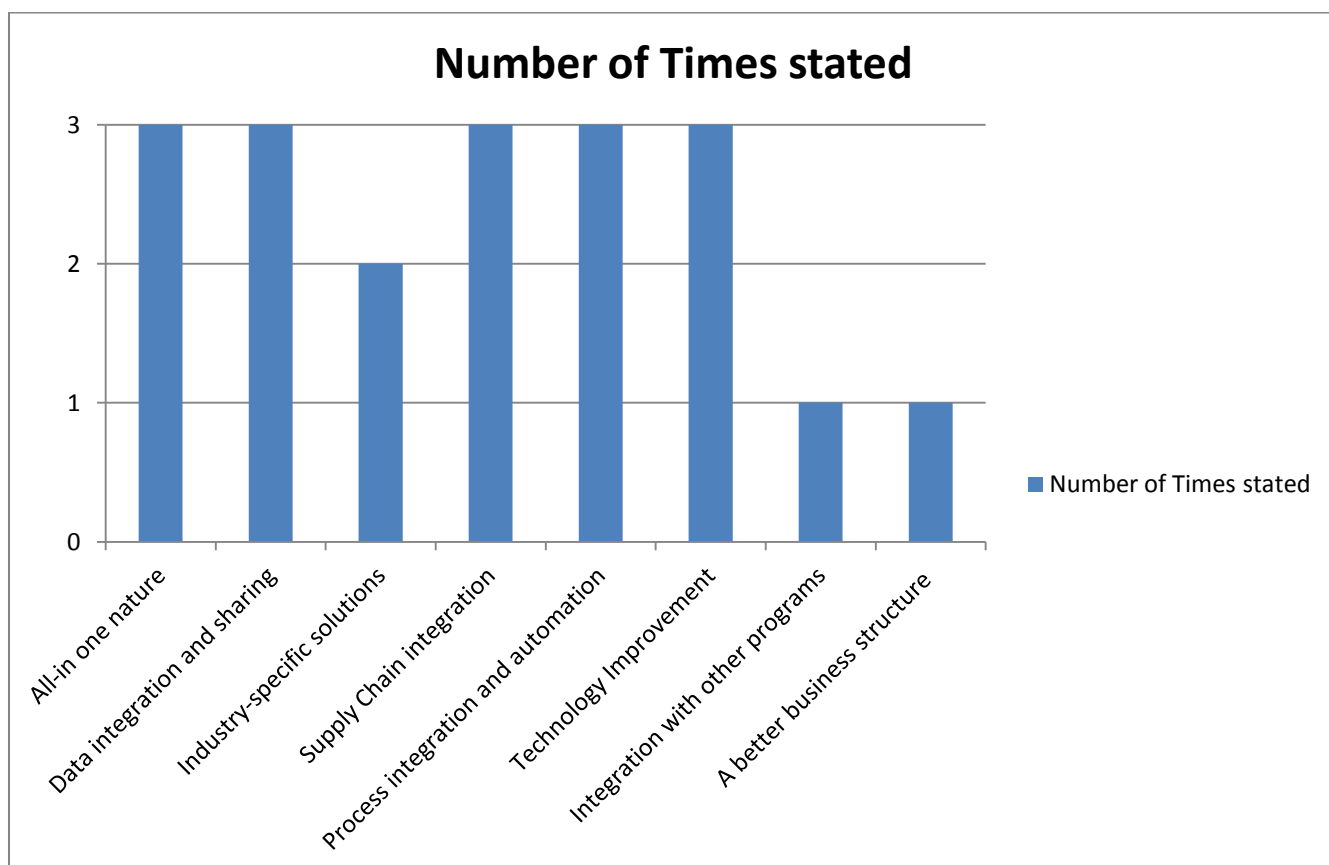
First and third participants also claimed that ERP implementation also provides a technology improvement and innovation for organisations in terms of business practices and its ability to integration with other professional tools. In fact, first interviewee claimed that although it provides many technological and innovative practices for organisations, some ERP tools sometimes cannot

meet all requirements of customers especially for vertical operations. This manager stated that the opportunity of integration with other professional tools which reinforce the system abilities and benefits is another factor for ERP implementations from customer perspective. It is argued that organisations see this point as an opportunity to obtain those programs and services with ERP implementations.

On the other hand first and third interviewees argued that ERP vendors provide industry-specific solutions for several industries such as oil, furniture, pharmaceutical and health. In fact, these solutions are claimed to focus on specific industries and bring significant improvement and benefits for organisations.

Finally, first interviewee claimed that today organisations are intending to implement ERP systems to create more flexible, reportable, scalable and improvable structures to maintain their market power and get competitive advantage against their rivals.

Figure (6-1) will summarise findings of this chapter and compare them with literature findings to provide a basis for discussion.



This table shows that how many factors stated in primary data and by how many participants.

6.1.2 Benefits of ERP Systems:

For ERP benefits many participants stated common points but their statements differentiate about some specific points especially on strategic benefits of ERP systems. In fact, all participants argued that in order to get benefits of ERP systems organisations need to spend time and make a significant effort. Third interviewee argued that organisations must deal with change of IT and business structures and also execute a BPR and investment for company infrastructure for implementing these systems successfully. This manager also argued that ERP success contains two dimensions; people and technology. Therefore, third interviewee claimed that even the most developed system requires an effective users and managers to realise potential benefits of software. All interviewees also added that ERP is a tool for organisations and organisations cannot get all benefits of these systems by just implementing them. First participant argued that ERP performance in two same sized companies would be different because of differences in business strategies or organisational or individual knowledge especially for strategic benefits of the system. Second interviewee stressed the importance of leadership styles or HR policies for some organisational benefits such as performance improvement of employees. This manager also stated that ERP is not the only solution for most of the strategic benefits such as Support Business Growth, Support Business Alliance or Generate Product Differentiation, and also argued that organisations can get these benefits without ERP or even without any software. This participant adduced that for product differentiation organisations need necessary infrastructure in terms of good designer or R&D people to generate successful product differentiation. In fact, responders were asked firstly their opinions about the benefits of ERP systems and then they were asked also points that mentioned in literature review.

Table (6-1) below summarises benefits suggested by literature and also comments of participant which is stated as **agreed (A)**, **disagreed(D)** or **partially agreed(PA)**;

Benefits:	Benefits Claimed in Literature review		
	Participant 1	Participant 2	Participant 3
Cost Reduction	A	A	A
Cycle Time Reduction	A	A	A
Productivity improvement	A	A	A
Quality improvement	A	A	A
Customer Services Improvement	A	A	A
Better Resource Management	A	A	A
Improved Decision Making and Planning	P.A	P.A	A
Better Performance control	A	A	A
Business Growth	D	P.A.	A
Support Business Alliance	D	P.A.	A
Build Innovations	D	P.A.	A

Build Cost Leadership	D	P.A.	A
Generate Product Differentiation	D	P.A.	A
Build External Linkages	A	A	A
Build Business flexibility for current and future	D	D	A
IT Cost Reduction	D	D	D
Increased IT infrastructure capability	D	D	D
Support Organisational Changes	D	D	D
Facilitate Business Learning	D	A	A
Empowerment	A	A	A
Built Common Visions	D	D	D
Better accounting	P.A.	A	A
Inventory Reduction	A	A	A

They also stated some other benefits that are not mentioned in literature review. First participant stressed that easy accessing to correct data and getting supporting information also helps companies for making rapid decision. Other benefits argued by this interviewee are technology improvement with system tools and other integrated tools or programs which is also mentioned by third participant. Improved reporting abilities also stated by first and third responder. Also first interviewee added that ERP systems are not really helpful for more comprehensive reports such as analytical but this point is not mentioned by third responder. All of them also stated data security as another benefit of ERP systems. They argued that with empowerment functions ERP allows only approved employees to certain data and improves data security. Second and Third responders also argued that ERP systems provide a better organisational visibility that improve the understanding of business among employees and decreases the adaptation time. First and second employees also claimed that ERP systems also provide supply chain management tools and improve the performance of supply chain for organisations. Finally, the last benefit mentioned by interviewees is the better monitoring and controlling the business workflow which is stated by first and third interviewee. Third manager argued that automatic and coherent workflow saves time and prevent errors for business operations.

Table (6-2) below also summarise benefits mentioned in the primary data;

Claimed benefits	Interviewee 1	Interviewee 2	Interviewee 3
Reporting	P.A	A	A
Technology improvement	A	A	A
Data Security	A	A	A
Visibility		A	A
Coherent workflow	A		A
Profitability increase		A	A

Supply Chain Improvement	A	A	A
Better Asset management		A	A
Cash management	P.A	A	A

In conclusion, Participants argued that with successful BPR and necessary investments and changes, an ERP can provide many benefits to organisations. They also stressed that ERP is a tool for organisations and without high skilled users and necessary infrastructure these benefits cannot be achieved. In fact, interviews could not provide a picture of how these benefits achieved because there are many benefits for ERP systems and they are generally industry-specific and depends on many other factors such as company knowledge, infrastructure, market power, size and duration of system use.

6.1.3 Dis-benefits of ERP Systems:

Participants generally stated similar points in literature when they were asked about dis-benefits of ERP systems. Also, points that were not mentioned by them in the first question were asked as a second question to get also their opinions about these systems. In fact, there were only one participant who were an ERP customer therefore with a larger sample more dis-benefits could be achieved. Table (6-3) shows the findings of primary data and compares them with literature review.

Dis-Benefits:	Interviewee 1	Interviewee 2	Interviewee 3
High Implementation Cost	A	A	A
Prone to Delay	D	P.A	D
High maintenance cost	A	A	D
Long ROI period	P.A	A	P.A
Cannot meet customer expectations	D	D	D
Limited Customisation for Users	D	A	P.A
Difficult to Learn and Understand the Logic	D	P.A	D
Disrupt Culture or processes with high change	D	A	A
Cause Dissatisfaction or Resistance.	D	D	D
Vendor Dependence	A	A	A

In addition to those points, first and second interviewees claimed that the necessity of enough expertise in organisation also provides a difficulty to retain these people into organisation and also bring an additional cost for companies. Besides, Second participant argued that ERP investment also requires additional investment for infrastructures of companies in terms of new databases, WAN upgrades or computer facilities. Therefore there is also an indirect cost for companies. Although third participant did not mention this point directly in the question, this manager stated that companies have to invest necessary money for developing IT infrastructure of the company. One can argue that this statement also have a similar meaning with second interviewee's statement. Third interviewee also stressed another limitation that ERP systems never end and software should be maintained and upgraded for future need of organisation.

As it can be seen on the table all participants agreed on two points which are high implementation cost and vendor dependence. For vendor dependence, second participant claimed that there should be an effective contract management to protect both sides in long run.

They all disagree about the failing to meet high expectations of customers. In fact, they argued that this is not a limitation of ERP system but a consequence of failure of managing the user expectations and explaining the software's abilities. They also stated that if senior managers communicate with their key users and set realistic goals for system which are focusing on company's needs rather than employees or key-user's needs.

They also disagreed for being prone to delay. In fact, the second responder partially accepted that most of the ERP project end late because of several reasons but in fact they claimed that good vision, planning and project management can solve this problem.

Besides, for high maintenance cost first and second participants directly stated this point and stressed that maintenance cost is a significant dis-benefit of ERP system that organisations must pay in long-run. In fact, third interviewee disagreed with this point and argued that his company supports customers without charging them for upgrades or maintenance.

Another result was limited customisation for users; in fact first interviewee argued that this point rises because of human-based reasons such as having tendency to assimilate new system to old one. Besides, third interviewee argued that their systems can be modified but generally costs more and also increases the maintenance cost for long run. But, second interviewee claimed that this point is a limitation for system because in some cases these systems should be modified for some purposes but claimed the system about not responding these needs. This responder also claimed in some cases, very simple and basic modifications can cause problems in upgrades and this really demotivates customers against system. Also, all managers suggested that modifications should be minimised and only urgent modifications should be done.

For Long ROI, all participants accepted that this is a bad outcome of ERP implementation. But first interviewee argued that this depends generally on company size and value of the business. This manager partially agreed with this point and argued that may invest 200 million dollars and maybe happy after a ten years return period. Third interviewee also stated that this depends on the customer's expectations for return and also the quality of implementation.

For difficulty to learn and understand logic, Second interviewees argued that some system's design and interfaces are quite difficult to understand or learn at the beginning, and exemplified that each page of SAP has a code and it can cause a difficulty to learn for users. Besides, first and third participants disagree with this point. Third manager argued that the system that they implement, has an easy design in terms of system logic and interfaces and added that they did not have any customer complaints about this point. Also, first manager claimed that some ERP systems may have difficult pages or interfaces to understand and adapt but he stated that this is directly related to the key user involvement in the process and the quality of training for key-users and employees. This manager stated that if the company succeed to provide these points effectively, this will not be a problem for companies.

For disrupting company culture and processes as a result of high change, all participants accepted that ERP systems provide a significant change for companies and almost touches every corner of the organisation. Also they stressed that in order to solve this problem an effective change strategy and management must be created. In fact, first participant considered this point as a reality of ERP implementation and argued that this is also a consequence of bad management of change and can be solved with successful BPR and change management. Besides, second and third considered this point as a disadvantage of ERP system. Second participant argued that these changes cannot be tolerated by some customers and cause performance problems especially in short run. Also customer firms afraid to execute a major change into their organisation and interviewee mentioned that this is a bigger problem for them.

Finally all interviewees considered the point of dissatisfaction and user resistance of employees as a potential consequence of previous factor and also a bad change management execution. They all mentioned that if the organisation executes a well change strategy with also user involvement into the implementation process they will not face a major dissatisfaction or resistance.

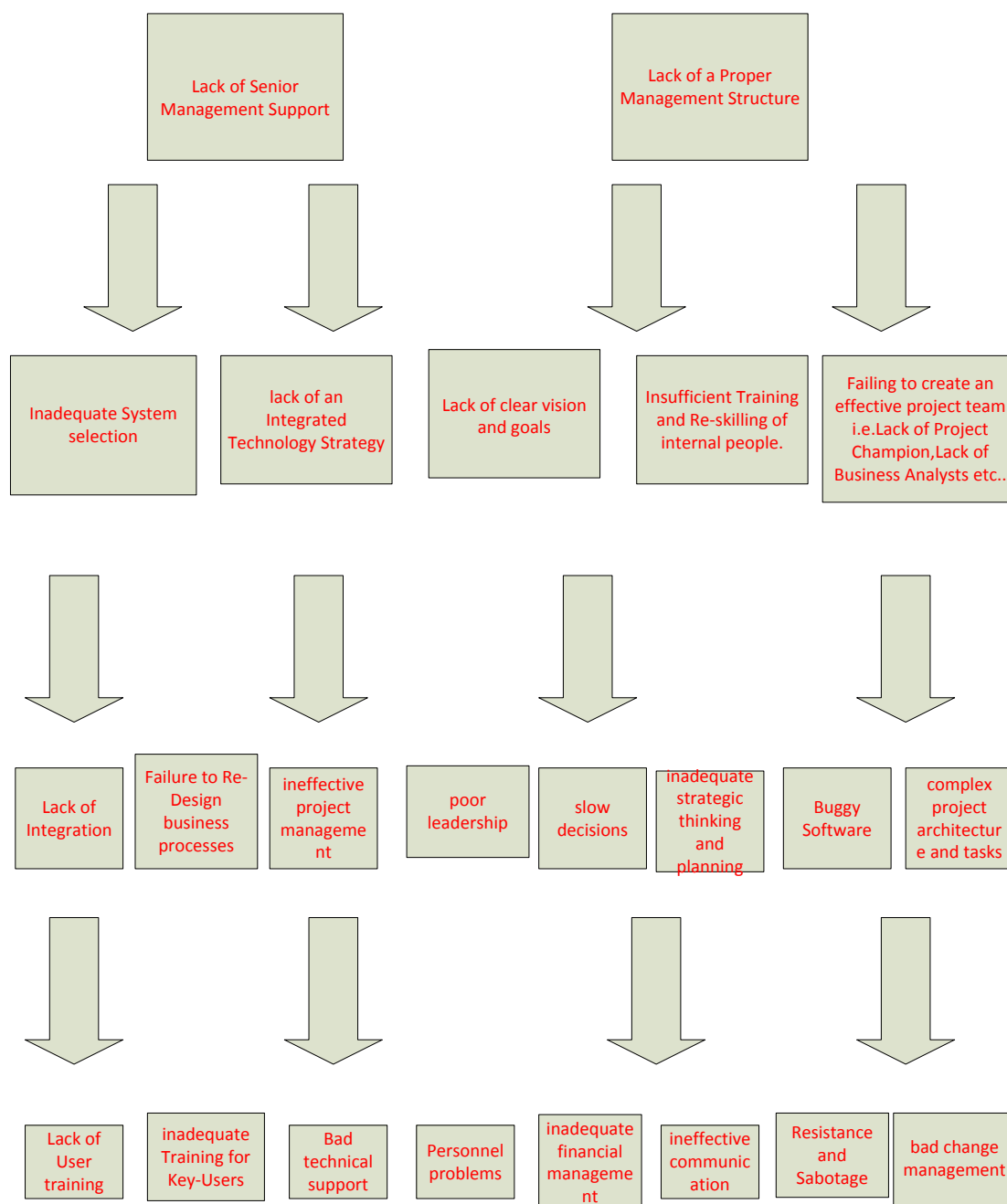
In conclusion, interviewees generally mentioned different ideas about the points stated in literature and also added some more claims for potential disadvantages.

6.1.4 Risk factors during Implementation:

For identifying risk factors in ERP project, risk factors which are found in literature review were shown to first interviewee to in order to remind all points if it is forgotten or not. But the for other project managers who participated more than 10 ERP implementation project, they directly stated their opinions about risk factors.

First interviewee stated that in ERP literature risk factors generally pooled without showing their relations. This manager suggested that categorisation of risk factors would provide a better approach for ERP implementers. Four categorises were claimed by first participant which are mentioned on the figure (6-2) from first and most important category which is on the top to the lowest one. First category is about readiness and contribution of top management for project. Then secondary factor category is related to establishing a clear vision and strategy for implementation and delegate right people to right tasks and positions and also giving them necessary training and re-skilling if it is

necessary for project success. Third categories are related to consequences of bad project team or lack of direction of project because of bad strategy or not having necessary skills. Fourth category factors are mainly related to the bad planning, project management and personal inefficiencies.



This manager also added another factor which is lack of documentation. It is stated by first interviewee that all decisions, defined goal and actions about previous stages should be documented properly during the project lifecycle and also have a back-up system. This participant claimed that with high top management support, effective management structure and effective project team many risk factors in third and fourth factor can be eliminated or mitigated. First interviewee also argued that all risk factors stated on the figure may damage project significantly and cause a failure.

When it comes to other participants, second and third participants also stated generally similar risk factors but also added some more factors in primary data. In addition, third interviewee stated another approach for risk categorisation which consists of 5 sub-categorises; operational, managerial, software, personal, project management. In details sub factors are;

Operational factors: Changes in project scope, Lack of Integration of all departments, lack of enough resources, Cack of some knowledge of employees and Insufficient Training and Re-skilling.

Managerial Factors: Lack of senior management support and belief to project, Lack of vision, Wrong scope definition, Lack of an Integrated Technology Strategy, Failure to Re-Design business processes to fit the software and Lack of a Proper Management Structure.

Software factors: High modification, Failure in conceptual design due to wrong project goals, Inadequate System Selection and Buggy Software.

Personal Factors: Lack of motivation, Ineffective Communication, Personal problems and conflicts, Resistance and Sabotage, Failure to Get User Support and Lack of familiarity to technology.

Project management factors: Failing to Create an Effective Project Team , Failing to delegate a competent project leader, Having wrong project methodology, Lack of enough time and support to project team, Inadequate Strategic Thinking and Planning, Lack of enough testing, Bad change coordination and management.

Table (6-4) below, will state compare also the literature claims and factors gathered from primary data sources; “+” means that participant agreed or stated this factor, “-“ means that participant were asked about this point and did not agree with it.

Risk Factors:	Interviewee 1	Interviewee 2	Interviewee 3
Failure to Re-Design business processes	+	+	+
Lack of senior management support	+	+	+
Insufficient Training and Re-skilling	+	+	+
Ineffective Consulting Services	-	+	+
Lack of User training or Inadequate Training for Key-Users	+	+	+
Ineffective Project Management	+	+	+
Lack of Integration	+	+	+
Lack of a Proper Management Structure	+	+	+
Poor Leadership	+	+	+
Lack of Project Champion	+	+	
Ineffective	+	+	+

Communication			
Inadequate System Selection	+	+	+
Lack of Business Analysts	+	+	
Existing Legacy System	-		
Lack of an Integrated Technology Strategy	+	+	+
Bad Change Management	+	+	+
Failure to Get User Support	+	+	+
Failing to Create an Effective Project Team	+	+	+
Inadequate Financial Management	+		
Lack of System Supplier Stability and Performances	+		
Inadequate Strategic Thinking and Planning	+		+
Slow Decisions	+	+	
Bad Technical Support	+		
Buggy Software	+		+
Complex Project Architecture and Tasks	+		
Resistance and Sabotage	+	+	+
Personnel Problems	+	+	+

In addition, as stated above, interviewees also stated some other important risk factors for ERP project. Table (6-5) will also show these points;

Risk Factors:	Interviewee 1	Interviewee 2	Interviewee 3
Lack of Documentation	+		+
Inadequate resources of customer		+	+
Lack of vision	+	+	+
Lack of Testing			+
Bad Risk management		+	
Wrong project scope definition		+	+
Inadequate time frame for project			+
High modification			+
Wrong conceptual	+		+

design			
Lack of motivation			+
Unfamiliar employee to technology			+
Lack of necessary knowledge and skills in customer firm.			+

In conclusion most of the claims in literature were also stated by participants. Factors such as Failure to Re-Design business processes, Lack of senior management support, Insufficient Training and Re-skilling, Ineffective Project Management, Lack of Integration, Lack of a Proper Management Structure, Poor Leadership, Ineffective Communication, Inadequate System Selection, Failure to Get User Support, Failing to Create an Effective Project Team are accepted by all participants.

Factors such as Lack of User training or Inadequate Training for Key-Users, Lack of Project Champion, Lack of Business Analysts, Lack of an Integrated Technology Strategy, Lack of Business Analysts, Inadequate Strategic Thinking and Planning, Slow Decisions, Buggy Software and Resistance and Sabotage, Inadequate resources of customer, Lack of vision, Wrong project scope definition were stated by two participants. Besides, Existing Legacy System was not mentioned or accepted by any participant during interviews.

In conclusion 12 new important risk factors were identified for ERP projects by interviewees. Finally two different risk categorisation approach were suggested in primary data rather than pooling all factors together.

6.1.5 Critical Success Factors:

Participants also stated many critical success factors for ERP projects. First and third interviewees suggested some factors as primary factor and some others as secondary factors. Table (6-6) represents success factors which are stated in literature review and also state participants' opinions. “++” are stated as primary factors, “+” are stated as secondary factors.

Critical success factors:	Interviewee 1	Interviewee 2	Interviewee 3
Top management Support	++	++	++
Clear Vision and Business Plan	++	++	++
System Selection	+	+	+
Minimum customisation	+	++	+
Good Project Management methodology	++	++	++

Successful Business process Reengineering	++	++	++
Retain the experienced Employee	+		
Monitoring and evaluation performance	+		+
User involvement	+	++	+
Problems anticipation and troubleshooting		+	+
Effective Training	+	+	++
Effective communication	++	++	++
Good Project team composition	++	++	++
Having a Project Champion	+	++	+
Effective Change management	++	++	++
Consultant and Vendor Support	++	++	++
Time Frame	+	+	

In addition responder stated some other important success factors for ERP success. Table (6-7) also summarises these points;

Critical success factors:	Interviewee 1	Interviewee 2	Interviewee 3
Customer Resources	++	++	++
Effective project leader	++	++	++
Documentation	++		++
System Testing		++	++
Enough Time for Data migration			++
Contract management		++	

All participants stressed that Top management Support, Clear Vision and Business Plan, Good Project Management methodology, Successful Business process Reengineering, Good Project team composition, Change management, Consultant and Vendor Support and Effective communication are critical success factors for successful ERP implementation. In fact, they stated similar reasons and points with literature for these factors.

At least two participants also mentioned having a Project Champion, Time Frame, Monitoring and evaluation performance, Documentation and System Testing as important success factors for ERP projects.

On the other hand, they stated six more point such as Customer Resources and Effective project leader which are not stated in literature review and are mentioned in primary data.

For Customer resources; all participants mentioned that companies must allocate enough time, budget and people for project. Second participant argued that the project plan must be appropriate to company's available resources. Third interviewee also stated that organisations must also continue their normal business but without enough customer support these systems cannot be implemented.

Effective project leader; All interviewees argued that effective project leader is another important factor for ERP project success. First interviewee argued that even the most competent team can have significant problems without a leader.

Documentation; First and third interviewees argued that all decisions, changes, actions and necessary information must be documented during the project lifecycle for project and long term success.

System testing; second and third participant stressed that before "going live" system should be tested appropriately. Third interviewee also suggested that allocating enough time for this period is also important for effectiveness of process.

Data Migration; Third interviewee also mentioned that data migration process takes remarkable time and sometime cause problems or delay for project. Planning this process and allocating enough time for data migration is also important for eliminating delays.

Finally contract management; second interviewee argued that for successful cooperation between customer and vendor firms, a good contract management is crucial. This management also claimed that this factor is also important for long term relationship between these firms.

6.1.6 Change Management Strategy:

Participants also answered question about an effective change management strategy for ERP implementation. In fact, findings showed a consistency in general with literature findings. But some other important points are also stated during the interviewing processes.

For change strategy all views of participants will be stated incrementally to create a strategy and bring and order to critical points.

First of all two main principles were stated by participant three as change must not be imposed to people and managing change is a responsibility of management not employees. This manager claimed that managers should ensure user involvement and get acceptance from employees for changes. In fact, almost all participants stated this point in the interview processes. Another tactical

suggestion for change management is stated by second and third participants as creating a sense of urgency for change in order to motivate and move internal staff for change.

Then all interviewees argued that a vision should be established by senior management. They also argued that without clear vision, ERP implementation and also change management are likely to fail. Third participant suggested that senior management must declare the company vision to show its support and ensure that everybody understand it clearly. Then planning stage starts, the need of an as-is analysis was stated by all interviewees. They stated that it must be followed by and to-be analysis to determine the organisation's needs according to the vision.

All participants continued with a Gap analysis after this point in order to clarify the gap between these two points and also determine the route map. Second interviewee stated that before starting to actual change implementation, it is useful for companies to reengineer their processes. This manager claimed that doing BPR during the change implementation can be time consuming and problematical. In fact, this point was not mentioned by any other participant.

Moreover, simultaneously or after BPR, it is advised by interviewees to start change planning. Third interviewee argued that ERP implementations require realistic and effective change planning and activities. All responders argued the need of an effective change team in order to plan and manage this change process during the implementation. First interviewee argued that this team must contain system analysts as well as business analysts to establish an effective conceptual design. Second interviewee also argued that it is better to create an independent change team under the project team if it is possible. Third interviewee stressed that this change team must have right people that have necessary skills and knowledge. This manager is also argued that members of the team must be convinced and determined about the change in order to guide them and be a model.

Besides, first responder stated that during this processes managers and consultant must focus on organisational functionality and employees impacts. All interviewees suggested that user involvement and allowing people to express their opinions play a vital role for this process. Second interviewee also claimed that getting feedback from company staff is invaluable for change process.

On the other hand, responders are agreed on the importance of communication. Third interviewee emphasised that a strong communication must exist between management and employees. This manager also stated that employee needs and expectations must be considered during change process in order to create an acceptance of system. Second participant argued that employees must be informed about the current position of the company in the change plan and what will be the next step.

Besides, it is stressed by first participant that organisations must take radical decisions such as closing a department or some redundancies. Second interviewee suggested that management must show their fairness and respect, consider all legal rights of employees and be thankful for their help to not demotivate other staff.

Third responder suggested that incremental change management is more appropriate for ERP implementations. This manager argued that step-by step approach with short term goals by evaluating the change plans and activities after finishing each change phase to fix some points and reinforce weak points. Another important statement of this manager was the celebration of success

after completion of each phase. It is stated by third interviewee that top management must celebrate the success and even little achievements. Also, this manager suggested to reward hardworking and change believer employees to ensure their motivation.

First responder also suggested planning some activities to endear new system to employees. This manager gave an example of a company which called their ERP as “Shrek” to endear staff and make them wonder about the system. This responder also suggested organising a launching party to motivate people for new company structure, order and system.

Final important finding of primary data collection is the need of supporting change process by additional activities. Second a third participant argued that organisations must support their change process with training, job redesigns, promotions, recruitments for getting some necessary knowledge or skills, and creating new job positions such as change leaders.

For training second and third participant suggested that key-users must be trained by hand-on training method with system demos to practice the system. Second participant also argued that class training or simulations should also be prepared and applied for other staff whose job will be redesigned or changed.

6.2 Discussion and Analysis:

This chapter will discuss and analyse the most relevant information from primary and secondary data to answer the research question and also achieve research objectives.

This study is based on the ERP project implementation in terms of reasons of developing and implementing ERP system, their benefits and dis-benefits, important risk factors in implementation process, critical success factors to consider and effective change management strategy to support this implementation. This chapter will discuss and analysis necessary information to find a solution for these points.

6.2.1 Driving Elements of ERP Systems:

As stated above, first aim of this research is to identify important elements of ERP that make these systems attractive for customers. First important point founded in literature is the high functionality of ERP systems. Many authors such as Al-Mashari *et al.* (2002) Nah *et al* (2001), Myerson (2002) cited in Fang (2005), Magal and Word, (2012) and Klaus *et al.* (2000) argued that ERP system provide many business solutions for different functions of the organisations. In fact, this point is strongly agreed with interviewees. All participants argued that one of the main attractive forces of ERP is its high functionality that provides common best practices for many different functions of the companies such as procurement, material management, production, distribution, financial accounting, asset management, cash management, controlling, strategic planning, and quality management. This ability of ERP is claimed to provide customers to facilitate managerial control, making rapid decisions and reducing operational costs by providing automated and improved incorporating best practices

(Al-Mashari *et al.*, 2002). This point is also approved by most of the participant. Interviewees argued that these points provide easier managerial monitoring and control for organisations. It is also stressed in primary data that all-in one functionality reduces cost and eliminates possible problems of using different programs or best practices in one organisation. Therefore, one can conclude that customers implement ERP systems to gain and improve their abilities for many different business functions to facilitate organisational control, reduce cost and possible problems of non-integration in terms of business practices and systems.

Another important element is stated as process integration for ERP in secondary data. Nah *et al* (2001), O'Leary (2000) and Al-Mashari *et al.* (2002) argued that one of the most important ability of ERP is automating and integrating business processes of a company. This point is highly stated also in primary data. First interviewee stressed that ERP implementation provides an opportunity of business process reengineering for firms to improve their problematical or redundant processes in order to create a better integrated system with developed workflow and improve departmental integration. Another important factor of integrated processes is the ability of better management of company's resources with high automation and integration. In fact, this better resource management is not stated in literature but it is highly stated in primary data in terms of a benefit. Besides, as partially stated above process automation and integration minimise errors and improves monitoring and controlling of business functions for managers.

In terms of integration, interviewees also argued that ERP also integrates external processes of an organisation with their supply chain partners and improve supply chain performance. This point is not highly stated in literature. An only claim is stated by Umble *et al.* (2001) as improving connection and integration with suppliers and customers to improve supply chain performance. First and Second participant said that implementing ERP systems improves the supply chain integration of an organisation with its partners and maximises the supply chain performance. Third interviewee also claimed that with B2B and B2C portals organisations can improve their linkage with customers and suppliers in the supply chain by advertising their new product, sharing information and other important notifications. Therefore, one can argue that firms implement ERP to automate business functions and integrate their business processes and departments as well as improving supply chain performance and integration.

On the other hand, Nah *et al* (2001) and O'Leary (2000) also argued that ERP provides a common data sources for organisations and also ability to creating and accessing information in a real-time environment. During interviews, this point is also proved with agreement of all participants. All responders argued that creating and sharing the information with both internal and external partners are one of the most attractive points of ERP systems. Second interviewee claimed that storing data in excels or PDF files can cause data loss or can be time-consuming to access necessary information. Second interviewee also stated that these kinds of data storage may cause also big problems in monitoring and reporting processes and obstructs to share data with other partners. Moreover, this manager stressed that ERP saves lots of time for organisations by providing the ability of creating, accessing and sharing information within the supply chain. On the other side, participants also mentioned the importance of data security and claimed that ERP secures organisational data and information by blocking unnecessary access. Therefore one can conclude that another reason

which drives organisations to implement ERP is the gain ability to manage data in terms of integrating, storing, sharing, creating and securing organisational data and information.

According to O'Leary (2000) and Klaus *et al.* (2000) supporting specific industries such as SAP for banking and oil and gas is another point of important ERP elements. This point is also stated by two interviewees except second interviewee. One can argue that this may decrease the credibility of this point. But, in fact, the first interviewee who is an ERP user and also the third interviewee who is a project manager strongly mentioned this point as a driving force that provides competitive advantage for companies in those markets. The reason of not mentioning this point by second interviewee may be the lack of working with a customer that aims this purpose. Also it can be said that with a larger sample of ERP customers, the importance of this point can be indicated more. The author will consider this point among important factors of ERP implementation from customer perspective.

Besides, in literature, it is claimed that a successfully integrated ERP enables innovative practices to organisations for their problems (Chen *et al.*, 2009). In primary data, participants directly stated a technology improvement point for customers. First and third participants also claimed that ERP implementation also provides a technology improvement and innovation for organisations in terms of business practices and integration with other professional tools. In addition, as stated above, ERP also necessitates a reengineering process which can be considered also a process innovation for organisations.

On the other hand first interviewee stressed that although ERP tools provide technological benefits to organisations, they cannot meet all needs for some vertical operations. So this manager stressed another point for ERP abilities which is the ability of integration with other professional tools. First participant stated that current developed ERP systems collaborate with many other software providers and integrate their systems with professional tools that focus on a specific area or operation in order to improve system functionality. In fact, one can argue that this example is given for SAP Company which is the market leader of ERP sector, but all ERP providers cannot provide same services or tools like SAP. Besides, this point is not directly mentioned with other participants among reasons of customer interest for ERP. But third interviewee stated a similar point in his industry specific argument. Third participant claimed that Workcube Company also integrates its system with professional tools in order to provide industry specific solutions.

Therefore, one can say that other ERP vendors may also provide a similar service to their customers in some degree. Besides, first interviewee stated this point as a driving force for customers in two ERP implementation cases. One can conclude that customers implement ERP to innovate their business in terms of reengineering or redesigning processes, accessing new technologies or best practices which are providing by system and integrating their system with professional tools.

Also, Literature stated that customers prefer ERP systems because of its abilities to reinforce organisational strategies (Wei, Chien *et al.*, 2003). In primary data none of the participant stated this point directly. But during the interviewing process, all of them argued that ERP can be a supporter of facilitator if organisations apply an effective strategy in order to get a benefit. In fact, these statements look the point from two different perspectives but state the same ability of ERP. One can

say that ERP system can support organisational and strategies and facilitate the achievement of intended benefits which make it attractive for customers.

Another claim in literature is stated about the ability of providing all system functions and abilities for customers, suppliers and partners outside of their office or working environment as well (Kamisky *et al*, 2009). This point is approved by third interviewee. This manager claimed that their web-based ERP system allows all these functions and practices outside of office with accessing tablets, laptops and cell phones. One can argue that this is an important feature of ERP system which makes it highly attractive. One can say that with this ability managers or employees can adjust something or do forgotten tasks at their homes by accessing the system online rather than coming back to the company or even if they go for a business travel, they can continue monitor their business and continue partially their job.

Final point is structural improvement, third participant argued that ERP systems increases flexibility of business manners and provide competitiveness to organisations. This manager also claimed that ERP is an important tool that provides a structure which is reportable, scalable, improvable and monitorable which is an important need of today's business organisations. This point is not directly stated by another participant or literature as a driving force. One can argue that third participant is an ERP consultant from a vendor company and this statement can be biased. Besides, in benefits section, Shanks, Seddon and Willcocks (2003) argued that ERP provides flexible systems to organisations in terms of operational benefits. Also, reportable, monitorable and improvable structure of ERP is claimed by other participants as ERP service in benefits section. Therefore one can argue that this statement is also true for ERP systems and customers design and implement these systems also for getting those benefits.

On the other hand, two important point stated in literature cannot be approved by primary data which are Supporting for multiple currencies or languages especially for multinational companies and The ability of customizing without programming (Switch settings). In fact, the primary data does not contain any multinational ERP customer or any project manager who has experience with multinational companies. In fact, Workcube is generally serving to small and medium enterprises in Turkish ERP market. Therefore this point is not approved by this research. Also, the second point for customisation, interviewees did not mention also this point directly or indirectly, therefore there

6.2.2 Benefits of ERP:

In literature 23 different benefits were identified and categorised into 5 main groups; operational, managerial, strategic, IT and organisational. In fact, during interviews, realisation process of these benefits could not be clearly determined because of some reasons such as lack of enough time. Participant partially mentioned some important points such as effective BPR. In order to analyse potential benefits of ERP systems to customer, benefits will be analysed as groups rather than analysing each separately.

Operational Benefits:

First group is stated as operational benefits of ERP. In literature, many benefits is stated such as inventory reduction by Umble *et al* (2003), Mahesha & Akash (2013), Hamilton (2003) and Shanks,

Graeme, et al (2000), Umble *et al* (2003), Chung & Skibniewski (2007) and Mahesha & Akash (2013), Cost reduction in material cost reduction by Hamilton (2003), Umble *et al* (2003), Chung & Skibniewski (2007) and Mahesha & Akash (2013) and labour cost reduction (Hamilton, 2003), (Umble *et al*, 2003), (Chung & Skibniewski, 2007), (Stein, 2003) and (Mahesha & Akash, 2013), customer service improvement (Stein, 2003), (Umble *et al*, 2003), (Mahesha & Akash, 2013), (Hamilton, 2003), Chung & Skibniewski (2007) and Shanks, Graeme, et al (2000), quality improvement in terms of process and product by Shanks, Seddon and Willcocks (2003).

In fact, most of these benefits are also approved by all participants. As it can be seen on table (6-1) all responders directly stated that ERP can provide cost, cycle time, inventory reductions, improvement in customer services, productivity and quality in terms of process and product.

Shanks, Seddon and Willcocks (2003) argued that ERP provides these operational benefits by automating business processes and enabling process changes to organisations. All participants agreed with this point. Especially for operational benefits, all responders argued that companies must analyse their processes and redesign them by removing redundant ones. Third interviewee argued that companies must also make necessary investment for developing their IT infrastructure to operate these systems effectively. Also, this manager argued that ERP success contains two dimension which are human and technology. In reality, all participants argued that organisations must train effectively their staff in terms of system usage and also other necessary concepts and skills. During interviews participants also mentioned that some job redesigns and recruitments must be done by companies to gain some necessary skills and knowledge in order to increase system effectiveness. In fact, these points also stated indirectly in literature as factors that improve system performance.

On the other hand, four other operational benefits were identified from interviews. Second and third interviewee argued that ERP systems also improve profitability of an organisation. In fact, this point is not stated in literature or by first responder. One can argue that becoming a more profitable company is likely to happen with low cost, more effective processes, better customer management and productivity. Therefore, this point can be considered as correct.

Besides, another operational benefit is coherent workflow which is stated also in previous chapter. First and third interviewee argued that ERP also provides coherent workflow for operations which reduces errors or missing out something and also saves time for customer. Third interviewee argued that this coherent workflow is one of the main providers of operational cost reductions in organisations. In fact, in literature many authors such as Wei, Chien *et al.*, (2003) argued that ERP provides improves workflow of an organisation and improves process efficiency. In fact, first interviewee is a customer and takes advantage of this benefit in his organisation.

Also, second and third managers also argued that with its asset management module, ERP provides a better asset management for organisations. In fact, this point is not stated in literature or by first interviewee. In fact, enough proof cannot be found for this point to argue this point as true. One can argue that this point claimed by two Workcube company project managers can be biased. But in fact, second interviewee is not an actual project manager and works for a different sector. Therefore, another person can say that if the primary data contain more ERP customers enough claims for this point would be provided.

Finally, second and third participant also claimed that ERP provides better cash flow management for organisations. In addition, first interviewee argued that although their ERP system did not improve this point significantly, this can be a true claim for other firms, especially small and medium enterprises. In fact, in literature Wallace & Kremzar (2001) and Klaus *et al.* (2000) mentioned that ERP allows manager creating valid plans and schedules for cash flow. Therefore, it can be said that this point is true for ERP systems.

Managerial Benefits:

Shanks, Seddon and Willcocks (2003) stated three managerial benefits in literature; better resource management, improved decision making and planning and performance improvement.

For better resource management, in primary data all participants agreed that by implementing ERP systems organisation can improve their management of resources. They stated that ERP provides many tools to manage and monitor their organisational resources such as human and monetary resources. Therefore, it can be said that implementing ERP can improve resource management of a firm.

In terms of improving decision making and planning, two main ideas were expressed for this claim. First and second participants partially agreed about this point. First manager stated that ERP system provides effective business practices for decision making or planning and also decreases the decision making time by accessing necessary information quickly. But they argued that ERP systems are just tools and skills or knowledge of managers are key determinant for these points. They also argued that this point cannot be achieved by just implementing ERP. In fact, first interviewee argued that improving decision making and planning can be achieved successfully without ERP. Therefore one can say that implementing an ERP system cannot provide this benefit directly. But it can be a tool to facilitate the achievement of these points.

On the other hand, Shanks, Seddon and Willcocks (2003) claimed that ERP also improves performance control of organisations in terms of financial, manufacturing, operational and employee performance. In fact, all interviewees argued that this is a very important benefit of ERP systems and facilitate managerial control. Therefore, this point is also proved as a benefit of ERP system.

Two other points are stated in primary data for managerial control which are improved accounting control and reporting benefits. In terms of accounting benefits, Second and Third interviewees stated that ERP systems improving reporting capabilities of organisations and facilitate to create effective report for organisations. Second interviewee argued that this point also facilitates managerial control and monitoring. On the other side, first interviewee argued that ERP systems facilitate reporting for companies in some degree, this manager stated that in terms of transactional report ERP can provide a benefit for organisations if the conceptual design of the system is well made and necessary parameters are defined. But for analytical reports ERP is claimed to be ineffective by this manager. It can be said that ERP provides a better and easier reporting process for organisations. The difference between first participant and the other two participants may be based on system differences or an

organisation problem in first participant's company. One can conclude that ERP systems provide reporting benefits to organisations in some degree and facilitate generation of some reports for organisations. In fact, the primary data has only one customer and it is not enough to say that ERP has limitation for analytical reports.

Final managerial benefit is better accounting, all participant also agreed on this point that ERP provides an effective accounting structure and practices for organisations. Besides, first interviewee argued that this point would not be valid for companies that have already established an effective accounting process.

Strategic Benefits:

Shanks, Seddon and Willcocks (2003) claimed many strategic benefits such as support business growth, support business alliances, build business innovations, build cost leadership and generate product differentiation.

For these strategic benefits, first interviewee disagreed with these points and argued that these are exaggerated claims and organisations cannot get these benefits by just implementing an ERP system. This manager argued that organisation's strategy, resources and knowledge are important factors that designate these points. In fact, it is claimed that these points must be organisational goal and ERP can only help organisations for realisation of these benefits. Although second interviewee partially agreed with these points, it is argued by second interviewee that these are related to the organisational strategy and ERP can only provide some solutions that may help for achievement of these points. This manager also argued that if firms apply right strategy and recruit right people they can achieve these benefits without ERP. This participant exemplified that with good R&D engineers and designers organisations can generate product differentiation and stated that ERP may provide just some tools to design or produce these products.

On the other hand, third interviewee agreed with these points and claimed that ERP may provide these benefits to organisations. In fact, this can be another biased statement to defend their systems. Besides, this manager also accepted that ERP is just a tool and it necessitates some skills and strategic planning and decisions of senior management. One can conclude that implementing ERP cannot provide these benefits alone and ERP can be used as a tool to achieve these five benefits. Besides, if the organisations determine these five points as its goals and cultivate necessary skills inside the organisation, there can be other ways to achieve these benefits. Therefore organisations that implement ERP as a facilitator for these points should evaluate all possible options to choose the most convenient one.

Another important benefit is stated as building external linkages (Shanks, Seddon and Willcocks, 2003). In fact, these points approved by primary data, all participants agreed that ERP systems build and improve external linkages of companies with customer and suppliers. Also, second interviewee argued that some systems may provide B2B and B2C portals to manage your relations with your business partners and customers on electronic media. On the other side, responders argued that ERP systems also improve supply chain of the companies and reduce total cost in supply chain. In fact, this point is also stated in literature by Ptak *et al.*, (2000). Therefore, it can be said that implementing

an ERP system improves external linkage of organisations with customers and suppliers. It also improves supply chain performance among them and reduces total cost.

IT infrastructure benefits:

Three important IT benefits are stated in literature by Shanks, Seddon and Willcocks (2003) as IT cost reduction, build business flexibility for current and future changes and increase IT infrastructure capability. But in fact, all participants disagreed with IT cost reduction and IT infrastructure capacity for ERP system. In fact, in dis-benefits section they argued that ERP generally increases IT cost for organisations. Second interviewee claimed that in very rare cases, ERP systems slightly decrease IT cost but this manager stated that in most of ERP implementations provide a high IT cost for organisations.

In terms of IT capacity, first and second interviewee disagreed with this point and argued that this is not a benefit of ERP but a necessity that organisations must invest to gain. Besides, third interviewee also disagreed with this point and stated that organisations must invest important amount for building their IT infrastructure. Therefore one can argue that this is not a benefit of ERP but a necessity that organisations should do to reach high system performance.

“Building business flexibility for current and future changes” is claimed to be wrong by first and second interviewee. But in fact, third interviewee argued that this point is true and ERP can support business flexibility for current and future changes. One can argue that this statement of third interviewee can be also biased. In fact, second interviewee also worked as a consultant for same software and did not accept this point. One can conclude that there is no enough evidence to prove this claim. The author will not consider this point as a benefit of ERP systems.

Finally, all interviewees strongly stated that ERP systems provide a high data security with its empowerment abilities. First interviewee argued that ERP provide high security for organisational data and information by delimitating the access of them for limited people. Therefore, it can be said that the data security is the only IT- benefit of ERP system that is identified in this work.

Organisational:

Shanks, Seddon and Willcocks (2003) also claimed some organisational benefits of ERP system. These are supporting organisational changes, facilitating business learning, empowerment and building common vision.

The primary data shows that all responders disagreed with supporting organisation changes and building common vision as benefits of ERP systems. In addition, they argued that common vision is a necessity for organisation and without a common vision ERP implementations are likely to fail.

In terms of empowerment, it is proved that empowerment is one of the most important benefits of ERP systems. All participants argued that empowerment secures data of the organisation by preventing unnecessary access to specific information. Also second interviewee argued that this factor also brings an order to organisations by authorizing and delegating specific people to specific tasks that prevents job interlopes.

Final claim in literature is facilitate business learning, all participants expect the first one agreed on this point and stated that ERP systems may facilitate business learning in organisations. Second interviewee argued that some systems such as Workcube is able to provide e-learning portals which provide trainers to upload training documents, tests or videos and share these materials with all internal employee and external partner. This manager also argued that it is possible to monitor each person's progress and get feedback about his or her results. It is also stated by second interviewee that with web-based systems, participants of training can also benefit from these material at outside of the office such as at home. Second interviewee also stressed that ERP is a facilitator here and the content of the training determines the quality of outcome. One can say that the main reason of the difference between first responder and the other two responders is the system differences. In fact, first interviewee use SAP and also used Oracle and never used Workcube. One can conclude that some ERP systems provide learning portals to their customers and support them to provide education and training sessions to their internal and external partners.

Besides, in primary data another benefit is claimed by second and third participants. They argued that ERP systems also provide a better visibility of organisational structure and processes. Second participant claimed that ERP brings an organisational transparency for employees, which facilitates adaptation of new employees and better and faster collaboration among departments. In fact, this point is stated neither in literature nor by first interviewee. But it is a fact that ERP systems generally cover all functions of an organisation by defining and integrating all business processes of an organisation. Therefore, it is likely for ERP to provide a better visibility for employees in terms of organisational structure and order.

6.2.3 Dis-Benefits of ERP:

In terms of dis-benefits of ERP systems, two significant points stated in literature; high implementation cost and project delays. It is stated that companies generally overspend their resources in terms of money, time and people to implement these systems. It is stressed that approximately 90 percent of ERP implementations end up late or over budget (Umble *et al* (2003). Moreover, Barker and Frolick (2003) stated that success is not guaranteed in ERP projects and even well planned and highly supported project may fail. It is also argued that their durations especially by being prone to delay and high costs are two of the most important disadvantages of ERP systems (Rashid, Hossain and Patrick, 2002). The high implementation cost is proved by interviewee. All participants claimed that ERP systems cause a significant implementation cost for customers. For instance, first interviewee said that ERP projects require significant amount of investment to fund the project and generally ends up with a 25-30 percent more cost than planned. Second interviewee also argued that the system generally necessitates indirect investment for organisation's infrastructure such as purchasing new databases, WAN upgrades or computer facilities. Third interviewee also stated that if it is necessary that companies must develop their IT infrastructure to get high performance from the system. One can conclude that ERP implementation brings a significant direct and indirect cost for organisations and generally cause overspends for customer. Companies should really consider these high direct and indirect costs of implementation.

In terms of being prone to delay, first and third participant argued that this is not a limitation of ERP system, but a consequence of bad management of project. First interviewee argued that ERP project

delays because of bad strategy in terms of scope, goals and lack of good planning and project management. Third interviewee also argued that this is not a problem of ERP systems. This manager stated that ERP project will end on time if organisations set clear goals, define scope well, allocate enough resources and apply effective project management methodology. Also, second interviewee partially agreed with this statement and argued that most of ERP project end up delays. This manager also stated that this point is not a real dis-benefit of ERP system but a reality for ERP projects. This participant also argued that if organisations generate good plans and manages well the implementation; this will not be a big issue for them. One can conclude that being prone to delay is not a limitation of ERP systems, if organisations allocate enough resources in terms of human and budget, generate effective plans and apply an effective project management methodology, they can eliminate this dis-benefit.

On the other hand, another literature claim is high maintenance cost for system maintenance and upgrades. It is stated that that maintenance costs of ERP system are remarkably high and constitutes an important income for ERP vendors (Chung and Skibniewski, 2007). In fact, first and second interviewee also mentioned this point. Second interviewee claimed that ERP maintenance and upgrades constitute a significant income-generator for ERP vendors and create a high cost for customers. First interviewee also argued that ERP systems should be maintained to keep system performance for responding the changes in customer requirements. This manager argued that these activities bring a significant cost of maintenance for organisations. Besides, third interviewee argued that their company provide these maintenance services for free, so this manager disagreed with this point. In fact, one can say that this can be also a biased statement because second interviewee used to work in same company and accepted this high cost for customers. In fact, it can be a new policy for organisation but most of the available data proves that ERP brings a significant maintenance cost which organisations should pay periodically. First interviewee stressed that ERP systems require new tools to respond requirements changes and also necessitate some expert people to keep that system functional. In fact, hiring these people is costly and difficult because there is a high demand for these experts in market which cause high turnover. The second point is also stated indirectly in literature as retain experienced employee success factors. For the first point, it is proved by first interviewee and also stated in literature. It is claimed that ERP projects never totally end because systems should be reorganised according to new needs of firms (Workcube, 2013). Therefore, one can argue that ERP systems necessitate a significant cost for system maintenance, upgrades, redesign and staffing to keep system operational and at high performance.

Besides, another proved claim in literature is vendor dependence. ERP is claimed to create vendor dependence for customer and it is stated that this relationship could cause some risks for companies such as losing talented people as consultant firm can offer jobs to talented people in organisations (Helo *et al*, 2008). Harwood (2003) argued that it is obligatory for customer to work with the vendor for the lifetime of the system and in this relationship client is fairly dependent to vendor. Rashid, Hossain and Patrick (2002) stressed a vendor lock-in situation for customers in terms of further upgrades or customisation and this can create discretion to discuss effectively about issues and new services. These are true statements because all participants agreed that ERP create vendor dependence for customers and this relationship should be managed properly. First participant argued that after implementing the system, customer have to work always with vendor firm in some degree especially in technical points. This manager also claimed that customers also need to use

vendor firm's database or other hardware if it is available to eliminate problems. Second interviewee also argued that a good contract management is crucial to manage this long relationship between two firms. Third participant also stated that this relationship may be problematical for both sides not just for customers. This manager suggested that in order to eliminate this problem a strong communication and contract management must be established. Therefore it can be said that vendor dependence is another limitation or dis-benefits of ERP systems and should be supported with high communication and good contract management.

Another point in literature is the long ROI period for customers. Umble *et al* (2003) argued that ERP vendors generally claims a pay-back period from one to three years, but in reality ROI period can be significantly long for companies. All participants agreed that firms especially small and medium enterprises can consider this problem as a limitation for ERP systems. Second interviewee argued that in some cases this high investment of ERP returns back to customer after a long period. This manager also argued that after first two or three years, this situation can cause problems of demotivation and mistrust of top managers for system. Third interviewee also claimed that for some cases ROI period can be long but in reality, it depends on the quality of implementation and customers expectations from the system especially timeframe for each goal to achieve. First responder also stated a similar point during interviews. This manager claimed that the perception of long or short ROI depends on the company's size and the value of business in organisations. Some organisations are used to invest high amount of money for significantly long return periods such as 15-20 years. So, one can conclude that this point can be considered as limitation for some ERP customers which is depending on the quality of implementation and perception of customers.

Another claim about ERP limitations is the failure of meeting high expectations of customers. It is argued that as a result of these highly challenging and demanding projects, expectations from the system become remarkably high (J.Chen, 2001). Smith and Fingar (2003) argued that although ERP has its strengths, it generally fails to meet all business requirements of companies. It is also stated that customers generally intend to solve all their problems with ERP but in reality it is impossible and cause dissatisfaction for companies and damage their reliance on system (Workcube, 2013). According to the primary data this statement is false. All participants stated that this not a limitation of ERP systems, it is a consequences of bad expectation management and lack of communication about system potential benefits. First participant claimed that this is not a limitation of system; this is consequences of bad strategy and poor management expectations of users. This manager claimed that senior management must set realistic goals and expectations and also explain limitations of system to key users clearly. Second interviewee said that the design should be based on company's primary needs and also defined goals must be realistic. This manager also stated that key users expectations are important but the system should be designed and implemented realistically in order to solve some key problems. Third interviewee also argued that organisations must categorise their realistic goals as primary, secondary and third to achieve them in different time frames. Therefore, one can argue that this is not a limitation of ERP system and can be solved with effective expectation management and realistic goals with realistic timeframes.

Moreover, it is stated that ERP system cannot allow modification service for customers and this cause a significant limitation. Barker & Frolick (2003) and Chen (2001) argued that limited customisation is also another disadvantage of ERP systems that cause significant problems to

organisation after each upgrade hence organisations are obliged to change their business processes to implement the system precisely. Primary data stated three different claims for this point. First interviewee stated that employees generally have the tendency of designing and modifying systems to their old legacy system which is generally a problematical approach. This manager claimed that it is not a limitation of ERP systems but a human-based problem for ERP implementation. First responder also argued that top management must take actions for this point and also an effective change strategy must be established to deal with this issue. On the other hand, second interviewee argued that this point can be a limitation in some cases, because customers really need customisation for some specific tools or interfaces especially when they intend to integrate new system with the old one. This responder also claimed in some cases, very simple and basic modifications can cause problems in upgrades and this really demotivates customers against system. Third interviewee partially accepted to this point and argued that software can be modified exactly same to the end-user wishes but this strategy increases cost and duration of implementation. Third participant also argued that modification can also cause problems in upgrades and increases maintenance cost. Therefore, it is a fact that modification can be problematical for ERP implementations, all participant argued that either it is a limitation or not, modification should be minimised and organisations must focus on BPR and organisational changes. One can conclude that for some systems this can be a limitation for specific tools and interfaces but in general BPR is proved to be the only choice of customers.

Also, in terms of being difficult to learn and understand the logic which is stated by many authors such as Helo *et al* (2008), Rashid, Hossain and Patrick (2002) and Kumar *et al* (2002). They claimed that ERP systems are found as difficult by employees and this difficulty can damage their performance and efficiency. Primary data generally says that this is not a limitation for ERP systems. First participant argued that interfaces of some ERP systems' may be difficult to understand but if key users involve in the process and get necessary training it is not a problem or limitation for ERP systems. Third manager also argued that their system's logical and screen designs are very easy to understand and any they did not get any customer complaints so far. In fact, this can be also a biased statement and requires more information to be proved. But also, second participant partially agreed with this point and stated that the system interface or design can be difficult to understand in some systems such as SAP screens but with effective key-user training this will not be problem for ERP customers. One can conclude that this is not a limitation for ERP systems, customers must pay attention to organise useful and effective training programs for employees to eliminate this problem.

Finally, in literature it is claimed that ERP changes significantly company processes, departments, jobs and dependently all compensation programs, reward systems and job evaluation criteria. Therefore authors in literature argued that this situation will influence employee behaviours in organisation and may disrupt the company culture by causing disagreements and problems during and after the reengineering process (J.Chen, 2001) and (Umble, 2002). In primary data, participants argued that bringing a significant change for organisations is a fact for ERP implementations. They argued that companies have to change many points in terms of processes, departments, jobs, responsibilities and even structure. Second and Third interviewee agreed that this can cause many problems for ERP customers and can be considered as a dis-benefit for ERP systems. On the other side, first participant argued that organisations must deal effectively with this change and take necessary action to mitigate the bad impacts of change.

For this point, second interviewee said that these changes cannot be tolerated by some customers and cause performance problems especially in short run. The main reason of collision between first participant and other participants can be difference of business size between the first participant's company and the size of Workcube's customers. In fact, first participant joined in two ERP implementations in two big sized Turkish companies, but ERP consultant also joined implementation projects in small and medium sized companies where this toleration and adaptation can be a significant problem. One can conclude that this point can be considered as a limitation of ERP systems. In terms of dissatisfaction and user resistance, all participants argued that this is not a limitation for ERP systems, they argued that this is consequence of the big scoped change stated in the previous point and also bad management of change.

6.1.3 Risk Factors in ERP projects:

In literature, it is claimed that developing and implementing ERP systems are inherently risky (Dey, Clegg and Cheffi, 2013). In fact, more than 25 risk factors are identified in literature. Many of them are also stated by participants and approved that those are significant risk factors for ERP project. This chapter will discuss each risk factor separately and state 12 more risk factors which are identified in primary data will be stated.

Failure to Re-Design business processes to fit the software:

It is argued that in order to implement ERP systems, most of the customers prefer business process reengineering solutions to improve their organisational processes. Huang *et al.* (2004), Dey *et al.* (2013) and Sumner (2000) argued that failing to re-design these processes appropriately is stated as a risk for project success. In fact, this claim is accepted by all participants. They argued that BPR is a critical process for ERP implementation and benefit realisation. They also argued that failing in BPR can cause many problems such as project failure, poor system performance or project delays due to redesigning. It is also claimed that some companies neglect business process redesign or focus on modifying their system which also constitute also a high risk for projects. (Aloini *et al.*, 2007). In primary data all participants stressed that effective BPR is a must for ERP implementations and should be done properly. Third interviewee argued that a company that has perfect processes will not need an ERP system so BPR is must for all implementation processes. In addition for focusing on modification; all participants argued that high modification can cause many problems for ERP implementations. In fact, only third interviewee claimed this point as a risk factor as it can be seen in table (6-5). But other participants also mentioned this point indirectly for other questions. Therefore, Failing to Re-Design business processes is a risk factor that may cause many problems. One can argue that organisations must pay attention to define their current processes and analyse them properly for successful reengineering.

Lack of Senior Management Support:

Lack of Top management support is stated as an important risk factor by (Aloini *et al.*, 2007) and Sumner (2000). Aloini *et al.* (2007), Sumner (2000), Huang *et al.* (2004) and Dey *et al.* (2013) stressed that sustained top management support; participation and commitment are essential points for the ERP project success. This point is also highly mentioned by all participants. All responders claimed

that without top management support it is almost impossible to implement an ERP system correctly in an organisation. Therefore, one can argue that companies must ensure top management support in terms of commitment and necessary effort before deciding to start an ERP project.

Insufficient Training and Re-skilling:

Sumner (2000) argued that investment in training and re-skilling the IT workforce and infrastructure is generally higher than expected. It is argued that this situation creates a risk of lacking enough resource for funding those needs and threatens the project success (Sumner, 2000). This point is also considered as a risk factor by all participants. They claimed that companies must allocate enough resources for training and re-skilling of employees. They also argued that for some roles or positions new people should also be recruited. Therefore this is also another risk factor for ERP project and should be considered in project planning phase.

Ineffective Consulting Services:

It is claimed that recruiting and retaining experienced ERP consultants is difficult because the market rates and demand are high for these people and there is a turnover for highly skilled people (Sumner, 2000). Having an ERP consultant with limited experience, technical, organisational and software knowledge constitutes a risk for companies (Sumner, 2000), (Dey *et al.* 2013), (Aloini *et al.* 2007) and (Musaji, 2002). Second and third participants argued that this is a risk factor for ERP project. They argued that organisations must select effectively their vendor and consultants to get necessary support. In fact, first participant claimed that this is not a current risk factor for ERP project. This manager argued that today most of vendors and consultants can provide effective consulting services to customer. Also, this participant also claimed that customers should check vendor's references and contact with clients to get necessary information for vendor selection process. Therefore first participant claimed that this factor should be clarified before project starts. One can conclude that this is a risk factor for ERP project, although the first interviewee did not accept this point as a risk factor, this manager accepted the necessity of effective consulting service with this statement and also mentioned in critical success factors section. It can be said that customer must consider this factor and should check all references about previous references of vendor firm before make an agreement.

Lack of User training or Inadequate Training for Key-Users:

Authors such as Sumner (2000), Musaji (2002), Huang *et al.* (2004), Dey *et al.* (2013) and Aloini *et al.* (2007) claimed in literature that lack of appropriate training that fail to create knowledge and understanding of key users about system, creates many problems and threatens the project success. All participants also mentioned this point as a risk factor for ERP project. They argued that effective training for key-users as well as other employees is critical for ERP project implementation and system performance. They claimed that training for key users must be hand-on training rather than class training.

Ineffective Project Management:

It is claimed that project stakeholders must use an effective project management methodology from project initiation to its end, in order to plan and control and manage the project for many points such as change or risks. All participants also agreed on this point and stated that lack of an effective project management methodology with appropriate tools and techniques creates an important risk for ERP project implementations. Sumner (2000) also argued that lack of customer contribution to project management process in order to support project activities constitutes also a risk for ineffective management of ERP project. In fact, participants also argued that project team must contain necessary managers and employees from customer firm in order to successfully plan and manage ERP implementation in organisations. One can conclude that ERP project must be supported by an effective project management methodology with useful tools and techniques and also by contribution of necessary members of customer firm.

Lack of Integration:

In literature it is claimed that ERP projects necessitate an enterprise-wide approach in order to define critical requirements of enterprise correctly and take action to make them happen (Sumner, 2000). Therefore, many authors claimed that lack of integration between organisational departments or departmental conflicts constitutes a high risk for ERP project (Huang *et al.*, 2004), (Musaji, 2002) and (Dey *et al.*, 2013). This statement is also approved by all participants. They argued that lack of integration between organisational departments causes a high risk for defining wrong scope or objectives and also damages organisational support for project. Therefore, it is crucial that organisations must establish an integrated approach of all departments and ensure that all functions of the organisation support and contribute to project.

Lack of a Proper Management Structure:

Lack of a proper management structure such as a centralized project leadership structure causes many problems such as unclear vision, duplication of effort and task failure (Sumner, 2000). Sumner (2000) argued that proper management in terms of central project leadership is a must for ERP project success. Many other authors such as Aloini *et al.* (2007) and Dey *et al.* (2013) also claimed that an effective managerial conduct is required for successful project implementation in order to set clear goals, objectives, vision, user engagement and planning. All responders agreed that lack of proper management structure with competent leaders to take decisions, monitor processes and also direct people can be significant risk factors for ERP project.

Poor Leadership:

It is stated that ERP projects require effective project leaders to direct people, solve problems, create strong communication environment, and create the vision of project (Aloini *et al.*, 2007) and (Sheldon, 2005). Aloini *et al.*, (2007) argued that lack of an effective leadership is a risk factor which aggravates conflicts and may cause loss of direction of project in ERP implementations. This point is stated also by all participants, they claimed that competent project leaders are necessary for successful project implementations. They stated this point also for effective in critical success factors

section for effective project composition. They also argued that this point is also important for change management process in ERP projects. Therefore it is crucial that an effective leader for project team and also departmental leaders are necessary for ERP project success and lack of them constitutes a significant risk factor.

Lack of Project Champion:

It is stated that leader of an ERP project is also the champion of the project, which is a crucial role for marketing the project throughout the enterprise (Sumner, 2000). First and second participant also mentioned that lack of a project champion can highly contribute to the project. In fact, this point is not stated by third interviewee. But first and second interviewee claimed that having a manager as a project champion in ERP project significantly help organisation to facilitate change process and motivate other employees. Therefore one can argue that this risk factor cannot threat the success of project or cause a failure in other words. But it can obstruct the management of ERP implementation.

Ineffective Communication:

Many authors in literature claimed that effective communication provides a link between all stakeholders about what is happening, scope, objectives, necessary activities and changes, and lack of an effective communication system threatens the successfully achievement of objectives (Aloini *et al*, 2007), (Sumner, 2000), (Huang *et al*, 2004) and (Dey *et al*, 2013). Urgency of communication is also stressed by all participants in primary data. They argued that without effective communication between project stakeholders, ERP projects are likely to fail. It can be said that effective communication channels must be established by project team at the initiation phase of the project and ensure that communication level is high between all stakeholder about issues, tasks and many other points.

Inadequate System Selection:

In literature Aloini *et al* (2007) and Dey *et al* (2013) argued that inadequate selection of software that could not satisfy all needs of customers would cause a failure or weaken the company performance. This point is claimed also by all participants as a risk factor for ERP project. They argued that customers must choose the most appropriate system for their organisational needs. First and third interviewee also argued that this also important for correct conceptual design of the system which is also a must for ERP projects. If the system is inadequate to meet some demands or cannot be designed in that way, the system performance will be poor for customer perspective.

Lack of Business Analysts:

Sumner (2000) argued that business analysts, who have high knowledge of business and technology, are one of the crucial workforce requirements for successful ERP development and implementation projects. It is also stated that lack of business analysts constitutes an important risk for ERP project (Sumner, 2000). This point is stated by first and second participant as a risk factor. They argued that ERP project teams must have business analysts to successfully develop and implement ERP systems. They also argued that these analysts are also important for BPR process. In addition this point is not

directly stated by third interviewee as a risk factor. But this manager also stated business analysts are important for effective project team building and must exist in ERP projects. Therefore it can be considered also a risk factor which can damage the effective management of project.

Existing Legacy System:

In literature, one of the most important risk factor is claimed as attempting to build bridges between ERP system and old legacy application (Aloini *et al*, 2007), (Dey *et al*, 2013), (Musaji, 2002), (Sumner, 2000), (Sheldon, 2005) and (Huang *et al*, 2004). It is stated that having different legacy technology systems in same organisation can cause many problems such as poor coordination or establishing consistency (Wallace & Kremzar, 2001). Umble *et al* (2003) claimed that old legacy systems should be removed from organisations to avoid these risks. In fact, none of participants for interviews stated this point as a risk factor for ERP projects. In addition first interviewee argued that today's ERP systems allow customers removing their existence system and implement all-in one ERP systems with other integrated professional tools to support their systems. First participant also stated that this point was a risk factor for 1990's but not for current ERP market. Besides, in previous sections all participants argued that ERP systems provide a various modules that can cover all functions of organisations and meet their operational needs. Second interviewee also argued that using different systems for different operations increases total IT cost and also errors of customers. Therefore, any proof was could not found in the primary data collection process about this risk factor. One can argue that current ERP systems drive customers to remove their old legacy system by its developed functionality and ability to integrate with other professional tools that collaborates with ERP vendors.

Lack of an Integrated Technology Strategy:

It is claimed that lack of a strategy to avoid technological bottleneck of organisation and support customer-server implementation is a risk factor ERP projects (Musaji, 2002) and (Sumner, 2000). Dey *et al*, (2013) also stressed lack of a synergy between this technology strategy and competitive business strategy is also a risk factor for organisations. In fact, this point is also proved by primary data. In fact, all participants agreed that lack of s strategy for integrated technology is a big risk factor for ERP project. As stated by first interviewee in previous chapters, these systems may need to integrate by other systems or professional tools to effectively meet organisational needs. Therefore one can argue that an effective strategy to eliminate all technological bottlenecks for organisation such as existing or removing legacy systems and providing these systems with other tools if it is necessary.

Bad Change Management:

In literature, having an inappropriate change management is stated as a risk factor by Dey *et al*, (2013), Huang *et al*, (2004), Sheldon (2005) and Aloini *et al*, (2007). They stated that ERP projects are not purely technological implementations, they bring a significant change to the way that organisation operates. Dey *et al*, (2013) stated that companies must establish an appropriate change strategy with clear requirements. Participants also stated similar points for importance of change

management. All interviewees argued that bad change management constitutes an important risk factor for ERP project and may cause significant resistance, conflicts, problems and performance decrease. In addition, all participants stated effective change management as a critical success factor for successful ERP implementation. Therefore, bad or ineffective change management can be considered as another risk factor for ERP projects. ERP project managers must pay attention to understand the impacts of change and establish an effective strategy against them.

Failure to Get User Support:

Failing to get support of users for implementation is identified as another risk factor for ERP projects (Huang *et al*, 2004), (Aloini *et al*, 2007) and (Musaji, 2002). It is also stressed that key users should be convinced about the utility of the system to avoid resistance and get high performance (Aloini *et al*, 2007) and Shields (2003). Besides, Aloini *et al*. (2007) claimed that user involvement is crucial to understand and meet expectations of users and ensure this point. All participants argued that failing to get user support for implementation is an important factor that fails the ERP project. They argued that ERP project manager must convince users about benefits of ERP to avoid resistance, conflicts and poor performance. They also stated that change management strategy is important tool to eliminate this risk factor. Besides, second interviewee argued that project champion, who advertises system and its benefits for employees can also play a vital role for getting support of key users and other employees. One can conclude that failure to get user support is a significant risk that should be eliminated by effective change strategy and management, user involvement and help of project champion.

Failing to Create an Effective Project Team:

In literature it is identified that creating an effective team that contains necessary skills and knowledge such as skill deep process knowledge, IT skills and some skills and attributes plays a vital role for effective implementation of ERP systems (Aloini *et al*, 2007). Many authors such as Huang *et al*, (2004), Aloini *et al*, (2007) Sumner (2000), (Dey *et al*, 2013) and Shields (2003) stated that failing to create an effective project team as a risk factor for ERP projects. In fact, this point is also mentioned by all responders as a critical success factors. They stated that an effective project team with a competent team leader must be established. They stated that failing this point will cause many problems for project and may fail the implementation.

Inadequate Financial Management:

In literature, Chen *et al*. (2009) argued that these projects necessitate an economic and financial justification before installation because; wrong cost analysis can cause a project failure. In fact, this point is only stated by first interviewee as a risk factor. One can argue that this point is more important for customers than project consultant or vendors. Besides, second and third interviewees accepted that ERP brings a significant cost for customers and also stressed the importance of customer's resources in critical success factors section as it can be seen on table (6-7). Therefore they could miss out this point during interviews. On the other hand, many successful and effective project

methodologies also necessitate effective financial management of projects. Therefore, this is an important factor for ERP project and lack of adequate financial management for project can be considered as an important risk factor.

Lack of System Supplier Stability and Performances:

Kendall *et al.* (1999) argued that in order to maintain and improve the fit and functionality of ERP system to organisation, these systems require continuous support in terms of upgrades and new modules from supplier. It is identified that instable vendor performance constitutes a risk factor for ERP success in terms of implementation and in long run (Aloini *et al.*, 2007). In fact, this point is also stated by only the first interviewee. But, other participants also stated the importance of user support for ERP success in long run. Second and Third interviewee also stated that a contract management must be used effectively to protect legal rights of both sides. This also shows that these interviewees also consider this point as a risk factor and propose mitigation plans to minimise the impact of it. Therefore, this point is also an important risk factor for ERP systems success for implementation and also for long run.

Inadequate Strategic Thinking and Planning:

Aloini *et al* (2007) and Wallace & Kremzar, (2001) argued that every implementation trial may become a disaster without determining business goals, business issues and strategic needs of organisations and creating a clear vision about company's future. In fact, first and third interviewee argued that determining reasons of implementation and primary goals to reach after implementing the system is a crucial point that must be done for successful system design and implementation. They stressed that lack of a strategic thinking about goals, issues and needs of the organisation creates a high risk for project success. In fact, second participant did not mention this point during interview. But, this manager also stressed that organisations must establish a clear vision and realistic goals for successful ERP implementation. Therefore, lack of strategic thinking and planning about organisational goals and issues to create a vision, generates a significant risk factor for ERP success.

Slow Decisions:

Shields (2001) identified having a slow decision process as a risk factor for ERP implementation. Author argued that companies spend time to build consensus or getting approval for some decisions and this cause a significant time loss for project team and holds up tasks (Shields, 2001). This point is proved also as a risk factor in by primary data. First and second interviewee mentioned this point as a risk factor. Third interviewee also mentioned indirectly that having a strong decision making process and effective team that provides quick and correct decisions is important for successful implementation. Therefore it can be said that not having an effective decision making process is a risk factor for ERP projects.

Bad Technical Support:

In literature Shields (2001), Sheldon (2005) and (Musaji, 2002) claimed that bad technical support in terms of not having the project environment ready, failure to support systems for project management, failure of LAN and failure to prepare databases testing, hinders the project team to

work effectively and progress. These authors claimed that not getting enough support can damage the performance of project team and can cause a significant time loss for project and maybe failure.

In fact, this point accepted by first interviewee and did not mention by other participants. In fact, one can argue that this point is so obvious for successful project management. In addition, all participants indirectly mentioned that project team must receive enough support from top management to execute their tasks. Therefore this is also an obvious risk factor for ERP projects but it should be mitigated well because it may damage the project and cause even a failure.

Buggy Software:

Another risk factor is buggy software; It is argued that programming problems can take weeks to solve and especially at the final testing stage the project team cannot afford cope a delay for weeks (Musaji, 2002) and (Shields, 2001). In fact, this is also true according to the primary data. In fact, first interviewee accepted that buggy software can be a risk factor for ERP projects. Although second and third interviewee did not mention this point directly as a risk factor. They stated system testing as a primary critical success factor for successful ERP implementations. These managers argued that organisations should allocate enough time for system testing-before “going live”.

Complex Project Architecture and Tasks:

In literature, it is claimed that more modules increase the level of complexity in projects (Francalanci, 2001). Authors claimed that failing to plan effectively key architectural considerations of system can cause complex project tasks. Aloini *et al* (2007) argued key architectural considerations should be well planned to minimise the need for additional software and lack of a good planning phase for these issues could cause problems about personalisation and adaptation of tools for organisations. This point is only stated by first interviewee as a risk factor. This manager claimed that conceptual design of the system should be done based on the organisations primary needs. But, other participants also claimed that organisations must focus on their key considerations to decrease the complexity of project. Therefore it is also a risk factor. Third interviewee stressed that companies should focus on their primary goals in short run rather than trying to meet all business requirements.

Resistance and Sabotage:

Many authors such as Dey *et al*, (2013) and Shields (2001) and Workcube (2013) considered resistance against change and sabotage as risk factors for ERP projects. Shields (2001) claimed that significant changes brought by ERP projects create winners and losers in organisations such as gaining or losing responsibilities, access to information and perceived power. In fact, all interviewees agreed with this risk factor and stated that this constitutes a significant risk factor for ERP projects and cause many problems for organisation. They argued that an effective change management is required to manage change effectively and eliminate the risk of resistance and sabotage.

Personnel Problems:

Shields (2001) argued that human resource problems such as jealousy, personal conflicts, family affairs or illness can have cause a tremendous influence on the failure or success of ERP projects. In

fact, interviewees accepted that personal problems generate an important risk factor for ERP projects. They generally focused on personal conflicts, vengeance or departmental problems and stated that these points are significantly important risks for ERP project that can cause even a failure. One can conclude that project managers must keep away problematical people from project team and process.

In fact, 12 new risk factors are identified from primary data, these are Lack of Documentation, Inadequate resources of customer, Lack of vision, Lack of Testing, Bad Risk management, Wrong project scope definition, Inadequate time frame for project, High modification, Wrong conceptual design, Lack of motivation, Unfamiliar employee to technology, Lack of necessary knowledge and skills in customer firm.

6.1.4 Critical Success Factors Framework:

17 critical success factors are identified in literature. In fact, most of factors which are stated in primary data, show similarity with literature. In addition six more factors were stated by participants. This section will analyse all results.

In an ERP project, the top management support is the first factor that organisations have to ensure. Many authors in literature claimed that necessary support of senior management provides many benefits and solves many issues or problems during project such as resource allocation, motivation, departmental integration, smooth change and successful vision creation (Bhatti (2005), (Zhang et al., 2005), (Al-Mashari et al., 2002) and (Nah et al., 2003). In fact, all participants stated very similar points during interviews. They argued that without top management support there will be a lack of motivation among employees for project and also for change progress. First interviewee argued that top management support will motivate people about new system and necessary changes which are an important benefit to decrease their tendency of staying with old system or assimilating new system as old one. They also argued that this factor will help project team to deal with resistance to change of employees. In fact, this is an important facilitator of getting user involvement. Participants also claimed that in project without lack of senior support, dominant departments or low manager will force their need and expectations which will cause a bad vision and unrealistic or unnecessary goals for project. First interviewee argued that establishing these goals and vision wrongly will lead a wrong conceptual design of system and may cause project failure or poor system performance. They also mentioned that in order to allocate enough resource in terms of financial and human, top management support will be helpful for organisations. Second and third interviewee also argued that this factor is also important for crisis management and getting agreement among stakeholders. One can say that top management support is a fundamental factor for ERP projects and without ensuring it, implementations are likely to fail or bring a significant cost and damage to organisations.

Another point stated by participants is clear vision and appropriate business plan. In fact, this point is also mentioned highly in literature. Shanks, Graeme, *et al.* (2000) and Umble et al. (2003) has concluded that a clear and persuasive vision, which explains how the organisation would operate in future and meet all stakeholders' needs, must be created before starting to the project and

understood by all stakeholders. All participants also argued that vision is one of the most critical points in ERP projects. All interviewees argued that it is fundamental to direct and motivate people for project and future changes. They also argued that vision will lead organisation to identify its goals of implementing ERP which is also stated an important factor for ERP implementation. Both in literature and in primary data, it is stressed that companies must establish also clear goals to reach in short run and also in long run. In addition, all interviewees argued that having unrealistic or wrong goals will cause a bad conceptual design and may lead project failure, dissatisfaction, poor performance and high cost. Third interviewee also argued that lack of clear vision and goals will obstruct to determine the scope of project and generate an effective business plan. This manager also argued that without a clear vision and goals ERP projects will become a scratch pad” and this situation will obstruct the project termination and benefit realisation.

Nah and Delgado (2006) and Wee (2000) also stressed the importance of an effective business plan which specifies intended strategic and tangible benefits, resources, costs, risks and timeline is extremely important for project success. In addition, it is identified that there must be a consistency between the business plans, organisations needs and selected ERP system (Nah et al., 2003). In fact, this point is also mentioned by all participants but highly by second interviewee. This manager stated a factor that called effective ERP strategy and stressed that an ERP business plan which identifies intended benefits, resources in terms of human and monetary, costs, potential risks and also an IT integration plan if the system will be integrated with other old legacy systems. This participant added that it must be generated by top management in order to successfully define the scope, define route maps and manage ERP projects. Therefore one can argue that generating a clear vision, goals and creating a comprehensive business plan which clarifies all necessary points about project in terms of system selection, resources and intended benefits are critical success factors for ERP project which ensure the direction, its limits and goals of project.

Besides, second interviewee claimed that minimum customisation is also another important component of successful ERP implementation strategy. This manager argued that keeping customisation at minimum level is a crucial success hint for ERP projects. Besides, other participants suggested this point in order to protect the stability of software. Second interviewee argued that this point is very crucial and organisations should choose customisation way only for significantly obligatory points. Third interviewee also stressed that this is an important critical success factor that ensures the system performance in long run by eliminating potential problems in upgrades and reduces cost of maintenance. In literature these points are also highly stressed by different authors, Parr and Shanks (2000) and Fang (2005) argued that uncomplicated module selection and keeping customisation at lowest level are crucial factors that increase the likelihood of project success. Fang (2005) also argued that the level of customisation is one of the key determinants of the project duration and also maintenance cost in long run. Therefore, it is crucial for organisation to identify their key primary needs and omit system modifications as possible as they can. Minimum modification is important for project success, software stability and long run system performance.

Another critical factor is identified in literature as Successful Business process Reengineering. In fact this point is highly related to the previous factor. In fact, this point is identified in literature as a substitute of system modification. It is stated that BPR is a prerequisite for taking full advantage of the ERP software. Nah et al. (2001) argued that organisations have to modify their business

processes to minimise the need of customisation. In fact, all participants argued that effective BPR is a vital tool to fit organisation to software and improve process quality. They argued that each organisation has problematical or redundant processes that decrease the effectiveness of system; therefore fixing it by BPR plays a vital role for benefit realisation of ERP systems and system performance. Third interviewee argued that companies should adapt their current processes to software's ones to increase their process efficiency because this manager argued that these ERP solutions are developed according to the most useful best practices and processes for organisations. In reality, this can be a biased statement but other participant especially the first interviewee also agreed with the necessity of BPR. Therefore, rather than keeping their processes same, organisations must assimilate them to the recommended structure and order by system. Therefore, it is identified that business process reengineering is another key factor that fits organisation to software and improves process quality of organisation for high standard. Also, companies have to visualise their current processes before starting to the project and effectively reengineer them between system selection and actual change process. First and second interviewee argued that executing this reengineering process in the project implementation phase will cause significant problems for managers and may cause a failure.

The need of BPR is also increases importance of system selection because the extent on BPR is related on how system fits with current business processes of the company (Fang, 2005). In fact, system selection is identified as a primary factor in literature review; Davenport (1998) argued that customers generally do not consider whether the selected system would be appropriate to their business strategy or processes. Many authors argued that harmony between organisational processes and selected ERP package is a crucial factor for ERP project implementation (Al-Mashari et al., 2002) and (Somers and Nelson, 2004). In fact, harmony between business strategy and software were mentioned as a big risk factor for ERP projects. Therefore one can argue that this is a critical success factors for project which may cause risks of wrong conceptual design and poor system performance, because if the system does not match with strategy, they will not satisfy customers in long run even it is correctly implemented. For the second point to match with business processes which is the main point of the identified factor in literature, First interviewee also argued that organisations may also select their system which partially fits with their current processes to decrease the scope of BPR. But in fact, none of other participant is stated this point as a primary success factor for ERP project. They argued that this is a secondary factor that facilitates implementation and BPR processes reengineering. Therefore, organisations must pay attention on the harmony between their business strategy and system abilities rather than focusing on processes.

Another point is effective project management and methodology, many authors stated that applying an effective project management methodology is important to control and manage implementation, realise benefits, meeting time cost and quality requirements and also coordinating supportive activities such as training. In fact, all participants also highly mentioned this point for successful ERP implementation. They argued that failing to apply project methodology will cause problems to coordinate project activities and establish a strong communication between stakeholders. Third interviewee argued that customer must get necessary information about vendor's implementation methodology in terms of key project phases, roles, how the project will be documented, communication management and their expectations from customer. In fact it is proved that an effective project methodology must be established for ERP projects, third interviewee also suggested

that customers must choose the most convenient methodology for them to maximise their help to vendor firm.

On the other hand, it is identified that ERP project success is strongly linked also to establishing effective project team with necessary skills and knowledge. For successfully implement ERP systems, composition and teamwork of the project team plays an important role. It is approved by both sources of data that the team must have necessary people such as business analyst, technical experts, external consultants, end-users and other managers from necessary departments such as finance and HR or labour representatives when it is necessary. Somner and Nelson (2001) suggested that the project team should not have only for technological knowledge, it must be able to understand and analyse the organisation and business requirements. Wee (2000) also claimed that team member must allocate necessary time and effort for ERP project, in other words it has to be their highest priority job. In fact, this is broadly mentioned as an independent critical factor by participants. They argued that customer's resources constitute a very important critical success factors for ERP project. They argued that companies must consider their available resources for project planning phase and generate their plans according to the bottlenecks. It is identified that in order to generate a realistic plan, ERP customers have to analyse their resources to allocate necessary competent people, IT infrastructure as well as financial resources.

On the other side, another important factor is delegating a competent project leader. In fact, this point is not mentioned enough in literature but all participants stressed this point as a primary factor. They claimed that an ERP project leader is a key determinant of project team and even a perfect team cannot perform well without a competent leader. Third interviewee suggested that the leader must be flexible, disciplined, good decision taker, experienced, well educated, good motivator and communicator, popular and experienced in ERP systems.

Second interviewee also stressed that existence of project champion will be another important facilitator factor ERP projects. This manager claimed that a champion will provide enough support about system implementation in terms of advertisement, motivation and crisis or conflict management. In fact, this point is also stated as a secondary factor by other participants for ERP implementation. Second participant also added that it is better that project manager takes also the role of champion if he or she has enough time and knowledge for this point. Therefore, an effective project team leader is a must for high performing project team and will lead to project success. It is also important to delegate a project champion to facilitate implementation and employee issues.

Besides, it is also important for ERP project to establish a strong communication between all stakeholders. ERP projects require effective communication among functional levels. Amoako & Gyampah (2004) argued that failure to establish effective communication is one of the main reasons of project failures in project management history. All participants also mentioned that communication plays a vital role for project success. Third participant stated that this point is a secondary factor and generally depends on project team and leader competence and also methodology. Therefore it can be said that customer must also pay attention to communication knowledge and skills of team leader and member in team building process. In fact, as stated above, vendors may provide communication practices for company and customer should also pay attention on this point. In addition, Carton *et al.* (2008) stressed that in these kinds of projects, departments generally are reluctant to share their data or information with other departments because of

organisational structure, appropriation of information or secret agenda. Therefore, the top management must take necessary decisions and show its determination on this issue and also help project team to establish a strong communication method to support ERP project.

Change management is another critical success factor for ERP implementations. It was identified in literature and confirmed by primary data that organisations must pay attention to the management of change because ERP implementation projects will bring a significant change in terms of organisational culture and business processes. All participant argued that results of these change will strongly influence processes, employees, structures, policies and may cause redundancies, job or responsibility changes. It is stated by all managers that in order to minimise many potential risks such as resistance, dissatisfaction, confusion, departmental conflicts, poor performance in new system and even failure the project, companies must establish an effective change management strategy and activities. Third manager argued that implementing an ERP means a new way of doing business and employees and organisation must be prepared for an easy adaptation.

Moreover, another critical success factor for ERP implementation is vendor and consultant support. For ERP projects lack of necessary knowledge or skills and highly centralised company structure of customers necessitate an external support for ERP projects. In literature, it is argued that external consultant's usage in terms of knowledge and experience is important for driving ERP projects to success (Ehie and Madsen, 2006) and (Kapur et al., 2014). All participants also argued that vendor and consultant support play a vital role for ERP projects. Third participant argued that ERP implementation is not the primary job of customer firms but it is for ERP vendors and consultants. Consultant implemented these systems in many other organisations probably in similar sectors, so it is important to get support from consultant in terms of implementation methodology, system design and many other issues. One can argue that this participant is an ERP project consultant from a vendor firm; so this statement can be biased. But in fact, this point is also highly mentioned by second and third interviewee. A very similar point is also argued by first responder that Customer Company cannot find all necessary skills internally especially IT skills and ERP knowledge. Therefore, consultant support can provide help for customer to manage organisational change, generate blueprint analysis, develop their IT infrastructure, establish effective BPR and apply appropriate project management methodology. Also, this manager claimed that this cooperation can provide a knowledge transfer to customer firms in terms of project management, BPR or system design to reinforce organisational knowledge. In fact, this point is also stated by Al-Mashari et al., (2002) as Vendors can also help customers to organise effective training to all employees which is a valuable source to develop necessary skills in house. Another claim of first interviewee is vendor firms help to organise supportive activities such as training key-users or change supportive activities which is also stated by third participant. It is also claimed by first interviewee that vendor and consultant firms' resource qualification is also important like customer resources. Zhang *et al.*, (2002) identified three dimensions of qualified vendor support as; low service respond time of the vendor, providing qualified and educated ERP consultant who have high knowledge of enterprise business processes and IT technology and finally effective participation in ERP project implementation process. One can conclude that ERP customers must get consultant and vendor support to implement these systems into their organisations. Also, they have to consider these points stated by Zhang *et al.*, (2002) and also their past reference to ensure the quality.

In literature another important point is highly claimed by authors as retaining the experienced employee. Bingi *et al.* (1999) argued that implementing and sustaining ERP systems require many experts for various set of skills such as technical, interpersonal and managerial. But some authors claimed that there is a shortage of skilled and experienced ERP staff because of the high demand in the market (Kumar *et al.*, 2003).

In primary data, this point is only stated by first interviewee. This manager claimed that retaining key employee is difficult in IT market except the market leaders. Same responder also argued that organisations must also make provision to retain these people into the organisation as much as they can or they have to establish a system to eliminate the impact of this high demand. In fact, a similar point is stated by Fang (2005) as companies must pay attention to the effectiveness of their recruitment process and to provide career opportunities for experienced staff. Therefore, one can argue that this point constitutes a risk for customers during implementation in short and also threatens maintenance of their system performance in long because of high staff turnover. In order to mitigate this risk factor, first interviewee argued another factor which is effective documentation.

First interviewee argued that for sustainable system performance, documentation is important to keep necessary information about executed tasks, changes, user manuals and conceptual designs which are important for sustainability in long run. This manager claimed that with key job quits, these documentations will help new employees, key users and managers to understand the system and sustain its performance. In addition, this point is also stated for implementation process by first and third interviewee. They argued that project goals, primary needs of organisations, current business processes of company, modifications and executed tasks should be documented well for monitoring the project progress. Third interviewee claimed that ERP projects may become a “scratch pad” without effective documentation. According to the primary data two more critical success factors will be proposed; contract management and system testing.

Second and third participant argued that before “going-live” with the system, software must be tested appropriately. Second interviewee stated that it is a must to determine and eliminate bugs and problems in software that can cause system failures or poor performance which can discredit the system for employees and damage their motivation. In fact, in literature this point is stated as a sub-factor for troubleshooting and problem anticipation factor. But in primary data these managers treated system testing as a different factor. One can argue that the main reason of separating system testing from this factor, is drawing attention to system testing. Also, it is proved that companies must have an effective problem anticipation and troubleshooting process. It is identified that top management and vendor supports are crucial in order to establish this process.

Second interviewee also argued that a contract management is also crucial to establish a strong and effective relationship between customer and vendor firms that will protect legal right of both sides. In fact, this point is stated also as a limitation of ERP system and all participants also mentioned that effective contract will be helpful to protect the strong relationship between firms. Therefore, an effective contract that considers legal rights of both companies must be generated at the beginning of ERP project.

Another important factor is stated by first interviewee as allocating enough time for data migration. This manager claimed that this data migration process is a highly time consuming process for

organisations that require an effective verification, analysis and cleaning processes for decreasing the wrong and unnecessary data. Third participant claimed that this process requires a significant effort of employees and managers but plays a vital role for system performance. In fact, in literature the importance for project timeframes is mentioned by many authors such as Parr and Shanks (2000) and Holland and Light (1999). They argued that having realistic timeframes for ERP project is crucial for effective management and success. In primary data first and second interviewees stated this point as a secondary success factor. Also, third interviewee also indirectly mentioned that ERP project must have realistic goals and timeframes for each task such as data migration or BPR process. The key point here is establishing a project plan or schedule which is appropriate to the available resources of customer and vendor. In fact, this point is a subsidiary factor of ERP success and all stakeholders must pay attention.

Another secondary factor is stated as monitoring and evaluating performance of project members, in fact, this factor is stated only by first participant and any other participant did not mention this point either first or second factor. But in secondary data many authors claimed that this factor is useful to eliminate system glitches. Authors also argued that milestones should be used to track progress and that obtainment should be measure against targets or goals. First interviewee argued that this point is a sub-factor of effective project management methodology and effective project team. One can argue that although this point is not mentioned highly in primary data; it is a usual process for every project in order to effective project management. Therefore, the performance of employees and system should be monitored and evaluated in regular project meeting to eliminate possible problems.

Importance of training and user involvement is also mentioned highly in literature as well as primary data. It is founded that organisations must generate effective training plans both for key users and also other employees whose job will be changed as a result of implementation. It is also proved that user involvement plays a vital role for project success and ERP customers must ensure it for project success. In fact, these points will be discussed in next chapter in details but they also identified generally as a secondary factor under change management.

6.1.5 Change Management Strategy:

Before starting to change strategy, two key principle of change management are identified as; managing change is a responsibility of senior management not employees and change must be implemented by involving people and getting their approval rather than imposing or forcing them. Third participant claimed that these are two important points that all companies must understand before starting to change management activities. Another tactical suggestion for change management is stated by second and third participants as creating a sense of exigency for change in organisation to motivate and move internal staff for change. Therefore, it can be said that organisations must start immediately to motivate people even before planning or visioning phase.

In fact, in literature the change strategy is started with a force field analysis to identify driving and restricting forces for change progress. In fact, none of the participants mentioned this point during

interviews. But, all possible problems stated on table (4-1) are actually mentioned by them indirectly. Therefore, it is author's recommendation that organisations should start first by a force field analysis to analyse whether these points exist or not. In fact, points which are stated such as "Lack of a visible top management support or commitment to the project", "Lack of a strategic initiative", "Difficulty to determine an executive sponsor for the project", "Top management disagreement on the value of the project" and "Expected tangible benefits are extremely aggressive", are stated as critical points that an ERP project must ensure at the beginning of the project. For instance all interviewees mentioned the necessity of top management support for ERP project. Therefore, one can argue that it can be a second chance for top management to double-check these points and take necessary decisions.

Then, in literature first section is identified as diagnosis or current situation analysis. In fact, participants argued that first of all, a clear vision and goals must be established by organisation in order to determine the future point that organisation intends to achieve. All participants stressed that without a correct vision, change management trials are likely to fail. In fact, this point is also mentioned by literature. Kotter (1996) and Sengupta, Nilanjan *et al.* (2006) argued that lack of a clear vision and will cause a lack understanding the whole strategy and how the organisation will achieve its goals. Therefore second point of the change strategy must be establishment of vision and business goals. Responders suggested that this vision and goals must be clear, realistic and understandable. They also suggested that senior management must declare the company vision to employees to show support ensure that everybody understand it clearly understood it.

Afterwards, all participants stated the need of a comprehensive analysis of current state of company. In fact, in literature it is also identified that companies should analyse their current situation and identify their lacks and needs for effective change management (Sankar & Rau, 2006). In order to analyse the current state, all participant suggested to execute an as-is analysis to visualise the current state of the organisation in terms of processes, knowledge level, resources, strengths and weaknesses. After that phase, participants suggested a to-be analysis according to the vision of the company which will determine the future situation that organisation must achieve in order to realise its vision and business goals. Then participants stated that this must be followed by a gap analysis to identify the gap between current and future points and also to determine also the route map of change to change team.

Second interviewee stated that before starting to actual planning and change implementation, it is useful for companies to reengineer their processes. This manager claimed that doing BPR during the change implementation can be time consuming and problematical. In fact, this point was not mentioned in literature section. But one can argue that BPR brings a significant change to organisation and its people, so it would be useful to understand the size and the content of change for managers to better generate plans and activities. In fact, one of the main reasons of change management is to adapt people in new company order, so the scope of this change must be defined well in order to deal effectively with the resistance and other potential risks. In fact, first interviewee also argued that before starting to change realisation, conceptual design phase of the project must be executed by project team which must contain system analysts as well as business analysts to establish an effective conceptual design. Besides, first responder also stated that during this processes managers and consultants must focus on organisational functionality such as opening or

closing new departments, defining new processes or job positions. After finishing this phase, the sub-change team must focus on their potential impacts on employees and how this intended order will be realised into organisation.

After this process, change team must be established to guide people, plan and coordinate change management activities. It is stated that minor changes can be successfully managed under responsibility of project team but if the scope of change is big, it will be useful to delegate a sub team with change experts to focus only managing change (Shields, 2001). Second participant also mentioned that if it is possible, a sub- team should be defined apart from the project team to deal only with change management activities especially in radical change trails. Therefore, it can be said that it is beneficial for organisations to delegate a sub change team in order to concentrate and deal better on change activities.

Third interviewee stressed that this change team must have right people that have necessary skills and knowledge as well as a competent change leader with necessary leadership skills such as communication or influencing. This leader can be either project manager or another person who is really competent and experienced about this topic. This manager is also argued that members of the team must be convinced and determined about the change in order to guide them and be a model. In fact, this point is also stated in literature by Hughes (2006) as a qualified change team must be established, which should be an example of required changes and show other people that changing is possible. In terms of change leader, it is stated that leaders of change are ones that everybody focus on and main responsibility of change coordination and success are on them (Sankar *et al.*, 2006). They must align their behaviours, attitudes and appearance with the goals of the change process (Sankar *et al.*, 2006). Third participant also approved this point. Therefore, it is crucial for organisations to create a guide team with a competent leader to coordinate change and create an environment that leads people to the intended changes.

In order to do that, four critical supporting points are identified in literature; communication, involvement, training and job-redesign.

In terms of communication, Aladwani (2001) argued that communication plays a vital role for influencing cognitive component of key employees' attitude. Also, Shields (2001) emphasized that effective communication helps managers to create awareness about objectives, activities and status of the change plan and also the whole project. In fact, participants also stressed the importance of communication for effective change strategy. Second interviewee argued that effective communication must be established to inform people about the current situation and guide them to the next step. Third interviewee also argued that without effective communication it is impossible for managers to understand employee needs and expectation which will lead to a poor expectation management. This participant also argued that communication helps managers to explain the benefits of system for company and for them and their job. Therefore, it can be said that effective communication must be one of the main component of a change strategy.

In terms of user involvement, both literature and participants argued that change strategy must also ensure user involvement. Third manager stated that user involvement is another crucial factor for change management. Second participant claimed that during change process, involving people and giving them opportunity to say their opinions is important. This manager argued that employee

feedback is invaluable for change management. Hayes (2010) argued that involving key people involvement that will be affected by change provide appropriate feedback which is a necessary input for change management. Besides, Sankar *et al.* (2006) also stated that employee involvement helps manager to deal with employee fear, mistrust and risk aversion. Third manager also stated that key user involvement help managers to deal with resistance of change that is related to employee fear of change. Therefore, it is approved that change managers must generate plans and activities to ensure employee and user involvement during change process. For this point, second interviewee suggested that managers must endear the system to employees. This manager stated that launching parties, advertisement campaign to attract employee attention to system. It is exemplified by second interviewee that an ERP customer called its system as “Shrek” in order to advertise system to employees.

Another critical point is training for effective change strategies, Wallace and Krezman (2001) suggested that in an ERP implementation at least 80 percent of internal staff should be trained. In fact, this point is also accepted by second employee. This manager argued that ERP implementation necessitates a comprehensive training for all function of the business. Also, Hughes (2006) stressed that if people do not understand the new system they may question their abilities to adapt and learn new things. Third participant also mentioned that training is helpful to improve self-confidence of employees. Therefore, it can be said that a change strategy must contain also effective training programs. Participants and literature also agreed that training for these systems must be hand-on for key-users so they can perform their normal tasks with help of new system. One can argue that it is another way to endear system to employee because people can realise the benefits of system. It is also found that if it is necessary companies can organise class training and prepare documentations to educate people.

On the other hand, change strategy is stated by third interviewee. This manager claimed that incremental change plans with short term goals are more appropriate for ERP implementations. This responder stated that incremental change management provides the opportunity of fixing or reinforcing your initial plan after each step. It is also said that getting feedback after each step and evaluating the plan for next step according to those feedbacks can provide many benefits to change team. This manager also suggested that after finishing each phase, it is useful to celebrate the success with all member of the organisation and reward hard-working people for motivation. In fact, most of these points are also mentioned by Sankar *et al.* (2006) and Kotter (1996). Therefore, one can argue that a step-by step approach can be useful to verify plans and organise motivating activities. In other respects, one can argue that if the gap between the current and future point is small, a radical change or single step approach can also be applicable to save time and cost for customers.

Another important finding is the need of supporting change with other activities. Companies must generate activities to support change process such as new recruitments to get new skills and talented people, job designs promotions and creating new positions like change leaders. Shields (2001) also stressed that changes in organisation’s processes and structure necessitates job redesign for some roles. Besides, Leon (2008) mentioned the need of supporting these changes with new recruitments to get necessary skills and expertise. Hardwood (2003) also stressed that job changes must be documented to support people transition to their new jobs. In reality, importance of documentation

is also stated by participant in previous chapters therefore it can be said that change team should organise necessary change activities to reinforce change process and also document all decisions, modifications and actions to manage this process appropriately.

Finally, two more important principles are found from primary data. Third manager argued that during the change process, the team can face a significant resistance even they plan everything appropriately. It is important for the team to show their determination to employees and continue to advertise the system. First and Third participant also mentioned that top management support also plays a vital role against resistance of change. Also, second interviewee argued that during the change process may necessitate lay offs for some employees. This manager stressed that managers have to be fair, give all right of these people, show their respects and be thankful in order to not damage other employees' morale. Therefore, project team should stay determined against the resistance and also use the top management support to break it. Managers must also pay attention to not disrespect or demotivate employees during the change process.

Chapter 7: Conclusion & Recommendations

7.1 Research aims and objectives:

The aim of this research was to identify an appropriate process for developing and implementing an ERP system into organisations. In details, the research firstly focused on why organisations are intending to develop and implement ERP system in order to create an understanding of customer goals. Then, the research tried to answer the question of what benefits can an ERP provide to customer and also what are the limitations of systems to create a better picture for customers. Afterwards, the question of what are the main risk factors in ERP implementation project was asked for identifying critical risk factors during this implementation process. Moreover, the question of what critical success factors should be considered during the implementation process was asked in order to clarify critical points that would ensure the success of implementation. Finally, the research tried to answer how the change in organisations should be managed to support these implementation.

In order to answer these questions, four objectives were defined;

- 1. To map the business development elements which typically drive companies to implement ERP systems.**
- 2. To identify benefits / dis-benefits and risks of developing and operating ERP systems.**
- 3. To propose critical success factors of developing and implementing an ERP system.**
- 4. To propose an organizational change strategy to support ERP system operation.**

7.2 Conclusions:

According to the objectives stated above, an appropriate literature review was conducted in order to find answers to research objectives from past studies. Then, a research was organised to collect appropriate data about research objectives by executing qualitative interviews with professional ERP project managers and a customer. At the end of this process, following conclusion have been drawn from combination of primary and secondary data.

7.2.1 To map the business development elements which typically drive companies to implement ERP systems

According to past literature and survey results, this study identified many business elements of ERP systems which make these systems attractive. Key findings are stated below;

- One of the key findings is high functionality of ERP systems; One of the main important element that drives firms to ERP implementation is high functionality structure of ERP systems that provides many common best practices for various function of organisations such as procurement, material management, production, distribution, financial accounting, asset management, cash management, controlling, strategic planning, and quality management. It is identified that this points attracts customer by facilitating organisational control, reducing cost and possible problems of non-integration in terms of business practices and systems. In fact, another key finding is this all in one functionality prevent ERP customers to invest different system for each business function and operations which is significantly costly and risky than ERP investment.
- Process integration is another key element of ERP systems. It is proved by literature and interviews that one of the most important ability of ERP is automating and integrating business processes of a company. It is determined that ERP provides an opportunity of analysing current business practices and fixing problematical points or removing redundant ones to customers. In fact, this reengineering process brings a better integrated system with developed and automated workflow and improves departmental integration into organisation. It is also identified that this leads a better resource management, error minimisation as well as easier monitoring and controlling of all business.
- Another element of ERP is supply chain integration. It is discovered that ERP also improves external processes of an organisation and improves supply chain integration between customers and suppliers. This point maximises the supply chain performance and reduces total of organisation. It is also identified that customers implement these systems to also improve their external linkage with supply chain partners to better communicate and advertise their product or services.
- ERP implementation brings also a common data source to organisations. It is also identified that ERP helps organisations to store all of their necessary data and improves their abilities to create and share information with external and internal partners to customers. These

systems prevent data losses in organisations and also secure available data by blocking unnecessary access.

- ERP systems are attractive to customers because of their industry specific solutions. It was found that ERP systems provide specific solutions to certain industries and this point makes ERP attractive for these companies. In fact, it was identified that these solutions are highly beneficial for customers and provide a competitive advantage in those industries.
- Another important finding was technology improvement and innovation for organisations. It is determined that ERP brings many technological tools and also the opportunity of integration with many other professional tools to support system effectiveness. In fact, this is identified as an important element of ERP systems.
- Customers also prefer ERP because of its abilities to support organisational business strategies. It is identified that ERP can support reinforce many strategic goals and provide many strategic benefits to customers.
- Providing web-based solutions is also identified as another important element of ERP systems. It is identified that some ERP systems can be used outside of the office by a phone, tablet or laptop with aid of internet. In fact, this was considered as an important solution managers who travel more or generally work outside of the office
- ERP also improves organisation structure and creates reportable, scalable, improvable and monitorable which is an important need of today's business organisations.

7.2.2 To identify benefits / dis-benefits and risks of developing and operating ERP systems:

In terms of ERP benefits, 5 benefit groups were identified at the end of study. These are operational, managerial, strategic, IT and organisational.

- Identified operational benefits are inventory reduction, cost reduction in terms of material and labour costs, customer service improvement, quality improvement in terms of process and product, improve profitability, coherent workflow, better asset management and better cash flow management. It is identified that in order to get these benefits companies must execute an effective BPR, necessary investment, effective training and re-skilling and other supportive activities such as job redesigns or recruitments.
- In terms of managerial benefits, identified benefits are Better resource management such as human or monetary resources, better accounting control, improved reporting benefits and developed performance control of organisations in terms of financial, manufacturing, operational and employee performance.
- In fact, it is also identified that ERP can be an important tool for facilitating decision making and planning activities for organisations. But, this is dependent to the quality of managers.
- It is identified that many claimed strategic benefits for ERP systems are also depending on other important factors. Research results showed that organisations cannot get business growth, improved business alliances, becoming an innovative company, cost leadership and product differentiation by just implementing ERP systems. It is identified that ERP can be a tool for these points that help organisation's strategy to reach these goals. Also, resource

and knowledge of organisations are other key determinants for these points. Therefore, many claimed benefits in literature are refuted by this study.

- Results showed that real strategic benefits of ERP systems are building external linkages and supply chain performance improvement.
- In terms of IT benefits, same as strategic benefits, many literature claims are refuted at the end of survey. Data security is the only identified benefits for IT- benefits of ERP.
- Organisational benefits are identified as facilitate business learning, empowerment and better visibility of organisational structures. It is identified that some ERP systems may provide learning portals to their customers and support them to provide education and training sessions to their internal and external partners. Empowerment is the main provider of data security and also determined as provider of organisational order with authorizing and delegating abilities. Final organisational benefit is high organisational visibility in terms of processes and structure which facilitates adaptation of new employees and better and faster collaboration among departments.

In terms of dis-benefits;

- The most important dis-benefit of ERP systems is cost. It is identified that ERP system cost consists of three dimensions; implementation, indirect investment and maintenance cost for long term system performance. It is clarified that implementing ERP brings a significant implementation, investment and continuous maintenance cost for organisations during system life-time.
- ERP also necessitates some expert people to hire. It is identified that there is a high turnover for these experts that may cause problems. Also the wage of these people can be significant for some companies.
- Other important dis-benefits of ERP systems were found as vendor dependence which obligates customers to have a relation with vendor firm. In fact, this dependency can cause problems for both sides. Also, Long ROI period is identified another dis-benefits of ERP systems especially for small and medium enterprises. In addition, ERP is found to be weak for bringing solutions with customisation abilities. In fact, it is identified that modification of software must be minimised. Final limitation is identified as bringing significant change to Customer Company. It is determined that ERP systems may necessitate significant changes in terms of structures, roles, departments and policies. It is clarified that some organisations cannot tolerate these changes or afraid to move things significantly in their business.
- On the other hand, many points such as being prone to delay, failure to meet high expectations and may cause resistance are identified as a consequences of bad project or change management, poor communication, ineffective training and bad expectation management.

In terms of Risks, at the end of survey 38 risk factor were identified, in fact in literature risks were stated with a pooling approach. During interviews two different risk approaches were stated by first and third interviewee. In fact, third interviewee is a project manager; therefore this manager's approach is selected to group all identified risks

- **Operational factors consist;** changes in project scope, Lack of Integration of all departments, lack of enough resources, lack of some necessary knowledge of employees and Insufficient Training and Re-skilling, Bad Technical Support.
- **Managerial Factors consist of;** lack of senior management support and belief to project, lack of vision, wrong scope definition, Lack of an Integrated Technology Strategy, Failure to Re-Design business processes to fit the software, Lack of a Proper Management Structure and ineffective consulting services, Lack of System Supplier Stability and Performances, Slow Decisions.
- **Software factors consist;** high modification, wrong conceptual design due to wrong project goals, Inadequate System Selection and Buggy Software.
- **Personal Factors consist of;** lack of motivation, Ineffective Communication, personal problems and conflicts, Resistance and Sabotage, Failure to Get User Support and lack of familiarity to technology.
- **Project management factors:** Failing to Create an Effective Project Team (Lack of Project Champion, Lack of Business Analysts), failing to delegate a competent project leader, wrong project methodology, lack of enough time and support to project team, Inadequate Strategic Thinking and Planning, lack of enough testing, bad change coordination and management, Lack of documentation, Inadequate Financial Management, Complex Project Architecture and Tasks and Bad Risk management.

7.2.3 to propose critical success factors of developing and implementing an ERP system

- As a result of primary and secondary data, the top management support is identified as the first factor that organisations must ensure. A strong senior management support will help resource allocation, motivation, departmental integration, smooth change, crisis management and successful vision creation.
- Second factor is identified as clear vision and an appropriate business plan. Vision is determined as one of the most critical points in ERP projects. It is useful to direct and motivate people for project and future changes. Also companies must establish an effective business plan which specifies intended strategic and tangible benefits, resources, goals to reach in short run and also in long run, costs, risks and timeline is extremely important for project success. This business plan consistent with organisations needs and selected ERP system.
- Besides, it is identified that keeping customisation in minimum level is an important factor for successful implementation. Organisations should choose customisation way only for significantly obligatory points. Minimum modification is important for project success, software stability and long run system performance.
- Successful Business process Reengineering is identified as another critical factor. It is determined that BPR is a crucial for taking full advantage of the ERP software. Effective BPR fits organisation to software and improves process quality of organisation for high standard.
- System selection is also a crucial factor for successful ERP implementation. Organisations must pay attention on the harmony between their business strategy and system abilities to eliminate the risk of poor system performance.

- Effective project management and methodology is also another factor for ERP projects. Project management methodology is important to control and manage implementation, realise benefits, meeting time cost and quality requirements and also coordinating supportive activities such as training. It is also identified that customers must get necessary information about vendors' implementation methodology in terms of key project phases, roles, how the project will be documented, communication management and their expectations from customers.
- Establishing effective project team is determined as another critical success factor. Composition and teamwork of the project team plays a vital role for ERP implementation success. The team must contain necessary people such as business analyst, technical experts, external consultants, end-users and other managers from necessary departments such as finance and HR or labour representatives when it is necessary.
- Customer's resources constitute another vital success factors for ERP projects. It is identified that companies must consider their available resources for project planning phase and generates their plans according to the bottlenecks. Customers should be also ready to allocate necessary competent people, IT infrastructure and financial resources for project success.
- Another significant finding is delegating a competent project leader. ERP project leader is a key determinant of project team performance. The leader must be flexible, disciplined, good decision taker, experienced, well educated, good motivator and communicator, popular and experienced in ERP systems.
- Existence of project champion is also stated as a facilitator factor ERP projects. The benefit of champion is identified as providing enough support about system implementation in terms of advertisement, motivation and crisis or conflict management.
- It is also determined that effective communication among all stakeholders must be established to successfully manage the project. In ERP projects, departments may be reluctant to share their data or information with other departments because of organisational structure, appropriation of information or secret agenda. In order to solve it, the top management must take necessary decisions and show its determination on this issue and also help project team to establish a strong communication method to support ERP project.
- Change management is another important findings of this study, organisations must pay attention to the management of change because ERP implementation projects will bring a significant change in terms of organisational culture and business processes. This change constitutes also a potential source of risks. In order to eliminate many potential risks such as resistance, dissatisfaction, confusion, departmental conflicts, poor performance in new system and even failure the project, companies must establish an effective change management strategy and activities.
- Vendor and consultant support constitutes also an important factor for ERP projects. It is identified that customers must get enough support from consultants in terms of implementation methodology, system design and many other issues. Cooperation with vendor firm may provide also a knowledge transfer to customer firms in terms of project management, BPR or system design to reinforce organisational knowledge.

- For sustainable system performance it is important to establish an effective documentation process to store necessary information about executed tasks, changes, user manuals and conceptual designs which are important for sustainability in long run. Also, project goals, primary needs of organisations, current business processes of company, modifications and executed tasks should be documented well for monitoring the project progress. Another important point for maintaining system performance is retaining key employee into organisation. Therefore, organisations must also plan provisions in order to retain these experts into the organisation as much as they can or they must establish a system to eliminate the impact of this high demand.
- Other important points are; software must be tested appropriately in order to determine bugs.
- Contract management; In order to establish a strong and effective relationship between customer and vendor firms that will protect legal right of both sides in long run.
- Allocating enough time for data migration; data migration process is a highly time consuming process for organisations that require an effective verification, analysis and cleaning processes for decreasing the wrong and unnecessary data.
- Four more secondary factors were also identified as monitoring and evaluating performance of project member, user involvement, training, having realistic project timeframes and troubleshooting and crisis management.

7.2.4 To propose an organizational change strategy to support ERP system operation:

- Before starting to change strategy, two key principle of change management are identified as; managing change is a responsibility of senior management not employees and change must be implemented by involving people and getting their approval rather than imposing or forcing them. These are two main principles that manager have to understand before starting to change process.
- Effective change management necessitates some points, such as top management support and commitment or a strategic initiative. Therefore, organisations must analyse their driving and restraining forces about change process in order to ensure that they ensure necessities for successful change management.
- First of all, a vision and organisational goals must be established by organisation in order to determine the future point that organisation intends to achieve. This vision and goals must be clear, realistic and understandable. In fact, lack of vision will cause a lack understanding the whole strategy and how the organisation will achieve its goals. It is also important to declare this vision to and ensure that everybody understand it correctly.
- Another important component of change management is the current state analysis. Organisation should analyse their current point well in terms of lacks and needs for an effective change management. In order to do that, it is suggested to use as-is analysis to visualise the current state of the organisation in terms of processes, knowledge level, resources, strengths and weaknesses.
- Then a to-be analysis must be executed according to the vision of the company in order to understand the necessities of intended future point.

- Then a gap analysis must be executed to determine the gap between current and future point that will give also the route map of change.
- Afterwards, the conceptual design of the organisation must be finished; a team which contains system analysts as well as business analysts must focus functionality of organisation and redesign it to achieve the company vision. This process will contain activities such as BPR, departmental changes by closing or opening new departments.
- After this phase, a sub-change team must be built with a competent change leader and right people with necessary skills to focus on potential impacts of new company order on employees and how this intended order will be realised into organisation.
- Change team and leader must be “example” for other staff. They have to align behaviours, attitudes and appearance with the goals of the change process.
- This team must establish strong communication, ensure user involvement, and coordinate training which has to be done hand-on training for key users.
- It is identified that incremental change planning is more appropriate for ERP implementations. Therefore, change team must apply a step-by-step approach by defining short term goals.
- Supporting change process with additional activities such as recruitments, promotions, job designs and new job creation.
- It is also identified that after finishing each phase; change team must evaluate its plans or supporting activities and must do necessary adjustments.
- It is also identified that after obtainment of each phase or goal, the success must be celebrated and hard working people must be rewarded.
- Documentation is identified also as another important component of an effective change strategy. All decisions, plans and other important notes or information must be documented effectively.
- Finally, change team must show its dedication against resistance of change. The change team must be supported also by senior management to effectively break the resistance and convince employee for the change.

7.3 Limitations:

The main limitation of this research is the number of responders. In fact, the primary data sample should be more with more customers especially to get more accurate information about benefits and dis-benefits of ERP systems. In fact, some objectives were based on the customer perspective but lack of enough customers obstructed to get necessary data for these points. Also, the data collection process is based on one type of research method which is qualitative interviews. In fact, questionnaires could have been used to increase the sample size in order to increase the ability to generalise.

Also, the scope of project is highly broad and it obstructed to collect data from responder. It also obstructed to analyse the data and get a conclusion.

Besides, the primary data source is generally based on participants from a Turkish ERP vendor which is a regional firm. The sample size should get participants from different ERP systems to increase the comparability of data. In fact, there are many ERP systems and the system specification or design may require different factors for implementation.

7.4 Future Work:

The next step of this dissertation should be a comprehensive analysis of benefits realisation of ERP systems. In fact, this work identified many benefits in different categories. But, it would be better to examine how these systems bring these benefits to organisations. Cultural factors did not consider in this research but in fact, culture plays a vital role in project management. It can focus on differences in implementation process for different cultures. Moreover, a deeper analysis should be done in order to distinguish roles and responsibilities of three parties of implementation; vendors, consultants and customers. In fact, identifying clearly their roles will also give an opportunity to improve the understanding about the implementation process and consider the harmony between them.

Critical success factor framework also needs to be improved. In fact lots of CSFs were identified but in fact, these are generally primary factors for ERP implementation. The analysis should go further to determine secondary and third level factors and categorise them to clear a better picture for CSF framework. Finally, in terms of business development elements, this dissertation further focus on analysing different ERP systems to compare which system dominates which business elements in the market.

7.5 Recommendations:

- 1) Top management support plays a vital role for ERP project. It provides enormous benefits to ERP implementation process. It is recommended that customers should ensure this point before taking any other decisions.
- 2) Poor communication between stakeholders is a problem for ERP projects, (so project team should pay attention to establish a comprehensive communication system to connect all stakeholders each other for successful implementation.
- 3) It is also recommended that customers should focus on their primary goals and establish a clear vision that is based on organisational needs
- 4) Effective project management methodology is also an important factor. Customer should negotiate this point with vendors in order to get information about their methodology and what is expecting by customer firm.
- 5) It is also recommended to establish a competent project team with best people in the organisation and also a change leader with necessary knowledge and skills.

- 6) Organisations should focus on business process reengineering to improve their current processes up to a high standard. They have to keep customisation in minimum level and choose this way when it is significantly necessary.
- 7) It is also suggested to establish an effective contract that is convenient for both sides. Effective contract management will protect their relation and allow them working for a long time.
- 8) It is also important that customers allocate enough time and resources in terms of human and monetary in order to manage the project without any problem.
- 9) Executing effective system testing is also crucial before “going live” and plays a vital role.
- 10) It is also recommended to allocate enough time and effort for data migration process.
- 11) Effective change management strategy is also important for ERP project success. It is recommended that key user involvement should be established during change process.
- 12) Good cost and resource management and monitoring process should be established for the project. An S curve method could be used for this purpose.
- 13) It is also suggested that all decisions, plans and other project paper must be documented and a back up system must be established
- 14) Customers must understand that this is not an IT project, ERP implementations are business management projects and must be managed properly.
- 15) ERP projects are highly risky, therefore an appropriate risk management methodology must be established and contingency and mitigation plans must be generated for all factors stated in this research.

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Appendices:

Appendix A: Transcription of Interviews:

Background Information:	
Name:	B. A.
Company Name:	Netlog Logistics
Experience:	SAP ERP Customer

Q1) what kind of Enterprise Resource Planning (ERP) software do you supply the customers or sectors/ are you using?

We are using SAP R3 in our company, also we intended to implement a SAP CRM module to our system but it failed three times, so I have a two different story about ERP from this company. Also, I used Oracle in my previous company and participated implementation project of that system.

Q2) In your point of view, why do companies implement these systems, in other words, what are business elements that drive companies to implement those systems?

Companies implement these systems because ERP can provide most of their basic needs in one system. For example today, with an ERP system you can perform your CRM, logistics, finance, purchasing, HR, production and many other business functions with one system. That's the main reason of ERP success. This all in one system also provide facilitate managerial control because you can see current tasks to do or in what stage they are and who are responsible to them, who must approve them etc.

Also, it facilitates storage, accessing, sharing and easily creation of data for companies with its best practices. In fact, accessing necessary information with appropriate reports can help managers to take rapid decisions. Another important reason for my company was industry-specific systems for example oil or pharmaceutical sectors. These specific programs focus on certain industries which provide specific tools, structure and practices for companies in those sectors. In fact these solutions provide significant improvement and benefits for organisations.

Another point is, especially, if you are in a sector in which there are many vertical operations, this point is really important. For example we are a logistic firm and some of tools in ERP cannot meet our company's need therefore this system should be integrated with other professional tools. In recent years ERP providers highly developed this point and became able to integrate their systems with other professional tools. For example SAP integrated our system with a professional Warehouse management tool which is known worldwide and this was an opportunity for us to obtain also that program. Finally, ERP provide an opportunity for organisations to focus on problematical points in

company's processes and improve them to create a more effective system and increase integration within the supply chain.

Q3) can you explain the scope of an ERP implementation project? What kind of tasks does it involve?

From company perspective, an ERP implementation requires firstly a vision and clear goals. It means why the company needs this system. Then requirements should be identified clearly to determine what modules will be implemented such as procurement or material management, in fact companies should focus on their primary needs or most urgent ones rather than trying to solve all problems or meeting all needs. After that point vendor selection process must come, a reliable vendor which has a clear project methodology, experience and technical knowledge to provide service successfully in long run, must be selected. In fact, customers should check vendors past customers and references. And finally, establishing an implementation strategy is another important point for ERP project; in fact, this process must be handled with vendor firm and should be appropriate to customer's current situation and resources in terms of human and financial.

Q4) in our literature review, we have identified many claimed benefits of ERP systems. According to your ERP experience, what are the benefits of ERP system?

Firstly, in order to understand benefits of ERP system we have to understand that these systems are just tools which provide some best practices or solution for organisation. Implementing ERP system for two similar companies in same size can give totally different results because many other variables such as company strategy or organisational knowledge are involving to benefit realisation process. In reality some ERP providers does not explain this point clearly to their customers. When we come to your question I will state most common benefits of these systems for you. In fact, I have participated project implementation process in my previous company; we redesigned almost 80 percent of our available processes and added more than 15 percent new processes to fit the system and make our business practices more effective

Common benefits of ERP systems are cost reduction, cycle time reduction, inventory reduction, productivity improvement, quality improvement in terms of process and product quality, Customer services improvement, faster decision making, better resource management and finally technology improvement with new tools of ERP. As I mentioned above these systems necessitates a BPR process which redesign company's processes, structure, department and almost every other points. If company can succeed this transformation and implement this system these are the potential benefits of these systems. You can add also better supplier management because one of the main goals of these systems is to improve supply chain of the organisation by reorganising processes and providing tools for better operation and linkage between partners. For example, I used to work for a production company; with ERP system I was able to control my current stock level, current orders and raw material requirements to produce them. I was able to get supplier or customer statistics if it was a regular one and calculate potential risk of ordering from them or accepting their purchase request. Or I was able to control and categorise customer complaints or queries and identify problems easily with ERP. For production it was also important to have automated workflow which reduces personal errors such as missing something for orders and other potential problems that

might occur. In fact, when your customer sends an order to you, system directly records it which is also another important point for production.

Another point is empowerment is also important point, with these systems you can authorise people to execute some tasks and access some special data. It facilitates performance control and brings an order to organisational processes. Another important benefit of this point is the data security. Today data security is one of the most important issues for organisations and with these empowerment abilities you can delimitate access to some remarkably important data set and ensure their security.

Final benefit is reporting, ERP can provide transactional report if your system's conceptual designed have been done by considering these points and also necessary parameters were set but in my opinion getting analytical reports is almost impossible with ERP systems. So, ERP can also facilitate reporting abilities in some degree.

Q5) in our literature review, we have identified some other benefits for these systems; I'm also wondering your comments about these points?

For Performance control, I agree that ERP facilitates to control performance of employees, customers, supplier and also processes. This is a very important benefit of ERP that facilitates management's role.

In terms of Support Business Growth, Support Business Alliance, Build Business Innovations and Build Cost Leadership, these are really big claims and you can't realise these benefits by just implementing an ERP system. Your organisation's strategy, resources and knowledge are important factors that determine these points. These points must be your organisation's goals and ERP can help you about these benefits but I cannot say that these are benefits of ERP systems.

For Improved Decision Making and Planning, I partially agree with it because as I mentioned above a well designed ERP system can provide improved business practices for decision making or planning and also decreases the decision making time. For example you can get all information about your customer performance or your company capacity and current demand to decide about a production request. But in fact, as mentioned before these are just tools, your manager's ability and knowledge are key determinant of these points and you can successfully make successful plans and decision without ERP. For better accounting control, it is almost same ERP provide some tools for accounting control and monitoring cash management. My current company and the previous one were also successful for accounting control before implementing ERP. Therefore it can be true for some organisations which develop some fundamental structures with ERP systems.

Finally, I disagree with Build Business flexibility for current and future changes, It Cost Reduction, Increased IT infrastructure capability, Support Organisational Changes, Facilitate Business Learning And Build Common Visions. In fact, common vision is a necessity for ERP implementation that organisation should have before starting to implementation project.

Q6) According to you what are the main disadvantages of these systems?

Firstly it's cost of design and implementation. These projects require significant amount of money to fund the project and generally takes 25-30 percent more than planned. Maintenance cost is also high for system upgrades and implementing new tools to respond requirements changes, in addition system requires some expert people to keep that system functional and hiring these people is highly expensive and difficult because there is a high demand for these expert people in market and high turnover is a usual.

Q7) in fact, in our literature review, we have identified some other dis-benefits for these systems; could you make some comments about these points?

Most of these points are not limitations of ERP systems; these are generally "human-based" problems. Being prone to delay is a consequence of bad strategy in terms of scope, goals and planning. We tried to implement SAP CRM module three times and every time it failed because the scope could not defined well or some departments forgot to define some processes before BPR.

Also, cannot meet high customer expectations is almost same, this is not a limitation of system; this is a consequences of strategy and management of expectations of users. Senior management should set realistic expectations and explain limitations of system to key users clearly. In terms of, Limited Customisation for Users People generally have the tendency of designing and modifying systems to their old legacy system. It can cause significant problems but in my perspective it's not a limitation of ERP systems. Top management must take actions for this point and an effective change strategy must be established to deal with this issue.

I also think that "May Cause Dissatisfaction or Resistance of Users and Discussions" is not a limitation of system because if you train people enough and get them ready for new order, they will generally accept new system also these systems are implementing to bring an innovation for organisations, not to facilitate people's jobs or task, aiming this from an ERP can cause problems.

Some ERP systems' interfaces are difficult to understand but if key users involve in the process and get necessary training it is not also a problem. Finally, it is a fact that ERP systems bring a Significant Change for organisations and may Disrupt Company Culture or processes. But this is a consequence of implementation and management must also make plans to manage this change.

I only agree about vendor dependence because it is a fact that after implementation, you have to work always with vendor company in some degree. Also if you use oracle system, you should use also oracle database to possible eliminate problems. It is a fact that it creates a technical dependency to vendors. For long ROI, it depends on the company's size and the value of your business, some organisations may invest 200 million dollars in a project and can consider 10 years ROI as normal.

Q8) what are the main risk factors for ERP implementation projects? Also, in our literature review, we have identified possible risk factors in ERP systems. What do you think about them, do you agree or disagree and why?

It is a fact that ERP project are risky for organisations and require an effective risk management. In my point of view it is better to categorise risk factors rather than pooling them. In fact, I also read

some literature for ERP risk management and it was also a problem for me because in literature these factors were generally mentioned as a totally different factor, but I don't think that way.

First of all, I disagree with existing legacy system and ineffective consulting services because consulting services might be a problem 15 years ago but today almost all ERP vendors are able to consult effectively their customers. Also, customers must pay attention to vendor's background before having an agreement. For existing legacy system, organisation today generally prefers BPR and integrated tools that ERP vendor provide with the system. As I said before today's ERP are able to integrate with other systems, so in my point of view, it was a problem in 1990 but not today.

For other risk factors as I mentioned above we need a categorisation, primary risk factors are Lack of Senior Management Support and Lack of a Proper Management Structure. It is a fact that implementation is almost impossible without senior management support. High senior management support and contribution may provide many benefits and mitigate most of the risk factors stated here such as failure to get user support, slow decisions or even it can mitigate the resistance of change of employees. If you don't have a proper management structure such as clear leaders to establish vision and goals for company implementation will be also difficult and almost impossible.

Then secondary factors are more about the strategy and delegating right people for project team who are able to manage this implementation. Risk factors are Inadequate System selection, lack of an Integrated Technology Strategy, lack of vision, Insufficient Training and Re-skilling because this is a new world for organisation which necessitates same new skills and knowledge for almost every department and individual, failing to create an effective project team. In fact, this team must have many different skills and people such as project champion, business analysts, finance people, HR and external consultants therefore you can add, Lack of Project Champion, Lack of Business Analysts and many others such as lack of external consultants or IT staff also in this category under ineffective project team. After that, third factors are related to secondary points such as failing to create an effective project team may cause to Failure to Re-Design business processes to fit the software, ineffective project management, Lack of Integration, slow decisions, inadequate strategic thinking and planning, Buggy Software and complex project architecture and tasks. Then fourth factors are Lack of User training or inadequate Training for Key-Users, ineffective communication, inadequate financial management, poor leadership, bad change management which leads Resistance and Sabotage.

Therefore, first factors are about top management readiness, and then secondary risks are about delegating right people, if they fail in secondary risks, then thirds category factors may occur about project management performance, leadership etc.. And finally fourth factors such as bad change management or ineffective communication can damage project. I believe a project which has a high top management support and effective project team may have some risk factors in third or fourth category but will not be damaged significantly. Actually someone can consider especially fourth category as consequences of previous factors.

Finally, Bad Technical Support and personnel problems are also potential risk factors that might occur in every phase of project. But it can be mitigated also with a high top management support and good project team. Besides, I will add lack of documentation and wrong conceptual design as risk factors

for ERP projects. All decisions and actions about previous stages should be well documented and also must have back-up system.

Q8) how do you define the success for ERP projects?

My success definition is to reach project goals on time, on budget and by meeting system quality requirements. But also, I am a customer so system sustainability is also important for me.

Q9) what do you think are the critical success factors in ERP implementation? And shortly explain why?

Before starting, companies have to understand that ERP projects are not IT project, these are business management project and should be managed with this perception.

First of all **top management support** must be ensured because as I said before without it, implementation cannot succeed. It is important for almost every points of project such as staff motivation, correct system design, resource allocation and project management.

Then, **clear and realistic vision and goals** is also crucial for planning and motivation. It helps also for planning phase of the project. It is important that timeframe, milestones and allocated budget must be realistic for project. Without these points, project will lose its direction.

On the other hand, **Effective project team building and effective project management methodology** are also important factors. In fact this is a project and it should have a good project team that must contain necessary roles, disciplines, skills and attributes. Besides, project must be managed effectively with necessary best practices and tasks. Also a competent project leader must be delegated to lead this team because even you build a perfect team, problems will occur without an effective leader.

Successful Business process reengineering is another factor, analysing company's current processes and identifying problems is a key factor for ERP success. BPR is also important to improve process quality and effectiveness for organisations. As stated above many claimed benefits of ERP are directly related with BPR. It is also important for having minimal customisation in system which is crucial to not damage the integrity of software. The difficulty of BPR is directly related to the system selection process because if the selected system generally fits with organisational processes, the need of BPR will be lower than usual.

Another point is customer's resources; companies must consider their available resources for project planning phase. Having lack of resources in terms of necessary people because of tight schedule and money can cause problems and fail the project. In fact, organisations must continue to do business during implementation and some people in organisations must execute other tasks or their roles. Also, company must fund their operational expenses therefore, companies resources is an important point to consider.

Consultant and Vendor support; Consultants are very important for ERP implementation. In fact, Customer Company cannot find all necessary skills internally especially IT skills and knowledge.

Consultant support for organisational change, blueprint analysis, IT infrastructure development and BPR and abilities in terms of consultant technical or business knowledge and project management methodology are important factors for project success. We talked about customer's resource but vendor resources are important as well. Another point, this cooperation can provide a knowledge transfer to customer firms in terms of project management, BPR or system design. Also, they may help to organise supportive activities such as training key-users or change supportive activities. In fact, Vendors have a significant past experience about these projects and they can help customers for various points in ERP projects.

Effective communication; effective communication between project stakeholders is also crucial for project success. Communication is important for information sharing, BPR, expectation management, change management and many other points for project.

Change management; as I mentioned above, implementing these systems will bring a significant change to organisation. So for successful adaptation, successful change management is very critical for project success and system performance.

Documentation and retain experienced employee; As I said before, sustainability is important for customer's perspective of success. Documenting necessary information about executed tasks, changes, user manuals and conceptual designs are important both for project success and sustainability in long run. Especially with key job quits, these documentations will help new users and managers to understand the system and sustain system performance. Employees, who are experienced about system during implementation process, are also important for system sustainability. But it is a fact that retaining key employee is difficult in IT market except the market leaders. Therefore, organisations must also make provision to retain these people into the organisation as much as they can or they have to establish a system to eliminate the impact of this high demand.

Q10) According to our literature review, I have determined some other Critical success factors in ERP implementation projects, what do you think about these factors? Do you agree or not and why?

You mentioned here Education and Training, Minimal Customisation, Having a project Champion, Monitoring and evaluation of performance and Problems anticipation. These factors are also important but what I said before are key critical factors for ERP project. These points are sub-factors which should be under these those factors as an attribute. For example, having project champion is also a necessity for creating an effective team; therefore it is just a detailed point of that factor in my point of view. Or change management must also include effective training and education sessions.

Q 11) how did you compete with change during the implementation phase, how did you manage it?

First of all, conceptual design must be executed. The first step should be as-is analysis of the company. This is your current point of your company. Then, a to-be analysis must be done according to the vision of the company. After that, the gap between these points should be analysed that will give the route map of changes. After identifying the gap you have to analyse the conceptual design to reach the future points. In order to do that, your team must have both business and system analysts

to do this design successfully. In fact, during this change process you have to focus functionality of organisation, for example you will change some processes or close or open departments or redundancies. And also you have to adapt your team to this change by recruitments, training and job designs. In addition, effective communication and key user involvement in decision making process are also important factors for change management.

Background Information:	
Name:	E. B.
Company Name:	Company Y
Experience:	Ex- ERP Project manager

Q1) what kinds of Enterprise Resource Planning (ERP) software do you supply the customers and sectors?

I used to work in a company that were supplying a web-based ERP system to customer. I participated as a project consultant in 15 projects in telecom, surveillance system, electric, construction, furniture production, textile, printing, personal care products and advertisement sectors.

Q2) why do you think your customers intended to implement these systems or in other words, what are business development elements that drive companies to implement those systems?

Today, companies need an all-in one system to meet the high demand and expectations of customers and maintain their market share in a competitive market. In fact, using different systems for each business function will cause much higher cost for companies in implementation and also in long run because firms have to install different databases and hire many experts to maintain system performance. Besides, this can be problematical in terms of slow business processes or having many errors. Today ERP systems provide many tools and practices that allow managing many business functions in one system such as HR, CRM, production, inventory and procurement.

Also, ERP improves organisations' supply chain, processes by reengineering and automating them and. Another factor, ERP provides a single source of data storage and shares this data with all internal components of the organisation and also some systems allow sharing all partners in this supply chain. This point is important because some organisations were using excel files or word documents to store the data. These kinds of data storage cause data lose or take important time to find information. It is also big problem in monitoring processes and also obstructs data sharing. ERP saves lots of time for organisations by providing the ability of creating, accessing and sharing information within the supply chain.

Q3) can you explain the scope of an ERP implementation project? What kind of tasks does it involve?

Respectively; a presales analysis, a project feasibility analysis which determines the make or break decisions, preparation of master plan, WBS identification, Kick off meeting, Gap analysis, preparation of drafts, getting an agreement, preparation of Business requirements and conceptual design and functional spec design and preparation.

Q 4) What are the main benefits of ERP systems for customers?

With an effective business process reengineering, organisational vision and strategy and an organisational re-skilling, ERP systems may provide many benefits to customers. For instance,

Reduction of total cost by more effective operational processes and improved monitoring of fixed costs or unit costs and profitability improve. Also with successful BPR and effective tools it reduces the Cycle Time and improves Productivity and process Quality of an organisation. Also, it provides solutions to better resource, assets, cash and customer relationship management. For example, procurement module that we implemented into companies was able to help organisations to keep their stock in optimum level by providing automated minimum stock and order monitoring services which leads also a reduction in inventory. Besides, as mentioned above, it improves the supply chain performance of organisation with customers and suppliers. With its CRM solutions organisation become able to control its orders and eliminate wrong deliveries. Also, it provides many channels to improve relations with customers and record transaction with them in system. In fact, workcube was a web-based system that could also allow companies to access or monitor all customer orders, complains, feedbacks or information in everywhere such outside of the office with their phones or tablets. SCM modules also provide solutions to monitor supplier performances, decreases organisations order duration, allow categorising supplier according to many criteria such as price, quality, past deliver performance and deliver time which lead a better vendor negotiation process. Some Systems such as Workcube can provide also B2B and B2C portals to manage your relations with your business partners and customers electronic media. It is also very profitable for companies which lead 15-20 percent increase in profit and decrease in operational costs. Besides, ERP also facilitates and accelerates reporting process of organisations which provides effective reports for manager and significantly supports managerial monitoring. Finally, Empowerment is an important factor, it provides tools to delegate people for special tasks and block some people to access specific data. It ensures also data security and brings an order to business functionality. Especially in Turkey, people interlope other tasks an sometimes it can cause problems. So, these are generally benefits of an ERP system.

Q5) In our literature review, we have identified some other benefits of ERP systems. What do you think about them, do you agree or disagree?

For performance control, I agree with this point because ERP provides best practices to effectively monitor and control financial performance for customers or products. Also as I stated above, it improves the controlling process of operations and minimise errors.

Improved decision making and planning, I partially agree because ERP systems allow organisations tools to effectively provide many tools for effective planning and successful decision making. But, decision making and planning is also related to the quality and knowledge of managers. So ERP cannot provide this alone but can be a tool this purpose.

For Support Business Growth, Support Business Alliance, Build Business Innovations, Build Cost Leadership, Generate Product Differentiation; for these points ERP also provide some solutions and can help organisations. But these points also are related to company's strategy. In reality, if company can apply right strategy and recruit right people to achieve these points, they can succeed without ERP. For example for product differentiation, you need good designer or an R&D team before an ERP system. So ERP is not a must for these and I cannot say that just implementing this system will provide those benefits.

You have to understand that ERP is a tool like cell phone. It is a fact that buying a cell phone will provide some benefits to you such as increasing your communication with your friends. But you can't say that if you buy a cell phone, your girlfriend will always love you.

I disagree with Build Business flexibility for current and future changes, Increased IT infrastructure capability, Support Organisational Changes and Built Common Visions. Without common vision, implementation is likely to fail. Also other points are strategic issues and do not have any direct relations with implementing ERP.

I agree with the statement of Facilitate Business Learning; Workcube is able to provide e-learning portals to upload training documents, tests videos and other material and share these materials with all of your internal employee and external partner. You can also monitor their progress and get feedback about their results. As I said before online system provide an opportunity to participate and benefit these training with everywhere that internet is available. But you have to keep in mind that training is also related to its content and how it's designed so ERP is facilitator here. ERP means transparency for organisation. So, ERP provides a better visibility of organisation for employees that can also facilitate adaptation of new employees and better and faster collaboration among departments. Besides, I also agree with accounting improvement, in Turkey most of the companies did not have an effective method to manage their accounting process. Flow of papers was really inefficient method to execute this process. By implementing these systems we really developed their accounting processes. But for multinationals or other big companies, it should be really important. Finally IT Cost Reduction is very rare to achieve. Companies generally face an increase in their IT expenses. If you operate all in one-system and your contract with your vendor is also appropriate for this, you can get a decrease in long run but it is very rare so I disagree.

Q6) According to you what are the main disadvantages of these systems?

First disadvantage of ERP system is cost. These systems generally require a significant implementation cost especially if the company is not institutionalized. In this case organisation's needs or in other words Gap between current point and future are generally too big and it requires a significant investment and endeavour for implementation. Also in long run, maintenance is the most important income-generators for ERP vendors and this creates also a high cost for companies. Besides, customers can face with high indirect cost due to the need of new IT infrastructure. They also need some experts to ensure system sustainability which means also additional cost. Also in some cases this high investment returns back to customer in a very long run and generally in first two or three years top managers might lose their trust about system.

Another point is customisation, customisation is generally a source of problem and must be minimised. In some cases customers really need customisation for some tools or interfaces especially when the new system integrates with the old one but the system does not respond these needs.

Q7) in our literature review, we have identified some other dis-benefits of ERP systems. What do you think about them, do you agree or disagree?

Prone to Delay: It is a fact that most of these implementations end with a bad story. I partially agree about this point but I cannot say that this is totally a limitation ERP of systems because if you plan and manage well the implementation this would not be a big problem.

Cannot meet high expectations of customer; I disagree with this point because it is not a limitation of system. The design should be realistic and according to the company's needs. Key users expectations are important but the system should be designed and implemented according realistically to solve some problems. With an effective communication and claim management this problem can be easily solved.

Difficult to learn and understand the Logic; partially agree, for some systems the system interface or design can be difficult to understand. For instance if you look a screen of SAP you can realise that it is difficult to understand. But I think with effective key-user training this will not be problem.

Bring a Significant Change and May Disrupt Company Culture or processes; this is a disadvantage, it is a fact that these systems change the company culture and structure remarkably. In some cases especially small and medium size companies, employees and management cannot tolerate and adapt these changes. For example, you close a department and open two new ones. In reality, these major changes can cause performance problems and difficulty to adaptation of new system. Also in some cases customers afraid to change or move a thing which is higher risk according to me. Therefore an effective change strategy and which is also appropriate to company's available resources must be applied.

May Cause Dissatisfaction or Resistance of Users and Discussions; this is related to the previous point. If your change strategy and supporting factors are well design and succeed to manage this transformation, this is not a disadvantage for ERP implementations.

Vendor Dependence, I agree with this factor, you can consider this relationship is like a marriage and the system as the child of married couples. As long as you operate this system, you will need the vendor in some degree. Therefore, a good contract management is necessary to have a good relationship in long run.

Q8) what are the main risk factors for ERP implementation projects?

From the beginning of the project, lack of top management support is the biggest risk factor for ERP implementations. This is following by failure to allocate enough resources to project and failure to determine company's needs or vision. In fact, these are also related with the first risk factor in some degree.

Then, Lack of a Proper Management Structure, Ineffective Project Management methodology, personal problems or departmental conflicts, failure to build a good project team that has a competent leader and includes all necessary skills and roles such as IT, business analysts, senior managers, external consultants. Having a project champion is also really important and provides a significant advantage for project managers.

Other factors that I can add are lack of user involvement or support, ineffective communication between stakeholders which is a risk factor for almost all kinds of projects. Inadequate System Selection, Slow Decisions procedure, bad reengineering process, Lack of an Integrated Technology Strategy, Lack of User training or Inadequate Training for Key-Users, Insufficient Training and Re-skilling for both key-users and other employees. On the other hand, inadequate vendor support or

resources such as competence of consultants, change, scope and risk management are also important risk factors which are related to the project management methodology.

Q7) how do you define the success for ERP projects?

A first criterion is not violating time, cost and quality requirements. But creating usable and sustainable system that leads to customer satisfaction.

Q8) Do you think that applying a critical success factors framework ensures the success of ERP projects.

I cannot say that it will guarantee 100 percent but it is a fact that these points are generally most important and problematical points in the project and if you ensure that they will be met during the project, it increases significantly your success chance.

Q9) what do you think are the critical success factors in ERP implementation? And shortly explain why?

Senior management support: Top management support is important for establishing right vision and goals, keeping staff motivation and performance in a high level, enough resource allocation, successful troubleshooting and crisis management and change management. In fact, this factor is important for executing all tasks or issues.

ERP Strategy: It's important that customers have clear vision, goals and realistic expectations. Other points that a strategy must involve and clarify are; selected system and why, planning an adequate adoption with enough time frame and human resources and also an IT integration plan that consider if the system will be integrated with other old legacy systems. Keeping customisation at minimum level is an important strategy for implementation.

Effective Business Process Reengineering: BPR is the tool to fit system to organisation. It is important for benefit realisation of ERP systems. Also, it is a fact that every organisation can have problematical processes so it is also a chance to improve the process quality.

Effective Project management methodology: It is crucial for project success and meeting time cost and quality requirements. Applying ineffective or wrong methodology are common reasons of ERP projects failures.

Change management: These systems will change organisations and ineffective change management causes generally a project failure because of dissatisfaction, resistance of change, departmental conflicts and dissatisfaction of users.

Effective project team building: Project team is the unit that will implement these systems therefore the composition must be strong. It has to contain many other disciplines and a clear project leader who should be also the champion. Many companies urge to not delegate some of their key employees to project team in order to not hinder their business. But in fact, this team must know well the organisation and contain business analysts, system analysts, senior manager, finance people, if it is a producing company labour representatives as well as IT and external consultants.

Consultant and vendor support: Without external consultant support implementation is not possible. Consultants are providers of necessary knowledge about the system and also have more experience of implementation than customers.

Effective communication: Effective communication is crucial for project progress, troubleshooting and for many other points. All progress, risks or issues should be communicated effectively with all stakeholders. It is important for set realistic user expectations and prevents user resistance or dissatisfaction.

User involvement: Users must understand the reasons of ERP implementation to accept changes easily. It is important also to create a familiarity between users and system.

Testing: In fact, this is an IT system so this system should be tested well before “going live” for determining problems and bugs. Without appropriate testing phase, the system can cause many problems and this can discredit the system in organisation and decrease staff motivation.

Contract management: As mentioned above, this is a long run relationship and all issues should be clarified between both sides. Without a good contract many problems and conflict might occur between customers and vendors.

Having enough company resources: Customers must have enough financial and human resources to allocate the project. The scope, plan and timeframe should be appropriate to company’s resources.

Having an effective project champion: A project champion can provide significant benefits during implementation phase. In fact, this is important for crisis management to get a consensus into organisations, ensure key user and employee support and keep motivation in high level.

Q10) how do you help your customers for managing change? What is your Change management strategy to support ERP system operation?

A clear and acknowledged vision should be created according to company’s need. Then, as-is analysis should be done to analyse the current situation and gap analysis to determine route maps of change. After that point BPR must start about organisational processes. It is very useful to execute BPR before starting to change. Customers can do this BPR themselves or can get support from an external consultant or their ERP vendors but doing this BPR in the change progress can be time consuming and problematical. Simultaneously or after BPR change planning phase must come and requires an effective and realistic change plan and activities.

In order to manage this change process, you will need an effective team, if possible apart from project implementation team, to focus only on change management activities. In some implementations require a significant planning and effort for just change, so it is better to allocate a sub-team to delegate for change coordination. This team must have a change leader who is competent and has necessary leadership skills.

During this process involving people and giving them opportunity to say their opinions is important. In fact, employee feedback is invaluable for change management. It is important to create urgency into organisation for motivating and moving people.

Communication must be effective and inform people about where the company is and what the next step is. At the beginning you can face a high resistance but it is important to get top management support and be determined. During this process you will take some necessary decisions such as firing people. You have to be fair, give all right of these people, show your respect and be thankful to not damage the motivation of other staff.

Another important point is training for staff and also key-users. In an ERP implementation most of people in the organisation should be trained in some way. In fact, in Turkey companies do not pay attention on this point but this is really critical. For key users, training must be hand-on with system demos. For other staff whose job will be changed, training can be class training or simulations to reinforce their knowledge and train them for new company order.

Final point, you have to endear the system to employees. For example one of my clients called the system as “Shrek” and organised a part which all staff came together and celebrated the implementation of “Shrek” into their organisation. They created new word such as “Shreking” rather than using the system or sending orders. It was a brilliant strategy for change management. After implementation they organised launching party where people came with Shrek masks and costumes. People really warmed to the system and new work environment.

Background Information:	
Name:	S. O. H.
Company Name:	Workcube ERP provider
Experience:	ERP project consultant and director.

Q1) what kind of Enterprise Resource Planning (ERP) software do you supply the customers or sectors?

I was ERP project consultant for in 32 project implementations of Workcube ERP systems in organisations from sectors; furniture production, shipyard, iron-steel production, construction, e-business, service, retail, advertisement, chemical, printing, security, telecommunication and food.

Q2) why do you think your customers intended to implement these systems or in other words, what are business development elements that drive companies to implement those systems?

Today companies are investing significant amounts to ERP systems because of several reasons such as data integration and security, process automation and monitoring. ERP offer companies a market advantage of low cost by providing solutions for more productive resource utilisation. It also increases flexibility of business manners and provide competitiveness to organisations. ERP is an important tool that provides a structure which is reportable, scalable, improvable and monitorable and that's another need of today's business organisations.

ERP is also an important technological investment for organisation that provides many business functions and best practices in one system such as HR, finance, production, stock management, project management, sales& marketing. Today companies are implementing ERP to monitor their different and separated departments and also ensuring that they operate straightly. Besides, modern ERP systems such as Workcube provide industry-specific solutions for retail, metal, furniture and IT which provide a specific set of modules and also other integration with other specific tools and programs which are useful for companies in these markets.

Finally, ERP provide a common source of data for all departments that facilitates to access and share data with other departments and also with business partners in supply chain from B2B and B2C portals. In fact, Workcube is a web-based system so you can access to your system and do your job without being in office. You can check information, approve something or easily communicate with your employees from system. So with ERP implementation; organisations can get an opportunity to change and improve their business and maintain market power.

Q3) can you explain the scope of an ERP implementation project? What kind of tasks does it involve?

The scope of an ERP project can vary for each project. We determine the scope of each project according to the expectations and needs of customers at the beginning of each project. Mainly these implementations contain a conceptual design of many subjects such as production, inventory management, member management, sales management, procurement, product management, service management, finance, and accounting, HR, SCM and CRM. We may add also B2B, B2C or carrier portals into the design and implementation project.

Q4) in our literature review, we have identified many claimed benefits of ERP systems. According to your ERP experience, what are the benefits of ERP systems for customers?

My comments are about Workcube ERP system. In an organisation implementing ERP system will bring a significant change in terms of IT and business structures and will require significant investment and effort to succeed it. The organisation should redesign its processes by removing redundant ones, execute necessary changes and organisational modifications and make necessary investment in terms of IT infrastructure or employees. But if it succeeds the implementation, an ERP system can provide many benefits to organisations. In addition, success of ERP has two dimensions; people and technology. ERP is a technological investment and even if you implement the most developed technology in your organisation, competence of people will determine the success of the software.

It should be understood that ERP is just a tool and some points will necessitate strategic planning and decision of senior management, re-skilling and necessary investment for other requirement. Therefore benefits that I will state are true “in a good light” situation.

Our system provided cost reduction, inventory reduction, profitability improve, cycle time reduction, productivity improvement, improvement in process Quality, Services Improvement for customers, Improved Decision Making and Planning, better performance control, support business growth, support business alliance, bring Innovations to organisation, help organisations to build cost leadership, improve internal and external linkages, improve Business flexibility, facilitate business Learning, empowerment, improve accounting performance, better cash, assets and resource Management, technology improvement in terms of new tools, data security, effective reporting, better tracking and monitoring, organisational visibility and automatic and coherent workflow which saves time and prevents errors or missing out something. In fact, this is a factor which reduces operational cost of organisations.

As I said before these are potential benefits of ERP systems and requires effort and investment to achieve. Also, some of them can be achieved in short run but some other can be achieved in long run. I haven't seen a company that reach all of them but I witnessed each of them in different cases.

Q5) we also identified some dis-benefits of ERP system. According to you what are the main limitations or disadvantages of ERP systems?

ERP requires significant effort and investment for successful implementation. Also, implementation is highly challenging and endless process because ERP should be maintained and modernised according to the changing needs of organisations. ERP implementations touch all business functions of an organisation and changes and affects order and people in the system. This can cause problems in organisations and necessitates an effective management.

Q6) we also identified some dis-benefits of ERP systems, what do you think about these points?

Being prone to delay; if you have clear goals and define scope well, get enough support and apply effective project management methodology you can reach your goals in terms of time, cost and quality. For High maintenance cost; according to our support agreements, we do not charge any

money for maintenance therefore I don't agree. I partially agree with long ROI period. It is true that in some cases ROI period can be long but I cannot generalise it for all cases. It actually depends on the quality of implementation and customers expectations from the system especially timeframe for each goal to achieve.

For high expectations, it is crucial to explain what goals can be achieved in what time frame. As I said before ERP can provide many benefits but it doesn't mean if you implement an ERP system and you will get all of these benefits. First of all company's primary goals should be achieved in short run and by time, secondary or third expectations or needs of the company can be met. This is not a limitation of system but consequences of bad expectation management.

For user dissatisfaction or resistance of Users, actually these are consequences of bad change management in an ERP implementation. As I mentioned above, these systems bring high change and organisations must take necessary decisions and make plans to manage this change for eliminate this problem. In my opinion this is not a limitation of ERP.

I partially agree that limited customisation is a dis-benefits of ERP systems. We can modify our software and create a system exactly same to the end-user wishes. But it is a fact that high modification will cause much higher cost and time loss for implementation. This can cause problem for upgrades and bring additional costs to customers. We suggest our customers to reengineer their processes and use software's best practices to totally realise the benefits of system. It is impossible to meet 100 percent of everyone's expectations. Our goal is to create a successful and stable system.

Vendor dependence is a correct point, it is a fact that two organisations must have a connection and work together in some degree with lifetime of the system. In some cases this can be problematical for both sides not just for customers. In order to eliminate this problem it is necessary to have good communication and contract management. Establishing a good contract which protects rights of both parties would minimise this problem. Finally for difficulty to understand the logic, our systems' logical and screen designs are very easy to understand. We did not get any difficulty on this point.

Q7) in our literature review, we realised that ERP projects are significantly risky, according to you what are the main risk factors that a project manager should consider in ERP project?

We categorise risk factors in ERP project in 5 groups which are; operational factors, managerial factors, software factors, personal factors and project management.

Operational factors consist; changes in project scope, Lack of Integration of all departments, lack of enough resources, lack of some necessary knowledge of employees and Insufficient Training and Re-skilling.

Managerial Factors consist of; lack of senior management support and belief to project, lack of vision, wrong scope definition and Lack of an Integrated Technology Strategy, Failure to Re-Design business processes to fit the software, Lack of a Proper Management Structure and ineffective consulting services.

Software factors consist; high modification, wrong conceptual design due to wrong project goals, Inadequate System Selection and Buggy Software.

Personal Factors consist of; lack of motivation, Ineffective Communication, personal problems and conflicts, Resistance and Sabotage, Failure to Get User Support and lack of familiarity to technology.

Project management factors: Failing to Create an Effective Project Team , failing to delegate a competent project leader, wrong project methodology, lack of enough time and support to project team, Inadequate Strategic Thinking and Planning, lack of enough testing, bad change coordination and management.

Q8) how do you define the success for ERP projects?

Success is equal to expectations minus performance, it is crucial to successfully determine expectations and creating a system performance according to those points. Many factors involves in to this question such as meeting project requirements, system usability, sustainability or security.

Q9) what do you think are the critical success factors in ERP implementation? And shortly explain why?

Our critical success factors framework contains;

Clear vision and goals: This is important to determine the scope of project and creating an effective business plan for implementation. Without a clear vision and goals, an ERP implementation may become a “scratch pad” and this will obstruct the project termination and benefit realisation. In order to have a successful journey, we have to know where we will go. It is almost same for ERP implementations. It obstructs also motivating people and encourage them for implementation. It is important also to differentiate short term goals and long term goals. In fact, it is impossible to reach all objectives just after the implementation of the system. Organisations should identify their critical or primary goals which the implementation will focus to reach them in short run but they should also identify their long-term goals to execute an appropriate conceptual design.

Well defined business processes and effective BPR: It is a fact that if an organisation’s processes are 100 percent effective, they wouldn’t need ERP system. Therefore, comprehensive analysis of all business processes and fixing problematical or removing unnecessary points by BPR is a must to get real benefits of these systems. In fact, these ERP solutions are based on most useful best practices and processes for organisations. Also, it is time-saving to visualise current business processes and individual steps of organisations before starting to the project.

Customer Resources: For successful implementation there must be enough competent human resources who are able to allocate enough time and effort for the project. It is a fact that organisations must continue their normal business and but without human resource support from customers these systems cannot be implemented. Also, IT infrastructure of customer is also another point in terms of computer facilities, databases and internet supply. Customers must have enough IT infrastructure to get benefits from system. Finally financial resources, customers should allocate enough budgets for system implementation and development of infrastructure if it is necessary.

Top Management Support: This is crucial for ERP project, without top management support there will be lack of motivation and effective troubleshooting and crisis management. In Inadequate senior

management support situations dominant departments can force its expectations to development team and this can distort project from its main purposes.

Effective project leader and team: In project team there should be people from each department who manage the operation in organisation. There should be also good business and system analysts as well as IT managers. Good team composition with different skills will facilitate system design and improve the decision making process which is important to take quick and correct decision. The team must be competent for necessary project management skills and methodology because it is a project and failing to apply an effective methodology will cause problems and delays for project. In fact, we provide our own methodology to customer. Also an effective project leader, who is able to analyse business processes and take decisions for organisation, is necessary for project success. His or her leadership style is a determinant for motivation and contribution of employees and ensures a smooth implementation. Therefore a project leader should be flexible, disciplined, good decision taker, experienced, well educated, good motivator and communicator and popular. Also it is nice to have if he or she has experience about ERP. In fact, this is ideal example of project leader but all points are important according to me.

Project methodology: As I stated above, project management methodology is very important for ERP projects like all other projects. Customers must get enough information from vendors or consultants about their implementation methodology or in other words how they will manage the project, in terms of project phases, documentation, communication management, project role requirements and vendor's general expectation from customers. Customer must pay attention to choose the most convenient one for them because customer firm support is also crucial for project management performance. It is important to establish a strong project management methodology.

Minimal Customisation: As I said before, high customisation would damage the stability of system and cause problems in upgrades so it is important factor for system sustainability.

Consultant Support: It is a fact that ERP implementation is not the primary jobs of managers from customer firms but it is for ERP consultants. Consultant implemented these systems in many other organisations so it is important to get support from consultant in terms of implementation methodology, system design and many other issues. We help customer for organising training and education plans for key-users which is another necessity for ERP performance. In fact, consultant's job does not include reengineering of current process. It is about designing a system that support intended processes but we also provide this service to customers if they want. Therefore, Consultant support is a must for successful implementation and without enough consultant support ERP project are likely to fail.

Change Management: Implementing ERP systems will bring a significant change to organisations so it requires an effective change management and planning. This change process generally includes many potential risks and effective change management will minimise these risk factors. In reality, Implementing ERP is also an implementation of a new way of doing business. Therefore if organisation does not manage this change effectively, ERP implementations are likely to face a strong resistance and poor system performance.

Documentation: It is important to establish an effective documentation system to record project goals, primary needs of organisations and current business processes of company and modified points. Lack of documentation the project will also become a “scratch pad”.

Allocating enough time for testing and data migration: Testing is very important for system performance and should be done appropriately before “going live” of the system. Another point is migration of all data of the company, this is a time-consuming process. Old data of the company should be controlled, verified and cleaned if it is unnecessary. This is an important process that requires significant effort and it is an important factor for system performance.

These are primary factors that we consider for ERP implementation. Then secondary factors come which are Effective communication, User involvement, crisis management and effective process and performance monitoring. In fact, all points are important here and must exist in an ERP project for successful implementation. But these factors are outcomes of primary factors and cannot be realised without succeeding on primary factors. For example effective communication is related to the project management methodology and project team knowledge.

Q10) how do you help your customers for managing change? What is your Change management strategy to support ERP system operation?

I believe two main principles of managers must not impose change to people and managing change is a responsibility of management not employees. Employee and especially key user involvement and acceptance are crucial points for effective change management. This is a vital tool that helps managers to deal with resistance of change. In reality, some people fear of change and they resist against it, so change strategy must ensure user involvement to sell project to employees.

To start change planning and as-is analysis must be done to visualise the current state of the organisation. After that, the customer must determine the future point according to the vision that it is intended to achieve after this change process. It is important to declare this vision to company and ensure that everybody understand it clearly. Than planning stage comes, gap, to-be and Gap analysis must be done to identify these two points and to clarify the gap between two points and the route map of change progress.

In order to manage change successfully, a change team should be established with people who are motivated about the change and have necessary experience and skills. Also an authentic, credible and experienced change leader, who has necessary skills for leadership and change management, must be delegated. The project manager can lead this team or delegate another person who is more competent about change management and leadership. These people must be examples of organisational change starting by the change leader and they are required to create a positive atmosphere and environment that will lead people to change. It is important to create an exigency for the change to move and motivate people from the beginning of the change progress.

Communication is also important in change process. In order to create a change acceptance among employees, their needs and expectations should be considered and without communication it is impossible to get this information. Also Managers should explain well the benefits of system for company and for them and their job.

Besides, I suggest generally an incremental change progress for ERP implementation with short term goals. For example, we celebrate with employees after achievement of each phase and suggest organisations to reward people for motivation. It is also important to support change with other activities such as training which is a must for ERP implementation or promotions, job design recruitments of new people for getting some skills and new positions such as change leaders.

For training I also want to mention that training must be hand-on training that allows key-users to recognize the system and also learn quickly. If it is necessary class training and documentation must be used also to cultivate some skills. By using effective training methods you can help employees to gain self-confidence about new order.

I can also say that determination is important for change progress. You can face a significant resistance of employees but if you don't give in and continue to advertise your system and its benefits by also getting the support of top management and leaders, it is likely to solve this problem.

Finally change evaluation meeting are also helpful after each step. In fact, the best point of incremental change management is the opportunity of fixing or reinforcing your initial plan. It is important to getting feedback after each step and evaluating the plan for next step according to those feedbacks can provide many benefits to change team.

Appendix B: BSREC e-mail and Form:

Dear Arda

Thank you for submitting your Supervisor's Delegated Approval form to BSREC for the project: *Appropriate process for developing and implementing ERP systems.*

Your reference number is **REGO-2014-1036**.

You now have the appropriate approval in place to begin your study.

Best Wishes

Emily

Emily Dight

Research Ethics & Governance Administrator

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