

**REQUIREMENTS ENGINEERING IN THE DEVELOPMENT OF A
CORPORATE PORTAL:
THE CASE OF KENYA PETROLEUM REFINERIES LIMITED.**

BY

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DECLARATION

I, the undersigned, declare that this MBA research project is my original work and has not been submitted for the award of any degree in any other university or institution of learning other than the University of Nairobi.

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This management research project has been submitted for examination with my approval as the:-

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DEDICATION

I dedicate this research work to

My parents

(Jeriah and Josiah Arika),

My wife

(Alice Gesare),

and

My children

(Gerry, Kimberly and Kyler)

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ABSTRACT

“If opportunity does knock, build a door”

Milton Berle

In the 21st century, organizations are faced with complex challenges stemming from increasing opportunities to create economic value by integrating corporate environmental and social responsibility change issues into business. Due to globalization and the complexity of issues associated with working in a knowledge economy, the potential offered by emerging information and communication technologies along with commitment to the principle of sustainability pose profound strategic challenges for organizations. In order to stay competitive within this changing business environment, organizations are forced to embrace technology such as **corporate portal**. A corporate portal is an exciting new phenomenon forming part of the recent generation of online services for all stakeholders in business and non business organizations.

The purpose of this research project was to apply the software development methodologies particularly the Soft Systems Methodology and Work Systems Methodology in a unified manner referred as cross fertilization in this research to analyze the user needs in the development of corporate portal based on KPRL.

The literature review focused on the concept of Corporate Portal and Information Systems Development Methodologies with emphasis on Soft Systems and the Work Systems Methodologies as core tools for analyzing the user needs especially the soft issues like culture, attitudes of stakeholders and political noise.

From this study it is evident that not only Work Systems Methodology and Soft Systems Methodology have connected people, processes and IT for business results, but also they have injected some system thinking in requirement engineering towards improving communication about systems that would help in seizing missed opportunities, minimizing wasted effort, and attaining business results.

ACRONYMS AND ABBREVIATIONS

AOL	America Online
API	Application Programming Interface
ASP	Application Service Provider
B2B	Business to Business
B2C	Business to Consumer
B2E	Business to Employee
B2G	Business to Government
CP	Corporate Portal
CRM	Customer Relation Management
EDGE	Enhanced Data Rates for GSM Evolution
EDI	Electronic Data Interchange
EIP	Enterprise Information Portal
GPRS	General Packet Radio Service
GOK	Government of Kenya
ICT	Information and Communication Technology
IS	Information System
ISD	Information systems development
IT	Information Technology
ITM	Information Technology Manager
KM	Knowledge Management
KPRL	Kenya Petroleum Refineries Limited
MB	Mega Byte
PC	Personal Computer
RE	Requirements Engineering
SSM	Soft Systems Methodology
WSF	Work Systems Framework
WSM	Work Systems Methodology
WWW	World Wide Web
XML	eXtensible Markup Language

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

This chapter introduces the study with an overview of its background and relevance. It first gives some background information on Corporate Portal, Requirements Engineering and the Company where the study is based (KPRL), then proceeds to state the problem, objectives and its importance. Issues raised in this opening chapter forms the foundation of the details to be discussed in the later chapters.

1.1 BACKGROUND TO THE STUDY

In the third millennium, organizations have to cope with accelerating rate of change in technology and increased level of competition on a global scale more than ever before. The business operations of enterprises in many sectors would be unthinkable without Information Technology (Buchta et al., 2007). Consequently there is incredible pressure on companies to achieve and sustain competitive advantage. In order to stay competitive within this changing business environment, organizations are forced to constantly pursue new strategies to differentiate themselves from their competition, such as offering a stream of new products and services. The Corporate Portal technology promises to offer competitive advantage to organizations.

Corporate portal is defined as application that enable companies to unlock internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decisions (Shilakes et al.,1998). A portal is a gateway that provides information from diverse data sources in a customizable and personalized way keeping in mind the users' needs. It is hub of information (Reidy, 2004).

The research conducted by Boston-based Delphi Group in 2001 on Corporate Portal adoption rate indicated that about 35% of companies surveyed had implemented a Corporate Portal and another 30% were in the pilot/experiential stage of development. Figure 1 below shows the Corporate Portal adoption rate based on a Delphi Group survey of fortune 500 companies. The reasons cited to explain why the organizations are quickly adopting the Corporate Portals include:

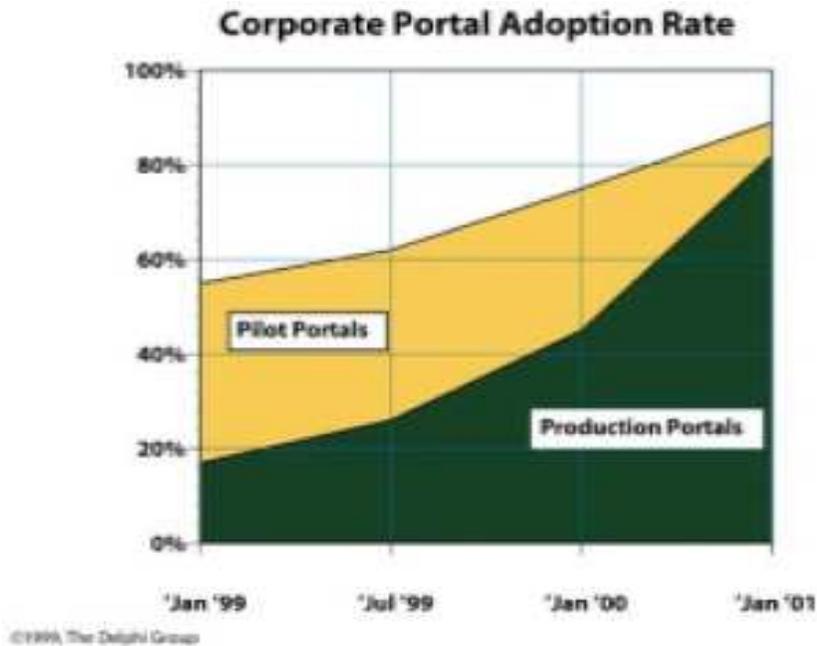


Figure 1 : Corporate portal adoption rate (source: Aneja et al. , 2000)

Firstly, today’s businesses are characterized by the presence of a distributed workforce that is required to stay in touch with corporate offices and access relevant contents and applications in order to make timely decisions. However, the dynamic business environment within which the distributed workforce function often leads to a lack of communication, and consequently low company loyalty (Rahim, 2008). The corporate portal allows the distributed workforce to gain access to corporate information on 24/7 basis thus strengthening their loyalty to the company.

Secondly, the phenomenal growth of the internet over the past several decades has changed the traditional computing environment completely (Xiao et al., 2006). Consequently, information is delivered at an astonishing pace and from a dizzy array of sources such as e-mail, news, documents, reports, articles, digital files, video and audio files, and transactional data. Yet it is difficult to take advantage of this wealthy of information because it is buried in separate, often disconnected and disorganized repositories. This has lead to information overload for employees. The term information overload is sometimes referred as “Information syndrome” which means the bombardment with information from several sources (Aneja et al., 2000). The corporate portal promises to consolidate the disparate data, categorize and personalize the delivered information thus eliminating the information syndrome.

Thirdly, Murray (2000) argues that empowering of employees is one of the strongest messages of trust one can give as a manager. Happy employees manifest themselves in their pro-activeness, and feel empowered to get their ideas listened to. Employees are regarded as partners in company's success and not just workers, because companies have realized that the employees are most important assets and without regarding their efforts and solving their problem properly they cannot compete (Malik, 2004). The corporate portal will support collaborations among the employees and provides an avenue through which their voices can be championed for example use of blogs.

The concept of Corporate Portal has been partially embraced in Kenya today. Many companies are rushing to embrace the Corporate Portal as a strategic tool for enhancing their competitiveness. For instance the Government of Kenya has embraced e-government with an aim of transforming government operations in order to improve its effectiveness, efficiency, service delivery and to promote democracy (Gakunu, 2004). The results obtained from Google search "Portal in Kenya" indicates that several companies are racing towards embracing some facet of corporate portals. Some of these companies in the search result include Kenya Revenue Authority (Tax Returns Portal), Steadman Group, University of Nairobi (Student and staff portal) among others. The mushrooming of local Kenyan Internet Portals will no doubt favor the first movers in this space, giving them an advantage of some sorts (Kemibaro, 2009). It is becoming increasingly apparent that the operational high speed undersea data cable that connects Kenya to the rest of the world is fueling the emergence of local Internet portals.

Requirements engineering (RE) is defined as the process by which the requirements for software products are gathered, analyzed, documented, and managed throughout the software development lifecycle (Aurum et al., 2005). Requirements engineering is concerned with interpreting and understanding stakeholders 'goals, needs and beliefs'.

There are many problems associated with requirements engineering which may lead to inconsistent and incomplete requirements and cancellation of corporate portal projects. As requirements engineering is one of the main contributors to the success of corporate portal projects, improving the requirements engineering process can significantly increase the likelihood of corporate portal development project success. Furthermore, understanding, identifying and articulating the role of business requirements which are elicited from stakeholders from diverse backgrounds with different needs, expectations and goals is a challenge in requirements engineering.

Requirements engineering is accepted as one of the most crucial stages in corporate portal design and development as it addresses the critical problem of designing the right portal for the customer. The development of a software requirements specification is widely recognized as the bases of system functionality. Software requirements are the critical determinants of software quality, given empirical studies showing that errors in requirements are the most numerous in the software life-cycle and also the most expensive and time-consuming to correct.

The most common reasons for project failures are not technical and Table 1 identifies the main reasons why projects fail. The data is drawn from surveys conducted by the Standish Group in 1995 and 1996, and shows the percentage of projects that states various reasons for project failure. The incomplete requirements reason tops with 13.1 % as the major cause of software project failures thus calls for requirements engineering as a recipe in addressing this issue.

Table 1: Reasons for project failure

Incomplete requirements	13.1%
Lack of user involvement	12.4%
Lack of resources	10.6%
Unrealistic expectations	9.9%
Lack of executive support	9.3%
Changing of requirements/specifications	8.7%
Lack of planning	8.1%
Didn't need it longer	7.5%

Sources: Standish Group, 1995 and 1996; Scientific American, September 1994.

The previous IS research studies have also singled out errors, omissions and other difficulties in determining IS requirements as the primary cause of IS project failures and disappointment e.g. preliminary investigation by researcher Liquist (2005) indicates that mishandled requirements can torpedo a project at any time, from inception to delivery.

Corporate portal designers face new challenges in designing information systems. The corporate portal environment is a paradigm shift from the past software development. In the near past, software applications were designed either for a set group of users within the organization (such as custom payroll) or for the mass market (such as a word processing application). For a set of users within an organization, it was possible to

determine exactly who these users were, and their exact computing environment. For mass market software, the software could have minimum requirements (such as 8 MB RAM, 50 MB free hard drive space and so on), and software was sold to work only with one platform. Corporate portal, however, are totally different because they are accessed by anyone, anywhere, with any technological environment, using any platform, any browser, and any browser version. A corporate portal therefore has to work under hundreds or thousands of possible technological environments (Lazer, 2001).

About Kenya Petroleum Refineries Limited (KPRL)

According to the information obtained from its website Kenya Petroleum Refineries Limited was originally set up by Shell and the British Petroleum Company (BP) to serve the East Africa region in the supply of a wide variety of oil products. The company was incorporated in 1960, under the name East Africa Oil Refineries Limited. KPRL is a privately owned limited liability company. The Government of Kenya (GOK) own 50% of the equity while Essar Energy Overseas Ltd own the other 50% of equity (KPRL, 2009).

The refinery's main products include Liquefied Petroleum Gas (LPG), unleaded premium gasoline, regular petrol, automotive gasoil, industrial diesel, fuel oil and special products like bitumen and grease. The refinery also offers other services to its customers including: laboratory services, fuel loading services and emergency school training services.

The first computer system was installed in the 1970s dubbed as 'CDC PROSS Computer' and was mainly used to control the refining process. It was based on pneumatics technology. By 2009, KPRL had implemented various systems in all departments and their major challenge was to integrate these silos systems so that information could be accessed from a single point (ITM, KPRL). The refinery has partially integrated system covering inventory management, procurement and the finance functions. The processing systems, engineering systems, oil accounting systems exist in isolation thus pose data gathering challenges "Island of information problem".

The e-mail is used as a core means of collaboration among employees and external stakeholders. According to the statistics obtained from report generated from the security system in the year 2008 alone the refinery received and sent out about 100,000 emails. This has created inbox bloat problem. The number of emails in an organization-

especially the size of those emails is growing thus forcing the IT department to enforce inbox size limits that calls for constant emails archiving. Smith(2006) in his article “E-mail’s Mid-Life Crisis” asserts that Email is the killer application because of its ubiquity and simplicity, so employees rely on it for tasks the inbox was never designed to handle like collaboration and ecommerce transactions. The KPRL website comprise of various specific portals including customers portal, suppliers portal (Order tracking and tendering), careers portal and whistle blowing portal.

1.2 STATEMENT OF THE PROBLEM

This research undertakes a study on requirements engineering in the development of Corporate Portal based on the case of the Kenya Petroleum Refineries Limited. The major issue under consideration in this research is how to develop effective portal accommodating the needs of all stakeholders. The KPRL’s IT Manager mentioned disparate systems and email inbox bloat problem to be his main concerns. This study establishes how the adoption of Corporate Portal would address these issues.

The background of the study has explained broadly the challenges faced by the corporate portal designers in trying to meet the stakeholder requirements. This research study focuses on issues related to requirements engineering in corporate portal development and will particularly provide answers to the following research questions:-

1. How is requirements engineering undertaken during Corporate Portal Development within the context of Kenya?
2. What frameworks/models lead to successful Requirements Engineering in the development of Corporate Portal?
3. What are the barriers to Requirements Engineering process in the development of Corporate Portals in Kenya?

1.3 OBJECTIVES

The main objectives of this study are to:-

1. Undertake thematic analysis using selected methodologies in Requirements Engineering for the Development of Corporate Portal case KPRL.
2. Uncover the barriers in Requirements Engineering in the development of corporate portals in Kenya.

1.4 IMPORTANCE OF THIS RESEARCH

The contributions of this study will be meaningful to academia, practitioners and policy makers as explained below.

i. Academia

The study will be of value to research as a basis for future empirical and concept research. The need to contribute to the accumulation of knowledge on experience related to users Requirements Engineering for corporate portal development in Kenya.

ii. Practitioners

The study entails exploring on models that may lead to successful requirements engineering. Such discussions of the frameworks or models will be of importance to the Information Systems Managers in ensuring the right requirements are elicited from the stakeholders

iii. Policy Makers.

The study will uncover how the requirements engineering in the development of corporate portal is undertaken in the context of Kenya. Such information may be used by the information systems (IS) managers in Kenya to craft appropriate strategies to boost on the portal project implementation success rates and usability.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter provides a review of the relevant literature. After a review on historical background on Corporate Portal concept, the chapter proceeds to look at the various definitions advanced on Corporate Portal concept. The chapter further looks at the benefits, core features and types of corporate portal. The chapter finally reviews literature on RE process, debates surrounding it, Information System Development Methodology with emphasis on Soft System Methodology and Work Systems Framework, its various elements and captures the screen shots of *Valero corporate portal refinery* for benchmarking purposes.

2.1 BACKGROUND OF THE CORPORATE PORTAL CONCEPT

An evolution of portal can be traced back to the original concept of internet and web technologies, which introduced the perspective and concept of the internet, intranet and extranet. In fact, the conceptual framework of a portal is extended from original concept of the first personalized public web portals like AltaVista, AOL, Excite, and Yahoo! in the Mid 1990s. These sites provided a core set of features including news, e-mail, weather, stock quotes, and search presented in self-contained boxes or portlets. Many enterprises of all sizes began to see a need for a similar starting place for their variety of internal repositories and applications; and immediately switched to Web technologies.

The first prepackaged corporate portal software was produced in the late 1990s. These software packages were used as toolkits for enterprises to quickly develop and deploy their own customized enterprise portal. The first commercial portal software vendor began to appear in 1998. The pioneers in this marketing included "pure play" vendors like Epicentric, Plumtree Software and Viador. The space, however, quickly became crowded by 2002 as both application server vendors (such as BEA, IBM, Microsoft) came on board.

Some of the technologies closely associated with Corporate Portal are intranets, extranet and internet. An intranet is an organization's internal private network that uses the infrastructure and standards of the Internet and the World Wide Web (O'Brien, 2004). When a corporation develops a public website, it is making selected information

available to consumers and other interested parties. When it creates an intranet, it enables employees to have quicker access to internal information and to share knowledge so that they can do their jobs better. Information exchanged on intranets may include employee e-mail addresses and telephone numbers, product information, sales data, employee benefit information, and lists of jobs available within the organization.

Extranets are private intranets that connect not only internal personnel but also selected suppliers and other strategic parties. Extranets are network links that use the internet technologies to interconnect the intranet of business with the intranets of its customers, suppliers and other business partners (O'Brien, 2004).

The Internet is a worldwide network of computer links. It is perhaps the most well-known, and the largest, implementation of internetworking, linking hundreds of thousands of individual networks all over the world and has evolved into a global information superhighway (O'Brien, 2004). The Internet has a range of capabilities that organizations are using to exchange information internally or to communicate externally with other organizations. This giant network of networks has become the primary infrastructure for both electronic commerce and electronic business.

2.2 DEFINITIONS OF PORTAL OR CORPORATE PORTAL

Many definitions have been suggested with respect to portals (Eckerson, 1999; Aneja et al., 2000; Kendler, 2000). Nowadays, the terms 'corporate portal', 'corporate information portal', 'business portal', "enterprise information portal", "enterprise resource portal", "knowledge management portal", "IT portal" are often used as synonyms (Dias, 2001, McFarland, 2001).

Within the context IT and IS, there is no standard definition of a portal yet. Almost all authors and researchers in the field have defined this term differently and still there is no consensus about this term. The article published by Gartner Group, the author pointed out that "portal is the most abused term in IT" (Philer, 2001). The term is relatively new within the context of information technology that is why there is no precise and universally accepted technical definition of portal (Hogger et al., 2000). Yahoo holds the honor of being the first portal in the consumer market. But before the term portal was originated, Yahoo was simply referred as a search engine.

McFarland (2001) defines a corporate portal as a web-based interface that consolidates access to the information and applications. The users often employees, partners, or clients

access those resources through a personalized web page, very much like that used on the consumer portals like My Yahoo.

According to Chan and Liu (2007), a corporate portal is an IT strategy to aggregate a selected subset of information into a central location by using extensible markup language. Terra et al. (2002) defines corporate portal as an important advance to collaborative software that can be used to develop and implement initiatives of knowledge management.

According KPMG forum, corporate portal is defined as technological solutions which integrate dispersed applications, information and knowledge to facilitate decision-making and improve efficiency of an organization. Boye (2005) defines a corporate portal, as a framework for integrating information, people and processes across organizational boundaries. It provides a secure unified access point, often in the form of a web-based user interface, and is designed to aggregate and personalize information through application-specific portlets.

Davydov (2001) sees the corporate portal in its widest definition as: “a single, web-based interface into the world of heterogeneous and incompatible information sources distributed across the network”. Collins (2001), also makes the distinction between external portals, which she calls enterprise portals and internal which she calls corporate portals. For the latter she offers the following definition, a browser-based application that allows knowledge workers to gain access to, collaborate with, make decisions, and take action on a wide variety of business-related information regardless of the employee's virtual location or departmental affiliations, the location of the information, or the format in which the information is stored.

According to Gurage (2003), a corporate portal is a web-based, fully automated emulation of a highly proficient, well-motivated call center operation. It is an elegant and efficient way to conduct most, if not all business interactions hitherto transacted using telephones or faxes. Hence the association with call centers. An alternative name for corporate portals, during earlier days, circa (1998), was “internet call centre”. Another often used name is “self-service portals” both of these alternative names clearly convey what a corporate portal is supposed to be.

Merril Lynch report, by Shilakes et al. (1998) defines corporate / enterprise information portal as applications that enable companies to unlock internally and externally stored

information, and provide users a single gateway to personalized information needed to make informed business decisions. They are an amalgamation of software applications that consolidate, manage, analyze and distribute information across and outside of an enterprise (including business intelligence, content management, data warehouse, mart and data management applications).

This study adopts the definition by Shilakes et al.(1998) because of its attempt to be comprehensive emphasizing both basic function of corporate portal and subsidiary applications that are presently converging to produce corporate portal products and applications (Firestone,2003).

2.3 THE BENEFITS OF CORPORATE PORTALS

Corporate portals function as gateways; it is one stop approach which helps move data much more quickly and makes losing data less likely says Robert LaGaglia, senior Vice president of strategy and development in National Imaging Associates (e-Business Special Report). Corporate portals simply stream-line and expedite the entire process of interacting with a corporation. They provide an inviting and secure web-based interface to a diverse range of corporate information, services and application (Gurage, 2003).

The corporate portals empower the employees by allowing them to manage its contents and personalizing it. The corporate or business to employee portal is designed to provide far greater management of knowledge and data resources. It provides the employees with simple access to consolidated information sources and company applications, as well as analytical and collaborative tools (Murray, 2002). In 2001 survey, the Gallup management journal found that 19% of all U.S workers were “actively disengaged”, or fundamentally disconnected from their work. Portals aim to ease that burden by making the tools needed to perform job functions accessible, up to date and consistent throughout the organization (mcFarLand, 2001).

Whereas previously the intranet provided links to static files that need regular updating to have any real meaning, the corporate portal is integrated into the existing applications. Information is drawn from these on real-time basis and presented to the employee in a format based on their particular preferences and role within the company. Thus, a corporate portal can increase employee productivity (Aneja et al., 2000).

Gurage (2003) further asserts that the corporate portal permits the employee, customers, partners, prospects, investors, suppliers and any other stakeholders to directly interact with a corporation 24/7, to conduct authorized business or gain necessary information without having to deal with a company representative. Thus, heighten company efficacy, promote increased productivity, and reduce operational costs while increasing company reach.

Even though the enterprise information/corporate portal is very young, many benefits are already being claimed for corporate portals. Some of the benefits include the following:-

Firstly, the company enjoys competitive advantage. The argument for competitive advantage begins with the idea that valuable information is currently still locked away in disparate, badly integrated corporation data stores. Corporations that can get at it quickly will have a competitive advantage because they have access to timely and accurate information on marketing, performance, and customer relationships as well as in other areas. In addition, having this information will allow them develop better forecasts, to adapt faster to changes (to be more agile), and to provide better support for decisions than their competition. Therefore, the user's job performance is affected and, specifically the efficiency, quality, effectiveness, and net benefit and cost of user's job performance are upgraded (Shilakes et al., 1998; Firestone, 2003).

Secondly, the company enjoys increased return on investment. Another frequently mentioned benefit of corporate portal is that they increase return on investment. The argument here is that packaged corporate portal applications should produce higher return on investment than other IT applications. The emergence of 'packaged' enterprise information portal applications are more attractive to customers because they are less expensive than customized systems, contain functionality that caters to specific industries, are easier to maintain and faster to deploy (Finkelstein et al.,1999; Nielsen,2005)

Thirdly, adoption of corporate portal increases employee productivity. This refers to productivity in the very narrow sense of improving the cycle time involved in information acquisition. According to Rob Perry, a senior analyst with Boston based research firm the Yankee group, portals have been touted as enterprise tools that can help managers take lost time back. Managers are recognizing that people are going to be looking for information in a variety of places. The portals will take control and put it

back to the people. Nielsen (2003) asserts that portals can help employees find information and perform their jobs.

Fourthly, corporate portal adoption leads to increased effectiveness. The claim of increased effectiveness is based on the idea that portals not only make available new information to users that were not available before but also provide that information in an integrated and personalized way. Integration and personalization focus information on the job role of the user and therefore lead to improved performance and eventually to a more knowledgeable and effective organization.

Fifthly, the companies that have adopted corporate portal lay claim to decreased cost of information. The benefit of decreased cost of information is a consequence of both web-based publishing and automated character of portals. For a company that still distributes information on paper, portals promise big savings. Realization of significant reduction in call-center operation costs through staffing cuts, reduction in operational hours and call-center consolidation in the case of multiple centers (Firestone, 2003; Garuge, 2003).

Sixthly, corporate portal promotes universal access to enterprise resources. A particularly attractive appeal of corporate portals is their promise to provide universal access to enterprise and extended enterprise information and knowledge resources. It is possible to use both “push” and “pull” technologies to ensure that users have the right information available to them at the right time and right price.

2.4 CORPORATE PORTAL FEATURES AND FUNCTIONS

Not all portals are expected to have all features; the actual configuration is dependent on the type or tilt of the portal. Due to breadth of corporate portal functional possibilities Aneja et al. (2000) has provided a framework that could be adapted to fit different business requirement as shown in figure 2 below. Some of the main features of corporate portals include the following:-

2.4.1 Categorization / Taxonomy

A portal provides structure to effectively deal with the ever increasing amounts of data, applications and content can be organized into categories creating a taxonomy that can be easily navigated by users. Categorization of corporate portal is critical because it provides stakeholders with a navigation directory that can browse to find intended information; it can be user- or administrator-defined (Saha, 1999; Aneja et al., 2003)

2.4.2 Content integration

This feature aims at integrating scattered data repositories both structured and unstructured in organizations allowing the users to access the information from a single point. Portals require content integration tools to manage discrete content objects, which can be combined on the fly to create different target formats. The content integration is normally achieved through the gadgets called portlets (Saha, 1999; Aneja et al., 2000; Gurage, 2003).

2.4.3 Personalization

Personalization encompasses the ability to provide the user with the right content both from the user's and web site owner's perspective. It is based on the user needs or the needs of communities of users and delivering the right content at the right time based on current context. A personalization algorithm determines how the content is presented to the user, and in what order of priority (Saha, 1999; Aneja et al., 2000; Gurage, 2003).

2.4.4 Collaboration services

Portals may need to support real-time collaboration so that it is easy for users to find colleagues, partners, customers, and suppliers online, and communicate with them regardless of their location. These services allow users to chat, share live documents and applications, and create an instant shared workspace where team members can centrally communicate. Mail and shared calendar services are also instances of collaboration tools that are increasingly finding their place as integrated portal services (Saha, 1999; Davydov et al., 2001; Firestone, 2002).

2.4.5 Search

Search technology helps users to filter and find information that is useful and relevant to their roles. Corporate information resides in numerous places, and search capability across multiple information repositories like web/intranet, database, legacy systems files, discussion forums and others is essential. One important search technique is parametric search, which associates name/attribute pairs to search keywords. This technique is especially relevant to electronic commerce (Saha, 1999; Aneja et al., 2000)

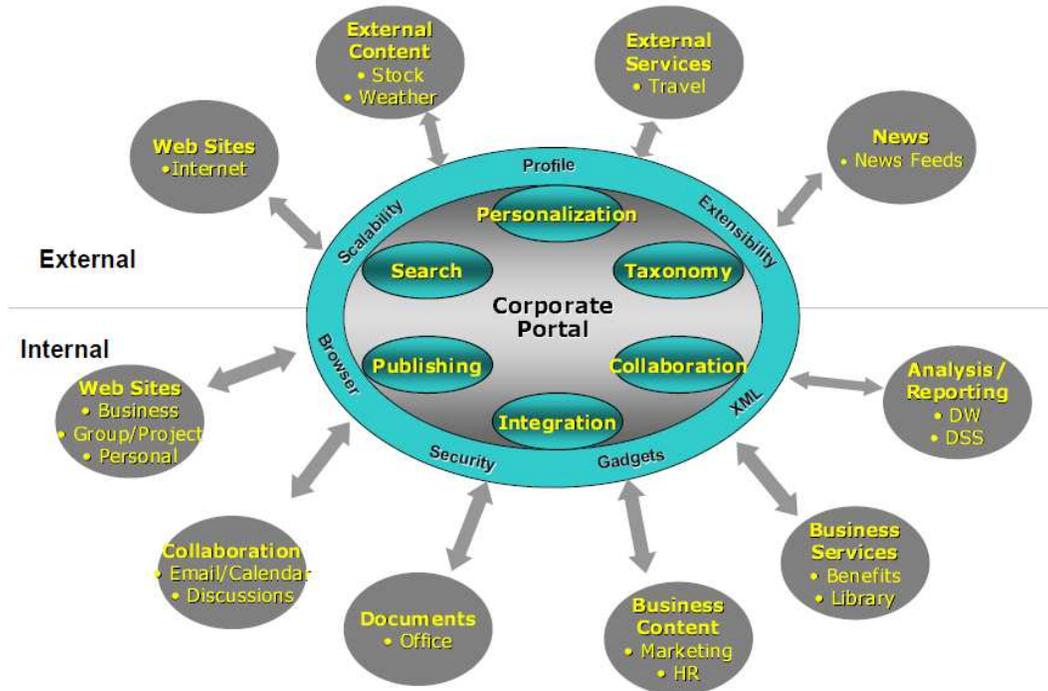


Figure 2 : Corporate portal framework (Source: Aneja et al., 2000)

2.4.6 Content Publication and management

The content on corporate portals gets outdated if not well managed. One technique of avoiding outdated content is to specify the expiration date for all content. When the content expires, the owner is notified and can then extend the content expiration date or let the content be archived (Aneja et al., 2000).

2.5 TYPES OF PORTALS

Portals, irrespective of their type, to paraphrase the famous adage about beauty, are essentially all the same under the skin. In other words, much of the perceived variation among different types of portals is mainly on the surface. Although the content, structure, and presentation of portals may vary dramatically, though design and necessity, the underlying precepts, infrastructure, and mechanisms of portal are basically the same for corporate portal, an internet call centre, a business to employee intranet portal, a business to consumer, e-commerce portal or a self-service portal (Gurage,2003).

Portals can be classified into three types based on the functions they perform;- horizontal portals, vertical portals and enterprise portals (Xiao et al., 2006). Horizontal portal is website that provides consumers with access to a number of different sites. They are also

called public or mega portals examples include my Yahoo! and My Excite portals. Vertical portals are portals that focus on specific industry, community or organization. Vertical portals are also referred as vortals and are geared towards a narrow audience or community with specific interests, such as consumer goods, computers, retail brokerage services and banking.

An enterprise portal (also called a corporate portal) provides access to proprietary internal information within a company intranet and access to selected internet sites. For example can have access to their pay stubs, retirement contribution through enterprise portal

Saha (1999) a member of software strategy team in IBM, a leading supplier of software, hardware and research services divides portals in five major types as listed below:-

- Corporate portals or corporate desktops
- Inter-enterprise portals
- e-marketplaces
- Personal portals
- Application Service Providers portals

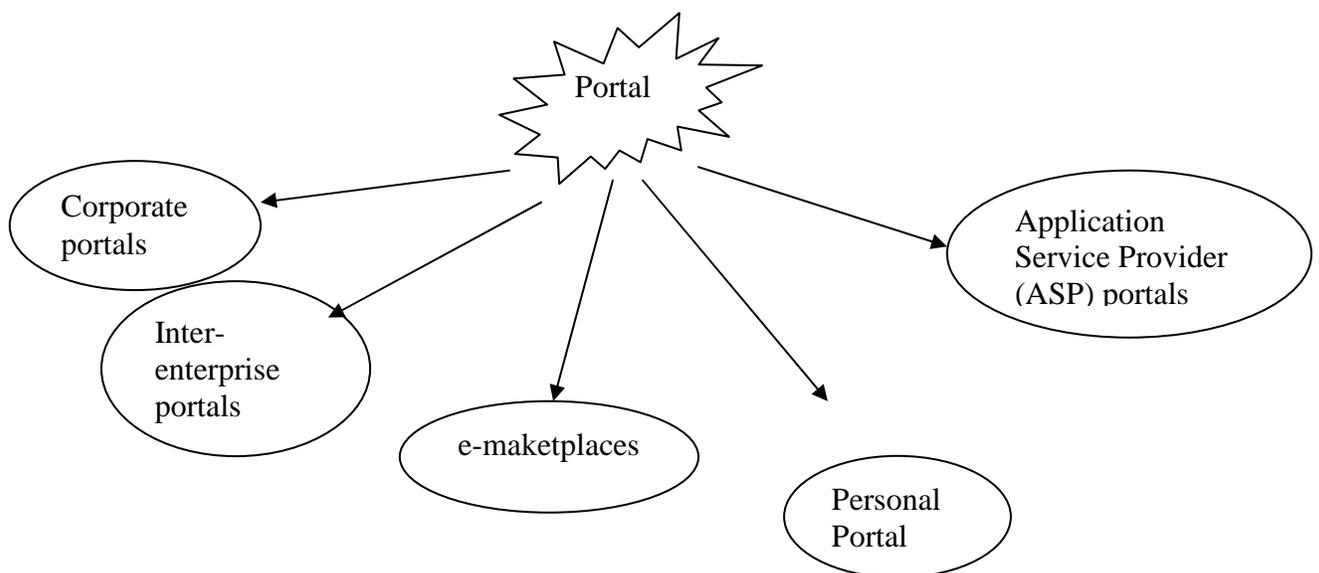


Figure 3 : Hierarchy of portal types (source: Saha, 1999)

Corporate portals provide stakeholders with access to information and applications that they need to make decisions. One can envision that such portals will evolve to become the next generation of integrated and intelligent desktops that can be accessed from

anywhere and from any device. Many information- centric applications such as knowledge management, business intelligence, and customer-relationship management software are being integrated and deployed via similar portals.

Inter-enterprise portals are owned and managed by a single enterprise but support business processes such as supply-chain solutions and procurement among customers, partners, and vendors across different enterprises. Supply-chain portals aggregate parts, inventory, and pricing information from a large number of suppliers, support interaction, collaboration, and dynamic partnerships and help manage/coordinate the end-to-end flow of a business process.

E-marketplaces are portals or trading hubs that connect buyers and sellers in virtual marketplaces. Such portals are cross-enterprise and can cater to specific industries such as the steel industry or semiconductor industry. In addition to an infrastructure that is common to most portals, e-marketplaces may need specific service -- for example, bidding and auction services.

Personal portals are provided by the likes of Yahoo, Excite, and Netscape, provide users with a customized, first point of access to the web. The business intent is to grow the portal's user base by providing useful information and functions that in turn drive advertisement revenues. Community portals are a variant that cater to specific communities of interest by providing tailored content.

Application service providers' portals provide integrated access to data and applications and are supplemented by a set of additional services to support the business models of Application Service Providers. The new business model of Application Service Providers expects renting of hosted applications to be a viable and economic alternative for users

2.6 REQUIREMENTS ENGINEERING PROCESS

There is a common misconception that requirements engineering is just a single phase that is carried out and completed at the outset of product development (Hull et al., 2005).Requirements engineering refers to all life-cycle activities related to requirements. This primarily includes gathering, documenting and managing requirements. With the growing awareness of the significance of requirements in the software process, requirements engineering increasingly becomes an area of focus in software engineering research.

Common requirements engineering activities are elicitation, interpretation and structuring (analysis and documentation), negotiation, verification and validation, change management and requirements tracing. There are several process models available to describe the requirements engineering process. The process itself is often depicted in different forms, including linear, incremental, non-linear and spiral models. Kotonya et al. (1998) suggest a conceptual linear requirements engineering process model, which indicates iterations between activities.

On the other hand, Macaulay (1996) provides a purely linear requirements engineering process model that does not indicate the overlapping or iteration of activities suggested by the Kotonya et al. (1998) model. While some researchers tend to portray the requirements engineering process as a linear model, non-linear models have also been suggested. Loucopoulos et al. (1995) depict the requirements engineering process as iterative and cyclical in nature. Alternatively, the spiral model represents a sequence of activities being performed in iterations, resulting in gradual progression requirements engineering process. However, it has implications on the requirements engineering process model. A spiral approach would require requirements to be handled in each round. The spiral model is similar to the ideas presented by Kotonya et al. (1998). They provide a second requirements engineering process model, which depicts the same requirements engineering activities as in their linear model, only occurring in a spiral representation.

The activities from the linear process model are repeated in iterations, forming a spiral. At the end of each this iteration a decision is made as to whether to accept the requirements document or to perform a further iteration.

Results from studies of the requirements engineering processes in practice have indicated that the systematic and incremental requirements engineering models presented in literature may not necessarily reflect the requirements engineering processes in current practice. Martin et al. (2002), who examined the requirements engineering process in a case by case study, found that projects were generally handled by following a linear model, with some iteration of activities. Most of the projects they examined generally followed a linear process until the prototyping phase, which then resulted in an iterative process. Martin et al. (2002) indicated that the Loucopoulos et al. (1995) model was a good representation of the ad hoc process and the iterative nature of prototyping, but did not show the progression of phases. On the other hand, Nguyen et al. (2003) found that the requirements engineering process in their case study did not occur in a systematic,

smooth and incremental way. Rather, it was opportunistic, with sporadic simplification and restructuring of the requirements model when it reached points of high complexity. Furthermore, Houdek et al. (2000) performed a case study in the field but could not produce a monolithic requirements engineering process model of requirements engineering activities, as they were too heavily intertwined and not seen as separate tasks by the participants of the study.

Requirements engineering field studies have also gathered conflicting results as to the status of requirements engineering process standards in organizations. This indicates that the area has not fully matured in the sense that there is no universally used and accepted process. Instead, several different requirements engineering processes have been presented. Kotonya et al. (1998) put forward that not many organizations have a standard requirements engineering process definition. Consistent with this, Hofmann et al. (2001) examined, requirements engineering processes of 15 requirements engineering teams in industry and found that most participants saw requirements engineering as ad hoc, with only some projects using an explicitly defined requirements engineering process or customizing a company-wide requirements engineering process standard. Furthermore, studies of requirements engineering in web development projects have further confirmed the ad hoc nature of requirements engineering.

The main conclusions were that a standard process methodology should be used but should also be tailored to the specific needs of each project. Furthermore, resources should be put into the initial iteration of the requirements engineering process.

Since requirements engineering processes are fundamental to the success of software projects, it surprisingly not improving the requirements engineering process can subsequently enhance the chances of developing successful software. The process of establishing requirements is subdivided into three stages: elicitation, analysis and validation (Yeates et al., 2004). Requirements *elicitation* is the investigation stage of this process, and the requirements engineer will use the interview, observation and modeling techniques in the same way as the systems analyst. The *analysis* of the requirements often concentrates on the resolution of conflicts that can occur naturally amongst these stakeholders. Recognizing the need to address and resolve these conflicts is part of the analysis phase of the requirements engineering process. Prioritization is also considered at this stage. When the analysis of the requirements has been completed and the conflicts have been resolved, *validation* of the requirements specification checks that they have been documented correctly and conform to the organizational standards.

2.7 INFORMATION SYSTEMS DEVELOPMENT (ISD) METHODOLOGIES

Countless methodologies for ISD have been recommended since early 1970s, and development methodologies in the area are still being produced. The production of the new methodologies is fuelled by emergency of new technologies like web and internet. Maddison et al. (1983) defines a system development methodology as a recommended means to achieve the development or part of the development of the information system based on a set of rationales and underlying philosophy that supports, justifies and makes coherent such as a recommendation for a particular context.

Some of the well established and accepted methodologies include traditional systems development life cycle (SDLC), structured analysis and design (SSADM), Jackson systems development (JSD), Soft systems (SSM), Effective technical and human implementation of computer-based systems (ETHICS), object oriented methodology, Work systems methodology (WSM) and multiview. This study discusses in great details SSM and WSM only.

2.7.1 Soft Systems Methodology (SSM)

This study makes use of some attributes of Soft Systems Methodology. SSM was developed from a twenty-year programme of action research in response to the limitations of 'hard system thinking' when faced with dynamic, multi-perspective social problems which defy any attempt at solution (Checkland, 1981, 1985; Checkland and schools, 1990). Of particular importance within SSM is the conceptual distinction between the 'real world' and 'systems thinking about the real world'. Unlike the tradition of systems engineering, SSM makes no pretence that systems exist independent of human perception (Green, 1997). SSM is intended to be used for purposes of sense making, rather than as a prescriptive guide to action. The methodology is implemented as a participative process whereby a facilitator works with the problem stakeholders. The classic SSM inquiry has seven stages illustrated in figure 4 below. Some of the stages address the 'real' world and others address a conceptual world. The SSM stages are as follows:-

Stage 1: The first step, very much in the real world, is to acknowledge, explore and define the situation in some way. Checkland talks about the "problem situation" to denote problem solving idea.

Stage 2: Expressing the problem situation through rich pictures. As with any type of diagram, more knowledge can be communicated visually. A picture is worth a 1,000 words.

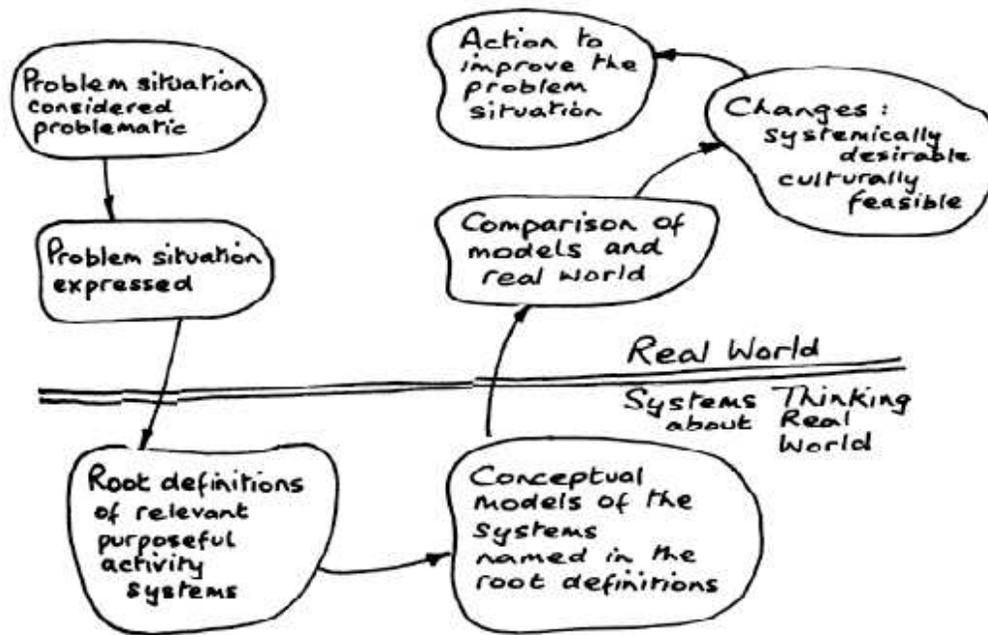


Figure 4 : SSM classic inquiry stages (source: Green, 1997)

The problem owner's help is the input of the process. The problem solver will perform analysis on the soft system and end up with a rich picture as output of this transformation process. The analyst will use the rich picture to aid their communication the problem to the owner. The rich picture is used to identify problems and inform the problem owner of the situation rather than provide possible solution.

Stage 3: Root definitions of relevant systems-this stage moves out of the “real” world and into the world of systems. It is necessary to pay close attention to the formulation of names of relevant systems, and to write them in a way such that a model could be built based on these names. These names are known as *root definitions*. The purpose of the root definition is to express the core purpose of some purposeful activity system. It is important that attention is paid into the development of root definitions. Properly written root definitions provide a much simpler insight into building system models. Checkland developed the mnemonic CATWOE to assist in root definition names:

Customer: everyone who stands to gain from a system is considered as a customer of the system. If the system involves sacrifices such as layoffs, then those victims must also be counted as customers.

Actor: The actors perform the activities defined in the system.

Transformation process: This is shown as the conversion of input to output.

Weltanschauung: The German expression for worldview. This worldview makes the transformation process meaningful in context.

Owner: Every system has some proprietor, who has the power to start up and shut down the system.

Environmental constraints: External elements exist outside the system which it takes as given. These constraints include organizational policies as well as legal and ethical matters.

Stage 4: Building conceptual models of what the system must do for each root definitions. You have basic "Whats" from the root definitions. Now begin to define "Hows".

Stage 5: Comparison of the conceptual models with the real world. Compare the results from steps 4 and 2 and see where they differ and are similar.

Stage 6: Identify feasible and desirable changes. Are there ways of improving the situation?

Stage 7: Recommendations for taking action to improve the problem situation. How would you implement the changes from step 6?

SSM has been under criticism for lack of theoretical rigor and practical value since its inception. Compared with classic ISD methodology, SSM is less tangible and more difficult to explain and use. This inevitably limits its opportunity to be adopted in practice. Moreover, the supporters of SSM often object to applying explicit, measurable evaluative criteria to assess the success of SSM.

Unfortunately, many SSM advocates have chosen to stick to this path. They create a public image of SSM as an amorphous philosophy concept by presenting the soft system methodology in an ambiguous manner. They always elaborate on why SSM makes sense but seldom discuss the barriers to implementing SSM in system analysis practice. They attack traditional system analysis methodologies as narrow-minded and near-sighted and

claim SSM as the best system analysis approach based on their belief, without giving sufficient empirical evidence to support their conclusions.

The value of SSM lies in its recognition of the importance of human/soft factors in organizational and social systems, the multifaceted nature of system rationality, and the role of incremental learning. The objective of SSM should be to provide mechanisms to better capture and explicitly incorporate these elusive elements in the system analysis process rather than to dismantle the process structure offered by other system analysis methodologies. It is a rigorous tool to use in "messy" problems. Two unspoken assumptions of structured methods that come under fire from these challenges are that there is a well-defined problem to be solved and that social, political and cultural factors are inconsequential.

SSM can play a useful part in problematisation – clarifying and prioritizing unclear situations. Social theory might play a useful part in sensitizing information system development to social, political and cultural issues. The main SSM pitfalls are that it requires from participants to adapt to the overall approach. There is a risk of narrowing the scope of the investigation too early. It is difficult to assemble the richest picture, without imposing a particular structure and solution on problem situation. People have difficulties to interpret the world in the loose way. They often show an over-urgent desire for action.

Assumptions of the Soft Systems Methodology are that it assumes that most management and organizational problems cannot be seen as pure "systems problems" as the system is far too complex to analyze. Nevertheless applying a systemic approach in a non-systemic situation is valuable.

2.7.2 Work Systems Methodology (WSM)

A work system is a system in which human participants and/or machines perform work using information, technology, and other resources to produce products and/or services for internal or external customers (alter, 2007). Typical business organizations contain work systems that procure materials from suppliers, produce products, deliver products to customers, find customers, create financial reports, hire employees, coordinate work across departments, and perform many other functions.

The work system method is a broadly applicable set of ideas that use the concept of "Work system" as the focal point for understanding, analyzing, and improving systems in

Organizations, whether or not IT is involved. WSM therefore allows the business professionals to think about systems for themselves, avoiding the IT jargon thus enhancing project success rates. WSM is purely user centric approach.

This method is more broadly applicable than techniques designed to specify detailed software requirements and is designed to be more prescriptive and more powerful than domain-independent systems analysis methods such as soft system methodology thus can be used in requirements engineering for the development of corporate portal. The work system method combines a static view of a current or proposed system in operation and a dynamic view of how a system evolves over time.

The static view is based on the work system framework shown in figure 5 which identifies the basic elements for understanding and evaluating requirements engineering for corporate portal development. This framework is prescriptive enough to describe the corporate portal engineering requirements by identifying problems and opportunities, describing possible changes and tracing the likely impact as those changes propagate to other parts of the system. This framework can aid in determining and structuring user needs during the development of corporate portal. This study make use static view only.

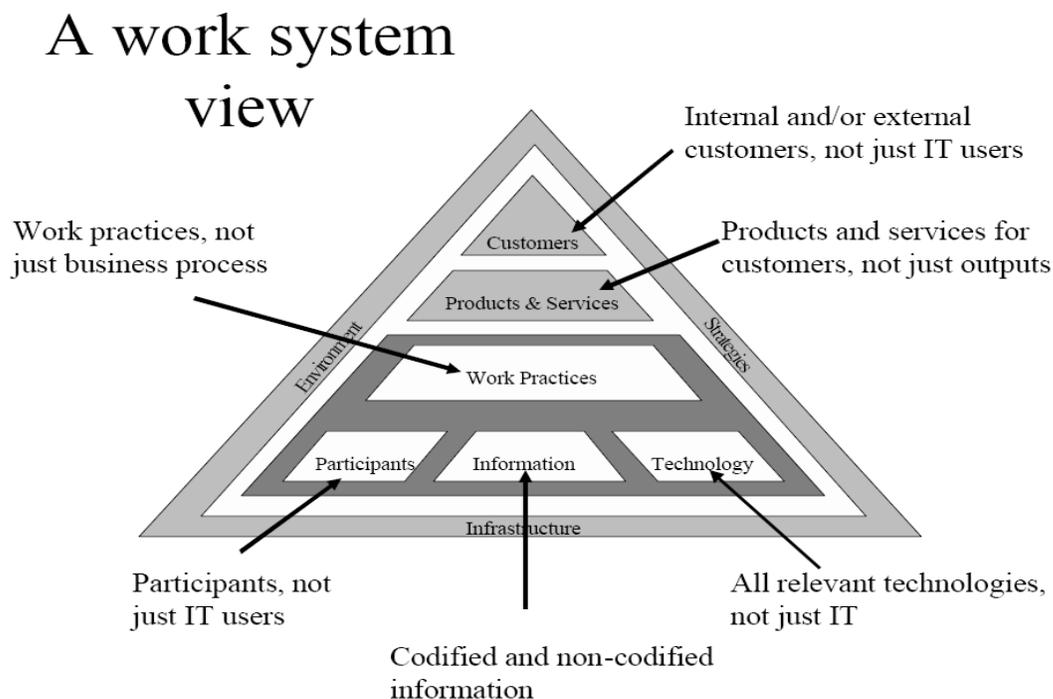


Figure 5: Static view work system framework (source: alter, 2003)

Customers

In this study the customers refers to the users of the corporate portal, business professionals affected by this system and IT professionals who will be involved in the development of the portal. This element addresses the universal usability challenges in the development of corporate portal identified in the first chapter. Some of the critical issues to address in requirements engineering for the development of corporate portal in this section include:-

1. Identification of all the users of the corporate portal and their usability concerns
2. The tactics the IT and business professionals will use to influence the requirements engineering for corporate portal development and how effective are those tactics.
3. The interest of IT professionals in the development of high quality corporate portal as opposed to slow and disorganized corporate portal that will be difficulty to maintain.
4. The tactics that are sometimes used to sabotage or delay the requirements engineering for the development of corporate portal efforts.

Products and services

Products and services are the combination of physical things, information, and services that the work system produces for its customers. The work system exists to produce these products and services. The visible products produced by requirements engineering for the development of corporate portals are documents such as functional specifications, user requirements and recommendation reports. The RE effort also produce important intangible, such as stakeholder's feeling and beliefs. This element will address the following issues:-

1. Shared or unshared understanding of the situation, the recommendations and justification affecting the RE for the development of corporate portal
2. The feelings and belief about the stakeholder's voices and interests in the RE for the development of corporate portal.
3. The effects of stakeholder's impression on the RE for corporate portal development.
4. The quality of the documents produced from RE for development of corporate portal.

Work practices

A business process is the set of work steps or activities performed within the work system. These steps may be precisely defined in some situations or relatively unstructured in others. In some situations, the same steps may be performed differently based on differences in the participant's skills, training, and interests. This study will particularly be interested with work practices surrounding the development of corporate portals that meets the stakeholder's needs. It will address the various business process involved in gathering, processing and disseminating the information for both knowledge management and decision making within and outside the organization under the study.

Participants

Participants are the people who perform the work steps in the work practices.

Some participants may use computers and information technology extensively, whereas others may use little or no technology. In this study the participants include the business and IT professionals and any other users involved in the corporate portal requirements engineering process. The incentives, interests, morale and knowledge of RE participants have an impact on the success of the RE for corporate portal development. In addition, communications and negotiation between the business and IT professionals during RE for the development of corporate portal is often problematic. These problems are related to a variety of personal, interpersonal, and technical issues. This element will address the following issues:-

1. The impacts of user participation on the RE for corporate portal development process
2. The competencies of participants in the RE for the development of corporate portal
3. The job roles and characteristics of RE participants related to their ability to understand the use particular RE work systems framework

Information

The specific information used by the participants to perform their work. Some of the information may be computerized, but other important information may never be captured on a computer. RE collects and uses substantial amount of information. The addressed in information processing include the following:-

1. Capturing, organizing, storing and retrieving of information during RE for development of corporate portal.
2. Archiving of information for future use such as post implementation review

3. Management of information by the participants in RE process and the effects of information overload on RE for corporate portal development.
4. Coding of information on the corporate portals

Technology

Technology includes the hardware, software, and other tools and equipment used by the participants and customers while doing their work. The technology considered to be within a work system is dedicated to that system, whereas technical infrastructure is technology shared with other work systems. This element will tackle the requirements challenges surrounding the technologies on the usage of corporate portals identified in the background of the study section. The issues addressed include the following:-

1. The various technologies to be used by the users in accessing the corporate portal i.e. the mobile phones used in the third world countries whether are internet enabled e.g. support GPRS, EDGE technology
2. The technologies to be used by the IT professionals in requirements engineering and in the development of corporate portal
3. The various technologies to be used in addressing the corporate portal security challenges like hacking, denial of service

Infrastructure

Infrastructure is shared human, informational, and technical resources that the work system relies on even though these resources exist and are managed outside of the work system. Infrastructure typically includes human infrastructure such as support and training staff, information infrastructure such as shared databases, and technical infrastructure such as networks and programming technology. This study will particularly be concerned with the internet connectivity in Kenya. The current developments in this arena involving the laying of fiber optic undersea cable connecting Kenya to the rest of the world with an objective of increasing the internet carrying capacity will give this study an impetus. The core issues to be addressed in this element are as follows:-

1. The impact of technical infrastructure in accessing the corporate portal from remote locations
2. The effective ways to share centralized RE for the development of corporate portal competence across an organization.

Strategies

Ideally an organization's systems should be aligned with its strategy (Luftman, et al., 1999; Reich and Benbasat, 2000). Related research issues include:

1. The mechanisms through which a strategy used in a target work system is made visible during RE for the development of corporate portal as opposed to focusing mainly on process and information details
2. The mechanisms through which a firm's strategy is made visible during RE for development of corporate portal.
3. The extent to which choices during analysis and design efforts genuinely reflect a firm's strategy

Environment

Aspects of the internal and external environment surrounding an RE for development of corporate portal effort include organizational culture, the organization's policies and procedures, the organization's history, the resource environment, the competitive environment, the political environment, and industry and governmental regulations and standards. Each of these aspects can impact RE for the development of corporate portal practices and outcomes. The core issues addressed in this section include:-

1. The effects of organization's culture and balance of power on the analysis process and design decisions for the development of corporate portal particularly in the third world countries like Kenya.
2. The effects of ICT bill 2008 on the usage and development of corporate portal.
3. How organizational policies and procedures are made visible in RE efforts?
4. How do the availability of vendors and other resources (e.g., component vendors) affect the RE for the development of corporate portal effort?
5. Does the nature and intensity of competition in the environment affect the quality, speed or content of RE?

WSM steps

The work systems methodology is undertaken in three steps as follows:-

- System and problem. The key activities include the following:-
 1. Identification of the work system
 2. Define the problems or opportunities
 3. Factors that contribute to problems or opportunities
 4. Constraints limiting the feasible recommendations
- Analysis and possibilities – key activities are:-
 1. Identification of the customers and their concerns related to work system
 2. The quality of goods and services produced by the work system

3. The quality of the work practices inside the work systems
 4. Effects of better information and technology
 5. The works system infrastructure and surrounding environmental fitness
 6. The work system and strategy fitness
- Recommendations and justifications- key activities are :-
 1. Recommended changes to the work system
 2. Preferred alternative compare to other alternatives
 3. Recommended changes and address to original problems and opportunities
 4. The new problems or costs might be caused by the recommended changes
 5. The conformity of proposed work system to work system principles
 6. The implementation of recommendations

2.8 CORPORATE PORTAL IN OTHER REFINERIES

This research study bench marks its architectural portal model to working portals in other refineries around the world like the one for Valero Energy Corporate in USA. The Valero portal offers the following services online:-

- Products marketing and sales services
- Community social responsibility services
- Healthy and Safety environment practices
- Online payments for services
- Tendering and bidding process
- Refining performance highlights



Figure 6: Valero enterprise portal (source: Valero)

CHAPTER 3

RESEARCH METHODOLOGY

3.1 DESIGN METHODOLOGY

The study sought to elicit user requirements in the development of a corporate portal using some selected frameworks the case of KPRL. In addition the study intended to document barriers in the requirements analysis process in the development of corporate portals in Kenya. The research study adopted work systems methodology devised by alter (2006) as a core framework and incorporate some facets of soft system methodology developed by Checkland. WSM is considered appropriate when the problem is complex and IT Business culture gap exists and SSM is also powerful where a multi-perspective social problem exists like in eliciting user needs. This research study therefore exploits the cross fertilization of the two methodologies in the RE for the development of corporate portal. The researcher in addition reviewed the KPRL's existing website and conducted interviews to stakeholders to bring out the role played by the website in deployment of corporate portal. The researcher undertook structured and unstructured interviews on selected staff of KPRL to elicit their requirements for the development of a corporate portal. WSM and SSM methods are more broadly applicable than techniques designed to specify detailed software requirements and are designed to be more prescriptive and more powerful.

Many system failures and low utilization issues emanate from focus on the technological solution rather than provision for support of user participation. Low user participation and little consideration of other factors affecting the use of the system like the cultural, social and political issues. Participatory design where one includes users in the design is necessary so that they can give their expert perspective, preferences and own the system. The WSM and SSM intend to create a mechanism where the users can participate fully in the development of corporate portal by empowering the business specialist to describe the problem as a work system.

3.2 DATA COLLECTION

Primary qualitative data were collected using the interviews, observations and analysis of secondary document. Saunders et al. (2007) provide two types of qualitative research interviews: semi-structured and unstructured interviews. They noted that in semi-structured interviews the researcher has a list of themes and questions to be covered,

although they may vary from interview to interview. Unstructured interviews on the other hand are noted to be informal and used to explore in-depth a general area.

3.2.1 Personal Interviews

For this case study, a number of qualitative personal interviews were conducted on some selected KPRL staff. Personal interviews are interviews with individuals (white, 2002). And can either be structured or unstructured. These interviews were deemed appropriate given the busy nature of the targeted interviewees.

An interview guide was developed based on the Work Systems Framework elements (Appendix II) targeting the review of the usability of the KPRL's website and analyzing the user needs for the development of corporate portal objectives of the study. The interview guide in Appendix III tackled the second objective on the barriers facing the development of corporate portal in Kenya.

Face to face interviews were done and a video camera device was used to record the interviews and transcription was done in the analysis chapter.

3.2.2 Observation

Observation was also used to collect primary data: an accurate record of what people do and say in real-life situations. White (2002) asserts that it is a good method to use in the area of business. This study made use of this method particularly in documenting the work practices and challenges associated with this business processes.

3.2.3 Secondary documents

Secondary data was also be used to augment the primary data findings. Some of the secondary documents reviewed include annual financial reports, internal documented procedures and business process manuals, the strategic plan, the KPRL website, newspaper articles and magazines especially the quarterly lantern flush.

3.4 DATA ANALYSIS

This is a qualitative research. The mode of analysis adopted was hermeneutics. Hermeneutics is the study of interpretations (Gerrard, 1991). Hermeneutics is primarily concerned with the meaning of a text or text-analogue (an example of a text- analogue is the organization, which the researcher comes to understand through oral or written text).

Hermeneutics originated as a study of the principles of biblical exegesis, deriving its name from Hermes, the messenger of the Gods. Gradually hermeneutics extended its scope beyond the confines of the biblical exegesis, becoming the study of textual interpretation in general.

Hermeneutics analysis is used in information systems study, the object of the interpretive effort becomes one of attempting to make sense of the organization, people (different stakeholders) can have confused, incomplete, cloudy and contradictory views on many issues. The aim of hermeneutic analysis therefore becomes one of trying to make sense of the whole, and the relationship between people, the organization and information technology.

This study particularly made use of hermeneutic analysis to makes sense of the relationships that existed between the elements work systems framework. The researcher also used hermeneutic analysis to aid in interpreting both primary and secondary data gathered.

Assumptions

Hermeneutics techniques has some subjectivism during interpretation or trying to make sense from text therefore the reader should take this into consideration while reading this research report.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

4.1 INTRODUCTION

This chapter presents the results of the analysis and findings of the study. The study was undertaken to elicit user requirements in the development of a corporate portal case of KPRL using cross fertilization of work systems and soft systems methodologies. The study adopted WSM as a core framework and incorporated some aspects SSM to improve elicitation of the user requirements. Hermeneutics technique was used to analyze data as described in the research methodology.

4.2 KPRL REQUIREMENT ENGINEERING IN THE DEVELOPMENT OF CORPORATE PORTAL

WSM was undertaken in three steps. During the first step the work system was identified and the problems or opportunities surrounding the work system were explored. The second step revolved around analysis of the work system and looked at the possible solutions. This step identified the work system's customers, the services produced and its work practices. The third step made recommendations and justifications for the work system improvement.

4.2.1 Step 1: System and problem

Even though the study focused on requirement engineering in the development of corporate portal the underlying work system was identified as Management Information System which encompassed activities like gathering, processing and disseminating of information. During introductory workshop the researcher gave a brief overview of the study. The researcher and the respondents reviewed the ways of gathering, storing, processing and dissemination information within KPRL. The problems, contributing factors and constraints identified were tabulated below.

Ref	Text: Excerpts of Transcripts	Description (Text Analysis)
P1	Gathering of information is tedious and most reports are done in excel. For instance reports such as test certificates, sales	This demonstrated the presence of silos systems. The development of corporate portal shall integrate systems from diverse sources

	invoices, customer statements, purchase orders are printed and dispatched to clients in hard copies. [MA,KPRL]	and present information in consolidated manner.
P2	Some information is not available in “Sunsystems” and I have to get it from other systems like LIMS, SAWA, PAYROLL and ETL. I often use copy and paste commands to consolidate data from these several sources into single spreadsheet this causes me a lot of problems especially the correctness of the final report. [CA, KPRL]	Some of the reports were not accurate due to several unstructured sources that were isolated thus relying on recursive manual manipulations and validation based on individual’s work experience.
P3	Inspection information is found in many places starting from email, spreadsheets, file repositories and hard copies. We lack inspection data management system that can consolidate these information to make sense out of it (PI,KPRL)	Voluminous data that was not fully harnessed into knowledge thus leaves the employees overloaded with data and not able mine it. Corporate portal promise to consolidate such scattered data and present it in better formats desired by user.
P4	We depend on other people to generate our information; the information provided by such people is in verbal format (OSS, KPRL). You have to chase people to get information from them. Others are reluctant to give out information especially during incident investigations (HSEA, KPRL)	Some data is unstructured and only stored in people’s heads. The data obtained using verbal means is mostly blurred and distorted as it purely depends on the reporter’s skills in extracting it from the people and how to it is reported.
Table 3 : Factors contributing to work system problems		
Ref	Text: Excerpts of Transcripts	Description (Text Analysis)
P5	We lack inspection data management system that can consolidate information to make sense out of it. People are relying a lot on email for disseminating reports and occasionally they delete the emails containing such reports by mistake (PI,KPRL)	Lack of integrated system is one of factor contributing data gathering, processing and dissemination challenges.
P6	Our website is small and lacks the information that I need to do my job. It is not regularly updated and the company has	Lack of willingness by the company management to promote the use of website to pass information to stakeholders and website

	not promoted the use of the website to pass information (PI, KPRL).	is not updated constantly to remove outdated information.
P7	We have a lot of hard copies of information especially the drawings kept in the cabinets and we spend a lot time to retrieve them whenever they are needed. I wish we had a document management system that would manage these drawings (RI, KPRL)	Lack of documents management system
P8	Our computers have become too slow and I believe they need an upgrade (FB,KPRL) The local area network access is generally slow and license limitations on laboratory information is a big hindrance to department (MPO,KPRL)	Consider upgrading or replacing the slow computers with ones that are capable of supporting the user needs. The network performance shall be evaluated to identify the bottlenecks and initiate action.
Table 4 : Constraints limiting the feasible recommendations		
Ref	Text: Excerpts of Transcripts	Description (Text Analysis)
P10	Internet accessibility is a big challenge here in Kenya. The internet connectivity is indeed slow and its costs is out of reach of most Kenyans (MPO,KPRL) The cost of computers and communication gadgets like modems, web enabled phones are not cheap for ordinary Kenyans(OSS,KPRL)	High internet costs and slow internet speed are major impediments towards deployment of corporate portal. Most of the interviewees owned phones that are not internet enabled. The mobile phones that supports internet are costly thus unaffordable by many people.
P11	The diffusion of social amenities including availability of electricity is a challenge to our government and still remains low. In spite of efforts being put by the government to connect the rural homes to power grid we are not yet there (ITM,KPRL)	Lack of reliable electricity to power the computers is a major constraint. This will reduce the number of persons who would access the website.

In general table 2 summarized the major problems hindering employees and stakeholders from freely gaining access to information at KPRL. Table 3 focused on factors contributing to this situation and finally table 4 looked at any feasible constraints to the recommendations made by the researcher.

4.2.2 Step 2: Analysis and possibilities

Stage two of WSM revolved around conceptualization and planning. With the help of the systems and structured tools, and much discussion with stakeholders, an understanding of how the corporate portal would be developed was defined. The stakeholders were highly encouraged to make use of the rich pictures to express their problems. A rich picture is not a system model or corporate portal architectural model. Some of the rich pictures drawn are shown in figure 7 and 8 below.

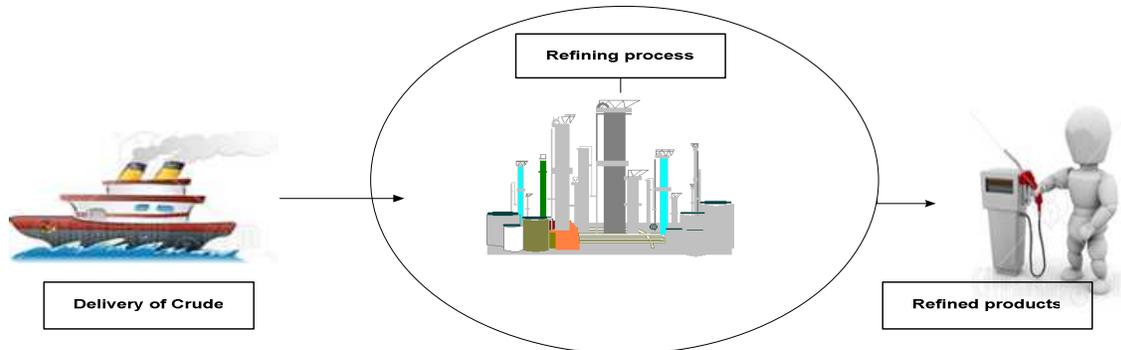


Figure 7 :The petroleum supply chain summary

The pictures depicted in figure 7 puts the refinery in the petroleum sector supply chain perspective. This formed the basis in the identification of stakeholders in the development of envisaged corporate portal. Figure 8 summarized existing IT portfolio silos anchored on business processes with proposed integration using the portal concept.

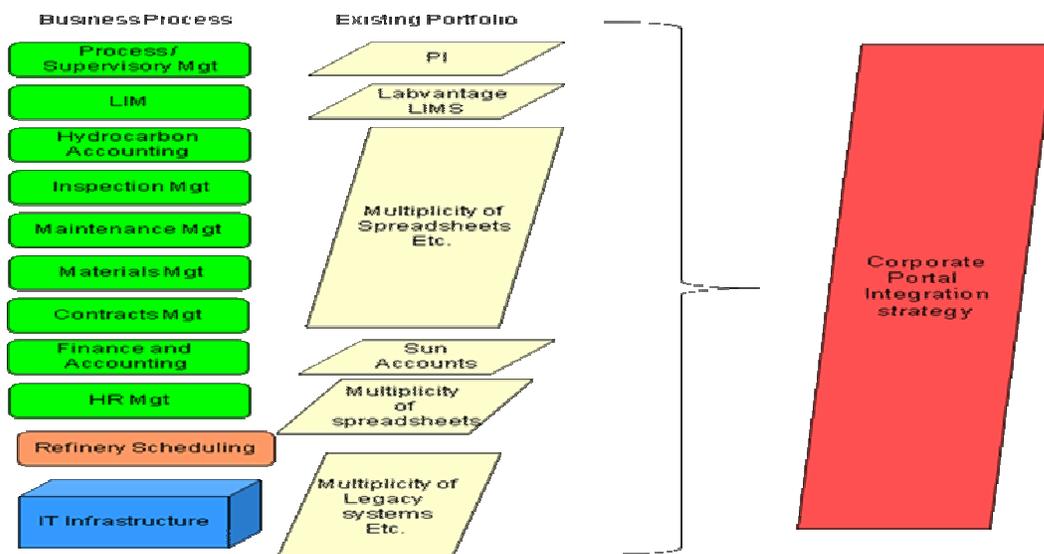


Figure 8 :The KPRL's Business processes and its current silos systems

Table 5 summarized the major activities in second step of (WSM) based on the nine elements of work systems framework.

Table 5: Analysis and possibilities activities

Customers and Work Systems Concerns		
Ref	Excerpts of Transcripts on Customers	Work System concerns
S1	The consumers of the information generated in KPRL include internal staff and management, suppliers, Oil Marketers, Government and its Agencies, Shareholders, trade union and general public(MPO,KPRL)	Some of the cited concerns are as follows:- <ul style="list-style-type: none"> • In-accuracy of information due to myriad silos systems especially reports that were compiled on spreadsheets(CA, KPRL) • Knowledge exists in people and was not captured in any soft formats (HSEA,KPRL) • Delays in information delivery • Online e-procurement
Ref	Excerpts of Transcripts on Products and Services	Work System concerns
S2	The products and services of the work system identified include reports mostly spreadsheets and word documents, graphs, paper based print outs,meetings,discussions,website and disseminations (ITM,KPRL)	<ul style="list-style-type: none"> • In-flexible report formats (MA,KPRL) • Misplacement of hard copy reports (PI,KPRL) • Lack of drill down functionally in the existing systems (HOA,KPRL) • A lot of time was spent in getting the right facts (HSEA,KPRL)
Ref	Excerpts of Transcripts on Work Practices	Work System concerns
S3	The work activities involved in this Work system include gathering, categorization, integration, personalization, publishing of the information to enhance decision making.	<ul style="list-style-type: none"> • Data gathering was cumbersome process since systems exists in silos. • Users were bombarded with lots of information from various sources hence information overload
Ref	Excerpts of Transcripts on	Work System concerns

	Participants	
S4	The participants or actors of the corporate portal include the KPRL IT staff and business specialist (ITM,KPRL)	<ul style="list-style-type: none"> • Lack of training on web based system development (BSA,KPRL) • IT and Business staff lived in silos (ITM,KPRL)
Ref	Excerpts of Transcripts on Information	Work System concerns
S5	The major sources of information cited include e-mails (exchange 2003), software applications are not integrated e.g. LIMS, PI, Payroll, Sunsystem,workflow,onsite,SAWA,Pro II,RCM,Shepherd,DEPS,Compiler, Impress,PRS,RRM,RBI,ETL,DCS,Entis etc, company website , people inside and outside the company (ITM,KPRL)	<ul style="list-style-type: none"> • The information was scattered in separate best of breed and calls for integration. • Data was not well categorized • The company website lacks the content that users desire to carry out their jobs and was often not updated
Ref	Excerpts of Transcripts on Technology	Work System concerns
S6	The interview conducted revealed that most of the users mobile phones are not web enabled thus cannot access the portal from them. The company already has a corporate portal software MS share point but is not used. All users have access to Pentium IV computer. The company has invested in a well elaborate firewall known as Astaro and internet explorer is used as a primary browser ranges from version 6 to 8. (ITM,KPRL)	<ul style="list-style-type: none"> • Most of the mobile phones of the interviewees were not web enabled thus will be impediment in the accessibility of corporate portal from such handheld devices. Wide digital divide on the mobile phones. • Existence of corporate portal software that had not been implemented demonstrated lack of capacity to deploy such tool
Ref	Excerpts of Transcripts on infrastructure	Work System concerns
S7	The landing of the undersea fiber optic cable is likely to change the internet connectivity in a major way (ITM,	<ul style="list-style-type: none"> • Slow internet connectivity • Lack of electricity in the rural areas • The wireless solutions available were not

	KPRL). The rural electrification championed by the government is likely to open up opportunities in the remote areas to embrace usage of computers (SI,KPRL)	<p>stable especially the VSAT that relies on line of sight</p> <ul style="list-style-type: none"> • Lack of Web portal technical capacity
Ref	Excerpts of Transcripts on Strategies	Work System concerns
S8	The Refinery had mission, vision statement and objectives and were well understood by the interviewees. IT was one of the pillars towards the realization of the objectives. The development of the corporate portal could be a fantastic strategy in support of our process automation agenda (ITM,KPRL)	No major concerns were raised by the interviewees in relation to this attribute.
Ref	Excerpts of Transcripts on Environment and Culture	Work System concerns
S9	The portal should adhere to the government policy like Information and communication Bill 2008 and organization culture to succeed. The wide population in the rural areas do not appreciate the value of Information Technology (ITM,KPRL)	<ul style="list-style-type: none"> • Acceptance of the value of Information technology. • Lack of awareness on the Information and communication Bill 2008

Development of KPRL's Conceptual Model

Building the conceptual model started with stating what the system must do for the users. KPRL seeks to get the system that consolidates all its disparate applications to facilitate the information gathering and processing to enhance its competitiveness. Figure 9 below summarized the various aspects of the work systems starting with the customers, their concerns and the envisaged obstacles in the development of corporate portal.

The challenge in the corporate portal development is the management of varied interests of the stakeholders. Synthesizing varied concerns of the KPRL staff as the development of the portal evolves, their expectations were:-

- Improving knowledge sharing

- Improving accuracy of information
- Integrated system
- Better service delivery to KPRL external customers
- Flexible reporting system

In order to achieve above expectations the development of corporate portal one must deal with obstacles like high internet costs, culture, unreliable electrical energy and technical capacity.

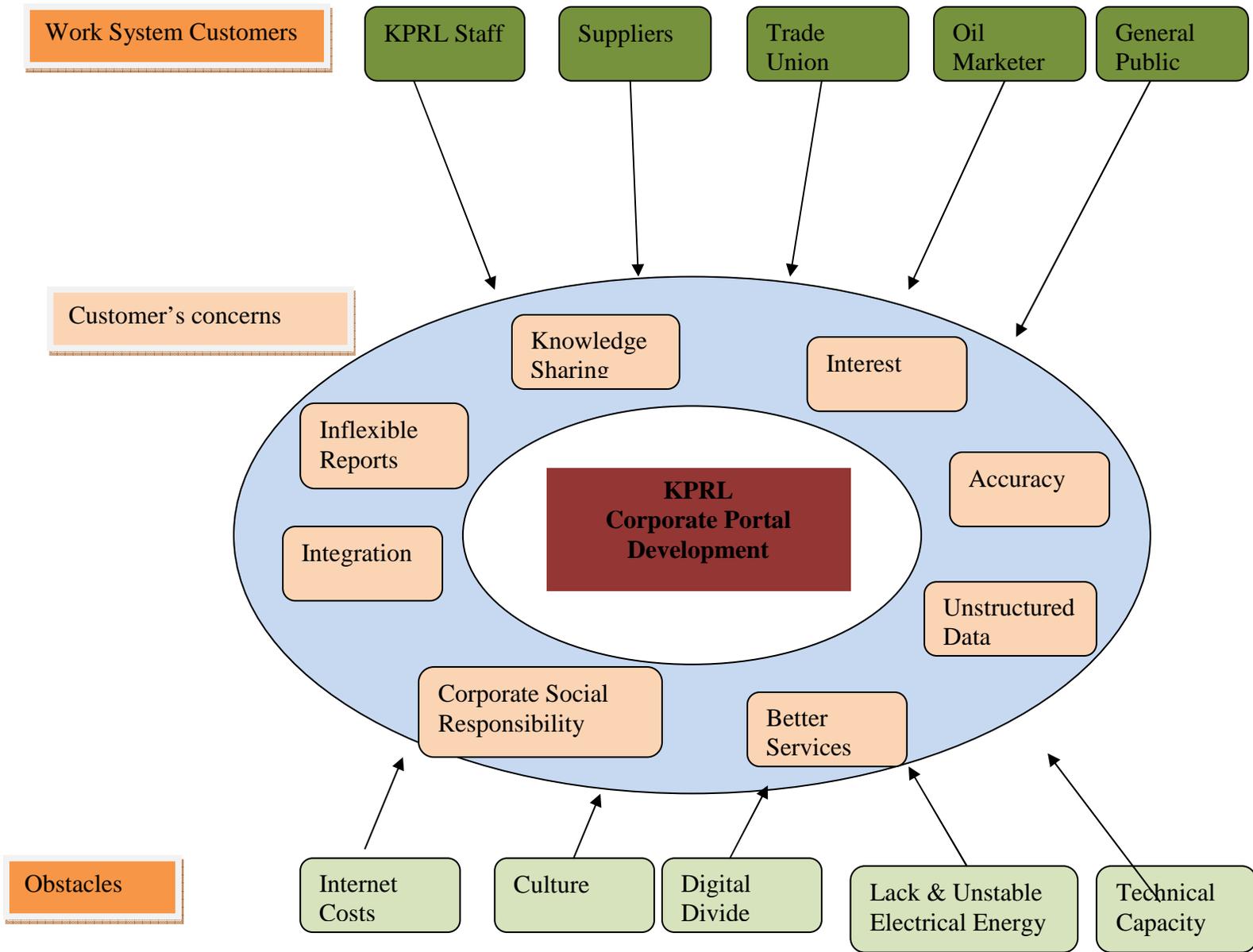


Figure 9 : KPRL MIS work Systems Schematic Diagram

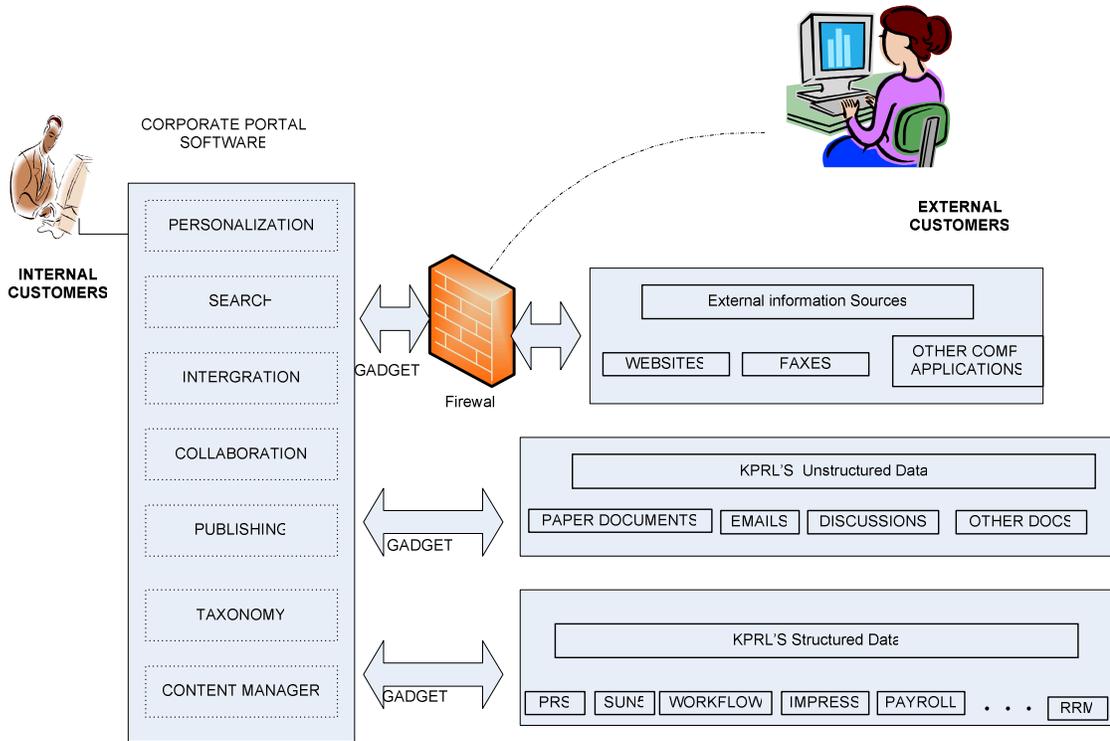


Figure 10: Solution conceptual model of the problem situation faced by KPRL

Figure 10 builds on the schematic diagram in figure 9 to come up with KPRL's problem conceptual model. During this stage, comparison was done between the conceptual model and the work system to determine what changes were to be done on the work system. The conceptual model constructed in figure 10 above gave an architectural structure to a meaningful problem situation which KPRL was facing.

The current work system from researcher's observation and conducted interviews was mostly based on disparate bespoke systems thus the information processing was done manually mainly on excel spreadsheets. This manual data manipulation was error prone accounting for inaccurate reports and promoted data duplications. The internal systems infrastructure including the local area network, servers' specifications, the client personal computers and software licenses were functioning as expected. Furthermore the organization was in possession of SharePoint the corporate portal software from Microsoft that was not in use. The computers were being used in all departments; however the during the interviews the computer literacy levels among some users in the operations department was cited to low thus requires training. The proposed corporate portal application seeks to enhance the data gathering, processing and dissemination by

integrating, categorizing, personalizing, publishing the current disparate applications. The portal would particularly provide a single gateway to access all needed information.

The infrastructure was cited as a major impediment in the usage of corporate portal particularly the internet connectivity speed. The portal would be developed with this limitation in mind to avert a condition were the customers have to wait for too long for the system service.

Implementation of feasible and desirable changes.

Technical, economic, operational social/political feasibility considerations need to be done to assess the benefits, costs and impact of changes Vis a Vis retaining the current system. The review ensures useful use of funds facilitates proper planning and avoids disruption of the organization's strategy, structure and way of doing business.

Technical feasibility

This seeks to establish the availability of reliable and robust hardware, software and human capacity to meet the needs of the proposed corporate portal development. The interview conducted on the IT staff at KPRL confirmed the availability of both the hardware and the software that can support the portal concept. The only issue that was highlighted was on lack of internal human resource skills to implement web based technology thus having to rely on external consultancy. This can be mitigated easily by sponsoring some IT staff to undertake web technology training to close the gap.

Operational feasibility

The KPRL staffs are computer literate and most of them are graduates. The few diploma holders working in the operation and engineering departments are fairly computer literate; however some interviewees cited slow data gathering being experienced in the operation department due to challenges on the computer usage. The IT department needs to train for such individuals. Generally, most of the KPRL staff have used internet thus could operate easily the proposed corporate portal.

Economic feasibility

This research did very little on the economic feasibility, however in the literature review a lot has been discussed on the benefits of embracing the concept of corporate portal.

Based on the information gathered during the interviews the only cost that KPRL will incur is on consultancy in developing the portal. The company has already a licensed copy of Share Point from Microsoft and fairly good servers and client computers.

Social political feasibility

The concern is if the corporate portal system was likely to meet resistance from the users and other stakeholders at large. Indeed the discussion the researcher had with the general manager was a positive one that led to his approval for the study to take place. The general support that KPRL staff gave the researcher during the workshops and interviews was a clear testimony of their desire to have corporate portal. The results obtained from the conducted interviews indicated that the KPRL's culture is process, job and professional oriented; it is closed system with tight control due to its business nature. The interviews also revealed that the proposed corporate portal development does not conflict with the company's strategic objectives in any manner. In fact it was pointed out the portal supports the strategy especially in aspect of delivering the services to customer particularly the 24/7 accessibility to company services.

4.2.3 Step 3: Recommendation and Justification

From the analysis corporate portal with the following features should be implemented at KPRL as shown in figure 11 below.

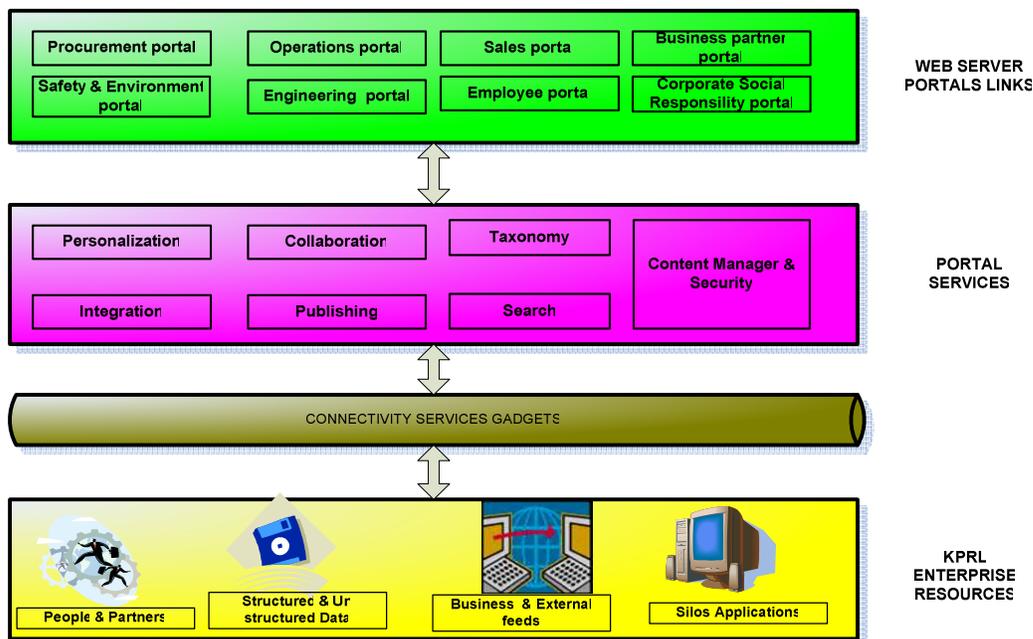


Figure 11: The proposed features of KPRL's corporate portal

4.3 THE BARRIERS IN RE FOR THE DEVELOPMENT OF CORPORATE PORTAL

Table 6: Barriers in RE in the development of Corporate Portal

Ref	Text: Excerpts of Transcripts	Description (Text Analysis)
R1	Accessibility to internet services. Some places in Kenya like the Northern part has no access to internet. The costs for accessing internet are high and thus excluding the poor from accessing the envisaged portal [PI,KPRL]	High costs for internet and computers
R2	Most Kenyans especially those in the rural areas do not know how to use the computers and underscore the value of computers [CA, KPRL]	Low computer literacy level
R3	Poor electricity penetration and frequent power outages is a major challenge in the development of the envisaged portal (OSS,KPRL)	Lack of social amenities in the rural areas.
R4	The technical language used by the IT experts puts off the business people. The IT experts ends up designing system that does not answer to the business needs (OSS,KPRL)	Existence of IT – Business culture gap
R5	Most Kenyans do not trust systems used in making payments online especially where they are required to use their credit cards (SI,KPRL)	Lack of government regulation and legislations to boost the trust of system users.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter discusses the conclusions and recommendations of the study in line with the objectives. This study sought requirements engineering in the development of a corporate portal using selected frameworks and also determine barriers in the requirement engineering in the development of portal in Kenya.

The objectives set out in first chapter were to:-

1. Undertake thematic analysis using selected methodologies in requirements engineering in the development of Corporate Portal case KPRL.
2. Uncover the barriers in requirements engineering in the development of corporate portals in Kenya.

The approach to this study was to use Work Systems and Soft System Methodologies highlighted in chapter two of this project as requirement engineering lens in the development of corporate portal, as well as to bring out other issues that were not captured in the research frameworks.

The literature review focused mainly on an understanding of the technology on corporate portals, review of literature on requirement engineering process, work systems framework, soft systems methodology and a snap shot of corporate portals in other refineries for benchmarking purposes. The literature review also touched on claimed benefits of corporate portals, corporate portal features and types of portals.

5.2 DISCUSSION OF FINDINGS

From the research findings as presented in chapter four of the study, several conclusions can be drawn in support of the adopted frameworks. These are discussed in light of the objectives of the study.

5.2.1 Objective 1: Undertake thematic analysis using selected methodologies in RE for the Development of Corporate Portal case KPRL

Thematic analysis can be developed from what has been ‘said’ and ‘recorded’ in interviews, videos, audio recordings. The ‘words’ are the most common form of qualitative data but you can also use thematic analysis with visual data.

The researcher used work systems methodology as major method of analysis and incorporated some attributes of SSM in requirement engineering for the development of corporate portal. From the text analysis based on the nine elements of work systems framework the following findings were deduced.

1. Recognizing that systems involve much more than information technology
2. Describing and understanding systems from a business viewpoint
3. Improving communication between business and information technology professionals
4. Understanding the role and limitations of IT

Firstly, recognition of the fact that system involve much more than Information Technology. The work systems framework comprises of nine elements namely customers, work practices, participants, products and service, information, technology, infrastructure, strategy and environment. Each of these elements provides a lens for requirement engineering in the domain. All the nine elements have a role to play in determining the proper function of a work system as opposed to the notion that systems are only affected by information technology. The researcher used the nine elements of WSF to drill down every aspect at KPRL that would affect the development of corporate portal.

Secondly, describing and understanding systems from the business view. It is evident from the results of the study in chapter four that most of the interviewees were from the business and they articulated their issues correctly without relying on IT experts.

Thirdly, WSM and SSM improve communication between the business and IT. The study has revealed the Work Systems and Soft Systems Methodologies have improved the communication between the Business and IT thus reducing the Business- IT culture gap. For instance at KPRL the business experts would define what the system will do for them aided by the work systems framework. Using the work system framework business

experts at KPRL defined accurately the features to be incorporated in the corporate portal without the help of IT department.

Fourthly, understanding the role and limitation of Information Technology; analyzing of the technology work systems framework element could reveal the limitations of technology. For instance at KPRL most of the mobile phones of the interviewees were not web enabled thus would be impediment in the accessibility of corporate portal from such handheld devices this demonstrated the widening of digital divide on the mobile phones. There was also existence of corporate portal software that had not been implemented demonstrated lack of capacity to deploy such tool.

5.2.2 Objective 2: Barriers in requirement engineering in the development of corporate portal in Kenya

The study besides undertaking thematic analysis using selected methodologies in requirements engineering for the development of corporate portal it also sought to uncover some of the barriers related to the development of the corporate portal. The barriers identified by the interviewees were tabulated in **Table 6** above. The text analysis of the transcriptions determined five core barriers in requirement engineering in the development of corporate in Kenya and were summarized as follows:-

- a) High costs of internet accessibility and computers
- b) Low computer literacy levels
- c) Lack of social amenities in the rural areas
- d) Existence of IT- Business culture gap
- e) Lack of trusted e-commerce systems.

Firstly, respondent in Table 6 R1 cited poor internet accessibility and connectivity. In spite of the commissioning of the undersea fiber optic cable linking Kenya to Fujaira in the United Arab Emirates there has been no improvement in the internet connection speed as envisaged. The fast internet connection would have boosted the corporate portal accessibility. The cost of the computers and the internet access are so high for most of the Kenyans to afford. The Government of Kenya zero rated the taxes on importation of computers with an intention of bringing down its costs. But the cost is still out of reach for most of Kenyans.

Secondly, respondent in Table 6 R2 cited low computer literacy level especially in the rural areas where people view computers to be of no value to their activities. This is an

impediment in the accessibility to corporate portal by general community thus socially excluding them from services being offered by organizations particularly the social corporate responsibility. The Government of Kenya has introduced the computer curriculum in both primary and secondary schools to improve on the computer literacy levels. Also the Government of Kenya has partnered with private sectors to champion projects like computer for schools (CFSK, 2009)

Thirdly, respondent in Table 6 R3 cited low electricity penetration especially in the non urban areas to be a major impediment towards realization of envisaged corporate portal. Despite the government efforts to establish the rural electrification program; the electricity diffusion is still low. The Government has setup Rural Electrification Authority that is charged with responsibility of distributing electricity to all the rural areas (ERC, 2009)

Fourthly, respondent in Table 6 R4 cited language used by Information Technology experts when communicating to business people to be a barrier. The IT experts make use of technical language which is jargon to the business people thus end up not understanding what system the business needs. Lee (1999) postulated that two worlds with two cultures. Lee was referring to information technology and the business as two separate worlds with different way of doing things.

Fifthly, respondent in Table 6 R5 cited that most Kenyans are skeptical when it comes to processing payments electronically. They don't trust the security of the computer systems especially the usage of credit cards. The government needs to come up with legislations to govern electronic payments to boost the confidence of its citizens. Despite the efforts by the developed countries to narrow the digital divide, the reality is that the gap is indeed widening. Take for instance most of the interviewee's mobile phones were not web enabled. The corporate portal is nascent product because of its ubiquity including ability to be accessed via mobile devices. The interview suggested that most people in the rural areas are in possession of mobile phones that are not able to access the internet.

5.3 CONCLUSION

The aim of this research work was twofold; mainly to analyze the user needs in the development of corporate portal based on KPRL using some selected methodologies and uncover the barriers to requirements engineering process in the development of corporate portals in Kenya.

This study was conducted on Kenya petroleum refineries limited and some of the tools used in data collection were interviews, workshops, observations and review of the secondary documents. The researcher selected 23 participants based their specialty in the subject areas.

In conclusion current business organizations cannot operate without Information Technology, but many IT initiatives fail to meet expectations of the business. Many IT-enabled systems satisfy neither employees nor customers. Some of the common problems include new systems that are supposed to improve performance but never meet expectations; ineffective analysis and design projects that absorb time and effort but never produce consensus about what is to be done and why; ineffective communication between business and IT professionals and software implementation that proceeds despite disagreement about how the software is expected to improve work practices and provide benefits.

From this study it is evident that not only (WSM) has connected people, processes and IT for business results, but also it has injected some system thinking in requirement engineering towards improving communication about systems that would help in seizing missed opportunities, minimizing wasted effort, and attaining business results.

5.4 LIMITATIONS OF THE RESEARCH

Every research has its own weakness and limitations. The limitations found in this research include the following:-

Firstly, the researcher applied some of the stages of Soft Systems Methodology selectively thus the confirmation of SSM framework was not fully attained. Further the researcher made use of static view of current system and ignored the dynamic view of how the system evolves over time.

Secondly, WSM and SSM methodologies don't actually tell how to build a system. They only provide the frameworks to be followed to describe and suggest improvement to the system. There is no verification mechanism to validate the needs analyzed from the users.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

Firstly, studying a fairly new area is interesting and rewarding, so is the case of the corporate portals. As mentioned in the literature review there are several ISD methodologies for analyzing the user needs especially in the development of corporate portals and so future research can explore other ISD methodologies to validate the findings of Soft Systems Methodology and Work Systems Methodology used in this study.

Secondly, this research focused on analyzing the needs of users in a single company (KPRL), it would be interesting to conduct the same research with employees in two or more companies.

Thirdly, there is great potential collaboration of Soft System Methodology and Work Systems Methodology in the system design. Combining work systems concepts with general solving aspects of soft systems methodology may yield a system analysis method that avoids separating social and technical system analysis (Joint optimization)

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APPENDICES

Appendix I: Interviewees briefing by the researcher

1. The researcher notified selected respondents through company email facility
2. Researcher introduced research topic, objectives and clarified issues raised by the interviewees
3. The researcher trained the interviewees on Soft Systems and Work Systems Methodologies.

The following interview questions were used. The interviewees included selected subject specialist as shown in appendix IV below.

APPENDIX II: INTERVIEW SCHEDULE TARGETING THE 1ST OBJECTIVE.

PART I: INTERNAL AND EXTERNAL CUSTOMERS

1. Who are the consumers of the information you generate?
2. Are your customers satisfied with the information that you provide to them?
3. What are the concerns of your customers about the information you provide to them?
4. What challenges are you experiencing in the process of generating your information?
5. What tactic has the IT professionals in the company put in place to assist your tackle the challenges identified above?
6. Who markets your services? How do they do it?

PART II: PRODUCTS AND SERVICES

1. In what form do you provide the information to your customers? Are there better ways you would have done it?
2. What are the customers' feelings and beliefs about the format used to provide the information above? Please elaborate on how you get to know they are satisfied?
3. What are the quality concerns of your customers on the information format?
4. What services do you offer to your customers?

PART III: WORK PRACTICES

1. What is your work? What does it entail?
2. What business processes are involved when you are preparing your information?
3. How do you gather, store and process your data?
4. How do you make decision on what data to use in generating your information?

5. How do you disseminate the information in your area of operation?
6. What challenges do you face in the process of generating your information?
7. How long does it take you averagely to generate the information on daily basis? (answer to be expressed in hours)
8. In your opinion what should be done to shorten the duration you specified above? What else do you need done?

PART IV: PARTICIPANTS

1. Apart from yourself who are the other people involved in processing the information that you need?
2. What are their competencies and skills?
3. What are their specific roles?
4. Do the participant's skills match their roles?
5. In your opinion are you satisfied with the performance of the people you have identified above? If no kindly state their weak areas and propose what needs to be done?
6. Is language an issue in interacting with participants you identified above?

PART V: INFORMATION

1. What are the major sources of getting information needed to complete your tasks?

<input type="checkbox"/> Internet	<input type="checkbox"/> e-mail	<input type="checkbox"/> software applications	<input type="checkbox"/> Company website
<input type="checkbox"/> Paper documents	<input type="checkbox"/> People inside the organization	<input type="checkbox"/> People outside the organization	
<input type="checkbox"/> Your own knowledge	<input type="checkbox"/> Other (s) _____		
2. If the main source of information is internet, which websites are mostly visited by you?
3. If main source is people, how do you interact with them and whom?
4. If the main source of information is paper documents, which documents are mostly used? And from where do you get these?
5. If the main source of information is from software applications, how many applications are involved and are the applications integrated? What are the issues relating to the usability of these software applications? Anything else?
6. If the source is company website please answer the following short questions:-
 - a. How often do you visit the company website?
 - b. Are you experiencing any problem in accessing the website?
 - c. Do you easily find the information intended? If not why? How would like it structured to facilitate the finding of information?

- d. How do you rate the company website? Elaborate your answer?
7. Are you satisfied with the way you gather and disseminate the information? If no why not? Any suggestions how it can be done better?
8. Do you wish to have a single source from where you can access all the information, documents and application you need to perform your daily activities? Will it make your work ease? How?

PART VI: TECHNOLOGY

Do you have any of the following tools and equipment?

1. Mobile phone or PDA? Does it support EDGE/GPRS ?
2. Computer? What are the specifications of the computer? What is the screen resolution?
3. Internet connectivity? What is the connection speed?
4. Web development tools like PHP,MySQL,SQL
5. Internet browser type and version?
6. CASE tools e.g. Microsoft Office Visio
7. E-mail servers and what capabilities?
8. Servers and their specifications?
9. Firewalls and what are core features?
10. Any portal software line Microsoft share point?

PART VI I: INFRASTRUCURE

1. What are some of the technological challenges that are likely to hinder the users of the corporate portal from access it from anywhere?
2. What impact in your view will the current laying of undersea fiber optic cable linking Kenya to the rest of the world have on the accessibility of the corporate portal?

PART VIII: STRATEGIES

1. Do you have a strategic plan? If yes go to 2 else proceed to 3
2. What are your objectives, vision and mission?
3. Does the development of corporate portal conflict with the strategic plan objectives? If yes kindly give more details?
4. How will corporate portal support the strategic plan? Elaborate?

PART IX: ENVIRONMENT

1. What is the organization culture?
 - a. Process v results oriented, employee v job oriented, parochial vs. professional, open system vs. closed systems, loose vs. tight control
 - b. Do you get complaints from customers on service delivery?
 - c. How do you solve the issues raised?
 - d. Have you ever had rebels among the customers?
2. Do you believe the corporate portal can improve the service delivery?
3. What are the effects of the ICT Bill 2008 on the usage of corporate portal in Kenya?
4. What are the policies, procedures and specification necessary for the operation, maintenance and evaluation of the system solution?

Appendix III: Interview schedule targeting the second objective (barriers In RE for development of corporate portal in Kenya)

1. What are some of the technological challenges that are likely to hinder the users of the corporate portal from access it from anywhere?
2. In your opinion do you think we have enough technical capacity to support the development of corporate portal technology in Kenya? Why? How can the situation be improved?
3. Is the lack of local content on our internet portal a challenge in the development of corporate portal? If yes how?
4. In your opinion is the low internet diffusion in Kenya a major barrier in the development of portal? How?
5. Has the commissioning of the undersea helped much in speeding the internet connection?
6. What are other barriers that you may think of that will affect the adoption of corporate portals here in Kenya?

THANK YOU FOR YOUR COOPERATION

APPENDIX IV: LIST SHOWING THE KPRL STAFF INTERVIEWED.

	Title	Designation	Department
1	Chief Accountant	CA	Accounts
2	Information Technology Manager	ITM	Information Technology
3	Internal Audit Manager	MIA	Audit
4	Manager Project Engineering	MPE	Projects Engineering
5	Manager Mechanical Engineering	MME	Mechanical Engineering
6	Plant Inspector	PI	Inspection and Integrity
7	Reliability Engineer	RE	Reliability
8	Human Resources Officer	HRO	Human resources
9	Manager Technology	MT	Technology
10	Manager Operations	MPO	Operations
11	Healthy, safety and environment advisor	HSEA	Healthy, safety and environment
12	Laboratory manager	LM	Laboratory
13	Head of oil accounts	HOA	Oil accounts
14	Management Accountant	MA	Accounts
15	Business System Administrator	BSA	Information Technology
16	Refinery Trainer	RT	Operations
17	Refinery Programmer	RP	Hydrocarbons and Economics
18	Technologist	TECH	Technology
19	Foreign Buyer	FB	Procurement
20	Senior operations supervisor	PS	Operations
21	Healthy occupational nurse	OHN	Human Resources
22	Office service supervisor	OSS	Human Resources
23	Shutdown planning coordinator	SPC	Mechanical engineering

APPENDIX V: LIST SHOWING THE KPRL DISPARATE SOFTWARE APPLICATIONS

ITEM	DESCRIPTION	PURPOSE
1	DIPS	Tank Dips Volume Calculations
2	PRS	Personnel Records System
3	EMS	Electrical Motors Inventory System

4	REMS	Equipment Lubrication Scheduling System
5	RES	Equipment Spares Interchangeability System
6	IAS	Instruments Alarms Settings Inventory
7	ETL	Employees Time Log
8	IMPRESS	Crude Oil Scheduling
9	PC OMIN/GEMMS	Linear Programming
10	WORKFLOW	Maintenance Job Tracking
11	ONSITE	Manpower Site Monitoring
12	INSPIROSOFT PAYROLL	Salaries & Wages Payment Processing
13	TRACK-IT	IT Help Desk And Pc Inventory
14	LIMS	Laboratory Information Management System
15	SUNSYSTEMS	General Ledger, Fixed Assets & Materials
16	DEPS	Design And Engineering Practice
17	MS-OFFICE SUITE	Spreadsheet, Word Processing And Graphics
18	IMAC	Plant Alarms Logging System
19	ENTIS	Tank Gauging Monitoring System
20	ENTEK IRD	Equipment Vibrations Monitoring System
21	EXCHANGE 2003	Mail Processing
22	COMPILER	Oil Accounting System
23	ULGPROGRAM	Unleaded Gasoline Process Programming
24	OPSDRAFT	Operations Draft Overtime Management
26	PI	Plant Process Control System
27	DCS	Yokogawa Distributed Control System
28	JUDAS	Pub Calls Logging System
29	ACAD	Autodesk Computer Aided Design
31	PRO/II	Refinery Process Modeling Tool
32	INCDB	Hse Incidents Database System
33	SAWA	Hse Sawa Audit Database System
34	EQUITRAC	Print Facilities Document Management
35	KPRLWEB	KPRL Web Site
37	TRACEIT	Clearance/Permit To Work
38	RRM	Reliability Risk Management
41	CITIDIRECT	Citidirect Online Banking