ENTERPRISE RESOURCE PLANNING IMPLEMENTATION STRATEGIES AND SUCCESS AMONG OIL AND GAS FIRMS IN KENYA

By

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DECLARATION

This project is my original work and has not been presented for any other award in any university.

Signature _____ Date 4/12/2023

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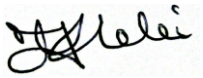
This research project has been submitted with my approval as the university supervisor.

Signature  Date 6/12/2023

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DEDICATION

This research project to devoted to my family members and friends for understanding the times that I didn't show up or showed up with a laptop because I would have meetings with my supervisor even in the middle of a family gathering. And lastly, I dedicate this project to my boss Mwiti for time off when I needed to, without your support it would have been very difficult.

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LIST OF ABBREVATIONS

BI	Business Intelligence
BPR	Business Process Re-engineering
CRM	Customer Relationship Management
ERP	Enterprise Resource Planning
ERPS	Enterprise Resource Planning System
EPRA	Energy and Petroleum Regulatory Authority
FCS	Fuel Card System
FMS	Fuel Management system
IT	Information Technology
KSH.	Kenya Shillings
LPG	Liquified Petroleum Gas
MRP	Material Resource Planning
MRP II	Manufacturing Resource Planning
MT	Metric Tones
O&G	Oil and Gas
OTS	Open Tender System
ROI	Return on Investment
SAAS	Software As A Service
SAP	System Analysis Program
SCM	Supply Chain Management
SME	Small and Medium Enterprise
SWOT	Strengths, Feeble nesses, Opportunities and Threat
TAM	Technology Acceptance Model
TTF	Task -Technology Fit
OLS	Ordinary Least Squares regression

ABSTRACT

The current business world requires the use of Enterprise Resource Planning so as to cut on cost and maximize profit. However, some firms that have embarked on establishment of ERP projects have not been successful. The failure may be linked to the Enterprise Resource Planning strategy. However, research establishing the role of ERP implementation strategy on the success of Enterprise Resource Planning is missing. This research investigates the intricate relationship between Enterprise Resource Planning implementation strategies and the success of ERP projects, with a focus on the oil and gas firms in Kenya. Employing principal component analysis, the study derived indices from observed indicators provided by respondents to determine the critical ERP implementation strategies influencing ERP project success. The study uses primary data collected from ICT managers of 80 firms in the oil and gas industry using structured questionnaire. The findings reveal that among the various implementation strategies, including Big Bang, Phased Rollout, Parallel, and Hybrid, these strategies emerged as pivotal determinants of success in ERP projects within the oil and gas industry in Kenya. This research contributes insights for practitioners and policy makers, emphasizing the importance of tailored ERP implementation strategies and challenging conventional assumptions about the universal significance of certain approaches. The identified determinants provide a foundation for organizations to make informed decisions, optimize their ERP implementation processes, and enhance overall project success. The study recommends the need for policy support for diverse implementation strategies. The policy makers ought to recognize the diversity of ERP implementation strategies and avoid promoting a one-size-fits-all approach. Encouraging flexibility and adaptation to the specific needs of organizations can lead to more successful ERP projects.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Enterprise Resource planning (ERP) is a business management application software that enables real time business processes integration through automated technology (Rosemann, 2020). ERPs are highly configured to accommodate different sectors. They come in packaged software that comes with pre-configured templated and require configuration to business specific requirements before used (Wanjau, 2020). Knowledge of ERP is traced back to the 1960s in the manufacturing firms mainly for inventory material planning to produce finished goods (Thomson, 2020). In the 1970's, Material Requirements Planning (MRP) systems were developed for purchasing, estimation, and planning production schedules (Singh & Nagpal, 2014). The MRP was improved from the Open Loop mechanism to Closed Loop mechanism which could receive information on production and give feedback to manage master production schedules to reduce overhead costs (Jacobs & Weston, 2007).

This saw the birth of third generation in the 1980's known as Manufacturing Resource Planning (MRP II) which was majorly for forecasting material needs by integrating manufacturing processes (Tanna, 2017). The fourth generation was characterized by internet-based Enterprise Resource Planning (ERP), and it featured in late 1980s and early 1990s incorporating core enterprise functions like financials, human resource, and supply chain management (Goldston, 2020).

From the 2000s cloud ERP II gave birth to cloud computing with reported 40% increase in cloud services in 2016 compared to 2015 (Goldston, 2020). Panaroma Report of 2016 market shared research placed SAP at 23%, Oracle 16%, Microsoft dynamic 9%. The future is geared towards developing sustainable ERP application (De Soete, 2016). The most popular implementation strategies are big bang, phased roll out, parallel approach, Software as a Service and Hybrid strategies and the extent to which they have been applied in Oil and Gas (O&G) optimize the chance of triumph in ERP implementation considering the challenges involved. Oil and Gas firms fall under the petroleum industry that deal with products such as fuel, lubricants, and Liquified Petroleum gas (LPG) as guided by the ministry of petroleum and mining. Some of the theories relevant to this study are the Theories of Technology Acceptance Model (TAM), DeLone & McLean IS success model, and Task Technology Fit.

1.1.2 Enterprise Resource Planning

ERP projects are long term projects that are capital intensive ranging frow a few million dollars to billions, and therefore, the right strategies must be put in place for successful implementation (Boafo, 2018). To get the right strategies it is prime to understand the implementation cycle. ERP implementation cycles explain the stages involved in the implementation process. There are models that have been used to describe the stages in ERP implementation.

One such model is Steve and Pastor (1999) ERP Life Cycle Model made up of several stages as follows, design planning, acquiring, implementation, utilization and maintenance, evolution, and retirement. Markus and Tanis (2000) Model have four phases outlined as project chartering, the project, shake down, and onward and upward. Project chartering is basically the stage for business analysis, while the project phase is for configuration and rollout to users and shakedown involves stabilizing the system by debugging and improvements and fourth stage deals with supporting, maintaining, and upgrading of the system.

Soh and Markus (1995) ERP life cycle model emphasize business value such as goals, plans, and quality. Brehm and Markus (2000) tendered the divided software life cycle (DSLC) model with three stages, the first stage being development and ERP modules adoption, followed by evolution, and third stage adoption and feedback to vendor. Stefanou (2001) ERP life cycle model emphasized analyzing cost, risk, and return on investment (ROI). The first two phases in this model are geared at evaluation of business vison, business requirements, ERP selection while the third and fourth phases are operational involving implementation and maintenance.

De Souza and Zwicker ERP life cycle (2001) broadly divides the stages as utilization and maintenance stage. Ehie and Madsen (2005) model has five stages of project composition, business layout, realization, final preparations and go live and support. Bento and Costa (2013) proposed 12 hypotheses for ERP life cycle. Law et al (2010) focused on maintenance and support. Kumar and Gupta (2011) suggested twelve phases with two optional Phases. Dantes and Hasibuan (2011) discussed success factors in three perspectives of operation, management, and strategic.

1.1.3 ERP Implementation Strategies

ERP implementation Strategies are transition methods that have been used for deploying an ERP software (Khanna & Arneja, 2012). ERP implementation strategies embed best practices, essential steps, and techniques either to deliver on time, reduce cost, or attain business

objectives. According to Falbala and Amani (2015) ERP projects are capital intensive and if not well managed could lead to bankruptcy. ERP implementation Strategies is a roadmap which combines the business scope and ERP implementation success factors to optimize business outcome. The ERP implementation strategy should aim at minimizing risk, delivering the project on time, optimizing ROI, and ensuring success. It's crucial to settle on the best fitting strategy for the organization at the beginning of implementation (Madkan, 2014). The dominant strategies for ERP implementation include Big bang, phased rollout, parallel, hybrid and software as a service (SAAS) (Madkan, 2014).

1.1.5 Selecting ERP Implementation Strategy

The choice of strategy is expected to help a business meet its local and global goals and objectives which makes it important to have clear goals, requirements, planning and scope of the project before adopting an implementation strategy (Soja, 2008). An organization must select the best suited strategy for their project (Kotiranta, 2012). Transition from legacy system requires a lot of planning between the implementation team and top management (Khanna & Arneja, 2012). ERP Strategy can be pegged on several factors such as size of the organization, risk tolerance level, cost of implementation, desired ROI, ERP size, set timelines, top management support, team composition, employees commitment, and vendor support (Caldwell, 2020). Among the Strategies, the Big-bang Strategy is ranked as less expensive due to universal implementation and fast but has the highest risk especially when it comes to fall back plan (Khanna, 2012).

According to Hedman and Borell (2005), cost of the implementation can be quantified by internet installation, software licensing, hardware, consultancy fee, training, and maintenance. According to Hung (2007), ERP implementation Strategy should increase chances of successful ERPS adoption. The Strategy taken for Go-live is overly critical for the success of the project. Companies should select the best suited strategy for implementation depending on the factors.

1.1.6 Challenges of ERP Implementation

Implementing ERP is normally faced with numerous challenges in every phase of an ERP project affecting a firm's inhouse and extended business operations, the project crew, as well as business end-users (McGaughey & Gunasekaran, 2007). Some general problems of EPR implementation include, insufficient knowledge on business procedures and processes, gaps in

project management, rushed testing, frustration by top management, unrealistic timelines, unclear scope, untamed user expectations, user resistance to change, difficulties in integrating existing systems and future innovations, incompatible business requirements and ERP system which could result into uncontrolled customization and business process re-engineering (BPR) and in turn may lead to extended delivery timelines, conflict in scope, unexpected project team exodus, time zone challenges, implementation stress or fatigue, data cleansing issues, ERP implementation complexities, and consultant inefficiency (Menon at el.2019).

According to Markus et al., (2000) problems faced in later stages of ERP adoption originate from earlier stages that failed to be addressed early enough. Findings from Chaos Report (2016) disclosed that 71% of ERP projects failed to comply with finishing date, budget, and satisfy client. This was more aggravated in big projects with 91% of Medium-sized projects failing and 94% of large projects (Joseph, 2019). Phased rollout strategy proved to take longer and more resource allocation at Hass petroleum Ltd which is a Kenya based Oil and Gas Company operating in nine countries and has integrated its cloud-based fuel management system (FMS) with oracle e-business suite. A good example of a project that flopped terribly was Jade petroleum limited, an oil and gas (O&G) marketer which closed shop because of project mismanagement, uncontrolled customization, budget overrun, running parallel systems which was exhausting causing resistance to new system, luck of project champion, and requirement sign of. Due to the challenges the project never ended, and a lot of resources went into waste.

1.1.7 Success Factors of ERP Implementation

ERP implementation is a success if a firm completes the implementation within the allocated project period and budget, benefits are derived, performance is measurable either by frequency of use, impact of organization and personnel satisfaction (Behrens et al., 2005). Markus et al., (2000) claims that the success of one implementation phase affects the success of another phase. Success factors to consider for ERP implementation strategy include size of the organization, data size, how complex the system is, nature of the industry and resource allocated, extent of integration to other systems, user preference and involvement, modules being implemented, timelines, vendor support, expected period of ROI, top management engagement, and risk involved in the strategy (Loh et al., 2006). Rebstock and Selig (2000) in their framework of ERP implementation strategies in international firms suggested incorporation of country specific requirements, globally accepted standards, and harmonized modelling of both local and global business process best practices in the implementation. Soh

et al. (2000) advocates minimizing ERP misfit by strategically aligning ERP to business requirements.

1.1.8 Oil and Gas Industry in Kenya

Oil and Gas industry is a key sector of the economy in Kenya with many processes regulated by the Ministry of Petroleum and Mining. The industry deals with petroleum products such as fuel, lubricants, and LPG supply. According to Energy and Petroleum Regulatory Authority (EPRA), there has been a tremendous growth of oil and gas firms in Kenya recording over 71 registered Companies as of 2019 and over 2,762 retail stations. The Market leaders Vivo, Total and Rubis Energy (formerly Kenol/Kobil), OLA petroleum and Gulf Energy, controlled a market share of 49.8% for the period ending December 2019.

According to the ministry of petroleum and mining demand for petroleum products increased from 4738.5 thousand tons in 2015 to 5207 thousand tons in 2019 from the trends in consumption of petroleum products between 2015 and 2019. In a daily nation article dated 19th July 2022 on page 7, it was ascertained that Galana Oil Company was the leading bidder since 2004. In Aug 2022, the company would import 102,072 Metric Tons (MT) of petrol and 16,052 MT of kerosene for September consumption which would be allocated to all Oil marketers from their nominated volume. Between April and May, the company imported 241,868 MT of super petrol. Other OTS local company winners are Riva Petroleum and Texas Energy. Kenya Pipeline Company (KPC), EPRA, and Kenya Revenue Authority (KRA) are key stakeholders. KPC provide storage and distribution infrastructure while EPRA regulate the wholesale and retail price of fuel in Kenya. The liquified petroleum gas (LPG) and lubricants price are determined by market supply and demand.

Transport is the leading consumer of petroleum products followed by manufacturing, agriculture, and power, respectively. Oil and gas marketing Companies have embraced the use of. The upstream part of O&G industry throws big challenge to ERP system because they require numerous customizations to make the process cycles complete. Customizing an ERP comes with lots of problems which include failure in case of a system upgrade, bugs or even lack of support from system owners. ERPS causes business restructuring at some stages of the implementation leading to centralization of shared services to reduce duplication functions hence reducing operational cost and standardizing processes. There is also lack of mastery of business when it comes to implementation team due to complexity and flexibility on the

tendering system of fuel procurement. Users also pose a threat to success of implementation by resisting change and failure to test the system properly. Some ERP solutions for oil and gas Companies in Kenya include, SAP, Oracle, IBM, Workday, Microsoft, Odoo, Sales force among others.

1.2 The Problem Statement

The current business nature requires an organization to be very innovative when it comes to service delivery if they must reduce the cost of production and maximize profit. The need to connect business internationally has increased the uptake of ERP systems. There are different aspects of ERPS that have been studied including Success models of ERP implementation, ERP Software, ERP optimization, ERP supply chain management, as well as several case studies. Some of the studies related to this research have been summarized in this section.

Boafo (2018) researched on successful strategies for implementing an ERP and part of his conclusion was that even though there was great risk involved in ERP implementation, the increased productivity motivated top management to integrate and harmonized business processes for better decision making. Findings from the study concluded that ERPs are capital intensive and require proper strategies that ensure successful implementation. The study showed 75% of Manufacturing firms preferred big bang strategy and 25% opted for phased rollout. However, the study did not tell us the extent to which parallel and hybrid approach were used.

A study of 150 U.S based manufacturing firms by Hsu (2020) ascertained that businesses struggle with decision between BPR and customizing the system to fit business processes due various reasons ranging from firm size, the support accorded by top management, the type of industry, and the strategy used. The study refrains from recommending a strategy for industries whose business processes are not provided in the generic ERP form. Another study by Yeh and Walter (2016) on the higher Education Library ERP project ascertained that the technical team expertise on infrastructure contributes to the success of implementation. The study noted trends towards cloud computing, SaaS, and IoT which made it critical to evaluate technical infrastructure for hosting data. An empirical study of ERP implementation Strategies done by Madkan (2014) stated that there were both advantages and disadvantages of using big bang and phased rollout. The risk of using big bang as opposed to phased rollout was that the risk of fallback plan is higher, time of resolving issues was longer and user take longer to transition to

new system. Grandhi and Chugh (2012) in their study on implementation strategies for ERP adoption by SMEs identified three vendor-based strategies for ERP implementation adoption namely, pre-configured solutions, implementation methodology and hosting options.

A case study at Rolls-Royce by Yusuf et al. (2004) ascertained the following challenges; failing to align ERP with goals of the organization, delivery of unreliable IT hardware and infrastructure both before and during implementation, failure to provide adequate and continuing support after implementation, sabotage by management and supervision, inadequate support from management and supervision, lack of thorough training of end-users, possibility of failure due to inability to load data into new system, insufficient testing of processes, excess implementation stress, and conversion related data issues, failure to give ERP adequate priority due to overlapping resources, maintenance hitches such as high cost of post implementation support and renewal of licenses, the project may impact on company management review schedules, end of year audits, financial reporting, shifting request during 'go live' affecting the new system and those operating it on a learning curve beyond capacity.

According to Venkatesh (2006) little has been researched in respect to impact of ERP implementation on employee's motivation, controls, and psychological effects such as job insecurity or distraction from comfort zone and uncertainty of adoption of a new system. If users feel that a system enhance task performance or decision quality, they readily accept it, otherwise they resist voluntary use of it (Bokhari, 2005). According to Al-Mashari (2002) the impact and outcome of ERP has been under investigation. Yen and Sheu (2003) cited that many Companies did not conduct proper analysis before implementing ERPs and if any attempts were made, they were based on traditional ROI and payback Strategy. According to Bhattacharyya and Dan (2014), there is an increase in open-source ERP trend for small scale business. The studies above did not look into strategies for Oil and Gas firms which motivated this study to understand why some ERP projects are successful and some end up in total failure or half complete.

Oil and gas firms in Kenya are facing many challenges of stock reconciliation and management, purchasing, timely financial reporting, accurate reports, delay of customer order delivery, theft, credit controls, heavy penalties for late duty and VAT payment, employee, and payroll management, tracking assets, payments control, unstandardized procedures and processes, whose solution have been found in ERP systems. The other challenge is overhead cost with the

latest revelation that 79 shillings (KSH.) per liter is in tax that has seen fuel prices shoot up to more than KSH. 200 pump price per liter as announced by EPRA. These firms adopt ERP for better planning by estimating their demands, reducing overhead and employment costs, introducing better credit controls, better service deliver, providing holistic organization information for better decision making and maximize their margins. This has led to interest in research on ERP systems locally and some of the studies that form part of this research.

According to Njuguna (2011) established that many respondents in Kenya revenue authority preferred three approaches to EPR implementation namely, big bang strategy, module wise and customized approach with main consideration being cost, time and usability. The study emphasized the importance of implementation strategies, user involvement, remaining within the scope, a well constituted team, budget, management support, adequate training and testing to ensure firms don't go bankrupt. This was a case study and did not address larger needs ERP implementation strategies and did not attribute the strategies to successful implementation neither include any information theory to understand the impacts on organization and individuals.

Managing director, Wilson (2019) SYPRO Africa research in collaboration with Strathmore university ascertained that only 63% of the Companies sampled had installed an ERP system with 33% using manual processes. The study identified hardware and software cost as main hinderance for acquiring ERP, inadequate skills, and expertise in the discipline of ERP implementation. One of the advantages established from respondents who had installed an ERPs was automation of business process and identify gaps in their production which enabled them to compete better in global markets.

According to Kipyegon (2018) challenges of ERP implementation in chartered universities included data security and acquisition costs as part of the challenge and some advantages as reduction unnecessary task duplication, reduction of operational cost and better reports.
Ireri and Chirchir (2015) also studies the barriers of adoption ERP at Kenya Ordnance Factories and concluded that the role of end user, stakeholder involvement in ERP implementation significantly impacted the success of system adoption .The study failed to suggest any Strategies for successful implementation and did not suggest models that linked user involvement to the success.

Wanjau, (2020) research on ERPs implementation in higher education institutions discussed the big bang strategy, phased rollout, parallel, pilot and hybrid strategies. The study does not tell us the extent to which the strategies were used in the implementation.

The present study aimed to address the following research questions. What are the implementation strategies used by Oil and Gas industries in Kenya for ERP implementation? What are the factors that determine choice of ERP implementation Strategy among Oil and Gas industries in Kenya? What are the challenges faced in ERP implementation in Oil and Gas firms in Kenya based on implementation strategy, and what is the relationship between ERP implementation Strategies and success of ERP implementation in Oil and Gas firms in Kenya?

1.3 The Objectives of Study

The main objective of this study was to establish the relationship between ERP implementation strategies and the success of ERP projects among the firms in the oil and gas industry in Kenya. The specific objectives were:

(i) To establish the implementation strategies used by Oil and Gas industries in Kenya for ERP implementation.

(ii) To establish the factors that determine choice of ERP implementation Strategy among Oil and Gas industries in Kenya.

(iii) To establish the challenges faced in ERP implementation in Oil and Gas firms in Kenya based on implementation strategy.

(iv) To determine the relationship between ERP implementation Strategies used and success of ERP implementation in Oil and Gas industries in Kenya.

1.4 Value of the Study

The problems identified during ERP implementation in oil and gas firms help establish strategies for successful adoption. According to Huang and Handfield (2015) about 58% of ERP projects exceed budget and about 65% are delivered late. It is therefore important for firms to understand these challenges and ensure delivery within the allocated budget and time.

The findings will help ERP implementation teams to determine which factors to consider when selecting the best suited strategy for the implementation. Knowledge of successful implementation strategies is vital to reduce failure and cost overrun.

Managers of any organization planning to implement ERP can also add to their knowledge on what ERP implementation entails for proper allocation of resources, planning, support, and enforcement.

The findings from this study could benefit the community by equipping O&G firms with best practices that will increase profitability and enhance social responsibility.
This study is helpful to O&G Companies because the ERP system allows timely computation of taxes and payment before a due date thus avoiding hefty penalties for delayed timelines.
ERP systems are valuable to Oil and Gas Companies for stock management and reconciliation to know how much of their product is available at KPC at any given time and do their demand projects in time and accurately.

CHAPTER TWO: LITERATURE REVIEW

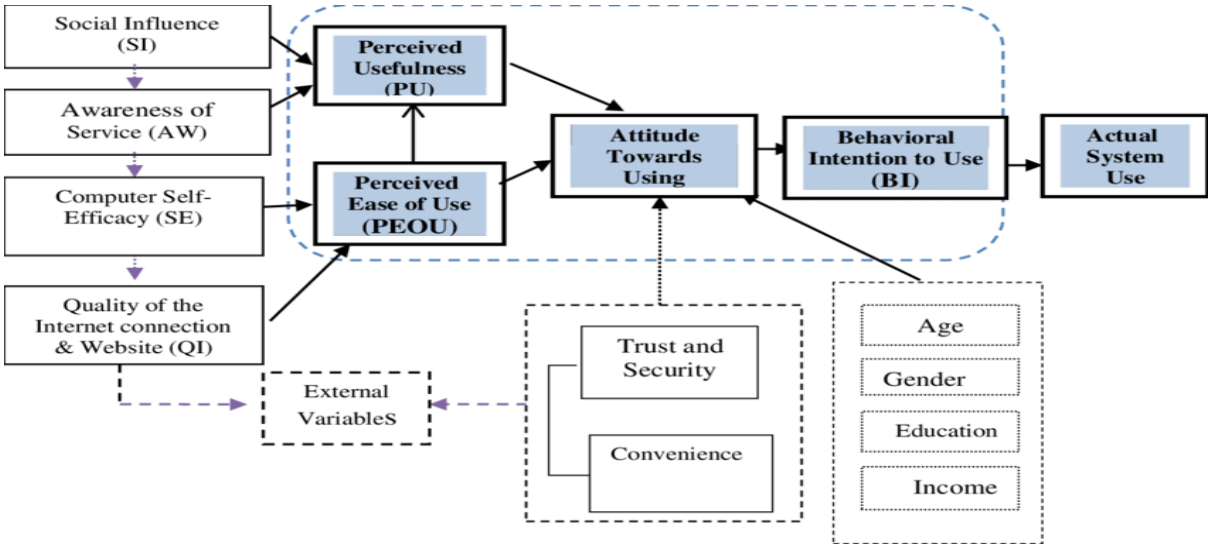
2.1 Introduction

Several studies undertaken by different researchers have been discussed. Key theories related to this study include Venkatesh and Davis (1996) Technology Acceptance Model (TAM), the Goodhue and Thompson (1995) Task Technology Fit model, and DeLone & McLean (2016) IS Success model.

2.1.2. Technology Acceptance Model (TAM)

This model was suggested by Davis (1989). The theory guides that the adoption of an ERP is highly dependent on perceived usefulness and perceived ease of use which influence user acceptance and individual's performance. According to Sinha (2020) the perceived usefulness of an individual is likely to improve job performance and motivate an end user. Venkatesh and Davis (2000) defined perceived ease of use as the extent to which a user trusts that using the system will be effortless. Davis (1989) claimed that usefulness of a system is more likely to influence usage than its ease of use, while Singh et.al (2020) argues that the easier it is to use a system the more useful it is. Demoulin and Coussement (2020) put more emphasis on perceived usefulness. According to Fusilier and Durlabhji (2005) perception usually impacts individual's behavior.

FIGURE 1 TECHNOLOGY ACCEPTANCE MODEL



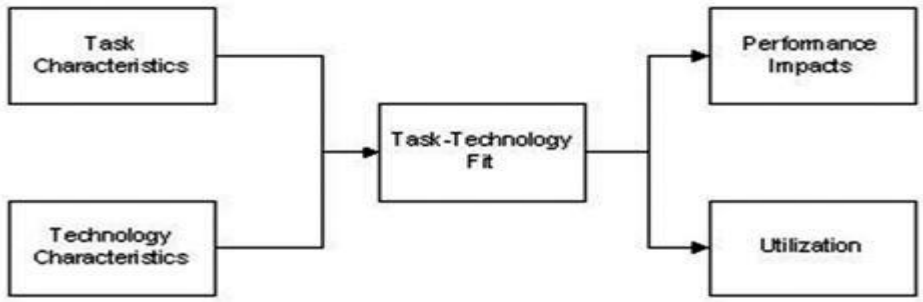
2.1.3 Theory of Task Technology Fit

Goodhue and Thompson (1995) developed this theory to examine the relationship between technology and the task which it is meant to support. TTF has received wide application in research (Papagiannidis & Marikyan, 2023). TTF explores the post-adoption aspect of technology utilization as opposed to many researchers who had focused on pre-adoption Strategy. TTF theory examines the relationship between five components namely, task characteristics, technology characteristics, task-technology fit, performance, and utilization. In ERP implementation Strategies, data size, training, and organization size relate to task characteristic, complexity of the ERP system can be associated with technology characteristics, aligning requirements to the system can be likened to Task-Technology fit, the challenges, and success of strategy will determine performance and utilization.

TTF theory suggests that the suitability of strategy to the task affects the use and performance benefits depending on user perception, attitude, and beliefs. Eight dimensions outlined as quality, compatibility, locate ability, authorization, training, production timelines, system reliability, as well as relationship with individual users have been used to rate the degree to which a system assist a user to perform their task. TTF explains the association of technology user, its characteristics (hardware, software tools) and task characteristic (functional use measured by task non-routineness, interdependence, and job title).

Ability of system functionalities should match user's ability, task procedure, and business processes (Goodhue & Thompson, 1995). Technology utilization indicates the interaction with the system assessed by the frequency and range of use (Menon et al., 2019). Utilization is determined by several attitudinal and belief factors like social norms, attitude to behavior and expected consequences which contribute mandatory or voluntary system use (Gregor, 2020). The performance impact is associated with what can be realized by performing a range of tasks.

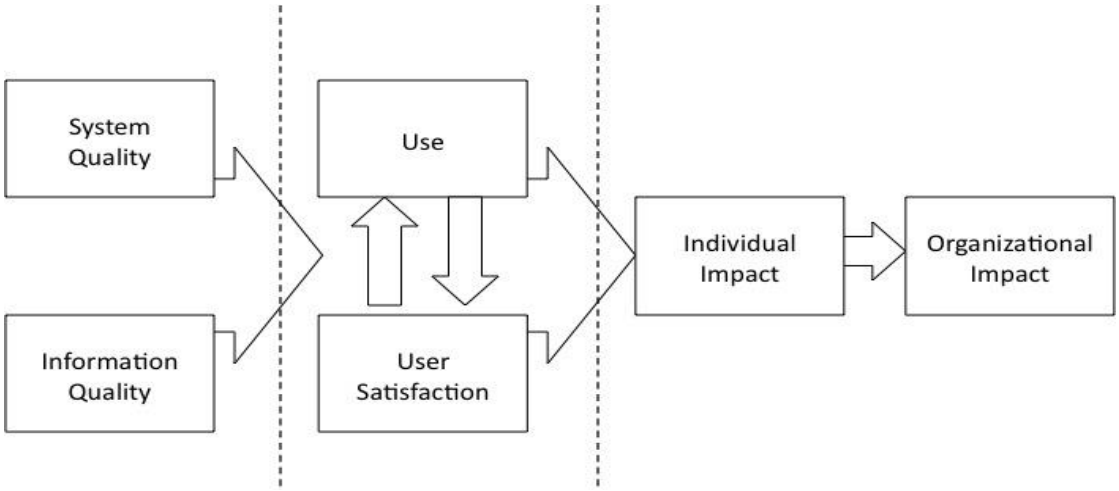
FIGURE 2 UTILIZATION FOCUS MODEL



2.1.4 DeLone & McLean IS Success model.

DeLone and McLean (2016) reviewed research studies undertaken between 1981 and 1987 and developed DeLone & McLean IS success model for measuring IS success. Six constructs comprising of ERPS quality, data quality, usage, client satisfaction, personalized impact of using the system, and how the organization is impacted from using the system were identified as being critical to measuring the success of information systems. Kenge (2020) recommended that service quality be included in the model construct. DeLone and McLean (2016) consolidated Individual impact and Organization impact to net benefit to allow multiple level analysis. The system quality is the desired output characterized by complexity and flexibility. Information quality is characterized by accuracy, completeness, and reliability. System usage is the frequency of system utilization, range of use, purpose, preference among others. User satisfaction is derived from quality of reports, few errors and minimum system downtime and ease of use. The system has potential to impact positively or negatively an individual or organization.

FIGURE 3 INFORMATION SYSTEMS SUCCESS MODEL (DELONE & MCLEAN 1992)



2.2 ERP Implementation Strategies

ERP implementation Strategies in this study are methods for transitioning from existing systems to adopted ERP system. Dunaway (2021) refers to implementation strategies as deployment methods that ensure that business objectives and goals are met. The choice for the right implementation strategy should be guided by risk tolerance, firm size, overall budget allocation, expected return on investment(ROI), competence of the consultant team, complexity and size of the ERP, judging from 2022 ERP report by Panaroma consulting group. The report ranked choice of implementation strategies in the year 2022 as follows, Hybrid

42.9%, phases rollout by location 20.7%, big bang 16.4%, phased rollout by module 12.1% and phased rollout by business unit 7.9%.

Big-bang (birth of universe) Strategy is popular for small firms' implementation (Mabert et al., 2003). Asha et al. (2023) argues that the big bang strategy requires proper preparation, configuration, development, testing and user training. The ERP research discussed Big bang Strategy as the fastest way of deploying ERP Modules but also ranked it the riskiest because if there is a hitch the entire business is affected. In this Strategy a cut-off date for moving all processes to the new system is determined, all business functions are launched at the same time and the legacy system abandoned (O'Leary, 2005). However, it is advised to have a fallback plan just in case go-live fails. This Strategy saves the organization training cost, the return on investment is also short, and takes shorter time as opposed to phased out rollout because of its ability to deliver instant benefits (Warwick, 2022). However, the strategy is very hectic because it requires comprehensive understanding of universal business processes, its aggressive nature makes it rushed, it can be very stressful to for end-users to learn everything in a short span of training and can hinder business process changes (Bently, 2014).

O'Leary (2005) calls Phased Rollout a step-by-step Strategy. Mabert et al., (2003), this is a slower implementation Strategy. Users are introduced to the new system in a planned step by step Strategy either by models, business line, functional units, or geographical locations. It is believed to cause more fatigue to users according to Garside (2004) due to the prolonged time of implementation. Wright (2016) the pros of this Strategy include using shared resource for training unaccustomed users hence reducing working capital, IT team is not overwhelmed by support, there is adequate time to stabilized one rollout before going to the next, and users have more time to adapt to the new system, offers better experience for enhancement in subsequent rollouts and controlled risk . However, Srivastava (2023), cited that it has its own cons such as dragging the project making it costlier, it may be too late for fallback legacy system, change requests too many, burnouts due study of each business section as opposed to global overview implementation and more implementation resources may be needed.

A parallel Strategy involves running the legacy system concurrent with the new ERP. Data integrity and migration issues are minimized, Nord et. al (2002). Running both systems parallel minimizes risk, it gives better comparison of legacy and new ERP to gather performance metrics and give better control in case of fallback. It is, however, time-consuming, and

exhausting, there is a higher risk of failed implementation and costly due to duplication of work. Pilot Roll-out is a more focused Strategy on key functional business areas at a time to evaluate how it works and whether it can be rolled out to other processes. This minimizes risk but increases the cost and time of implementation (Chamberlain, 2015). SaaS is the most recent cloud-based trend which saves on storage infrastructure. It uses the internet, it's easy to customize, and more flexible to access.

Hybrid is a mixed Strategy which might combine two or more of the discussed strategies. Often an organization will combine one or two Strategy depending on their analysis. A survey done by Neal (2010) found that 89% of organizations chose the big bang, phased roll-out, or a combination of the two strategies. Phased roll-out and big bang shared equally while parallel adoption ragged far behind. This strategy has moderate risk, while giving better control of the ERP implementation. Implementers should be conscious of prohibitive cost and intensive training and time required for successful ERP adoption.

2.3 Factors Determining ERP Implementation Strategy

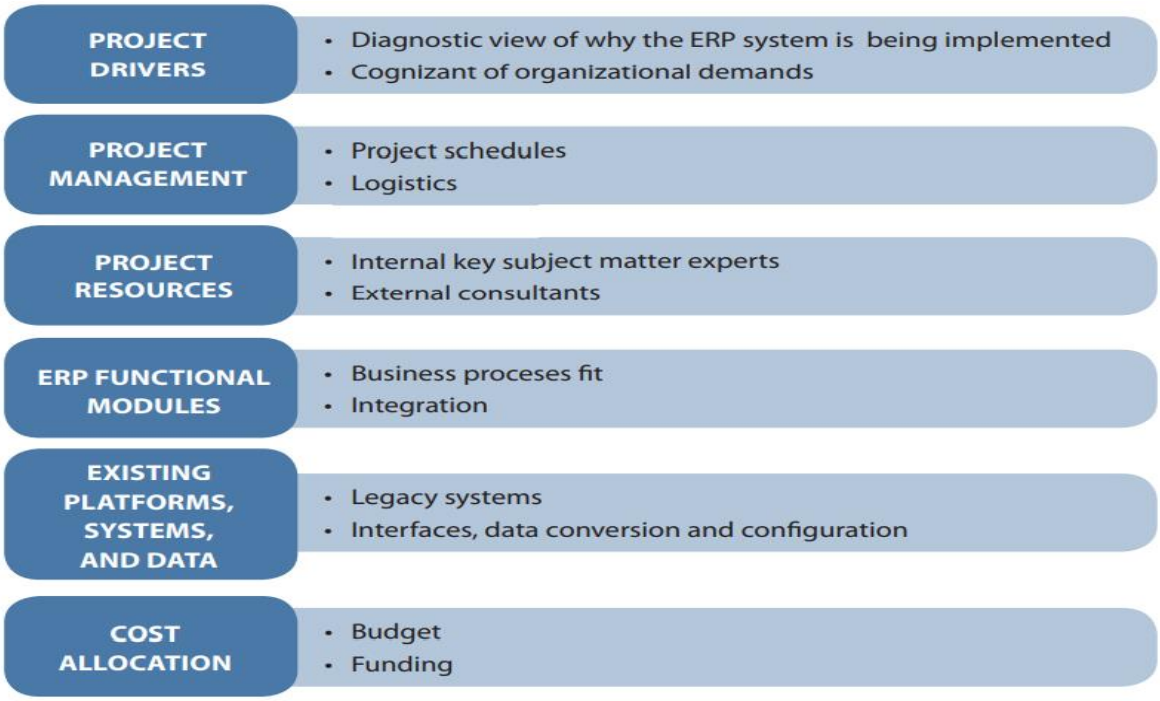
The choice of an ERP implementation Strategy is determined by several factors which encompasses the size of the company, number of geographical locations, business processes complexity and ERP system, size of data to be migrated, existing, future integration need, nature of the industry, customization requested, risks involved, business objectives, timelines, vendor involvement and user adoption to change. When the business operations are in single site it is easier to use big bang than when in multiple sites due to interdependencies between the sites. Donagher (2020), recommends the use of phased roll out when it comes to implementation in multiple sites of business and states that if parallel implementation is used, the organization must figure out how the old and new system will run concurrently without hitches. Steves (1999) emphasized the need to consider technology complexity when settling for an ERP implementation Strategy. According to Suganthalakshmi (2021) ERP version and future upgrades should be considered when selecting a system. Organization strategic factors to be considered according to Mutuku(2020) is to involve top management. Yen and Sheu, (2003) emphasized the importance of aligning ERP system with the selected implementation strategy.

Big bang Strategy is thought to be a high-risk implementation Strategy and therefore requires proper mapping of existing business functions, fall back plan and calculated risk. There should be some degree of risk analysis and quality management at all stages of the project according to (Mandal & Gunasekaran, 2003). Nah et al., (2001) urges that it is vital to prepare for change management. Mahraz et al.(2019) recognized the contribution of EPR to firm's global business achievement through utilization of information technology (IT) platforms. The Big Bang Strategy has been recommended for those smaller organizations that want faster implementation with low cost and want to abandon legacy system completely and adopt new platform. A lot of preparations go into making it successful by completing all configurations and developments, thorough testing, and training the users (Khanna & Arneja, 2012). This Strategy was successfully used in NIBCO, a construction company in the United States.

The Phased Strategy has been used by multinational organizations because the number of physical locations and employees may be too many to be handled in one step and the cost may be too hefty. However, each organization situation is unique based on the selection factors because it allows the firms to implement module wise, per business unit or location (Mundell, 2020). In the event that issues arise, diagnosing the problem and fixing it becomes easier compared to big bang Strategy (Sharma, 2022).

The parallel is recommended for organizations with critical functions to minimize customer impact. This approach ensures that there is no downtime, it reduces pressure on learning new system, allows humble time for transition and stabilizes the ERP system. However, productivity may reduce due to fatigue of running two systems concurrently, high risk of failure due to employee resistance to move from their comfort zone of legacy system, increased cost due to double licensing fees, and likelihood of user confusion. Hybrid is a blended approach mainly suited for rapidly changing and growing business environments with complex and unique requirements (Warwick, 2020). It allows an organization to be flexible depending on budget, planned customizations, adaptability, location, and business units, and time. It however, results in extended planning, timelines, additional cost, and too many customizations According to Dunaway (2021) the key aspects of ERP implementation adoption strategies include project drivers such as clear goals and objectives, project stewardship, project funding, ERP functional module, and current systems.

Figure 4 Key Aspects of an ERP Implementation Strategy



2.4 Success of ERP Implementation

Rosemann and Wiese (2022) balanced scorecard focus on project performance. Project performance of the ERP project can be measure using four perspectives namely, alignment to internal business processes with few customizations, customer satisfaction, learning, growth through training and knowledge transfer, financial aspect on budget variation, financial ratios, and ROI. Balances Scorecard transforms the business vision of selecting ERP software into measurable strategies, and objectives that aim to minimize cost and optimize operations. Originally ERPs were for inventory management and material requirement planning, it therefore follows that one of the key performance indicators (KPI) should be improve inventory management through supply chain schedules to reduce wastage and stock out, increase margins, improve financial reporting, enhance data accuracy, provide customer self-service portal, reduce system downtime, increase end user satisfaction, generate return on investment and should be both cost and time efficient Jean (2023). Schwart (2022) adds that the ERP system should be aligned to business requirement, should be within the scope, quantify key indicators for example how much data is required, understand the measure and the measure must be relevant.

According to Setiono (2020) ERP implementation KPIs can be grouped by action that trigger change, quantitative value, status quo of employee or organization, financial indexes, and

business process-based indicators. According to DeLone (1992) and McLean (2003), there are six aspects of measuring success namely system quality, information quality, system utilization, client satisfaction, how the individual is impacted by using the system, and how the organization is impacted by use of technology as paramount to measuring the success of information systems. The Praxiom Research Group Limited, (2020) stated that ERP system should be able to meet quality standards of ISO 9000 standards.

According to Millet and Grabot (2012) human factors determine the success and performance of ERP to a big extent, owed to overlooking the following dimensions of leadership at 42%, organizational and cultural at 27%. Menon (2019) emphasis on adopting ERP systems as standard rather than trying to modify to fit business processes, hence, avoid customization. Markus and Tanis (2000) also advocated for adoption of generic functionalities of an ERP system. According to Hoseini (2013), ERPs need to be customized to top up business functionalities that may not be available in their standard form. Nah et al (2001) research established eleven integral factors of ERP implementation which are top management support, business objectives, effectiveness in communication, change management, project management, project monitoring and evaluation, team composition, project champion, technical skills, business process reengineering or customization needs and choice of ERP.

Sharma (2022) recommends the following five steps to make the adoption of ERP implementation a successful, early planning for migration to the new system with minimum interruption, designing interfaces and workflows for migration taking into consideration factors such as connectivity, security, and maintenance, prepare for data migration templates and intensive training of resources after a thoroughly testing. In the case study conducted by Carton and Adam (2003) on four multinational Irish based firms identified several benefits related to ERP adoption including, transition from old way to new way of doing work, centralizing of data due to integration, cost reduction, increase production and shared resource especially if big bang Strategy is used. Hong and Kim (2020) proposed the model below to address the issue of Organizational fit to ERPs.

2.5 Challenges of ERP Implementation Strategy

ERP Implementation can be incredibly stressful both for the project joint forces and sol users. ERP projects have timelines which if not met can cause stress and hostility to change

(Rajapakse, 2023). Otieno (2008) in their literature cited some contributing factors to failure of ERP projects as resistance from the user's inability to give clear and conclusive business requirements, inadequate technical skill, inadequate resources, poor management of development phases, strenuous relationship between implementing partner and client, failure to manage user expectations. According to Zhang et al. (2003) approximately 90% of ERP projects are delayed or above budget compared to ERPs realization rate of approximately 33% compared to 23% of system failures are due to human technology challenges (Chang, 2004).

An ERP project can be said to have failed if it did not achieve ROI identified during project approval (Baumann, 2023). According to Majed (2000) 70% of ERP implementation did not achieve the expected outcome. Phillippi (2021) cited that 70 % of ERP Implementation projects fail because of poor project leadership. According to Phillippi (2021), some of the other contributing factors for failure of ERP Projects is setting unrealistic timelines, failure to allocate enough budget and resources, working with an inexperienced team, too many customizations, poor ERP implementation strategy, lack of proper leadership, inadequate testing and training and poor vendor support. Data cleansing as a big challenge for ERP Implementation especially when adoption implementors want to use big bang Strategy that requires large data to be validated for accuracy, completeness, and reliability (Doom et al., 2010). The size of data and its reliability must be considered when preparing migration templates for the Strategy selected to implement an ERP system. Yusuf et al (2004) cited that data cleanup is a big challenge in ERP implementation because it will affect the expected output. The cost of overrun delays was cited by Al-Mashari and Zaire (2000), as many project a delayed by unexpected customizations or even additional requirements. These challenges determine the choice of Strategy in adoption of the ERP system.

Oracle NetSuite research ascertained ordinally ERP implementation challenges during implementation such as ailing project management, scant project readiness, technology integration, data quality issues, lack of change management policy, and cost overruns. Companies that try to implement ERP systems have trouble explained by undermining integration of the various departments (Walton, 2000). Wallace and Kremzar (2001) argued that sudden change in use of big bang Strategy attracted high risk. Change normally affects people within and outside the organization such as customers, tax authority and suppliers before the system stabilizes. Zviran et al. (2005) found out that the age of users affected the perception of adoption in that younger users find it easier to accept information technology as

opposed to older users who fear technology. This will make older users managers prefer phased rollout as opposed to the big bang Strategy (Bentley, 2014). Holsapplem et al. (2005) cited those users with formal education used computers effectively and had higher chance of embracing technology than those with informal education. A hybrid Strategy may be suitable for organizations that have middle and higher level of education requirements. According to Nah et al., (2003) training enhanced adoption of an ERP system. According to Calegero (2000) ERP implementation blocks are allied with under skilled staff and inexperience of project crew which also affects the choice of adoption Strategy. More experienced implementation teams may take bigger risk like those in big bang and parallel Strategy. Davenport (2000) trusts that ERP systems application design impacts an institution's business strategy and organizational culture, so the strategy should be carefully selected. According to Langen and Walton (2019) the organization needs to have existing structure and best practices put in place even before adopting an ERP.

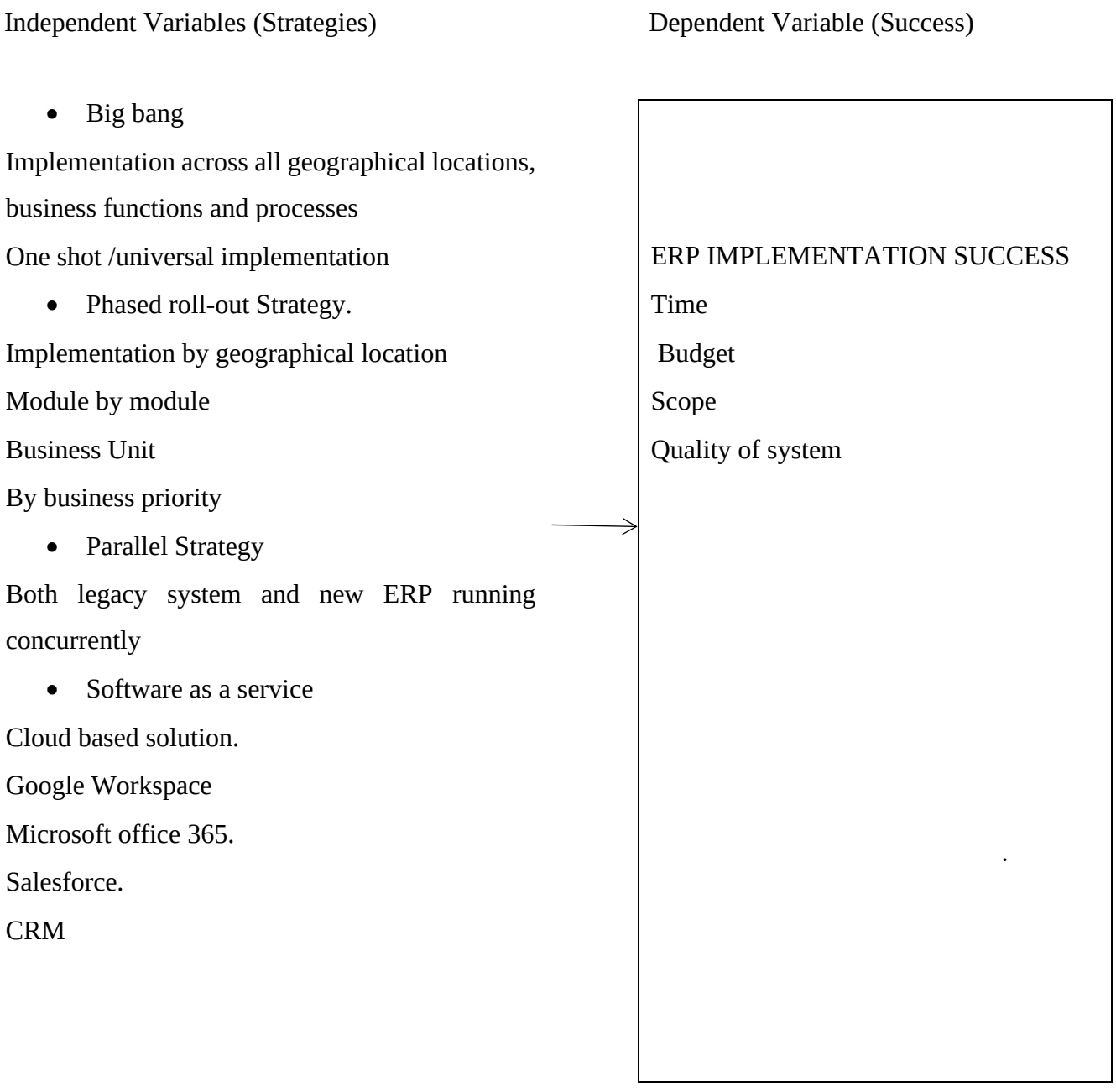
This will affect the quality of system and success of adoption Strategy. In Kenya we have an example of Jade Petroleum which closed shop after investing so heavily in Oracle E-Business suite because they did not have their requirements well defined, users were resistant to change because the legacy system was available concurrently, the choice of ERP was underutilized for the size of enterprise and top management did not give much emphasis to support implementation. However, many other Companies in the Oil and Gas industry have successfully implanted their ERPs but are still struggling to benefit fully. According to Kumar and Hillegersberg (2000) Companies face numerous problems due to the complexity of ERP systems and hefty cost of customizations, configurations, and consultation services.

ERP implementations are labor intensive, expensive, but do not always produce expected results (Tasi et al., 2010). The worth of ERPs is related to how well it is able to accomplish its purpose and achieve maximum usage but not on the system alone (Moon, 2007). Kheybari et al., (2020) cited that it is important for ERP system to be compatible with business process. Vanpoucke et al., 2014) cited that it is important for ERP system to be aligned with business process stating that it is hard to measure ROI from ERPs. According to Sumner (2000) lack of abundant training, lack of competent team and failure to mitigate risks can lead to failure of an ERP implementation resulting in loss and sometimes organization may close (Avison & Fitzgerald, 2008).

2.6 Conceptual Model

The conceptual framework helps to visualize the relationship between ERP implementation strategies and success among oil and gas firms. The independent variables are the ERP implementation strategies and the dependent variables the factors for measuring successful implementation. An ERP implementation will be said to be successful if it can be measured against known variables. Conceptual framework form part of the research question and data analysis of this study.

FIGURE 5 CONCEPTUAL MODEL



Chapter Summary

The theories discussed in the chapter include Technology Acceptance Model Davis (1989) to illustrate human factors on technology acceptance and what to expect when it comes to change management, Task Technology Fit Goodhue, and Thompson (1995) and DeLone and Mclean IS success model (2016) that help understand how performance of ERP implementation can be measured.

Researchers and Scholars have demonstrated the relationship between the ERP strategies used during implementation and the overall success. Information System Models have been used to assist in understanding relationships between various factors and how they influence acceptance and performance of ERP implementation systems. ERP projects cost millions of dollars for large organizations and hundreds of million dollars for small firms to implement and therefore it is important to understand the whole cycle of implementation to be able to put in place the most suitable implementation strategies.

It is fundamental to think through business requirements, objectives, and scope to be able to apply the appropriate strategies that will help deliver the system on time, reduce the cost, and minimize risks. More and more businesses have embraced ERPS to gain competitive advantage, enhance controls, optimize productivity, standardize processes, aid in decision making, increase transparency, and maximize ROI. Valuable resources technical, environmental, and organizational resources are needed to succeed. Caution should be taken on risks of failure as it can lead to bankruptcy.

The main Strategies used in ERP implementation adoption strategies are the Big Bang, Parallel approach, Phased rollout, and hybrid . The main factors to consider when selecting the approach include business objectives, business requirements, size of the organization, size of the ERP, resources allocated resources, allocated budget, vendor support, integration with legacy systems project timelines, organization risk tolerance level and expected return on investment.

The success of an ERP implementation can be measured if the project was completed on time, within the scope and allocated budget, requirements were met, data accuracy, number of customizations, customer satisfaction, production effectiveness and efficiency, ROI, inventory management, financial period closing and reporting, customer satisfaction, system adoption

and utilization, cost effectiveness maintaining new system and best practices during implementation.

The main challenges of ERP implementation include user's inability to give clear and conclusive business requirements, inadequate technical skill, inadequate resources, poor management of development phases, strenuous relationship between implementing partner and client, failure to manage user expectations, project fatigue, overrun cost, failed project, aligning business requirements to ERP system, complex nature of ERPs, extended deadline, poor documentation, change management issues, laxity from top management, vendor conflicts, users not cooperating, rushed implementation, test and training gaps, and lack project champion.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the procedures that helped achieve the objectives of this study. This being quantitative research using survey questionnaire to collect data that is objective and that can be either quantified, measured, or even analyzed.

3.2 Research Design

Cooper, (2003) describes a research design is a representation of a roadmap on data collecting, measuring, and analysis. Descriptive Research has been designed to answer what, where, when, and how queries mainly for cross-sectional survey. This descriptive research aims at utilizing cross sectional survey questionnaires as primary source of data for better comparison and more controlled responds. The choice of research is informed by ability to obtain accurate representation of the independent and dependent factors to derive.

3.3. Target population

According to a report from Energy Regulatory Commission (ERC) in (2022) there were more than 105 Oil and gas firms registered in Kenya by 2022. The study used 84 firms as the target population.

3.4 Sampling

The type of sampling that will be used is judgmental sampling.

Simple size Yamane's formula: n = N/(1+N(e)2

n = the sample size

N = the population of the study

e = the margin error in the calculation

n=105/(1+105(.05)^2

n=83.16

3.5 Reliability of the Research Instrument

Reliability of a research instrument refers to the ability of an instrument to provide same results repeatedly (Sachdeva, 2018). However, the instrument should be admitted under similar conditions. If similar findings are found, then the instrument is said to be reliable.

For the purposes of testing for reliability Cronbach's alpha was used. Bell, Bryman and Harley (2022) showed that a Cronbach's alpha of 0.7 is appropriate indication of reliability ths considered in investigating this work. A Cronbach Alpha 0.7 or above is an approved reliability coefficient. As shown in Table 3.1, two variables namely parallel, hybrid ERP implementation had values for scale reliability greater than 0.7. The remaining variables had reliability value of less than 0.7. Nonetheless, some of the variables had scale reliability of < 0.7 all of them combined had reliability value of 0.8466 hence meeting the threshold for the test.

Table 1.1: Cronbach's Alpha and Sampling Adequacy

Variables	Number of items	Scale Reliability coefficient
Big Bang	2	0.1724
Phased Rollout	4	0.4881
Parallel	2	0.7194
Hybrid	2	0.7064
SAAS	5	0.2751
All	15	0.8466

3.6 Data Collection

Primary Data was collected from IT managers through pre-collected online questionnaires via emails. The questionnaire was split into five sections. Section (A) is general information, Section (B); implementation Strategy used by O&G industries for ERP implementation, Section C; factors that determine choice of ERP implementation Strategy Section (D); challenges faced in ERP implementation in O&G industries considering implementation strategy and Section (E); success rate for different ERP implementation Strategy. A scale of 1-5 will be used to ratify the extent to which factors in section b, c and d have influenced the outcome of their ERP implementation.

3.7 Data Analysis

Collected data from questionnaire was validated against the set standards and probe completeness. The data was then grouped, and values assigned to represent data in tables and structures. Descriptive statistics applied in section A, B and C.

Regression analysis was applied to show the correlation linking ERP implementation Strategies (Independent Variable)and success of ERP implementation(Dependent Variable).

$Y = \beta o + \beta_1 X_1 + \beta X_2 + \beta_3 X_3 + \varepsilon$

Where Y =Success of ERP implementation

β_o = Constant

X_1 = Big bang

X_2 =Phased Rollout

X_3 =Parallel

X4 = SAAS

ε =Error term

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents results for assessment of enterprise resource planning implementation strategies and success among oil and gas firms in Kenya. The results in the chapter encompass both descriptive and inferential statistics. The results are presented inform of frequencies, mean and standard deviation. For inferential analysis, the study considered simple and multiple regression models. The Ordinary Least Square (OLS) was utilized to estimate coefficients of the variables indicated in the empirical model. Correlations analysis was performed to check for possibility of multicollinearity.

4.2: Response rate

A total of 84 questionnaires were distributed to ICT managers of various oil and gas Companies in Kenya. 80 questionnaires were returned representing 95 percent response. Mugenda and Mugenda (2013) proposed 50 percent reply, or more is ideal for carrying out a meaningful estimate. This assertion is corroborated by Maxfield (2015) by indicating that a return rate of 50 percent is sufficient for estimation to take place. Table 4.1 shows the results.

Table 4.1: Response Rate

Response	Total	Percent
Returned	80	95.24
Unreturned	4	4.76
Total	**84**	**100**

4.3: Demographic Characteristics

This section presents information on respondent's characteristics. Specifically, the information provided includes sex of individuals, level of education and age.

4.3.1 Response by Sex

Figure 4.1 represent gender of the respondents.

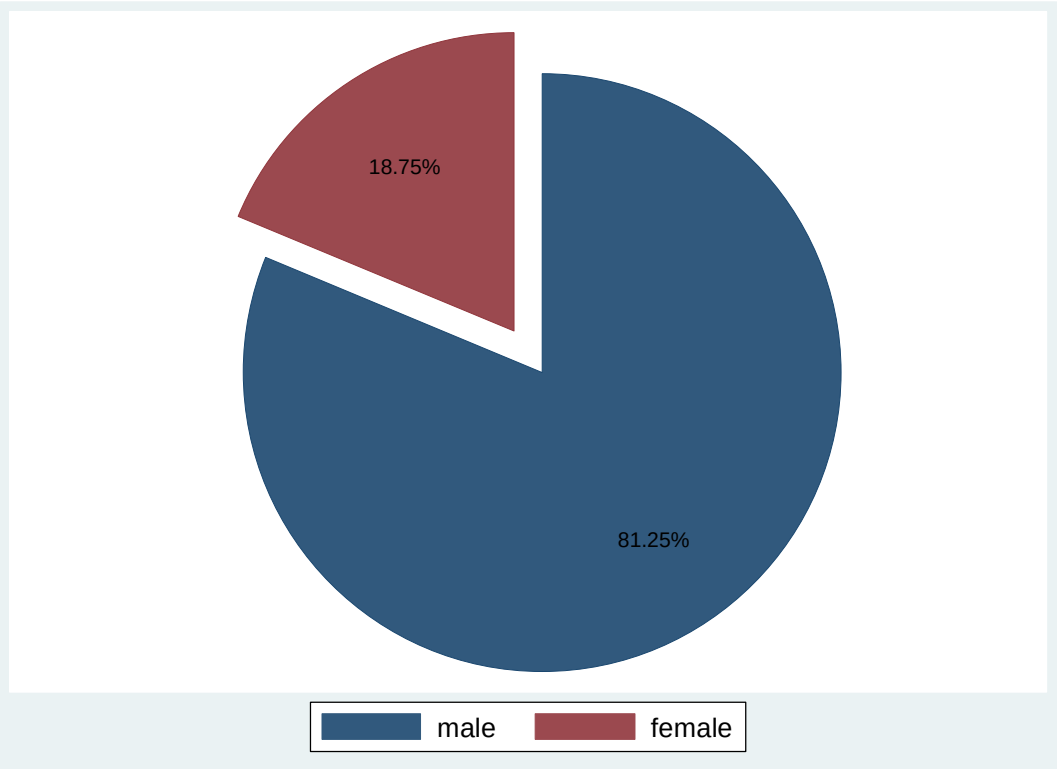


Figure 4.1: Gender of the Respondents

Figure 4.1 Established that majority of those who participated were male. They constituted 81.25 percent. The female respondent s accounted for 18.75 percent. This finding ascertained that the study considered both male and female respondents' variation. The results corroborate the Republic of Kenya (2023) report which showed that majority of wage employees in Kenya are male. The report indicated that the male wage workers were 1861500 in 2022 while female were 1153900 during the same year.

4.3.2 Response by Highest Level of Education

The managers interviewed were asked to specify their highest level of education. The responses were as represented on Table 4.2.

Table 4.2: The Education Level of the Respondents			
Education level	**Frequency**	**Percent**	**Cumulative**
Technical_Certificate	3	3.75	3.75
Diploma	19	23.75	27.50
Bachelor	43	53.75	81.25
Master	15	18.75	100.00
Total	80	100	

From Table 4.2 it was found out that majority of the respondents had a Bachelor degree. This category of the respondents accounted for 53.75 percent of the respondents. The respondents with a master degree accounted for 18.75 percent of the respondents. The respondents with diploma qualification accounted for 23.75 percent of the respondents. Those with technical certificate accounted for a paltry 3.75 percent. This result implied that respondents had adequate education and training to give informed responses.

4.3.3 Age Brackets

Those interviewed were requested to tick their age brackets. The results obtained are illustrated in Table 4.3.

Table 2.3: The Age of the Respondents			
Age	**Frequency**	**Percent**	**Cumulative**
18-25 years	14	17.50	17.50
26-35 years	41	51.25	68.75
36-45 years	22	27.50	96.25
over 45 years	3	3.75	100.00
Total	80	100	

From Table 4.3, it was disclosed that the majority of the respondents fell between the age of 26 and 35. They signified 51.25 percent responses. Those between 36 to 45 years were 27.5 percent. The respondents above the age of 45 accounted for 3.75 percent. The respondents between the age of 18 and 25 constituted 17.5 percent of the overall respondents. This finding could suggest that most of the Kenyans in labor market are between the age of 26 and 45 years. Those between 18 and 25 years are few since most of them could still be in secondary schools, colleges, and universities.

4.4 Firm Characteristics

This section presents information about the characteristics of the firms. Specifically, information on number of stations and number of employees is provided.

4.4.1 Number of Stations

The results obtained from the number of station are illustrated in Table 4.4.

Table 4.4: The Number of Stations

Stations	Frequency	Percent	Cumulative
11-20 stations	3	3.75	3.75
21-30 stations	3	3.75	7.50
31-40 stations	34	42.50	50.00
Above 40 stations	40	50.00	100.00
Total	80	100	

From Table 4.4 it was found that majority indicated that their organizations had stations above 40. Specifically, those who indicated above 40 stations were 50 percent. The findings also ascertained that 42.5 percent of the respondents had between 31 and 40 stations. This finding illustrates that oil and gas Companies in Kenya are large and therefore there is need for them to have ERP systems. The adoption of ERPs will make their operations efficient.

4.4.2 Number of Employees in an Organization

The respondents were asked to indicate the number of employees in their companies. The results for the responses are illustrated in Table 4.5.

Table 4.5: The Number of Stations

Employees	Frequency	Percent	Cumulative
50 or less	4	5.00	5.00
51-100 employees	6	7.50	12.50
101-150 employees	3	3.75	16.25
Above 200 employees	67	83.75	100.00
Total	80	100	

Table 4.5 express that many of the oil and gas Companies have employees above 200. This accounted for about 83.75 percent of the respondents. The Companies with 101 to 150 were 3 percent of the total respondents. This finding indicates the need for having ERP system.

4.5 Descriptive Statistics

Descriptive outcome of assessment of enterprise resource planning implementation strategies and success among oil and gas firms in Kenya are presented in this section. The factors considered big bang ERP implementation strategy, phased roll out implementation strategy, parallel ERP implementation strategy, hybrid implementation strategy SAAS implementation strategy and the success of ERP implementation.

4.5.1 Descriptive Statistic for Big Bang Strategy on Success of ERP Implementation among the Oil and Gas Firms in Kenya.

The aim here was to demonstrate how big bang strategy control the success of ERP implementation among the oil and gas Companies in Kenya. A Likert scale was used presented results in Table 4.6.

Table 4.6: Big Bang

Big Bang	Very High Extent (%)	High Extent (%)	Moderate Extent (%)	Little Extent (%)	Not at All (%)	Mean	SD
Implementation across all geographical locations, business functions and processes make ERP implementation successful.	28.75	37.50	17.50	7.50	8.75	3.7	1.21
Immediate switch from old ERP system to new system at a single point in time makes ERP implementation successful	41.25	37.50	17.50	3.75	0	4.16	0.84
Average						3.93	1.03

Results ascertained that 28.75 percent of the respondents concurred to a very high extent that implementation across all geographical locations, business functions and processes makes ERP

implementation successful. On the other hand, about 41.25 percent admitted to a very high extent that immediate switch from old ERP system to new system at a single point in time makes ERP implementation successful. The results ascertained that on average, the respondents admitted to a high extent that big bang implementation strategy can lead to successful implementation of ERP system.

4.5.2 Descriptive Statistic for Phased Out Rollout Strategy on Success of ERP Implementation among the Oil and Gas Firms in Kenya

How phased rollout strategy influence the success of ERP implementation among the oil and gas Companies in Kenya was demonstrated on a Likert scale and the results are as presented in Table 4.7.

Table 4.7: Phased Rollout

Phased Rollout	Very High Extent (%)	High Extent (%)	Moderate Extent (%)	Little Extent (%)	Not at All (%)	Mean	SD
Implementation by geographical location makes ERP implementation successful.	28.75	41.25	22.50	5.00	2.50	4.05	0.79
Implementing Module by module makes ERP implementation successful	48.75	38.75	8.75	3.75	0	4.1	0.87
Implementing ERP per Business Unit makes ERP implementation successful.	35.00	46.25	13.75	3.75	1.25	4.33	0.79
Adopting business priority makes ERP	31.25	45.00	21.25	2.50	0	3.89	0.96

implementation successful		
Average	4.09	0.85

The outcome ascertained that 41.25 percent of the respondents admitted to a high extent that Implementation by geographical location makes ERP implementation successful. It was also ascertained that 48.75 admitted to a very high extent that implementing Module by module makes ERP implementation successful. Also, 46.25 percent admitted to a high extent that implementing ERP per Business Unit makes ERP implementation successful. Lastly, those that admitted to high extent that implementing ERP per Business Unit makes ERP implementation successful was 45 percent of the respondents. Generally, the respondents on average admitted to high extent that phased rollout implementation strategy is preferred for successful implementation of the ERP system.

4.5.3 Descriptive Statistic for Parallel Strategy on Success of ERP Implementation among the Oil and Gas Firms in Kenya

The scrutiny sought to exhibit how parallel strategy influences the success of ERP implementation among the oil and gas Companies in Kenya. Table 4.8 represents options picked on Likert scale.

Table 4.8: Parallel

Parallel	Very High Extent (%)	High Extent (%)	Moderate Extent (%)	Little Extent (%)	Not at All (%)	Mean	SD
continuing running the existing ERP software system and at the same time rolling out a new one makes ERP implementation successful	20.00	30.00	28.75	16.25	5.00	3.43	1.13
Many organization that adopted parallel approach succeeded in	36.25	40.00	15.00	6.25	2.50	4.01	0.99

their ERP implementation		
Average	3.72	1.06

From the results it was ascertained that 30 percent of the respondents admitted to high extent that continuing running the existing ERP software system and at the same time rolling out a new one makes ERP implementation successful It was also ascertained that 40 percent admitted to a high extent that continuing running the existing ERP software system and at the same time rolling out a new one makes ERP implementation successful. Generally, the respondents on average admitted to high extent that parallel implementation strategy is preferred for successful implementation of the ERP system.

4.5.4 Descriptive Statistic for Hybrid Strategy on Success of ERP Implementation among the Oil and Gas Firms in Kenya

It was manifest how hybrid strategy influences ERP implementation success among the oil and gas Companies in Kenya. The descriptive statistics for the responses were rated on a Likert scale and the results are as presented in Table 4.9.

Table 4.9: Hybrid

Hybrid	Very High Extent (%)	High Extent (%)	Moderate Extent (%)	Little Extent (%)	Not at All (%)	Mean	SD
continuing Using the existing on-premises ERP system for corporate functions (i.e for tier 1) and adding cloud ERP systems to support some or all business units or regions (for tier 2) makes ERP implementation successful	18.75	33.75	20.00	17.50	10.00	3.34	1.25

Many organization that adopted parallel approach succeeded in their ERP implementation	37.50	43.75	11.25	7.50	0	4.11	0.89
Average						3.73	1.07

From the results it was ascertained that 33.75 percent of the respondents admitted to high extent that continuing Using the on-premises ERP system for corporate functions and adding cloud ERP systems to support some or all business units or makes ERP implementation successful. It was also ascertained that 43.75 percent admitted to a high extent that many organizations that adopted parallel approach succeeded in their ERP implementation. Generally, the respondents on average admitted to high extent that hybrid implementation strategy is preferred for successful implementation of the ERP system.

4.5.5 Descriptive Statistic for Software as a Service-Cloud Based System Strategy on Success of ERP Implementation among the Oil and Gas Firms in Kenya

The investigation sought to establish how Software as a Service-Cloud Based System strategy influences the success of ERP implementation among the oil and gas Companies in Kenya. The descriptive statistics for the responses were rated on a Likert scale and the results are as presented in Table 4.10.

Table 4.10: Software as a Service-Cloud Based System

Software as a Service-Cloud Based System	Very High Extent (%)	High Extent (%)	Moderate Extent (%)	Little Extent (%)	Not at All (%)	Mean	SD
Companies that utilize cloud-based computing as a way to increase their capacity, improve functionality, or add additional services without having to commit to	36.25	33.75	13.75	5.00	11.25	3.79	1.30

potentially expensive infrastructure costs succeed in ERP implementation							
Companies that utilize Google Workspace as a way to increase their capacity, improve functionality, or add additional services without having to commit to potentially expensive infrastructure costs succeed in ERP implementation	26.25	45.00	18.75	7.50	2.50	3.85	0.98
Companies that utilize Microsoft office 365 as a way to increase their capacity, improve functionality, or add additional services without having to commit to potentially expensive infrastructure costs succeed in ERP implementation	35.44	39.24	20.25	5.06	0	4.05	0.88
Companies that utilize Salesforce as a way to increase their	33.75	42.50	23.75	0	0	4.1	0.75

capacity, improve functionality, or add additional services without having to commit to potentially expensive infrastructure costs succeed in ERP implementation		
Average	3.93	0.98

From the results it was ascertained that 36.25 percent of the respondents admitted to very high extent that Companies that utilize cloud-based computing as a way to increase their capacity, improve functionality, or add additional services without having to commit to potentially expensive infrastructure costs succeed in ERP implementation. It was also ascertained that 45 admitted to a very high extent that Companies that utilize Google Workspace as a way to increase their capacity, improve functionality, or add additional services without having to commit to potentially expensive infrastructure costs succeed in ERP implementation. Also 39.24 percent admitted to high extent that Companies that utilize Microsoft office 365 as a way to increase their capacity, improve functionality, or add additional services without having to commit to potentially expensive infrastructure costs succeed in ERP implementation. Lastly, those that admitted to high extent that Companies that utilize Salesforce as a way to increase their capacity, improve functionality, or add additional services without having to commit to potentially expensive infrastructure costs succeed in ERP implementation was 42.5 percent of the respondents. Generally, the respondents on average admitted to high extent that phased rollout implementation strategy is preferred for successful implementation of the ERP system.

4.5.6 Descriptive Statistic for Success of ERP Implementation among the Oil and Gas Firms in Kenya

The study sought to establish how Software as a Service-Cloud Based System strategy influences the success of ERP implementation among the oil and gas Companies in Kenya. The descriptive statistics for the responses on the success of ERP implementation were ranked on a Likert scale and the outcome presented in Table 4.11.

Table 4.11: Success of ERP implementation

Success of ERP implementation	Very High Extent (%)	High Extent (%)	Moderate Extent (%)	Little Extent (%)	Not at All (%)	Mean	SD
Project was completed with admitted period	23.75	42.50	21.25	10.00	2.50	3.81	1.01
Project was completed within allocated budget	20.00	38.75	27.50	12.50	1.25	3.84	0.98
Scope (Admitted requirements met)	23.75	42.50	27.50	6.25	0	3.64	0.86
Quality (user satisfaction, accuracy, speed, productivity, controls)	25.00	41.25	25.00	7.50	1.25	3.75	0.94
Average						3.76	0.95

It was ascertained that 42.5 percent of the respondents admitted to high extent that the ERP projects were completed with admitted period. It was also ascertained that 38.75 admitted to a high extent that Project was completed within allocated budget. Also, 42.5 percent admitted to high extent that the scope that is the admitted requirements were met. Lastly, those that admitted to high extent that quality that is user satisfaction, accuracy, speed, productivity, controls were 41.25 percent of the respondents. Generally, the respondents on average admitted to high extent that ERP implementation in their firms was successful.

4.6 The implementation strategies used by Oil and Gas industries in Kenya for ERP implementation.

The implementation strategies adopted by the oil and gas firms are illustrated in Table 4.12

Table 4.12: Success of ERP implementation

ERP_strategy	Frequency	Percent	Cumulative
Big Bang	13	16.25	16.25
Phased	32	40.00	56.25
Parallel	16	20.00	76.25

Hybrid	14	17.50	93.75
SAAS	5	6.25	100.00
Total	80	100	

From Table 4.12, it was ascertained that the most ERP implementation strategy adopted in most oil and gas firms in Kenya is the Phased rollout. The results ascertained that 40 percent of the respondents indicated that their firms has used the approach during implementation of their ERP system. The results ascertained that 20 percent of the respondents have used the parallel approach. Those that had used hybrid ERP implementation system were 17.5 percent of the respondents. Those that had used the big bang were 16.25 percent of the respondents. Those that had used SAAS were 6.25 percent of the respondents.

4.7 Factors that Determine Choice of ERP implementation Strategy among Oil and Gas Industries in Kenya.

There was the urge to identify the elements that govern the choice of ERP implementation system . The study posed this question to the respondents and the responses were as shown in Table 4.13.

Table 4.13: Factors Determining ERP Implementation System

Factors Determining ERP Implementation System	Frequency	Percent	Cumulative
Top Management Support	38	47.50	47.50
Training and Reskilling of End-Users	11	13.75	61.25
Change management Strategy	16	20.00	81.25
Vendor Support	8	10.00	91.25
Size of the Organization	7	8.75	100.00
TOTAL	80	100	

From Table 4.13, it is ascertained that top management support is the major determinant factor on choice of an ERP implementation strategy. The results showed that 47.5 percent of the respondents had shown that the management support is important determinant of the choice of ERP system. This was followed by change management system. This factor was indicated to be important determinant of the choice of an ERP implementation system by 20 percent of the respondents. The respondents that showed that training and reskilling of end users as an important determinant was 13.75 percent of the respondents.

4.8 Challenges Faced by Firms During the Implementation of ERP Project among Oil and Gas industries in Kenya.

It was sought to identify the challenges that oil, and gas Companies face during implementation of ERP project. The study posed this question to the respondents and the responses were as shown in Table 4.14.

Table 4.14: Challenges Facing Implementation of ERP Project

The challenges Facing Firms During ERP Implementation Projects	Frequency	Percent	Cumulative
Factoring in requirements of implementation in multiple sites	17	21.52	21.52
ERP implementation complexity	15	18.99	40.51
Failure to meet project timelines	22	27.85	68.35
Management of implementation risk	17	21.52	89.87
A failure in one area of the system thus creating a backlog	8	10.13	100.00
Total	79	100	

From Table 4.14, it is ascertained that the failure to meet project timelines is the major challenge facing the implementation of ERP project. This factor accounted for about 28 percent of the responses. This was followed by the factoring in the requirements of implementation in multiple sites and the management of implementation risk. Each of these two challenges accounted for 21.52 percent of the responses. The results ascertained that 18 percent of the responses indicated ERP implementation complexity to be a challenge in the implementation of ERP projects. It was found that failure in one area of the system thus creating a backlog was the least challenging during the implementation of ERP project.

4.9 Model Assumptions Tests

For inference testing, principal component analysis was adopted. The index for each of the variables was computed. The indices computed included success of the ERP implementation as the dependent. The independent variables were the big bang strategy, phased rollout strategy, parallel strategy, hybrid strategy and SAAS strategy. Various pre-estimation tests were conducted before estimating the model in this study. The trails were necessary to inspect whether the assumptions of OLS were achieved or not. The achievement of these assumptions

concluded that the results obtained were unbiased, efficient, and consistent. Normality and multicollinearity tests were implemented as discussed below.

4.9.1 Test for Normality

Shapiro-Wilk published a test for normality that was adopted for this study. The null hypothesis for the test is that the variable is normally distributed. For null hypothesis to be not rejected, the probability of the variable of the test should be more than 0.05. The derived results are as shown in Table 4.15.

Table 4.15: Normality Test Results

Variable	p-values
Success of ERP implementation	0.11904
Big Bang Strategy	0.00166
Phased Rollout Strategy	0.02717
Parallel Strategy	0.00668
Hybrid Strategy	0.21221
SAAS Strategy	0.04278
Error term	0.80367

The normality test results ascertained that hybrid strategy, and success of ERP implementation strategy were normally distributed. This is because their P value was more than 0.05. The rest of the variables are not normally distributed as shown by p values being less than 0.05. However, the error term was found to be normally distributed since its p value was more than 0.05. This therefore suggested that the OLS assumption of normality was achieved.

4.9.2 Test for Multicollinearity

To ensure the explanatory variables are independent of each other, a multicollinearity test was performed. The study used Variance inflation factor (VIF) to test for presence of multicollinearity. A VIF value of less than 10 implies that multicollinearity is absent.

Table 4.16: Multicollinearity Test Results

Variable	VIF
Big Bang Strategy	1.75
Phased Rollout Strategy	1.47
Parallel Strategy	1.94
Hybrid Strategy	2.02
SAAS	1.59
Average VIF	1.75

The results in Table 4.16 imply that multicollinearity was absent. This was suggested by VIF of all the independent variables to be less than 10. In addition, the average VIF was 1.75, less than 10 corroborating the absence of multicollinearity. This suggests that the OLS assumption of no multicollinearity was achieved.

4.10 Correlation Analysis of Structural Variables

Correlation analysis assisted to establish the extent of linkage between explanatory variables and how significant they were to ERP implementation success. Explanatory variables in this case were latent considering they were measured by the observed variables. Spearman rank correlation analysis was adopted to summarize variables in table 4.10. The correlation interpretation of -1 to 1, where -1 implies perfect negative correlation and a 1 implies a perfect positive correlation, a zero indicates no correlation of any two of the structural variables.

Table 4.17: Correlation Matrix

Correlating Pairs	Big Bang Strategy	Phased Rollout Strategy	Parallel Strategy	Hybrid Strategy	SAAS
Big Bang Strategy	1.000				
Phased Rollout Strategy	0.4490 (0.000)	1.000			
Parallel Strategy	0.5418 (0.000)	0.4483 (0.000)	1.000		
Hybrid Strategy	0.4708 (0.000)	0.4097 (0.002)	0.6416 (0.000)	1.000	
SAAS	0.4785 (0.000)	0.1372 (0.2280)	0.3856 (0.0004)	0.5130 (0.000)	1.000

Key: The Probability (P) values are in parenthesis.

The output showed a feeble positive correlation of big bang strategy and phased roll out. The association was also statistically significant since the p value was less than 0.05. The results ascertained a moderate association between parallel strategy and hybrid strategy. Generally, the correlation results did show any strong relationship among the independent variables.

4.11 Inference Testing

The study performed inference testing and the results are follows.

4.11.1: Inference Testing for Relationship between Big Bang Strategy and Success of ERP project implementation

Table 4.18: Inference Testing for Relationship between Big Bang Strategy and Success of ERP project implementation

Source	SS	df	MS	Number of observation	=	80
				F(1, 78)	=	4.82
Model	10.458461	1	10.458461	Prob > F	=	0.0311
Residual	169.189217	78	2.16909253	R-squared	=	0.0582
				Adj R-squared	=	0.0461
Total	179.647678	79	2.27402124	Root MSE	=	1.4728

Success	Coefficient	Standard Errors	T	P>t
Big Bang	0.4553982	0.2073941	2.20	0.031
Constant	1.41e-08	0.1646623	0.00	1.000

The study ascertained that big bang strategy is important determinant of the success of an ERP project implementation. This was informed by a t value of 2.20 which was greater than 2, rule of thumb.

4.11.2: Inference Testing for Relationship between Phased Strategy and Success of ERP project implementation

Table 4.19: Inference Testing for Relationship between Phased Strategy and Success of ERP project implementation

				Number of obs	=	80
Source	SS	df	MS	F(1, 78)	=	5.04

Model	10.9048284	1	10.9048284	Prob > F	=	0.0276
Residual	168.74285	78	2.16336987	R-squared	=	0.0607
Total	179.647678	79	2.27402124	Adj R-squared	=	0.0487
				Root MSE	=	1.4708

success	Coefficient	Standard Error	t	P>t
phased	0.4719811	0.2102232	2.25	0.028
Constant	1.18e-08	0.1644449	0.00	1.000

The study ascertained that phased strategy is important determinant of the victory of implemented project. This was informed by a t value of 2.25 which was greater than 2 using rule of thumb.

4.11.3: Inference Testing for Relationship between Parallel Strategy and Success of ERP project implementation

Table 4.20: Inference Testing for Relationship between Parallel Strategy and Success of ERP project implementation

				Number of obs	=	80
Source	SS	df	MS	F(1, 78)	=	8.96
Model	18.5059266	1	18.5059266	Prob > F	=	0.0037
Residual	161.141752	78	2.06591989	R-squared	=	0.1030
				Adj R-squared	=	0.0915
Total	179.647678	79	2.27402124	Root MSE	=	1.4373

Success	Coefficient	Standard Error	T	P>t
Parallel	0.6557916	0.2191125	2.99	0.004
Consatnt	1.36e-08	0.1606985	0.00	1.000

The study ascertained that parallel strategy is an important determinant ERP project implementation success. This was informed by a t value of 2.99 which was greater than 2 using rule of thumb.

4.11.4: Inference Testing for Relationship between Hybrid Strategy and Success of ERP project implementation

Table 4.21: Inference Testing for Relationship between Hybrid Strategy and Success of ERP project implementation

				Number of obs	=	80
Source	SS	df	MS	F(1, 78)	=	5.93
Model	12.6834619	1	12.6834619	Prob > F	=	0.0172
Residual	166.964216	78	2.14056688	R-squared	=	0.0706
				Adj R-squared	=	0.0587
Total	179.647678	79	2.27402124	Root MSE	=	1.4631

Success	Coefficient	Standard Erro	t	P>t
Hybrid1	0.6234586	0.2561257	2.43	0.017
Constant	1.56e-08	0.1635759	0.00	1.000

The study ascertained that hybrid strategy is an important determinant of ERP project successful outcome. This was informed by a t value of 2.43 which was greater than 2 using rule of thumb.

4.11.5: Inference Testing for Relationship between SAAS Strategy and Success of ERP project implementation

Table 4.22: Inference Testing for Relationship between SAAS Strategy and Success of ERP project implementation

				Number of obs	=	79
Source	SS	df	MS	F(1, 77)	=	2.06
Model	4.67535477	1	4.67535477	Prob > F	=	0.1554
Residual	174.903817	77	2.27147815	R-squared	=	0.0260
				Adj R-squared	=	0.0134
Total	179.579172	78	2.30229708	Root MSE	=	1.5071

Success	Coefficient	Standard Error	t	P>t
SAAS	0.3226541	0.2248973	1.43	0.155
Constant	0.0032924	0.1695668	0.02	0.985

The study ascertained that SAAS strategy is not important determinant of the success of an ERP project implementation in the oil and gas industry in Kenya. This was informed by a t value of 1.43 which was less than 2 using rule of thumb.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

A summary and conclusion of the study is provided in this chapter. A section on recommendations obtained from the study's objectives and the key findings on the ERP implementation strategies and success of the ERP projects among the oil and gas firms in Kenya. This chapter is organized in a way so to provide a review of the major findings of the study. The deduction of the study gives insights on the role of various ERP implementation strategies on the success of ERP projects in the oil and gas industry in Kenya. It also provides recommendations to firms in the oil and gas industry on the best strategies to be used in implementing ERP projects in Kenya. Further, areas for future research are suggested in the chapter.

5.2 Summary

The study had four objectives including the establishment of the implementation strategies used by the Oil and Gas industry in Kenya for the success of ERP projects. The second objective was to establish the factors that determine choice of strategy for the Oil and Gas industry in Kenya The third objective disclosed the challenges faced by firms in ERP implementation in Oil and Gas industry in Kenya based on implementation strategy. The last objective of the study was to determine the relationship between ERP implementation Strategies and the success of ERP projects in Kenya. To achieve the study objectives, were aided by a structured questionnaire get information from the oil and gas industry in Kenya. The study singled out a sample of 84 respondents. A total of 80 respondents returned amounting to 95.24 percent response rate.

The results suggested that phased implementation strategy of ERP project is the one that is widely used by firms in the oil and gas industry in Kenya. Among the 80 firms that returned the questionnaire, a total of 39.75 percent indicated to have used the implementation strategy. This was followed by parallel strategy at 20 percent, hybrid strategy at 17.5 percent, big bang at 16.25 percent and SAAS at 6.25 percent. On probing the factors that determine the choice of an ERP implementation strategy, top management was suggested to be a major determinant. The factor was suggested by 38 firms out of the 80 firms. This amounted to 47.5 percent of the respondents. Change management was suggested to be the second most important factor, amounting to 20 percent of the respondents. The size of the organization was suggested to be

the least determinant of an ERP implementation strategy at 8.75 percent of the respondents. On probing the challenges faced by firms in ERP implementation in Oil and Gas industry in Kenya, failure to meet project timelines was pointed out as the main factor. The number of respondents who identified the factor was 22 amounting to 27.85 percent of the respondents. Factoring in requirements of implementation in multiple sites was established as a second major challenge facing the success of ERP project. A failure in one area of the system thus creating a backlog was established to be the least challenge affecting the implementation of ERP projects in Kenya.

In estimating the relationship ERP implementation strategies and the success of ERP project, the study used principal component analysis so as to get indices from the observed indicators by the respondents. The study established that big bang, phased rollout, parallel and hybrid ERP implementation to be the main determinant of the success of ERP projects. SAAS was established to be not an important determinant of success to ERP project among the firms in oil and gas industry.

5.3 Conclusions

The findings underscored that the adoption of specific ERP implementation strategies significantly influences the overall success of ERP projects. Notably, the study established that big bang, phased rollout, parallel, and hybrid ERP implementation strategies as the primary determinants of the success of ERP project. These strategies were shown to play pivotal roles in shaping the outcomes of ERP projects, emphasizing the importance of a well-planned and executed implementation approach.

Software as a Service (SAAS) was found to be not an important factor in determining the success of ERP projects among the firms in the oil and gas industry. This insight challenges conventional assumptions about the universal importance of SAAS in ERP project success within this specific sector.

In practical terms, the study findings offer valuable guidance to organizations in the oil and gas industry considering that many firms are implementing ERP. Taking into recognition of the importance of big bang, phased rollout, parallel, and hybrid implementation strategies can inform more informed decision making in planning and executing ERP projects.

5.4 Recommendations

The study's findings have extensive and intensive implications for policy makers, the law enforcement agencies and the public at large, signaling the need to consider the ERP implementation strategies. The following details show the implications and outlines several policy recommendations.

First there is need to invest in training and skill development policies. Taking Recognition, the importance of big bang, phased, parallel and hybrid implementation strategies, policy makers should invest in training and skill development programmes for professionals involved in ERP projects. This can include providing resources for project managers, IT professionals and other stakeholders to enhance their understanding and capabilities in executing different ERP implementation strategies.

Secondly, there is need for policy support for diverse implementation strategies. Policy makers ought to recognize the diversity of ERP implementation strategies and avoid promoting a one-size-fits-all approach. Encouraging flexibility and adaptation to the specific needs of organizations can lead to more successful ERP projects. This could be reflected in guidelines, frameworks or policies that acknowledge the effectiveness of different strategies in varying contexts.

5.5 Limitations of the Study and Areas for Further Research

The study's main limitation is relying on data that self-reported from respondents. This implies that the accuracy of the findings is subject to the honesty and accuracy of the information provided by the participants. Respondents may have biases or may not accurately recall certain aspects of the ERP implementation process.

ERP projects are usually long term initiatives. The time frame for the study may not capture the long term implications and challenges that organizations face post implementation, limiting the comprehensive understanding of success factors.

Future researchers in the analysis of ERP implementation strategies and success of ERP projects need to combine both qualitative and quantitative research methods so as to provide a richer understanding of the role of various ERP implementation strategies on the success of ERP projects.

Future researcher should therefore consider examining determinants of ERP implementation success using time series data. In addition, there is need for examination of more determinants of success other than the ones considered in this study. Future researchers could explore the ERP implementation strategies and success factors across many industries of the economy so as to determine if certain strategies are more effective in specific sectors. Understanding industry-specific implementation strategy can provide more targeted recommendations.

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APPENDIX I: QUESTIONNAIRE INSTRUCTIONS

I am currently pursuing a Masters of Business Administration at the University of Nairobi and doing a research as part of the requirements. My research is on ERP implementation. Kindly provide all the data required in this questionnaire.

SECTION A: **General Information**

1) What is your gender?

   Male [ ] Female [ ]

2) What is your age bracket?

   18-25 years [ ] 26-35 years [ ] 36-45 years [ ] Above 45 years [ ]

3) Which is your highest level of education?

   Technical Certificate [ ] Diploma [ ] Bachelor's degree [ ]

   Master's degree [ ] PhD [ ] Others, specify ……

4) How many years have you worked in the Oil and Gas industry?

   10 or less [ ] 11-20 [ ] 21-30 [ ] 31-40 [ ] Above 40 [ ]

5) What is your job title? .....

6) How many stations does your organization have?

   1-10 [ ] 11-20 [ ] 21-30 [ ] 31-40 [ ] Above 40 [ ]

7) How many employees are in your organization?

   50 or less [ ] 51-100 [ ] 101-150 [ ] 151-200 [ ] Above 200 [ ]

8) When was the firm established? .....

9) What is the ownership of your firm?

   Local [ ] Foreign [ ] Both local and Foreign [ ]

10) Which ERP system has your organization implemented? .....

11) How many years has your organization used the ERP system?

   5 or less [ ] 6-10 [ ] 11-15 [ ] Above 15 [ ]

SECTION B: ERP implementation Strategy

On a scale of 1-5, please indicate the extent to which your firm used the following ERP implementation strategies. Tick as appropriate using the scale:

Not At All (1), Little Extent (2), Moderate Extent (3),
High Extent (4), Very High Extent (5)

No.	Implementation Strategy	Not at All	Little Extent	Moderate Extent	High Extent	Very high Extent
1.	Big bang • Implementation in all geographical location and business processes at the same time					
2.	Phased roll-out Strategy. • Implementation in phases • By Business processes • By geographical regions					
3.	Parallel Strategy Implementation where both old system and new system running concurrently					
5.	Software as a service(SAAS) Cloud based					

SECTION C: Factors considered when selecting ERP implementation Strategy.

Indicate the extent to which your firm has considered each of the following factors in selection of ERP implementation Strategy. Please give your responses by ticking appropriately using following scale:

Not at All (1), Little Extent (2), Moderate Extent (3), High Extent (4), Very High Extent (5)

No.	Selection Factor	Not at All	Little Extent	Moderate Extent	High Extent	Very High Extent
		Please Indicate below				
1.	Top management support					
2.	Training and reskilling of End-Users					
3.	Risk level					
4.	Integration requirements with other existing and future system					
5.	Change management strategy					
6.	Vendor support					
7.	User involvement					
8.	Project timelines					
9.	Size of the organization					
10.	Post implementation support					
11.	ERP Size					
12.	Composition of ERP implementation Team					
13.	Need for Business Re-engineering					
14.	ERP test					
15.	Others, specify and rate accordingly.					

SECTION D: Challenges of ERP implementation in O&G industries.

Please rate the extent to which the firm has faced each of the following challenges in the ERP implementation project.

Tick appropriately using the scale:

Not at All (1), Little Extent (2), Moderate Extent (3), High Extent (4), Very High Extent (5)

No	Challenge	Not at All	Little Extent	Moderate Extent	High Extent	Very High Extent
1.	Factoring in requirements of implementation in multiple sites					
2.	ERP implementation complexity					
3.	Failure to meet project timelines					
4.	Management of implementation risk					
5.	User resistance					
6.	A failure in one area of the system thus creating a backlog.					
7.	Ensuring top management support					
8.	Delayed integration of the whole business process					
9.	Potential integration complications and bugs					
10.	Failure to meet Project team composition (experience, knowledge, skills)					
11.	Others, specify and rate appropriately					

SECTION E: ERP implementation Success

How successful was the ERP implementation in your firm? Indicate the extent of success with reference to each of the measures of success in the table given.

Tick appropriately using the scale:

Not at All (1), Little Extent (2), Moderate Extent (3), High Extent (4) Very High Extent (5)

No	Implementation Factor	Not at All	Little Extent	Moderate Extent	High Extent	Very high extent
1.	Project was completed within the admitted period					
2.	Project was completed within the allocated budget					
3.	Scope (admitted requirements met)					
4.	Quality (user satisfaction, accuracy, speed, productivity, controls).					