Networking the Enterprise:
A Solution for HBR Personnel

Werner Hönniger
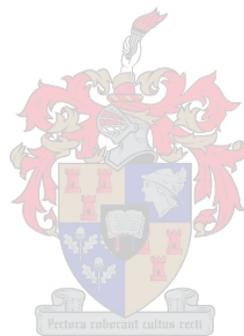
Assignment submitted in partial fulfilment of the requirements for the degree of Master of Philosophy (Information and Knowledge Management) at the University of Stellenbosch

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Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature: …………………………………….. Date: …………………………..
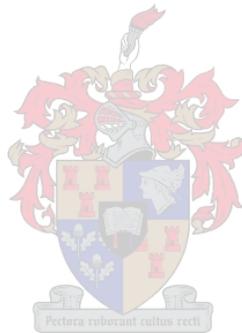
Abstract

This Extended Research Assignment discusses the information systems found in *HBR Personnel*. The discussion, based on the research problems, proposes steps in which the systems of HBR can be integrated so that they add the most value. Furthermore, a review of Corporate Portals is undertaken to show the potential impact it may have on organisational efficiencies and knowledge. The Assignment, according to the methodologies given, analyses the HBR information system for system incompatibilities and bottlenecks and proposes solutions for these problems. The solutions include changing core system databases and computer systems, together with a portal to fully integrate *HBR Personnel's* information systems.
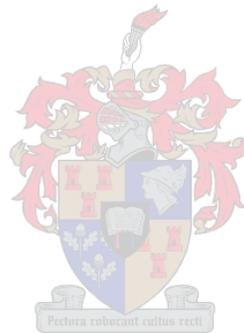
Abstrak

Hierdie Uitgebreide Navorsingsopdrag bespreek die informasiestelsels gevind in *HBR Personnel*. Die bespreking, gebaseer op die navorsingsprobleme, stel stappe voor waardeur die stelsels van HBR geïntegreer kan word om die meeste waarde toe te voeg. Verder word 'n oorsig gedoen van Korporatiewe Portale om te wys watter potensiële impak dit kan hê op organisatoriese doeltreffendheid en kennis. Na aanleiding van die gegewe metodologieë analiseer die opdrag HBR se informasiestelsel vir sistemiese probleme en bottelnekke en stel oplossings voor vir hierdie probleme. Die oplossings sluit in 'n verandering van kern-sisteem databasisse en rekenaarstelsels, tesame met 'n portaal om *HBR Personnel* se informasiestelsels ten volle te integreer.
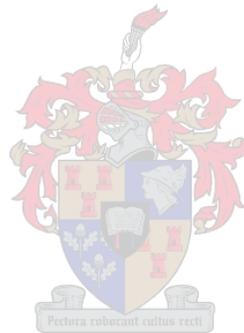
Dedication

Meike Wilhelmy

The Hönniger Family

The Engle Family

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Without Dr. MS van der Walt's patience and instruction this Research Assignment would not have been comprehensible nor logical.

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1   Introduction

1.1   Rationale

It is proposed that a study on Knowledge Portals and their implementation cause integration of organisational work processes. The purpose of this study is to overcome the "islands of automation" (Firestone, 2003) problem, and to create an environment of integration which can create competitive advantage, greater productivity, and realisation of the full asset value of resources.

The proposed study will focus on the processes needed to construct a successful portal.

The processes referred to in the above statement involve an in-depth study of current business processes or work flow performed by employees in the day-to-day operations in an organisation, leading to their successful integration under the portal. Furthermore, a successful portal can be viewed as a central space where information from disparate Information Technology (IT) systems can be retrieved and shared, and present the results according to the roles, specific tasks and preferences of individual employees (Terra & Gordon, 2003).

The following will highlight the importance of portals in organisations and highlight their benefits to employees in order to illustrate the need for involvement of all stakeholders.

IT has long been associated with "back office" operations, where technology acted merely as the underlying support for business processes. The realisation of the business world is that business strategy cannot and should not be designed and deployed in isolation from IT (Venkatraman & Henderson, 2000). Furthermore, it is no longer acceptable for business strategists to play the lead role and IT strategists to play the support role. Both should take the lead in designing the business platform. Venkatraman and Henderson (2000) argue that because IT is a key strategy enabler, allowing for business competitive advantage, IT's role has changed from being a supporter of strategy to a partner of strategy. Marchand, Kettinger and Rollins (2000) further this argument stating that only through embracing IT practices, information practices and values can information, people and IT be leveraged to increase business performance.

The above has argued IT's importance to the organisation. Bearing these considerations in mind, the discussion will move on to examining portals as more specific tool in achieving the above.

Dekker (2002) argues that the employees' lack of access to information can create frustration and helplessness. Dekker further states that a central repository for information that is easily accessible will decrease the need for employees to leave their desk in search of it. Furthermore, Collins (2003) states that portals improve productivity and remove complexity. Portals create a bridge between different and disconnected applications and systems to make work processes and finding information more intuitive for employees. They are designed to empower employees to access information, find forms, open applications to perform their jobs all from a single browser solution.

Together Dekker (2002) and Collins (2003) offer several key advantages that portals offer employees:
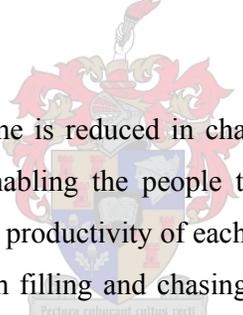
- Increase productivity: the time is reduced in chasing routine requests for resources, services and information, enabling the people to focus on the organisation's core business, which improves the productivity of each employee;
- Reduce frustration: stop form filling and chasing, a common frustration. This could reduce the level of staff turnover within an organisation and offers direct links to relative data and knowledge experts;
- Lower costs: reduced costs with internal administration;
- Improve employee knowledge: employees have better awareness of the environment;
- Improve company morale: builds an environment of trust and openness between employers and employees, because of more access to company knowledge, which could help improve morale and productivity;
- Reduce loss of corporate information: knowledge will be held and monitored centrally.

As has been illustrated above, portals can offer much to the organisation and its employees. It is therefore beneficial to look at some of the challenges that portals pose so as to be able to realise their full benefit.

- Portals offer employees added access to information, but with all this information how can employees find it and use it effectively? Terra and Gordon (2003) state the importance of classification of different types of information and the Taxonomy and content management is crucial in finding the information the employee wants.
- Davenport (2000) states active participation suffers due to static and poor designs of portals and capturing work processes incorrectly.
- Terra and Gordon (2003) state that participation is the biggest weakness of a portal. Therefore, Rayport (2000) argues that a portal needs to be made central or mission critical to all activities that take place in an organisation pertaining to work.

1.2   The Research Problem

It is proposed that a portal be developed around the needs of HBR Personnel, a staffing concern in the hospitability industry. The company employs 14 permanent staff whose typical day includes the recruitment and processing of applicants, their placement, and basic administration. These daily tasks are governed by HBR Personnel's Standard Operating Procedures (SOP), contractual agreements between the company and the recruited staff and the prevailing laws governing employment.

Several problems exist for employees when trying to carry out work:

- Employees often need to wait for information or confirmation on SOP.
- Employees need to switch regularly between programs.
- Employees need to wade through folders to find relevant documents.
- Employees need to leave their working area in search of help.
- Employees can view sensitive information which is not linked to their actual job.
- Employees' workstations are unstable

1.3   Problem Statement

The current information systems found at HBR are not integrated, resulting in work that is both redundant and prone to error, unstable systems that often delay work, and information is not easily accessible. The current situation limits the efficiency with which employees do their work.

1.4   Research Questions

- Importance of aligning IT with business practices.
- What are portals and how can they support organisational work processes?
- What is the present situation with regard to the information systems at HBR?
- How do HBR employees perform their work at present?
- What categories of information are needed by specific employees or departments?
- How can HBR information systems be integrated?

1.5   The Benefits of the Proposed System:

Analysis of work processes and existing problems is pivotal in designing a functional, integrative and navigable portal allowing for the following benefits

- Information will be gathered as to how employees perform work.
- The information that is needed by specific employees or departments will be categorised.
- Frequently used documents' locations will be determined.
- Information will be placed at employees' fingertips enabling instant access to information, saving time in finding information, where procedural documentation will run parallel to work processes.
- The portal will facilitate work, encouraging employees to be more self sufficient, in addition to integrating databases, payroll systems and SOP's
- Current employees will be able to record experiences via the portal and teach others in turn, decreasing training time.
- The design will offer ease of use and function.

1.6   Research Methodology

The information researched emanates from secondary sources of information, concerning the fields of Intranets, Corporate Intranets, Portals, Corporate Portals, Corporate Information Portals and Knowledge Portals. A qualitative research approach will be applied in which the data processing aims to organise and categorise the collected material in such manner that meaningful analyses and evaluation can follow. The aforementioned material includes periodicals and journals that are accepted by the fields of information management, knowledge management and internet enabled technology periodicals. The investigation contains heuristic elements, i.e. past experience used to aid in explanatory examples.

1.6.1   The systems that will be used include:

Workstations: Microsoft (MS) Windows 98 and 2000 with Internet Explorer 5.5.
Server: MS Windows Server 2000 with MS FrontPage 2003 server extensions.
Design Workstation: MS XP Pro with MS FrontPage 2003 and MS Visio 2002.

The workspace will be enabled by Microsoft Internet Explorer (IE) allowing for HTML based hierarchical navigation.

The following processes proposed by Collins (2003) outline the methodology in relation to the eventual construction of the portal. Qualitative fieldwork will be conducted, where the recording of actual work processes and their mapping in collaboration with the managing director will be undertaken. These work processes will then be evaluated before they become sketches for the final design of the portal (facilitated by MS Visio 2003).

1.6.2   Mapping Processes

- Defining the business objects: The process of collecting information designed to achieve a specific business purpose. For example what is done when HBR recruits new personnel?
- Breakdown into content elements: from the above example there exist multiple content elements for the recruitment in different places and systems.

- Outlining the work flow systems: diagrams of work process which aid in checking business objects relevancy.
- Create focus areas for categorising work flow systems for each user.

1.6.3   Content Elements

- Establish a content network: documenting of a series of logical models to capture how content is organised. This is used to identify ownership and manage the information.
- Identify entities: collection of entities that need to be defined, expand the content network to include entities.
- Assign information owners: individuals who have expertise in the high-level categories in the content network.

1.6.4   Business Object Context

- Document User context: Outline the structure to deliver the targeted business objects into the portal.
- Determine the presentation filter: Identify the presentation and delivery capabilities that will be provided to display the targeted business objects into the portal.
- Outline the business rules: Control work flow and processing of business objects, enforce role assignment and security for targeted business objects that are being integrated into the portal.

1.6.5   Storyboard

- Follow a defined process: supply sketches of user interface with alternative approaches – evaluate effectiveness.
- Base the design on work process diagrams: helps to define the interface design
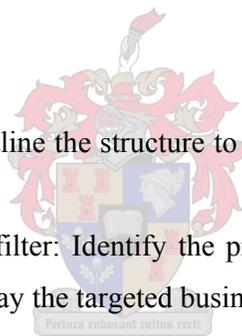
2 Networking HBR Personnel

2.1 Introduction

The digital business of today faces many ever increasing challenges. Organisations have learnt that simply spending vast amounts of money on Information Technology (IT) will not increase their competitive advantage in any given market. Many organisations still have large legacy IT infrastructures that inhibit growth, through highly centralised "islands of technology". This chapter serves to illustrate problems that HBR faces. Furthermore, it will draw attention to the analyses of existing processes and modifying them through business redesign, together with the integration of IT, whereby HBR can become efficient and add value.

New thinking toward value creation can enable HBR to find new and innovative ideas using IT and business processes in conducting new business. This chapter will develop a model that will suggest steps on how HBR can evolve from staid business practices to the virtual value chain. This can be achieved by addressing five successive challenges to become a truly networked organisation.

2.2 Step One: Legacy practices to integration

Being able to create a new organisation that is fully integrated has until recently been hampered by technology preconditions. However, a shift in technology has allowed the organisation to reinvent itself. Tapscott (1993) outlines various legacy systems and associated inhibitors toward integration. Furthermore, he shows how emerging technology is able to support new business goals.

Organisations need to move away from propriety systems that act in a unique and self-interested system. Open systems offers portability of software and information across hardware platforms and interoperability of technology extending out to the external value network. Organisations are a network of business functions that interoperate, so then logically IT systems should be configured in such a manner. Sales systems require market data, manufacturing requires sales data. The networking of business functions create an open organisation where people act not only out of self-interest but through shared vision or goals of that organisation (Tapscott, 1993).

The shift from "islands of technology" is characterised by moving to enterprise networks that facilitate communication and sharing of information and technology resources. This new technology offers organisations better integration allowing modular components to come together, offering seamlessness and transparency. Overlapping of functions and their conflicting responsibilities of processes can thus be eliminated (Tapscott, 1993).

Old Management Information Systems created reams of paper with figures on them that needed to be re-evaluated. Organisations need real time information systems that give an accurate picture of events taking place, enabling them to immediately adjust to changing business conditions (Tapscott, 1993). This information allows organisations to work with just-in-time principles that eliminate warehousing, thus increasing liquidity. This liquidity allows for further investment spending, which can be used in other needed areas.

The influx of computer desktops in the organisation allow for more people to be involved in processing data. The advent of client/server systems allows for closer collaboration among client/server hierarchies (Tapscott, 1993). Organisations need to become more cooperative internally. Individuals need to cooperate not because they are told to but because they have mutual interest. Paralleling the client/server architecture, this can be further developed where the organisation is interdependent, where each business function relates to another which needs to be built into the infrastructure and is hence more cooperative.

To expand on the above, collaboration tools allow for communication on a horizontal level. Consider bulletin boards, where managers across functions and even globally can participate in decision-making, and Delphi systems. Delphi systems allow for brainstorming sessions where it is even possible to have nameless discussions, focusing on group accomplishment rather than individual accountability. Traditional vertical hierarchies, or top-down decisions can often stifle this kind of creativity, therefore the networking technologies and human interaction coincide to create better synergy enabling shared expertise and goals (Tapscott, 1993).

The internet enables the organisation to network globally where a common set of standards like a web browser, e-mail and a dial-up account grant access to anyone, anywhere, anytime. The organisation is able to work independently through space and time, where people can work or collaborate from home.

Integration plays a vital role in the new networked business (Tapscott, 1993). Conversely, new technology also allows for a certain amount of organisational independence. This may seem to conflict with Enterprise Resource Planning (ERP) systems and collaboration as previously mentioned. However, those exact ERP systems like SAP, which allow for standardised communication and programming languages, can also be modular and pertain to the business unit. The organisation benefits from such integration yet independence in the form of business teams. These teams, who are grouped individuals, can work autonomously, yet pool resources across functions.

New era computing is more specialised, insomuch that they meet more of the requirements of the individual, team or function (Tapscott, 1993). Development of increased processing speed and greater complexity allow a greater amount of inputs to be processed faster. Other business aids like scanners, touch screen technologies found in Point-Of-Sale (POS) systems, and colour printing meet specialised requirements of flexibility and speed. The advent of specialised server platforms such as file servers, database servers, and application servers is installed for specific requirements. Like technology, knowledge workers are being encouraged to increase their competencies, thus they become more specialised, allowing for better decision-making.

Legacy systems that acted as an input terminal with characters on the screen have gone. Modern computing is designed to be user friendly, achieved by Graphical User Interfaces (GUI) like Microsoft (MS) Windows and Linux, and application consistency like MS Office (Tapscott, 1993). These new programs offer easy integration, consider MS Office, where PowerPoint, Word, Outlook, Excel and Access offer presentation, writing, e-mail, spreadsheet and database integration respectively. This offers the organisation the ability to be become more accessible, and able to unite its community in sharing information.

If HBR is able to realise that IT can offer proper integration through phasing out legacy systems, they should look into existing processes.

2.3   Step Two: Business Process Reengineering (BPR)

Every facet of every process in HBR needs to be analysed for bottlenecks, costs, timelines and whether processes actually do add value. It is crucial to analyse processes that cut across

organisational boundaries. These boundaries often act autonomously in their processes; therefore more often than not work is duplicated. Thus it is essential, before an IT system is bought like an Enterprise Resource Planning (ERP) suite, the business processes are more integrated and inline with the planned IT system (Whitten et. al., 2000). Furthermore, Tapscott (1996) argues ERP projects are becoming more feasible thus implementing "enterprise infostructure" where the entire business becomes integrated. However, the main impediments to BPR are legacy systems. These legacy systems comprise of IT systems that were designed to automate work, not change the nature of work. Technologies were often implemented only when they were mature and were cost-beneficial. These systems were planned within the context of functions like financial management or manufacturing with little regard for integration.

What can HBR do to further streamline business processes now that IT offers effective integration to the organisation?

2.4   Step Three: The Physical Value Chain

Organisations widely accept the view of the value chain as a set of processes that interlink and contribute to a specific outcome. The value aspect describes those processes as adding value along each portion of the chain. Added value is what an organization does to deliver a more perfect product or service to the customer. Identifying those processes where value can be added; and identifying how information technology (IT) systems can support those processes will help in adding value (Haag et al.). The value chain in Annexure 1 depicts two processes, Primary Value processes and Supportive Value processes. Primary value processes in the chain make, deliver, market and sell goods and services. Supportive value processes consist of management, accounting, finance, human resources (HR), research and development (R&D) and purchasing, all support the primary value processes. Each of these processes also contributes toward the whole value as seen by the customer. The value chain also provides for the organisation itself to be part of a chain, where it would add value to a given product or service in that chain.

For an organisation to become a cohesive part of a value chain, several technological factors need to be considered.

2.5 Step Four: Value Added Networks

The networked enterprise can build upon existing Value Chain developments, BPR and the continual development in IT and associated business integration. Value Added Networks (VAN) develops relationships with clients and partners. The click of a hyperlink on a webpage sets off a chain of events, order fulfilment, shipping financing, information brokering and access to other products and offers. The resources behind this are specialised software, trading partners, outsourced companies, alliance partners or internal business processes (Tapscott, 1993). What this means is that organisations today have a wide array of choices on how the customer arrives at his/her moment of value. This trading consists of 3 types of transactions: Business to Business (B2B), Business to Consumer (B2C) and Consumer to Consumer (C2C) transactions.

The following will focus on B2B trading and their transactions, specifically those transactions that involve the purchasing, of direct materials, indirect materials and services (Tapscott, 1993). Direct materials include goods used in core business like manufacturing or the product purchased for the shelf. Indirect materials include non-core items like stationary or costs like repair work. Services consist of corporate travel, consulting services and hiring part time employees. Most activity occurs in direct and indirect material transactions.

Purchasing direct materials consists of searching for reliable sources of supply, negotiating issues such as price, quality, delivery performance expectations and the monitoring of supplier performance. Agreements are reached with the supplier based on estimates of quantity required over the course of a year, then as goods are required, the goods are shipped to production plants or store locations. How can the networked enterprise make better use of digital information to streamline the above process?

Different methods are used in conjunction with an Electronic Data Interchange (EDI) to facilitate Just in Time (JIT) and collaborative planning, forecasting and replenishment (CPFR). JIT is an approach that produces or delivers a product or service just at the time the customer wants it. Car manufacturers in Japan were some of the first organisations to employ JIT techniques which allow for less money being spent on inventory. CPFR facilitates the collaborative processes among members of a supply chain. Furthermore, it allows retailers to share sales data gained from POS systems with manufacturers. This in turn allows

manufacturers better scope in scheduling production, and retailers can eradicate excess inventories, stock-outs and reduce total costs in the supply chain.

EDI is a direct computer to computer exchange of transaction information contained in standardised documents such as invoices and purchase orders. EDI facilitates the reduction in repetitive data capturing, which means that a purchase order that is printed, posted, received and then recaptured has become redundant (Tapscott, 1993). EDI's have to have a common format of data exchange, thus computer to computer standards need to be reached. Commonly, a large corporation, like General Motors (GM) that make motor vehicles, has a large supplier network. Suppose Goodyear is used as a possible supplier. When General Motors (GM) produces a vehicle and needs tires, GM's inventory system, using EDI, will create an order on Goodyear's ordering system. However, due to Goodyear having many other customers, like retailers and other manufacturers, their EDI systems may be different.

This is where the internet and VAN play an important role. VANs are able to act as central points of EDI's. A VAN makes it easier for trading partners to establish telecommunication links with each other, even though they have dissimilar EDI's. A VAN is able to translate between different versions of EDI. What a VAN offers the smaller customer is that they need not have an EDI system, they can simply dial-up and receive the information electronically. Modern trends show that for the modern digital organisation, the internet is becoming a rival to so called EDI's and VANs (Tapscott, 1993). The internet is cheaper to use, and with the introduction of XML, which is similar to HTML, the tags inside of XML can be read by computers and humans as well.

The above technologies enable organisations to effectively engage in e-commerce such as Mass customisation, Personalisation, and Disintermediation including Global Reach as suggested in Haag et. al. (2002). E-commerce such as B2C and C2C commerce offer consumers ease of use through enabling technologies provided by network savvy organisations.

Mass customisation allows the customer to tailor a product to their individual taste, for example when buying a car through a B2C site they could choose the colour, trim levels and extras. Personalisation offers the customer a feeling of being familiar to the company. This means that when a customer logs on to Amazon.com for example, their respective buying

history has been analysed with a process called collaborative filtering, which then suggests similar taste items for sale.

With internet as a delivery vehicle for data, new ventures do not need to invest in brick and mortar store fronts in the marketplace; they can do business in the marketspace. They are able to bypass intermediaries such as wholesalers and sell direct to the customer, at less cost. The increase of global reach can be directly attributed to the internet in many instances. A software programmer in Central Africa could upload a trail package to a website like CNET which distributes downloadable programs, and market it there. This allows for new business opportunities, where location was previously a hindrance.

Now that we know which processes to target in various functions to add value and how to facilitate those processes, how do we use IT to not only support HBR but create value in it?

2.6   Step Five: The Virtual Value Chain

Sviokla and Rayport (1999) contend that executives need to pay attention to how companies create value not only in the physical world but also in the digital world. However the processes are different for creating value in the physical and digital world. The physical value chain treats information as a supportive element of the value adding process, not as a source of value in its own right. Managers might use information captured on production systems to better control the situation, but rarely use information itself to create new value. There are, however, several examples of how companies have harnessed information as key to creating value and the Federal Express (FedEx) scenario is clichéd, but serves well. FedEx allows customers to track packages and mail via their website through the tracking number. The website was facilitated by a constantly updated database, which was updated according to the packages' whereabouts. This is a win-win situation for both parties, FedEx has happy customers because they don't have to spend time on the phone getting those same answers, and FedEx saves money because they do not require nearly as many customer service representatives. Although Fed Ex provides the service for free, it has created added value for the customer and increased loyalty in a competitive market. FedEx also gained a competitive advantage over UPS (another US carrier), as it was the first to offer this service, thereby creating more customers.

Sviokla and Rayport (1999) state further that to create value with information managers must look to the marketspace (virtual world), where services and products are different. These

value adding steps are virtual, meaning they are performed through and with information. Furthermore, they state that creating value in any state of the virtual value chain involves five activities: gathering, organising, selecting, synthesising and distributing information. This process is like having raw information and turning it to something useful, creating value along each step.

Organisations need to increasingly adapt to a Virtual World. Often small companies can have the edge over large corporations. The internet offers amazing marketing potential at a low cost, as the viewership can reach billions. The recording industry is facing such a dilemma, music bands or start ups are able to record their music with computers and do their own mastering. These small bands are then able to make a website for a small fee, and register with a search engine, or list the music in a peer-to-peer network like Napster. This method takes a different route to the recording industry, in effect leaving out the middle man. What this means is that bringing music to the market can be done in the virtual world, or marketspace, leaving out the marketplace. Record companies and their associated web portals need to be more competitive. Thus, record companies are using their marketspace to add value to their business by providing extra services to up and coming bands. The marketspace allows bands to submit their music electronically, or offer new services to customers, like listening to live recording in the studio - online. The virtual value chain allows for new and innovative ways of generating income for the recording industry, the recording in the physical world is an expense, in the virtual world people would pay to listen to a live recording session. This also allows the recording industry to generate new relationships with customers, consider that people may not be willing to buy the actual music, but rather listen to the recording sessions on the internet.

The challenge for the networked enterprise is that they must focus on the physical value chain and continue to exploit the virtual value chain. Sviokla and Rayport (1999) further state that the two chains are different, in so much that the economies of scale and scope do not apply to the virtual value chain as they do to the physical value chain. The chains must be managed distinctly but also in concert. Sviokla and Rayport (1999) observed that companies adopt value adding information processes in three stages.

In the first stage, companies acquire an ability to see physical operations more effectively through information. Managers are able to use large scale IT systems to coordinate activities in their physical value chains, and at the same time pave the way for a virtual value chain.

What this means to the organisation is that by having a physical value chain in place, information generated at each step allows them to make decisions with greater speed and accuracy. Modern technology like Point of Sale (POS) systems allow for up to the minute sales data, allowing managers to manage more effectively, where they are then able to access information in real time to facilitate the restocking, ordering, and production of goods. In short, the information used in the virtual value chain optimises the physical value chain (Sviokla and Rayport, 1999).

In the second stage, companies substitute virtual activities for physical ones by beginning to create parallel value in the marketspace, through mirroring capability. Networked organisations can thus begin asking questions such as: "what are we doing now in the place and what could we do more effectively in the space?", "What value adding steps currently performed in the physical value chain might be shifted to the mirror world of the virtual value chain?". Several organisations have attempted this and Ford's "global car" is a valid example. The process involved in designing the car did not consist of managers around the world flying to Detroit, but meeting in the marketspace, or in the virtual world. This allowed for space and time constraints to be eliminated and designing of the actual car and concepts took place in the virtual world. In this virtual world of information it was possible to establish global specifications for manufacturing and also enabling the contracting of a global supply network (Sviokla and Rayport, 1999).

Thirdly, managers are able to draw on the flow of information in their virtual value chain to deliver value to customers in new ways, creating better customer relationships. It is also important to note that value must also be extracted from it for the company. The internet and World Wide Web offer organisations the opportunity to host websites that advertise their products, or provide information on them. These websites also offer customers the opportunity to comment on services provided or ask questions on their products. Furthermore, the internet offers consumers the ability to buy their products on the net, instead of buying the goods form bricks and mortar stores (Sviokla and Rayport, 1999).

By combining these three stages with information value adding steps we can develop the value matrix (See Annexure 2). Sviokla and Rayport (1999) suggest that for managers to take full advantage of the virtual value chain, as a mirror of the physical value chain, they need to put into place a process of steps that: Gathers information, organises that information

for the customer, select what information is valuable, package the information and distribute that information.

Kalakota & Robinson (1999) agree that only through an approach that views the customer as central to strategy can the organisation remain competitive. The reason being that in today's global context, market taste can change fast, thus knowing customer needs is key. Together with these value adding steps and the virtual value chain, companies can better identify customer desires. The example above using Ford's "global car" can be further construed by involving the customer. The example already illustrates that Ford has shifted its activities from the physical value chain to the virtual value chain, allowing for collaboration globally. Now mix in the customers, who will be able to sample the product. Customers are able to give inputs to the design, enabling Ford to adjust the design to appeal to the broadest spectrum as possible, and further increasing the value. Instead of Ford driving an expensive marketing campaign, they could invite the community to view their website and the design of the new global car, and be assured of a successful product. Thus, in creating valuable digital assets the organisation sees an increase in competitive advantage.

2.7   Conclusion

The challenges faced by the networked organisation are far reaching. Below a model (Diagram 1) is suggested that proposes how HBR can become more networked. The steps involved highlight challenges an organisation faces in becoming a networked enterprise.

Step One argues that IT investments must not be looked at in the supportive role. What must be understood is that organisations need to rethink their IT strategies for allowing integration, collaboration and to support new business ventures. The organisation cannot move to the next step with out facing these challenges.

Step Two suggests that if IT is used for integration in business, business processes must be reengineered in line with IT. Failure in this results in poor business to IT integration. The organisation must be efficient internally before it can offer value added services to outsiders.

Step Three recommends that while business gears processes internally toward adding value, business must also look outside to the customer and partners to see what value can be given

there. Thus, the physical processes are crucial, because failure to do so results in poor end products, making the organisation less competitive in any network.

Step Four is essential for the aspiring networked organisation. Without creating networks, organisations cannot reap the benefits that e-commerce provides. Organisations should not hold the view that by simply networking will they reach step five; only by going through the first four steps will they reach step five.

Step Five is what truly makes an organisation networked. Careful restructuring of IT, bringing business processes in line with IT, streamlining business processes and effective networking will allow the organisation to finally realise its goal of effectively using information to create value, not only for the customer but for the organisation itself.

Five Steps to become a truly Networked Enterprise
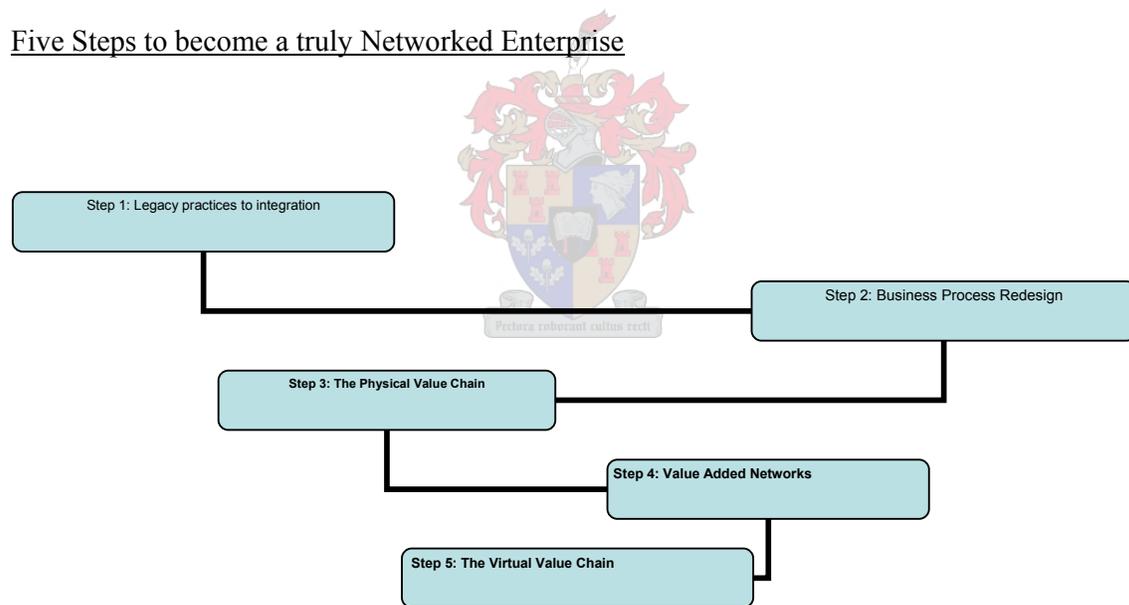
Figure 1

Due to the above recommendations, Section 3 will discuss the possibilities of a Portal to facilitate those recommendations.

3 Portal Strategies

3.1 Introduction

The following section will discuss portal technologies and their capabilities in relation to HBR. The discussion will show how portals are able help integrate disparate systems and also take into account that for portals to work effectively, the community that uses such a portal needs to both share knowledge and work in a trust based environment. Furthermore, the discussion investigates various tools and techniques that are able to provide information that is relevant to the end user. Finally, the discussion will highlight the need for a holistic approach to implementing portals, so as to enable HBR to transfer tacit knowledge to explicit knowledge.

3.2 A definition

A portal can be defined as an internet technology that facilitates the grouping together of content that makes it easier for users to find information they require (Terra and Gordon, 2003). Popular portals in use today include Yahoo! which allows people to search the internet, send e-mail, manage finances, join interest groups, create web pages, track personal calendars and chat with friends and family (Watkins in Jafari, 2003). A corporate portal (CP) as the names suggests, would therefore mean that it is a portal that offers services to a corporate environment, providing and sharing information to users based on their specific needs.

The underlying technologies of an intranet are perhaps not central to the following discussion of CPs, however a basic understanding of what they offer will help the reader to see how they benefit a potential user in a corporate environment. Intranets use web enabling technologies based on the TCP/IP protocol to effectively network machines together. Users using desktop machines can use a web browser like Microsoft's Internet Explorer to receive content from a server. The reason why this technology is so useful is that these networking technologies are able to connect to different applications and databases and display the information in the web browser (Spiegel, 2003). The information can also be displayed in a certain way, and include dynamic content like pictures and graphs, where the underlying program that is being accessed cannot do this (Pitt et al., 2001). Essentially what this means is that a query from a database will display rows and columns of data, however in a web browser the data can be displayed in any kind of format and grouped with a graph. The information is commonly

used internal to the organisation, but linking suppliers and customers can provide additional content which the organisation can merge to offer better services to all stakeholders of the corporate portal (Hoehne, 2003).

3.3   Knowledge Sharing

Recent studies have shown that there is not much of a link between investment in IT and business performance or increased productivity (Marchand et al.2000). True competitive advantage in companies is often due to tacit knowledge and how it is used, not IT solutions or business processes. This tacit knowledge includes a shared set of values, unspoken and uncodified common knowledge, communication patterns and organisational routines (Choo, 1995). Therefore, it can be said that by ignoring human elements in the organisation the full potential of this competitive advantage will not be harnessed. By codifying this knowledge; organisations are able to use CPs to share the knowledge of members of the organisations who use that personal knowledge to make sense of the real world. This knowledge comes from individuals who develop a feel for and a capacity to make intuitive judgements about the successful execution of an activity through extensive experience doing that activity. However codifying these activities and presenting it in a CP, the organisation needs to help users to find experts with whom to dialogue personally and to foster and support the development of communities of practice among users (Terra & Gordon, 2003). These CPs are often able to foster relationships with people who would otherwise not have spoken to each other, however organisations need people that are willing to cooperate and share information for it to work properly.

This cooperation is often relegated as a second tier of importance by management; however a successful CP depends upon a strong organisational culture. An organisational culture can be described as constituting the norms and values that help people interpret events and determine what behaviour is appropriate or inappropriate (Choo, 1995). Norms and values help provide order, meaning and identity, thus contribute toward communication and consensus. They also express and facilitate power relations and levels of collaboration. Norms and values can thus be regarded as a form of control, where they lead to a high degree of conformity, but at the same time give a person the feeling of autonomy. This can be viewed as a better way than having a formal structure of control, where people feel monitored or observed. It is this culture that is important to a CPs success. Strong leadership

can try and change existing norms and values to include a strong knowledge sharing and innovative culture as suggested by Terra and Gordon (2003) including Lodewyke (2002):

- Ensuring that the companies' polces and norms for accepting and rewarding behaviour and work processes are carefully laid out to reflect desired knowledge sharing outcomes.
- Through leading by example where leaders share information with subordinates.
- The careful promotion of knowledge sharing, through memos, speeches and public statements, and giving the proper recognition to those who do contribute towards knowledge sharing.
- Providing incentives to employees to foster knowledge sharing networks outside the company to generate new ideas.
- A repository needs to be kept, where knowledge gained after projects and tasks are recorded.
- Aligning Human Resource policies toward knowledge sharing, such as team based employment, task rotation and knowledge sharing training.
- Changing reward systems to include on the spot bonuses or recognition of a job well done.
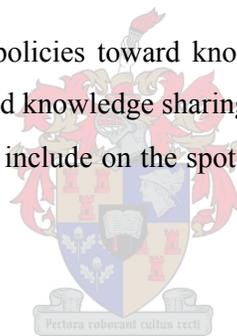
3.4   Trust

Trust is closely tied to knowledge sharing, but trust can destroy any form of sharing if employees do not trust others with their information or knowledge. Trust is built in the organisation's values, and there needs to be a careful balance. Trust is very difficult to build, and easy to lose. Increasingly today the workplace is multi-racial, where people generally find it difficult to trust different people, thus an organisational culture that promotes the integration of such people needs to be strong. Terra and Gordon (2003) also state that building deeper, more meaningful and trusting relationships among employees to develop more creative and innovative environments is becoming more important. Furthermore, that learning and creativity depend mainly on intrinsically motivated people who are eager to learn through social and trust based interactions, open to discussions on learning and willing to change their mental frameworks. Marchand et al. (2000) states that information behaviours and values are able to contribute to organisations who prize integrity. This enables the organisation to effectively share information, where a problem is rather an opportunity to

correct. This creates a team based scenario where employees are proactive, the information is provided, therefore they can act on it, creating value at every step of the business process. Thus, we can argue that with a good trust relationship employees will share information more readily, but only if the CP is not regarded as another form of control, but a way to share knowledge and provide constructive material to it.

3.5   Communities of Practice (CoP) and Online Communities

CoP is a concept that actually predates the web and CPs; however its use is fundamental to a functional CP. CoPs consist of people who share common interests in learning and applying a common practice. Members come from different departments of an organisation, or from different organisations, where contributions are made in an environment of trust in a community (Terra & Gordon 2003). These informal communities of peers who have a common sense of purpose combine their creativity and resourcefulness in solving problems. Thus, it can be seen that this form of knowledge transference, generation and innovation, to the organisation, makes CoPs that much more important when considering a CP.

3.6   Challenges of information

The reason why CPs are becoming a must have for organisations is due to the fact that they offer integration over a wide spectrum. Today's corporate environment contains a myriad of information, however there are many challenges they face especially with the view on how to organise it and use it effectively (Kontzer, 2002).

Most organisations struggle with incompatible propriety file formats or platforms, stemming from the use of different applications (Terra & Gordon 2003). Information generated using word processors or spread sheets from different vendors need those specific applications to open them. Organisations need to create a strategy whereby file formats become standardised, where anybody can open them, like Adobe's Portable Document Format (PDF) which can be opened on any browser and the plug-in is free.

Organisations have information that is accessed through many different methods, including client software, Web browsers, specific applications and individual hard disks. This creates a scenario where people need to be proficient in using and possessing different software, and being able to know where the information exists. This also leads to information being published in a very disorganised way, as the information may be kept on a local hard drive,

and if the machine is unavailable then nobody can access it. Individuals are also unable to easily publish information for enterprise wide viewing.

Many methods exist for searching and accessing information, however a Portal is able to provide a single window into this world where information exists through proper classification, searches and links, immaterial of the location. Non-technical users are often highly dependant on the IT department to generate reports or obtain information, but an effective policy of knowledge sharing through a CP and a portal that can integrate structured and unstructured data can put more knowledge into the hands of a user.

3.7   Finding Sources

If a CP is well implemented it allows easy access to information and knowledge and highlights important internal and external sources that are relevant to specific audiences (Terra and Gordon, 2003). A CP will allow for more complex searches of online data sources with less difficulty, facilitating better decision making. The reason for this is that these easier searches allow for increased productivity, better customer services and reduced personnel costs, including saving time in searching for information.

Terra & Gordon (2003) offer the following advantages of accessing information:

- Structured Data access via CPs
    - Enterprise Information Systems (EIS) were used before CPs where upper management was able to find information on the performance of the firm based on historical data.
    - Furthermore, these systems were highly technical needing SQL queries to extract data, making for only a few people who knew how to use the systems because the interface was not intuitive.
    - Thus, what can be seen from previous EIS systems is that only a select few could use these systems, making this process non-collaborative and highly inaccessible from a knowledge sharing point of view.
    - The introduction of CPs allows users who have had little training in back-end systems to access predefined and prescheduled information from a browser and be able to customise this data to form ad hoc reports – this can be done without extensive training in SQL or the help of the IT Department because

the browser links to these databases and provides an intuitive display of data including drill down menus of links.

o Some CPs can integrate Business Intelligence systems where users are able to manipulate data with statistical tools and customise the reports with specific templates and formats.

o Thus, with the advent of CPs there no longer needs to be extensive training for employees, or only a select few that know how to retrieve information. CPs allow employees to facilitate their understanding of the correlation between the many variables that affect business.

- Unstructured Data access via CPs

    o CPs provide access to unstructured information in addition to structured information.

    o This unstructured information includes e-mail, web pages, output from MS Office applications and information contained in collaborative applications like scheduling and online forums.

    o This unstructured data is also the logical directory of corporate intranets, where much of an organisation's strategic data may be found. Reason being that often such data is difficult to publish on a database, as this information is far too qualitative in nature, and can include project reports, graphs and pictures. To be able to find such information CPs need an effective way to search and categorise this information as discussed in the next section.

3.8   CPs – Codifying and publishing information and knowledge

The goal of any CP should be to empower employees to easily access information and knowledge in a timely and effective manner for the targeted group or even the whole enterprise and its customers. However, this information needs to be carefully codified and the use of Content Management Systems (CMS) is essential to create, publish, reuse and store this information (Firestone, 2003). CMS were initially developed for large online publishing operations, but can be used as knowledge sharing tools for a CP. These CMS allow for dynamic integration of structured and unstructured data. CMS allow for several design and authoring features which include creation of XML-based documents for users who have no knowledge of XML, tools for creating standardised templates, support different content files types and creators can include priority levels of documents that are going to published to selected groups (Firestone, 2003).

It however does not help to just provide a tool for the integration of structured and unstructured data and expect information to be found and distributed easily. Methods include categorisation, which is a process whereby fundamental indexing information is added to documents making it easier to find them later on (Firestone, 2003). Furthermore, taxonomy comprises of high level rules for organising and classifying information, adding tags to information created. These tags enable search engines to find these documents wherever they are, similar to internet technologies where XML web pages that contain metadata (similar to tags) can also be found by search engines. These tags help identify the documents, be they summaries, authors or date of creation (Terra & Gordon, 2003). A real world example of such technology enabled web pages would be that of EBSCO, a database consisting of millions of documents. The search allows for author, date, publication, subject, keyword and other fields where information can be searched for. The information can also be displayed in certain ways, where abstracts are shown, or a rating which shows the probability of a perfect match, considering all the search fields.

These taxonomies can however become an administrative quagmire, as poorly classified data would mean people still have to sift through several documents, before they find what they need. Careful attention needs to be placed on naming categories; these are often not obvious and might be confusing to users who search for information. Therefore there needs to be collaboration among domain experts as to how information will be categorised, and these experts need to maintain the integrity of the taxonomy as it grows in size. Another problematic feature of taxonomies is that users may feel the need to tag their documents differently, as people do think differently, especially wording of summaries.

3.9   Search Engines

Search engines provide a good service to the Word Wide Web (WWW), but often the information being looked for is not there, or more commonly not quite relevant. However, these search engines are often not to blame, rather it is the user who needs training about the capabilities of search engines to find information.

- Most search engines are capable of keyword and exact phrase searches. The problem with this is that the keyword may often be used in a different context (Terra & Gordon, 2003). Consider the word flower: a basic net search brings up, cauliflower,

tattoo parlours, flower shops, flower shows, flower hobbyists and many more. However using a Boolean search can narrow it down, for example flower AND arrangements NOT shows. Alternatively some search engines can be calibrated to search in context, so that the search for flower would only search along the "arrangements" path.

- CPs need further intelligent type searches that use natural language; where users can type in plain English. Knowledge based search engines use natural language to automatically build structured cases that let users tap into previous responses to similar questions, thus the engine can learn from previous searches that were successful and answer the user in a better fashion (Collins, 2003).

- Due to the collaborative nature of CPs, users who belong to groups share information, which the engine can use to its advantage and even propose information to a user. An affinity search can even go further where it finds commonality among documents, those who read, those who update and those who reply are easily linked in a search (Collins, 2003).

A CP can only be successful if users find the information they want, thus it is important that users of CPs are thoroughly trained in the benefits of proper searches.

3.10 E-mail as a corporate memory
E-mail is an important part of an organisation. Much collaboration amongst teams takes place through this medium including dealing with customers. The information dealt with in these e-mails needs to be captured as it can contain tacit knowledge that can be stored and reused. Software that searches e-mail can capture and automatically categorise e-mail around client engagements, internal projects, specific technologies or other business rules specific to the organisation (Terra & Gordon, 2003).

3.11 Personalisation
A Corporate Portal needs to address the information needs of its users. The above has explored methods in which data needs to be codified by using CMS, categorised and tagged so that the information is organised. Obviously, this information poses no real value if it cannot be found, thus different search techniques must be employed so as to find it. However, there is another way in which this information can be presented to a user, through personalisation. Employees need to be presented with certain facts that they need not search

for. Several companies allow for a system whereby upon user login, the department or area of work concerned is presented to the user (Greengard, 2003). This means that if the person is in the HR department, the CP will notify the user of events pertaining to their needs, like meetings, news on new appointments, or changes in regulation concerning employment, all subjects that matter to the user. The CP can be programmed either by domain experts or the user so that relevant information reaches them. Other personalisation techniques that can be employed include whether the user is accessing remotely, or bandwidth availability. These enhanced CPs are also able to monitor users' behaviour in respect of their favourite or most used links, meaning that if you log in the most visited links might appear bigger, or flash, giving the user even quicker access as it is easily seen.

3.12 Knowledge Transference

A Corporate Portal as discussed is designed to group together content so that people are able to find information pertaining to their needs. However, a more challenging aspect of a CP is whether people will learn anything from them. The CP works only when tacit knowledge is recorded, becoming explicit knowledge, is read by someone else and they use this new knowledge to their advantage. According to Barrett et al (2000), knowledge transference has two parts, that of transmission where knowledge is sent to a recipient and absorption where the recipient assimilates and uses that knowledge. If absorption does not occur then knowledge transference has not taken place. Nonaka and Takeuchi in Barrett (2000) identify four ways in which organisational knowledge transfer is a continuous and dynamic interaction between tacit and explicit knowledge. This can be adapted to see whether interaction via a CP through collaboration among users can transfer knowledge effectively.

Tacit to Explicit: In a CP environment this would amount to a user converting their tacit knowledge into explicit knowledge through recording that knowledge. This is done through written documents, drawings and graphs. This process allows other people, in the same domain, to make use of this explicit knowledge.

Explicit to Explicit: In a CP environment this new explicit knowledge, through a collaborative team, can be combined with other explicit knowledge to create new explicit knowledge. In other words, in a problem solving session all this knowledge can come together to propose a solution to a problem and along the way generate new valuable knowledge.

Explicit to Tacit: CPs where collaboration and sharing of information through trust allows for explicit knowledge to be learned, or through the process of learning by doing, thus becoming tacit knowledge for the learner.

Tacit to Tacit: This process is described as socialisation, where users of a CP interact on a day to day manner. The mode of communication is not necessarily serious, but rather casual. Employees discuss varying topics including sharing of experiences in the work environment, or a causal query to a domain expert about a certain process can serve as background knowledge to the enquirer.

Davenport and Prusak (1998) discuss knowledge transfer and the links between velocity and viscosity. Velocity can be described at the speed of which knowledge is spread throughout an organisation. If this was adapted to a CP it would give a tremendously high velocity, as a system in place that has categorised knowledge and information and is able to provide it quickly. Viscosity refers to the absorption and richness of the knowledge, and is where a CP can make a difference. Davenport and Prusak (1998) make reference to the fact that employees often ask for advice to those closest to them, as it is the quickest form, a high viscosity. However this may not be the best available knowledge, and the CP needs to be integrated into the community to such an extent that it also offers high viscosity. The CP would become redundant if such advice were to be found in a training manual rather than via a quick instant message to a domain expert.

3.13 Conclusion

A Corporate Portal is an emerging information management infrastructure, however as illustrated above, the implementation of a CP is not a technology only infrastructure, but involves the whole organisation. If HBR were to initiate a project involving a portal, they would need a strong knowledge sharing atmosphere, where the norms and values of the organisation promote the sharing of tacit knowledge of employees and that it is effectively harnessed and deployed in an organisation as a competitive advantage. Furthermore, trust based relationships in conjunction with Communities of Practice in an organisation further knowledge sharing, an intrinsic mission of a CP. However, the sharing of knowledge cannot be accomplished effectively within HBR if there are no systems in place that guarantee relevant knowledge. CPs are able to integrate information and knowledge with structured and

unstructured data so as to empower employees, but careful codifying of knowledge together with advanced searches is essential. Finally the transfer of knowledge that is tacit into explicit, and vice versa, taking the whole organisation into account including the relevant technologies, is the making of a successful CP and thus a true transferor of knowledge.
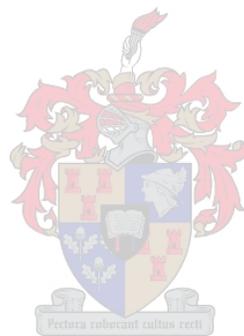
4 Analysis of the Current HBR Personnel Information System

4.1 Purpose

This chapter represents the detailed findings about the HBR Information System. The system is analysed according to the methodologies given below so as to determine how HBR can be become more networked in relation to Section 2.

4.2 History

HBR Personnel's Information Systems (IS) serves as a mission critical component in carrying out business. Without this system business performance would be greatly retarded. The current system has grown with the company since inception, when there was a need for desktop machines to help in day-to-day tasks in the business environment. Furthermore, the system has evolved and grown as the company has grown (See System Diagram 1). However, as the system and company has grown, so have the day-to-day problems.

This has conceivably evolved due the exponential growth seen in the company over the past few years. As workload increased over time, a file server was implemented so as to create a repository where documents were stored and users could access them. In parallel, other systems were introduced, specifically databases to better manage their client base, payroll systems and e-mail. This parallel system development has lead to a myriad of different programs being used to access information, including different operating systems for desktops. Furthermore, not all information in this repository is digitally stored, but still paper based. The prevalence of poor integration of systems is seen as the company's biggest problem.

4.3 Scope

The project will address the following business functions:

1. Recruitment 1st Phase

- This department is responsible for screening of potential staff.
- Responsibilities include first contact with prospective employees

2. Recruitment 2nd Phase

- This department is responsible for hiring staff.
- They have explicit knowledge of most employees.
- They are able to match personnel characteristics with jobs requirements.

3. Disciplinary

- This is action taken on behalf of HBR to discipline their contracted staff.
- This department works in conjunction with the labour law and CCMA.

4. Payroll

- Here payroll and other administration tasks are performed.

5. Contracts

- Contract managers conduct quality assurance tests with clients.

4.4 Report Contents and Organisation

The next section summarizes the operation of the current system. This is followed by a detailed analysis of the current system which has identified and analysed the current system for problems, opportunities, and constraints. Finally, recommendations will be made using current business theory and the results of the analyses.

4.5 Methods used during the Investigation

4.5.1 Methods

This report contains high-level pictures that diagram the flow of documents and data through the system. In the interest of brevity, this report only contains high-level pictures of the current system. The pictures use the following special symbols derived from (Whitten et. al., 2000):

- A square represents a person, department, organisation, or system that is beyond the scope of the system that has been studied, but which provides input to or receives outputs from the system being studied. In other words, the squares define where the system begins and ends.

- A rounded rectangle represents work that is performed in, by, or for the system. This includes work performed by people and machines.

- An open-ended box represents data storage, either temporary or permanent. This includes in/out boxes, log sheets, reference books, manual files, and computer files.

- An arrow represents the actual flow of documents, messages (possibly verbal), and reports through the system. Each arrow can be thought of as a pipeline through which one or more occurrences of the named flow travel.

Flow Chart 1 represents the flow of information through the Recruitment 1st Phase.
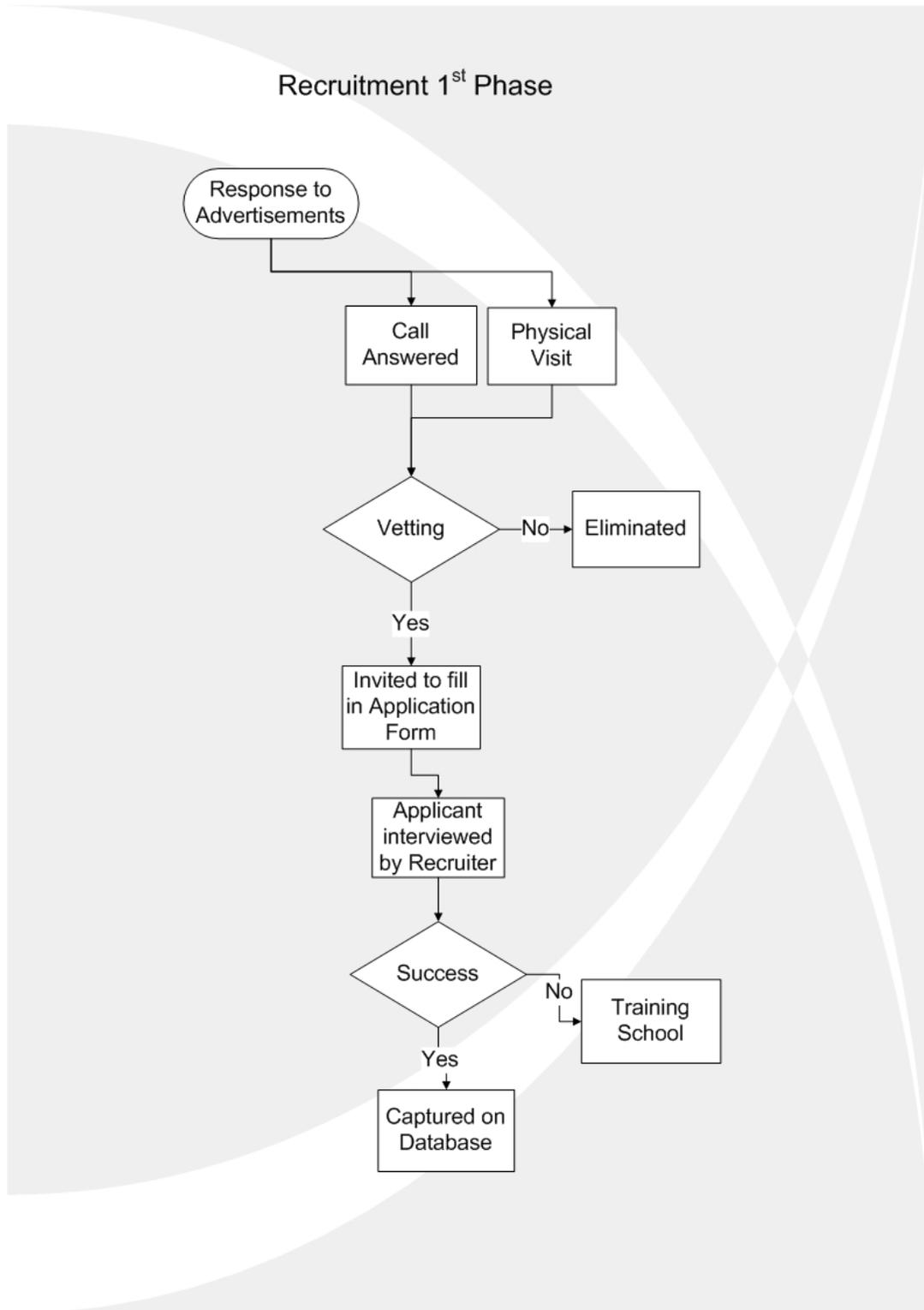
Flow Chart 1

Flow Chart 2 represents the flow of information through Recruitment 2nd Phase.
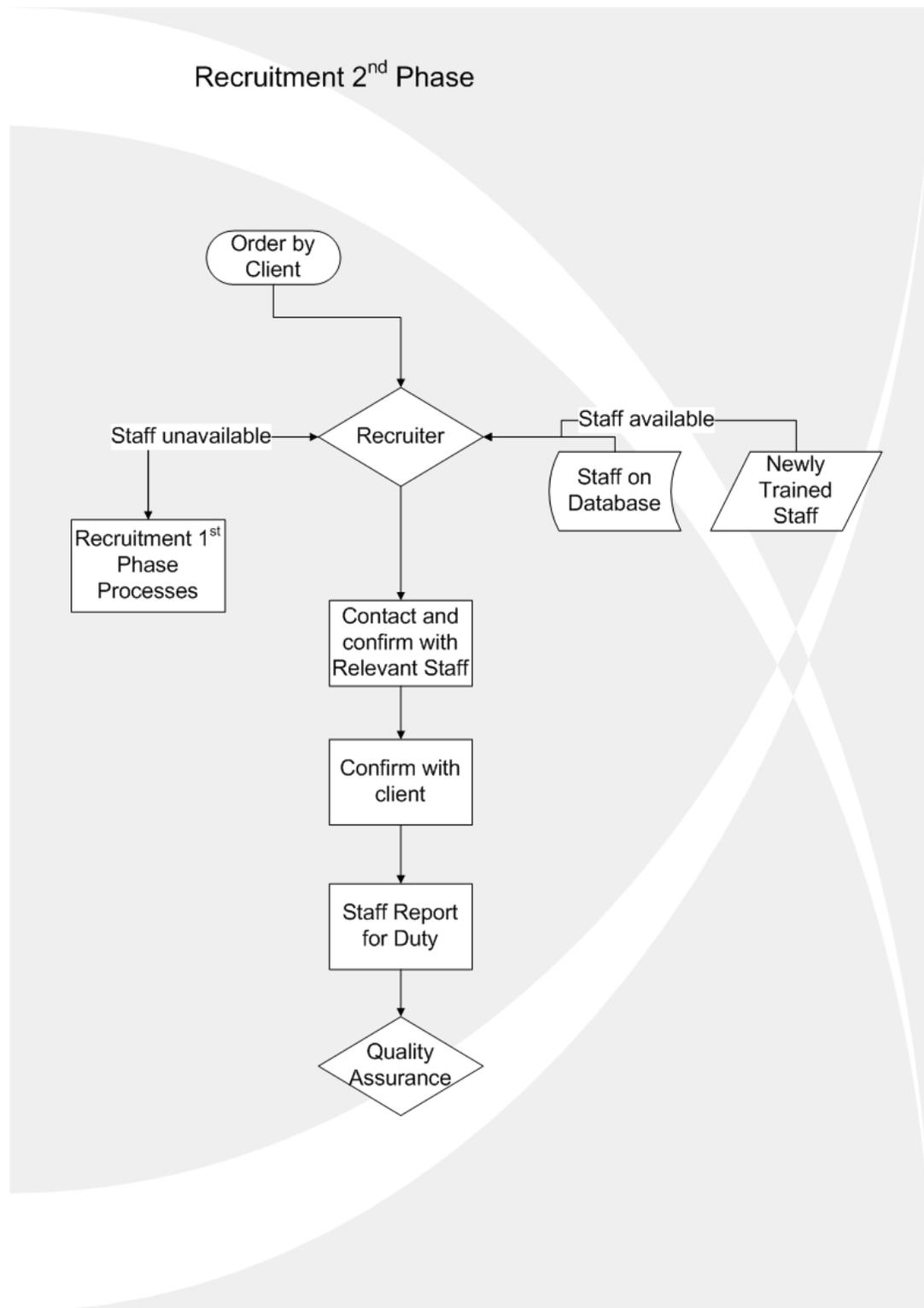
Flow Chart 2

Flow Chart 3 represents the flow of information through the Payroll Process.

Payroll Process

```
        ┌──────────────┐
        │ Client Faxes │
        │ Worked Hours │
        └──────┬───────┘
               │
               ▼
        ┌──────────────┐
        │  Time Sheet  │
        └──────┬───────┘
               │
   ┌───────────┘
   ▼
┌──────────────┐
│  Calculate   │
│    Times     │
└──────┬───────┘
       │
   ┌───┘
   ▼
┌──────────────┐          ┌──────────────┐
│ Capture data │─────────▶│   Invoice    │
│              │          │    Client    │
└──────┬───────┘          └──────────────┘
       │
       ▼
┌──────────────┐
│Print Payslips│
└──────┬───────┘
       │
       ▼
┌──────────────┐
│    EFT /     │
│ Print Cheque │
└──────────────┘
```
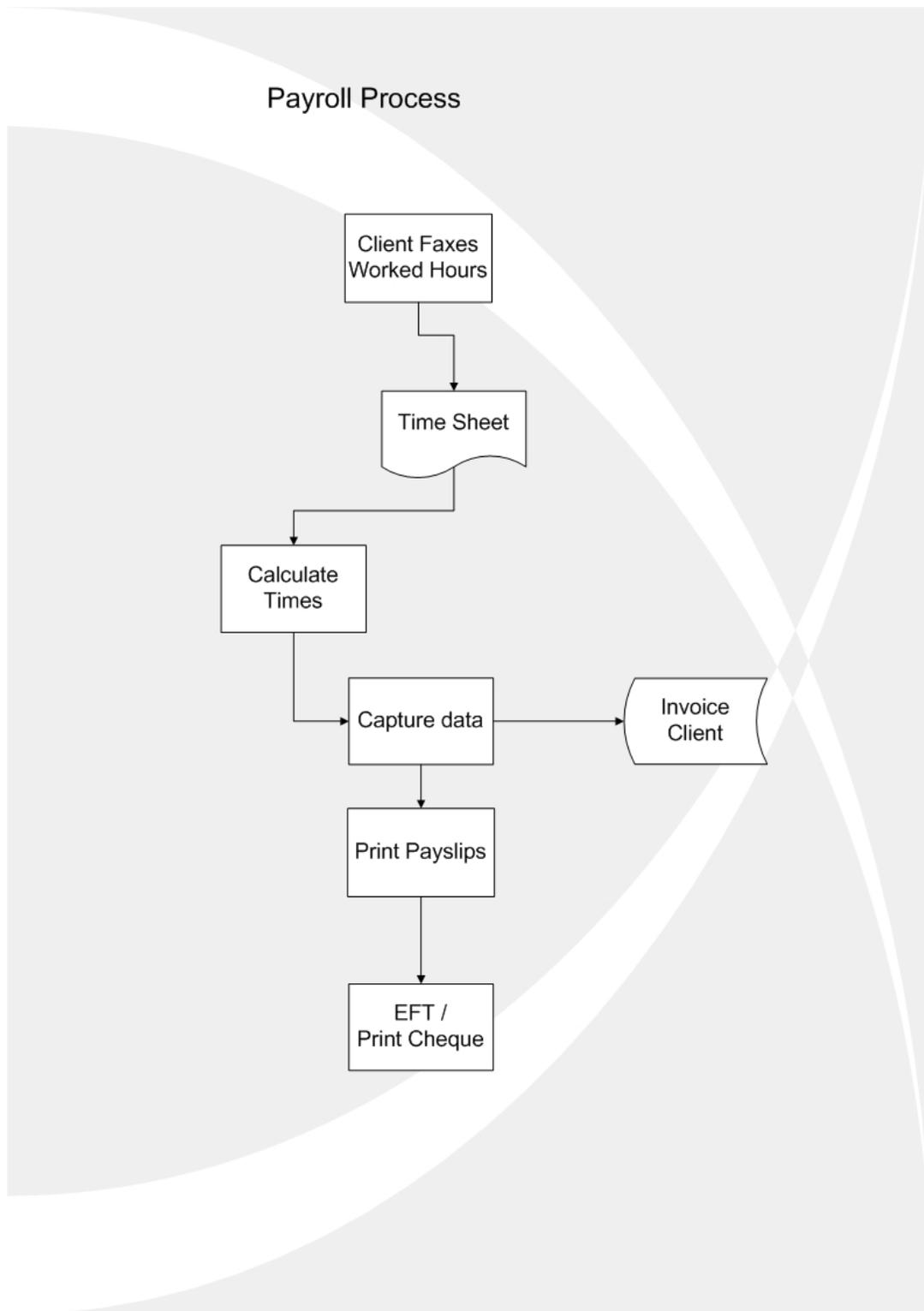
Flow Chart 3

Flow Chart 4 represents the flow of information through the Quality Control Process.
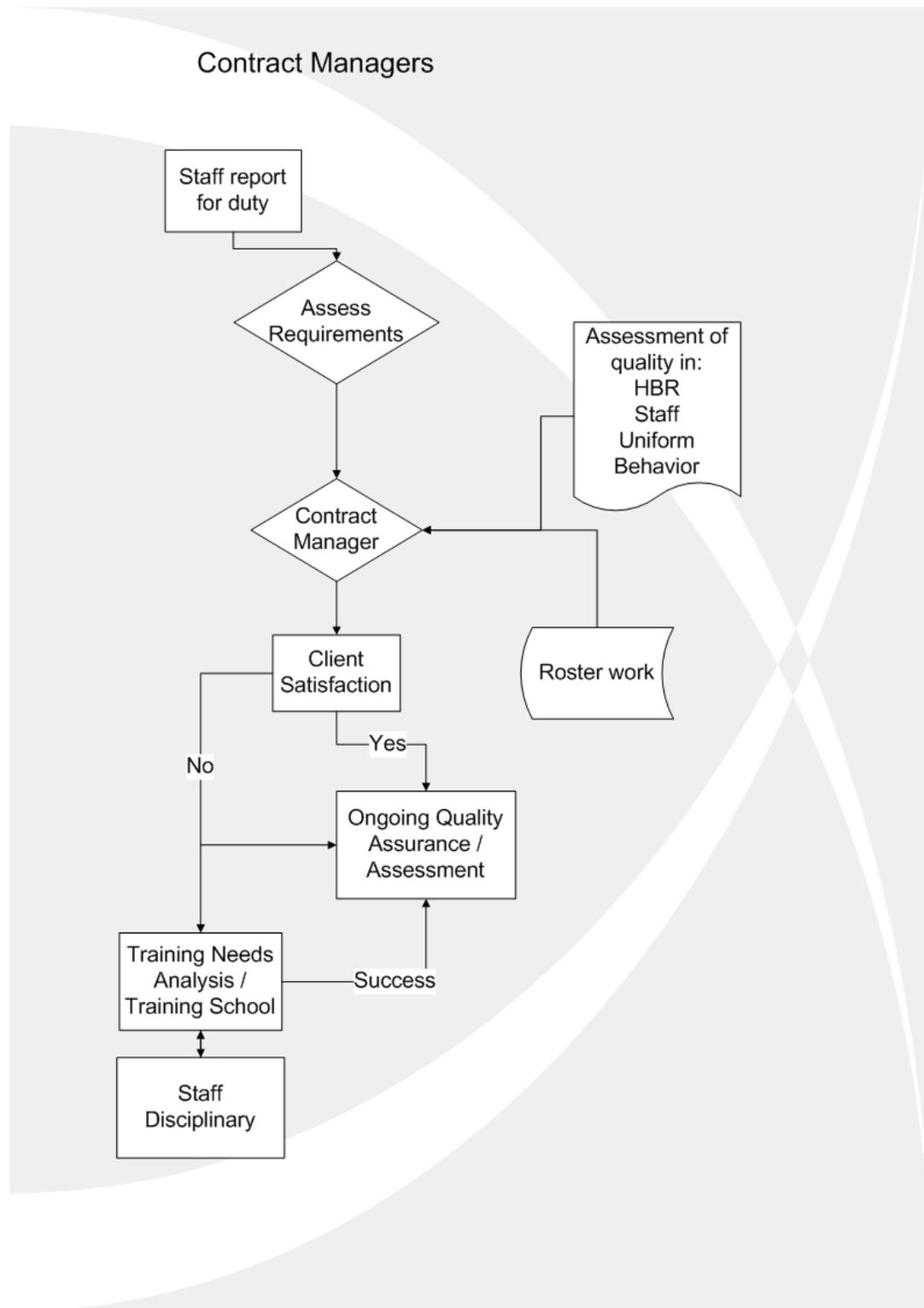

Flow Chart 4

Flow Chart 5 represents the flow of information through the Disciplinary Process.
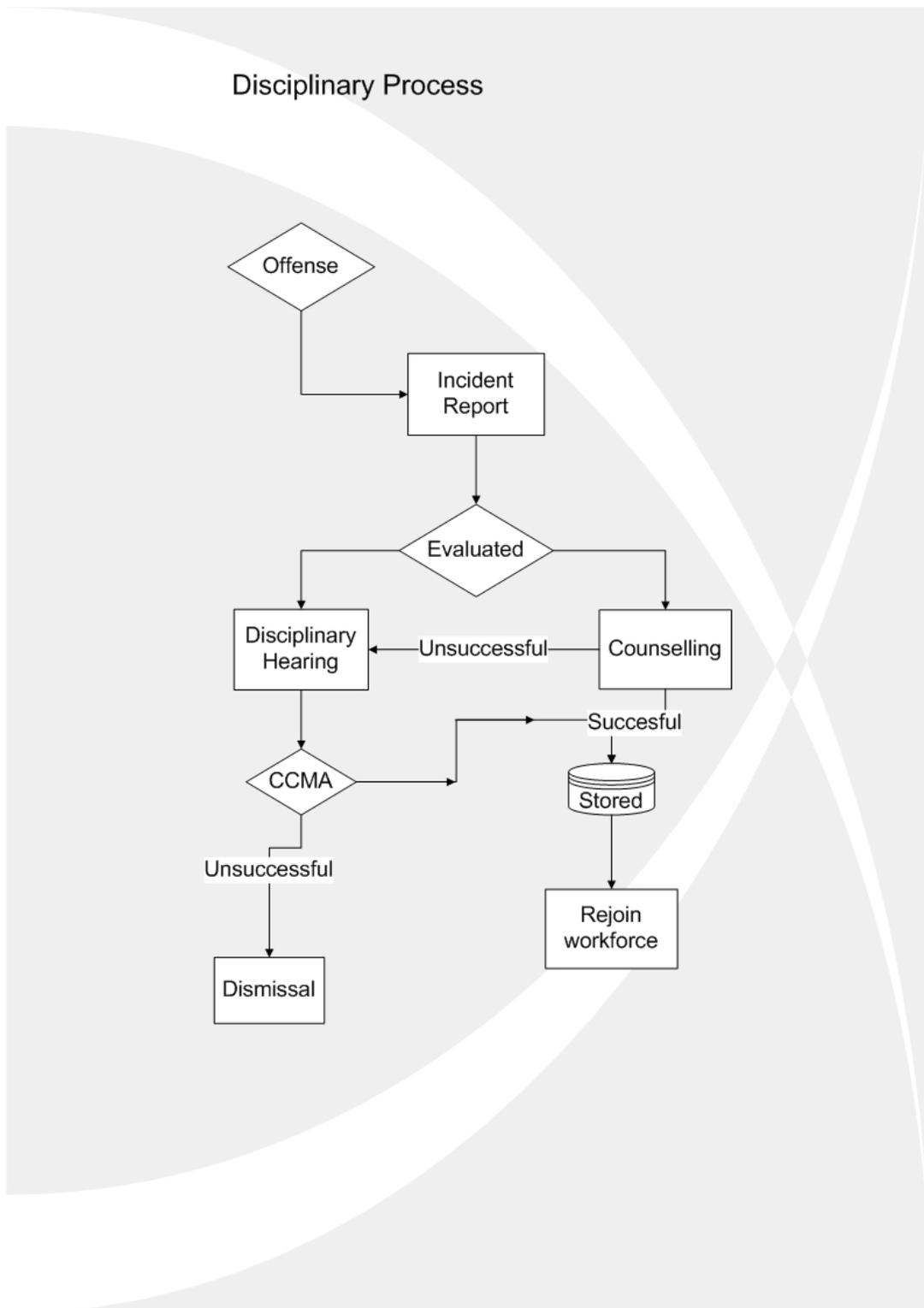
Flow Chart 5

Data Flow Diagram 1 represents the flow of information through Recruitment 1st Phase.

Recruitment 1st Phase Data Flow

```
                    ┌─────────────────────┐
                    │                     │
                    │    Advertisement    │
                    │                     │
                    └─────────────────────┘
                        │           │
                   Phone call    Physical
                        ↓           ↓
                    ┌─────────────────┐
                    │    Secretary    │
                    │   uses criteria │
                    │    to assess    │
                    │  feasibility of │
                    │    candidate    │
                    └─────────────────┘
                            │
                            ↓
                    ╭─────────────────╮
                    │ Candidate fills │
                    │  in application │
                    ╰─────────────────╯
                            │
                    Paper-based document
                            ↓
                    ┌─────────────────┬──────────────┐
                    │   Application   │              │
                    │      Data       │              │
  ╭──────────────╮  │    Captured     │              │
  │ Application  │← Telephone ─┘      │              │
  │  References  │  └─────────────────┴──────────────┘
  │   Verified   │           │
  ╰──────────────╯           ↓
                    ┌─────────────────┬──────────────┐
                    │    Compare      │              │
                    │    New Data     │              │
                    │      with       │              │
                    │    Contract     │              │
                    └─────────────────┴──────────────┘
```
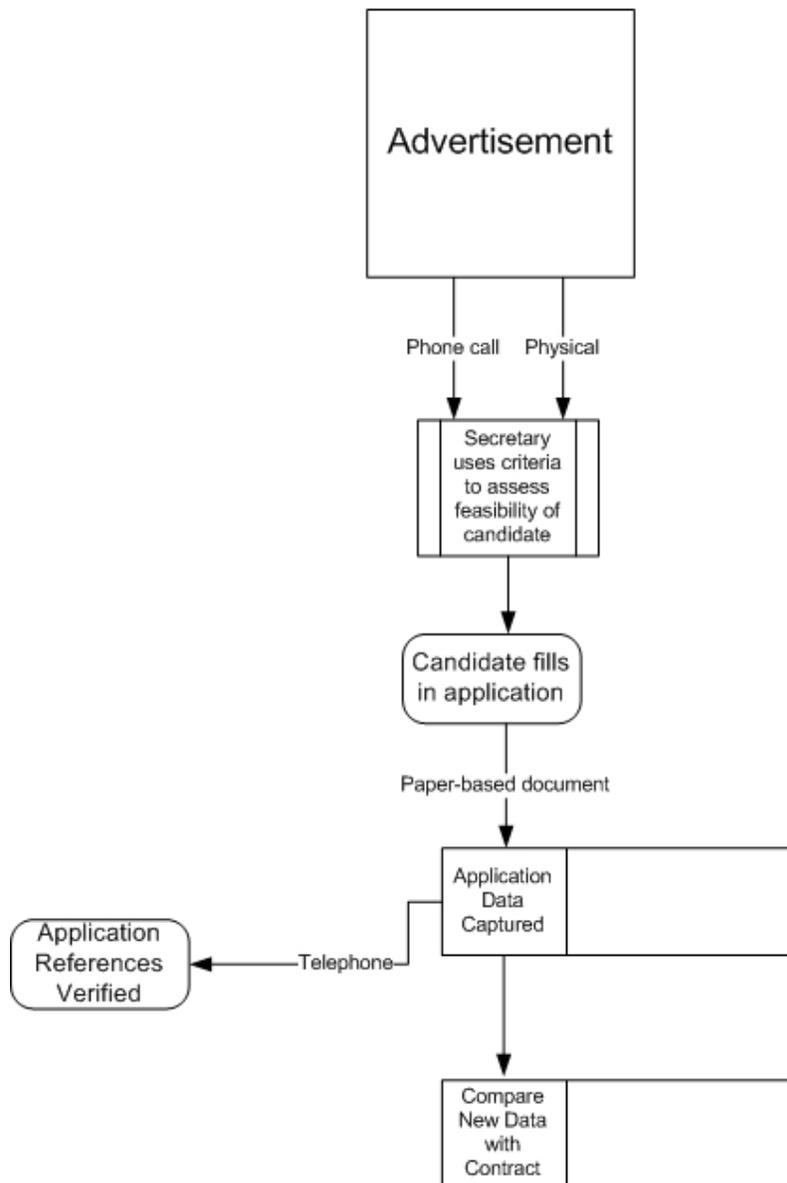
Data Flow Diagram 1

Data Flow Diagram 2 represents the flow of information through Recruitment 2nd Phase.

Recruitment 2nd Phase Data Flow
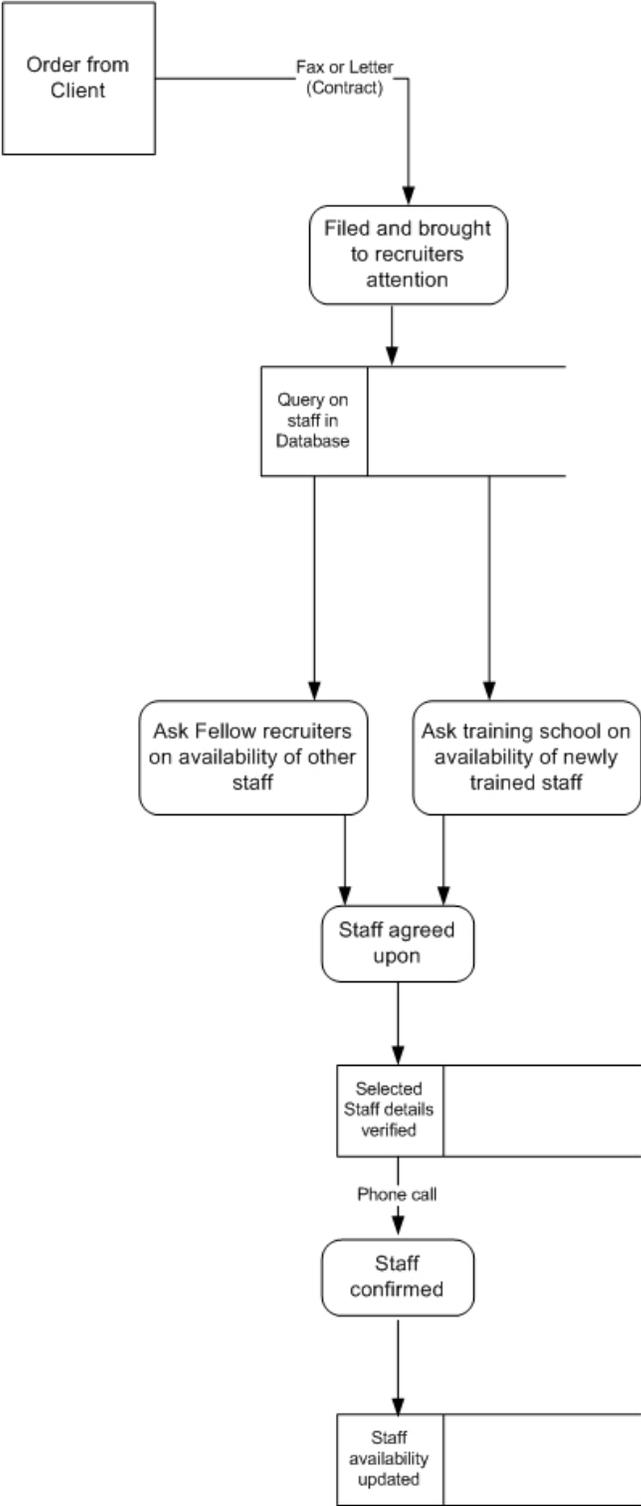
Data Flow Diagram 2

Data Flow Diagram 3 represents the flow of information through the Payroll Process.

Payroll Data Flow
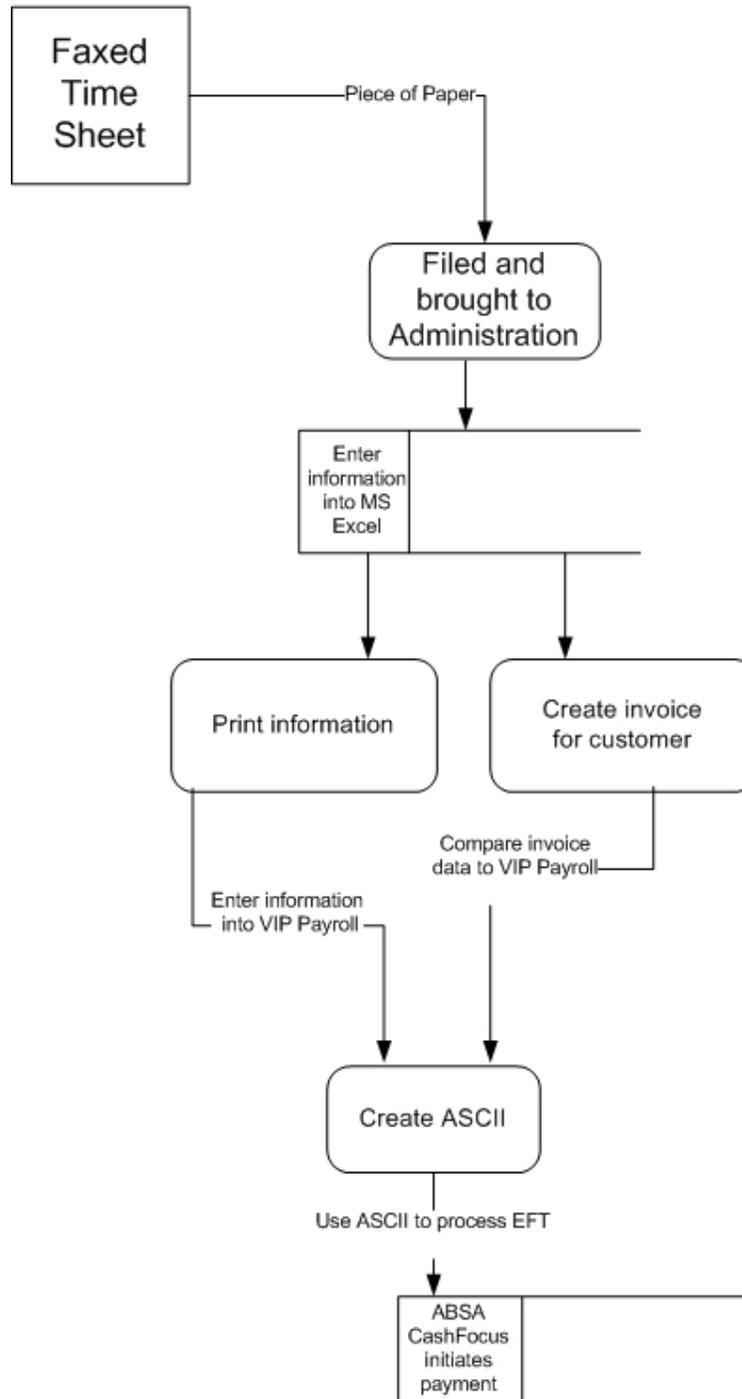
Data Flow Diagram 3

4.6   Analysis of the Current System

This section analyses the current system, describing and analysing problems, opportunities, and constraints according to (Whitten et. al., 2000).

A problem is a situation that results in an undesirable side effect. All problems will be defined in the following way: problem statement ,cause(s), and net effect(s) (Whitten et. al., 2000).

Sometimes confused for solutions to problems, opportunities are actually situations that have been identified as possible areas for improvement, despite not being specific problems. Computer automation is not an opportunity (only a way to exploit an opportunity). Opportunities are stated as follows: statement and business benefit that can be derived by exploiting the opportunity (Whitten et. al., 2000).

A constraint is an existing or anticipated situation that may constrain any improved system that may be recommended in the subsequent phases of this project. In other words, a constraint is something which cannot or should not be changed (e.g. policies, regulations, equipment, deadlines, budget, etc.). All constraints are stated along with the rationale for not being able to change the constraint (Whitten et. al., 2000).

Problems, opportunities, and constraints are presented within a framework called PIECE (developed by James Wetherbe and refined by Whitten/Bentley, 2000). The letters in the acronym classify the problems, opportunities, and constraints:

> P erformance
>
> I nformation and data
>
> E conomy (costs)
>
> C ontrol and security
>
> E fficiency

A single problem, opportunity, or constraint may show up in more than one category; however, there would be different implications. For example, a single problem may have performance, economic, control, efficiency, et al, implications.

Each category will be further defined in the subsequent subsections. Later in this project, PIECE will be used to analyse system solutions.

4.7 Performance Analysis

Performance analysis is generally applied to the systems transactions (or inputs). When discussing the performance of any given transaction, both throughput and response time need to be discussed. Throughput is the number of transactions processed in some specified period of time. Response time is the time required to process a single transaction. This section analyses the transactions for performance problems and opportunities.

4.7.1 Transaction: Payroll process

Throughput: On average 500 people are paid per week during the payroll process. Peak periods can involve over 2000 people being paid during the same week.

Response Time: On day 1 clients fax time sheets which are then captured into a MS Excel file. Separate invoices are then created for each company served on day 2, and then manually entered into the VIP Payroll system. Peak periods sees the above take longer but additional staff from the other functions is used to help capture timesheets as needed.

Anticipated Growth: Increases are predominantly seasonal, however new contracts could see numbers double in the future.

Problem: The MD sees no major problem in the response time. The system in place deals with timesheets that reflect the week up to day 7 with timesheets being processed on day 1 of the next cycle (week).

Opportunity: The throughput is acceptable but could be faster.

Benefit: An electronic and automated system would be faster.

Constraint: The company is small with time, money and knowledge constraints with regard to a new and improved system.

Possible
Improvements: With small tweaks to the system, an ASCII file could be used to transfer data between MS Excel and VIP Payroll.

4.7.2	Transaction:	Recruitment 1st Phase
	Throughput:	On average, during specific recruitment up to 100 people filter through the Recruitment 1st Phase.
	Response Time:	Each candidate needs to be screened at 2 minutes each. It takes approximately 15 minutes to fill in the application form and 20 minutes for a means test; and an interview can last up to 10 minutes. The particulars take up to 5 minutes to be captured, depending on references checking out.
	Anticipated Growth:	Increases are predominantly seasonal, however new contracts could see numbers double in the future.
	Problem:	Response time is acceptable; the MD argues that they are dealing with the vagaries of people.
	Cause:	Some people can be argumentative
	Effect:	It slows the system down
	Opportunity:	The company can process a greater amount of people faster and with less error.
	Benefit:	It saves time and there is greater accuracy.
	Constraint:	The company is small, with time, money and knowledge constraints with regard to a new and improved system.
	Possible Improvements:	The questionnaire and means test could be done on a computer terminal.
4.7.3	Transaction:	Recruitment 2nd Phase
	Throughput:	An order of 10 waiters was observed:
	Response Time:	5 minutes spent creating the order form with client details. 15 minutes to confer with database and other recruiters as to which are the best candidates for the contract. 20 people are chosen, due to some possibly being unable to work or the MD explained that often one needs to ask double the amount of people to arrive because half will not (an Industry norm). 1 hour to find all people by telephone. (Some people live where there is no

	phone, relying on family members to find them and reach a phone)
Anticipated Growth:	Seasonal and order related
Problem:	If recruiters are ill, there is no one to confer with.
Cause:	Some recruiters may know if some staff are on holiday or not working anymore.
Effect:	More people have to be called. This results in time delay and time waste.
Opportunity:	There is no opportunity to change throughput.
Possible Improvements:	Comments on the database should be made as to whether some staff are unavailable, or if possible recruiters should work in teams of two for added redundancy.

4.8   Information and Data Analysis

Information analysis examines the outputs of a system. Outputs include reports and inquiry responses. Data analysis examines the data stored within a system.

Information Analysis

Information analysis initially identifies those net outputs produced by or for the system. Each output is analysed for the following possible problems or opportunities:

- Information overload. Either too many outputs are produced or outputs contain too much information, limiting their usefulness.
- Information accuracy. Information contains errors or possible errors.
- Information timeliness. Information is not received fast enough to be useful.
- Information format. Information is in a format that is either not useful or must be modified to become useful.
- Information redundancy.   Multiple outputs contain much of the same information.
- Lack of information. Information is not available to aid in decision-making.

The outputs are listed and identified as follows.

4.8.1 Output: Invoice

Format:	Data File
Frequency:	Weekly
Problem:	The information is recorded manually from a fax document received from clients.
Cause:	Manual transfer
Effect:	Over or under-compensation of employees.
Opportunity:	The clients should rather use a standardised format to record the time sheet information, and email the data, so as to merge the information with the electronic payslips.
Benefit:	Less redundancy, higher accuracy
Constraint:	Several versions of Microsoft Access exist which are not entirely compatible (especially the version of 1997).
Possible Improvements:	Using Microsoft Excel, or another similar spreadsheet, or standardise the version of MS Access used.

4.8.2 Output: EFT

Format:	data file
Frequency:	weekly
Problem:	The MS Excel file created above is manually entered into the Payroll system causing errors
Cause:	Manual entry
Effect:	The data capturer has to check that each amount balances with the MS Excel file or possibly the original fax document.
Opportunity:	The users report the work is redundant and prone to errors; a new integrated system would be needed.
Benefit:	fewer employees needed during the payroll process, peak periods would not increase work load.
Constraint:	an automated system will need constant maintenance to change various parameters and trained operators.

Data Analysis

Data analysis describes the degree to which data is redundantly stored within the system, the ease (or lack thereof) of access to data (e.g. how easy or difficult it is to produce information and outputs from the data), and the accuracy and consistency of stored data.

The stored data are listed and identified as follows.

4.8.3   Data Stored: Employee Database

Number of records: 12,000.

Anticipated growth: The database is expected to double in 5 years.

Medium: Software database with MS Access.

Organization: The records are sorted according to a Key (unique MS Access identifier).

Problem: Not all employee information is stored here, much is still paper based.

Cause: Poor design of the system, thus it is unable to store additional information.

Effect: Time is wasted to look up further details of the employee in the paper based system.

Opportunity: The database could be enhanced to store additional information, through upgrading the system to MySQL where large amounts of data can be stored.

Benefit: MySQL is freeware which lowers cost of ownership, and has enhanced features over MS Access.

Constraint: The knowledge required to implement MySQL will need to be outsourced.

Possible

Improvements: A small investment is required to set-up a MySQL database, but enhanced access and storage options will be newly available.

4.8.4   Data Stored: VIP Database

Number of records: Depending on throughput during week

Anticipated growth: The database is expected to double in 5 years.

Medium: Software database with VIP Payroll.

Organization: The records are sorted according to a Key (unique MS Access identifier).

Problem: Little knowledge of the ASCII output medium
Cause: The ASCII files are not reusable in other programs

Effect: The VIP output can only be used to transfer funds, and cannot be used in the Accounting system.

Opportunity: Educating staff on how to convert the ASCII file to a common data file to be used in MS Excel or MS Access.

Benefit: MySQL is freeware, which lowers cost of ownership, enhanced features over MS Access.

Constraint: The knowledge required to implement MySQL will need to be outsourced.

Improvements: A small investment is required to set-up a MySQL database, but enhanced access and storage options will be newly available.

4.8.5   **Key Points of Information and Data Analysis**

Payroll Process:

When clients send faxes of time sheets, these have to be manually transcribed to an invoice, and then manually again from here to the VIP Payroll system to eventually pay staff.

Recruitment 1st Phase:

Prospective staff need to fill out a questionnaire and do a means test which needs to be recorded by the recruiters on to the database.

Recruitment 2nd Phase:

Recruiters who cannot find the staff needed on the database need to rely on fellow recruiters to know where to find additional staff, or if staff are not working or on holiday.

SOP Documents:

When information is required by specific employees and departments (SOP), and those department heads are not available, productivity suffers.

4.9 Economic Analysis

Economic analysis examines the system for cost problems (e.g. excessive costs or insufficient cost controls) or cost reduction opportunities. It can also be used to present budget constraints.

4.9.1 Problem: High cost in money and time to maintain the legacy systems

Cause: Extra staff employed

Effect: Employee numbers are bloated - increases operating costs.

Opportunity: Updating legacy systems

Benefit: Cost savings

Constraint: Firing extra staff decreases morale, high learning curve for new systems.

Possible
Improvements: Even though the upgrading of legacy systems might prove expensive at first, the Return on Investment should be realised in 1 year with a Linux and MySQL system.

4.10 Control and Security Analysis

Controls analysis examines how the system ensures that it is properly operating. Security analysis is concerned with both facility and data security. The system was examined both for excessive controls and lack of controls. Controls are measures taken to eliminate mistakes and tampering. Controls can also have performance implications.

4.10.1 Problem: MS Windows 98

Cause: There are no features implemented to control access to desktop machines and there is fairly poor reliability.

Effect: The system is vulnerable to would be data thieves, and plagued by regular system problems.

Opportunity: Install MS Windows 2000 on desktop systems

Benefit: The above desktop systems have access control mechanisms; Windows NTFS is far more stable.

	Constraint:	Users have to be trained to use the new system, passwords may be lost.
	Possible Improvements:	Create a culture of being security conscious; more consistent system uptime.

4.10.2	Problem:	File and database server
	Cause:	Poor redundancy.
	Effect:	High system- downtime.
	Opportunity:	Better redundancy controls should be implemented (RAID system) to save time.
	Benefit:	Eradicate work stoppage due to poor system up-time
	Constraint:	There are few people who are able to regularly check and configure the RAID.
	Possible Improvements:	The RAID system can offer increased system redundancy.

4.10.3 Key Points of Control and Security Analyses

- Windows 98 is currently not supported by Microsoft, insomuch as there are no new updates pertaining to security vulnerabilities and system stability. Furthermore, there are several compatibility issues with other brands of software also not supported.
- The file and database server suffers from a poor regimen of backups. The files that have to be backed up have grown from around 400MB to 2.5GB. Previously, this was achievable through using a CD-Writer, but now the backup would span over 4 CD's (allowing for one 700MB CD-R). Currently the backup is copied across the network to a Windows 98 desktop machine, creating amongst other problems, a congested network and possible file corruption.

4.11 Efficiency Analysis

Efficiency analysis is sometimes confused with economic analysis. Efficiency analysis examines the system for problems and opportunities related to how resources (e.g. people,

facilities, money, etc.) are being used. Efficiency problems and opportunities usually target resources that could be better used (not eliminated).

4.11.1	Problem:	Missing SOP instructions
	Cause:	There may be no senior staff available to assist.
	Effect:	Employees need to leave their working areas in search of help.
	Opportunity:	The help is available in document form but difficult to find, a portal will aid in the finding and answering questions as to SOP.
	Benefit:	Time saving, increase in productivity and autonomy.

4.11.2	Problem:	Employees need to switch regularly between programs.
	Cause:	Current desktop systems easily crash.
	Effect:	Time wastage due to work lost or rebooting machines.
	Opportunity:	A portal would be able to transfer stresses to the server with the desktop acting as a terminal to display information.
	Benefit:	Major cost savings in upgrading desktop machines.

| 4.11.3	Problem:	employees need to wade through folders for relevant documents.
	Cause:	The file server is used to store all user documents, where each user has his or her files, making it difficult for other users to search for relevant documents.
	Effect:	Time wastage.
	Opportunity:	A portal would be able to provide links in a hierarchical manner, furthermore proving advanced search functions.
	Benefit:	Relevant documents are easy to track.

5   Recommendations

The following will provide recommendations based on key elements of the system

analysis in Section 4 and how they relate to Sections 2 & 3.

5.1   *How can HBR become a networked organisation?*

The Following will offer, based on the conclusions from Section2, how HBR can become a
networked organisation.

5.1.1   *Step One: Legacy practices to integration*

The discussion in the literature review on "islands of technology" emphasises that when

such a situation exists little interaction is possible between legacy systems as these were

only developed for a specific function. This can be seen in HBR where the payroll system

handles the payroll only, the employee database stores employees' information only and

invoices generated have no further possible use other than being sent to customers. Thus,

according to the literature review it is recommended that HBR realises the strategic benefit

of integrating systems, and that before building such a system, an analysis of existing

working processes must be performed. Only then can HBR move closer to becoming a

networked organisation.
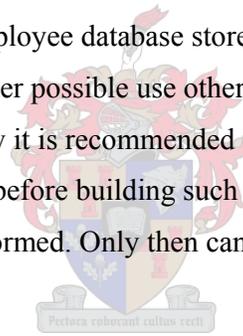
5.1.2   *Step Two: Business Process Reengineering*

The discussion in the literature review argues that HBR will need to align future business

processes with any IT implementation. It is thus important to relate HBR and its

processes:

- Work performed and analyses of existing work processes:

The existing work processes as described and documented in the System Analysis section

shows how work is performed. Each major category of the work performed is shown in detail,

and shows that the major business processes integrate to a degree, but as will be demonstrated,

IT will provide a major increase in integration so as to serve the company better strategically.

Having documented and identified the above processes, bottlenecks and IT infrastructure

problems, the analyses will attempt to rectify those problems in relation to HBR.

5.1.3 Step Three: Physical Value Chain

- Where can IT increase value in identified processes:

Payroll Process:

An integrated system for the payroll system would increase value. Faxes received from customers should rather be received in an electronic format where there is no chance of error when transcribing. The new IT system will then be able to provide each document required instead of starting a new process every time (See Suggested Payroll Process 1).

```
                    ┌──────────────┐
                    │  E-mailed    │
                    │  timesheet   │
                    │ information  │
                    │     as       │
                    │ spreadsheet  │
                    └──────────────┘
                           │
                  Email is converted
                     in to ASCII
                           │
                    ┌──────────────┐
                    │  Data fed    │
                    │ into Access  │
                    │  Database    │
                    └──────────────┘

  ┌──────────┐            ┌──────────────┐        ┌──────────┐
  │ Invoice  │            │ Selected info│        │  ABSA    │
  │printable │◄───        │ sent to VIP  │─ASCII─►│CashFocus │
  │          │            │   Payroll    │        │  pays    │
  └──────────┘            └──────────────┘        └──────────┘
```
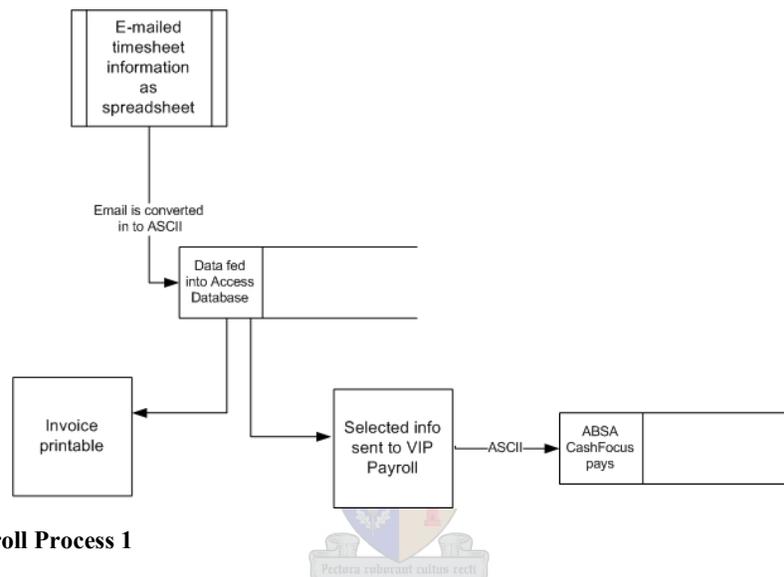
Suggested Payroll Process 1

Recruitment 1st Phase:

A system whereby applicants are able to electronically fill in and participate in a means test on a computer - to decrease the chance of errors during recording. For example long surnames, or incorrect date of birth.

Recruitment 2nd Phase:

A system where all information is recorded and provides up-to-date information on staff's whereabouts.

SOP Documents:

A system which attempts to implement a form of document management, where staff is able to access via searching all documents and SOP.

Control and Security:

As documented, converting the current desktop systems to Windows 2000 will increase program compatibility with further added advantages of controlled system access with passwords.

5.1.4 Step Four: Value Added Network

In the framework suggested in Step Four, the following will allow HBR to further develop a Value Added Network.

HBR's website could be made more interactive enabling the company to:

- Network with clients and enable correspondence and greater feedback
- Enable purchasing of contracts or staff
- Allow a query of the database for staff availability
- Offer customers Personalisation and Customisation
- Become less hindered by geographical location

5.1.5 Step Five: Virtual Value Chain

Considering the above four steps, HBR may be able to reach a level where the company is truly networked.

- This however can only be met when the physical value chain is not used as a supportive element to information and not as value in its own right. HBR, through integrated systems, can therefore treat information as new value. This value, possibly in the form of employee data, can offer services such as data mining and managerial support in the form of Decision Support Systems.
- HBR may be able to add value by combining both the value and virtual chains for customers as described below:
  - o Invoices can be used to generate new value in the form of strategy planning documents, budgeting and forecasting. Furthermore, information garnered from interviews and means tests could be used to compile industry data for Non-Governmental Organisations, government or for resale.
  - o The Value chain can give information to the virtual one: It would be able to tell customers the average working hours of their staff and average income.

o   The Marketspace has different service requirements to the marketplace, a web portal can offer advice, or legal services, or a forum for the recruitment industry through internal data.

The above analysis and recommendations of HBR suggests sweeping changes to the current system. Research in the literature survey in Section 3 may still provide an *all encompassing* solution to help implement the above recommendations. In the following, a solution in the form of a portal will be discussed, outlining scenarios and recommendations as to how a portal will benefit HBR best.

5.2   *What should HBR do?*

If HBR were to take full advantage of integrating their systems it is evident from the above that a portal, and in conjunction with theory in Section 3, would enable the company to change current processes and facilitate those changed processes under one system. Furthermore, following the practices associated with developing a successful portal one could argue that it would also increase HBR's organisational dynamics and further increase their competitiveness. The dynamics of a portal will be demonstrated as follows:

- The diagram of HBR Portal 1 below is a full working model designed to show how the portal is able to further integrate all work processes. For demonstration purposes it is not exhaustive. On the left hand side one can observe the menu system which contains hyperlinks to the Databases, SOP's, Contracts, Disciplinary and a Discussion Forum. Another navigation bar below the "HBR Personnel Portal" banner was designed for ease of use, with a search function, feedback section for comments and a contents page to see the full hierarchy of the site.
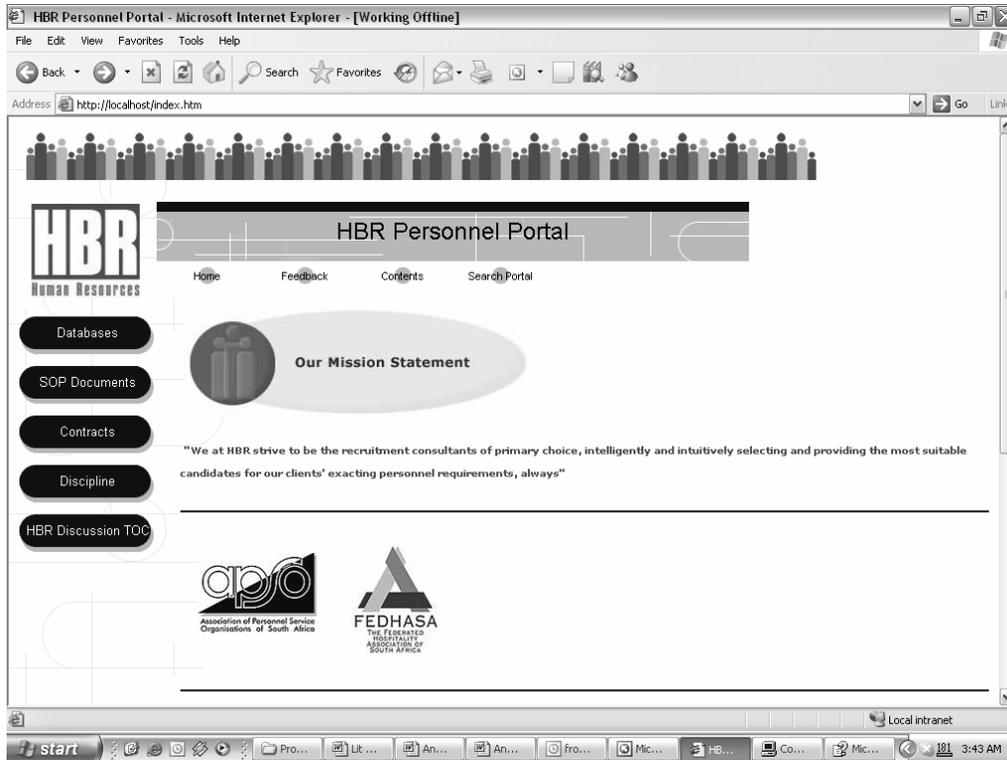
HBR Portal 1

- The diagram of HBR Portal 2 below is designed to give the user a hierarchical view of the portal for ease of use. Furthermore, it provides logical steps to the information required. For example if a person were to look for information on SOP's, pertaining to recruitment, they would navigate there via the SOP button and then on to recruitment and so on.
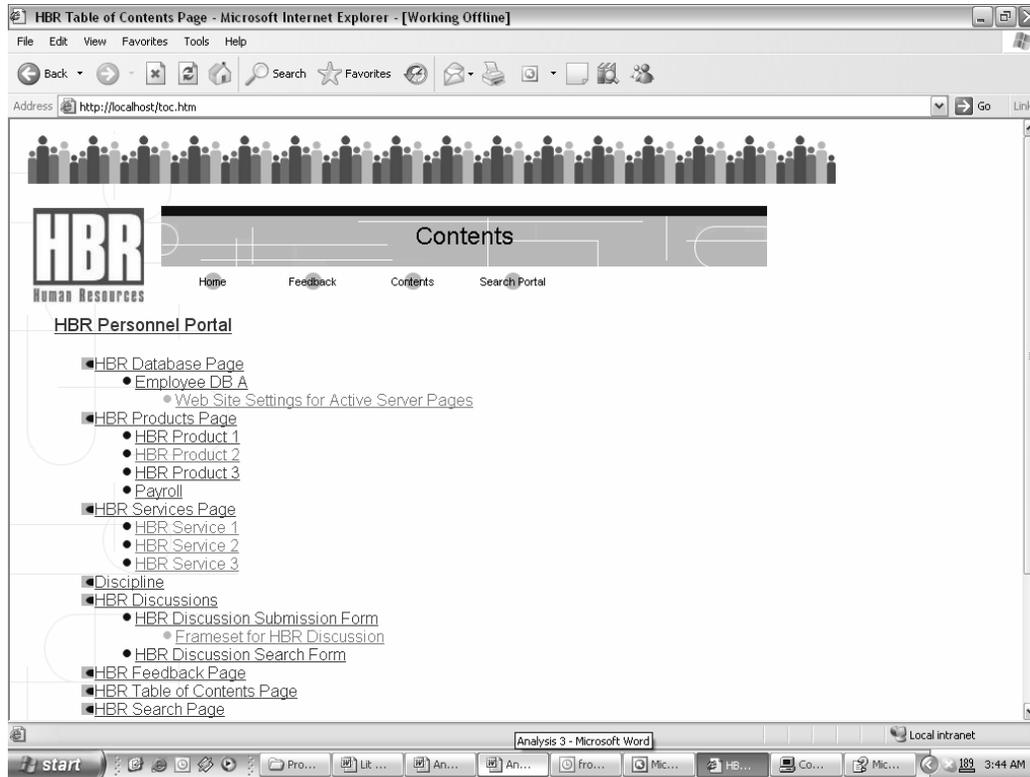
HBR Portal 2

- The diagram of HBR Portal 3 below is designed to show full database search functionality within a web browser, where computers need not be upgraded. Here the portals benefits are most highlighted as there is no database software required in the form of MS Access. All the back-end transactions are handled by the web server that hosts the portal.

HBR Portal 3

- The diagram HBR Portal 4 below is designed to show how employees are able to find information pertinent to their jobs and short descriptions of each function.
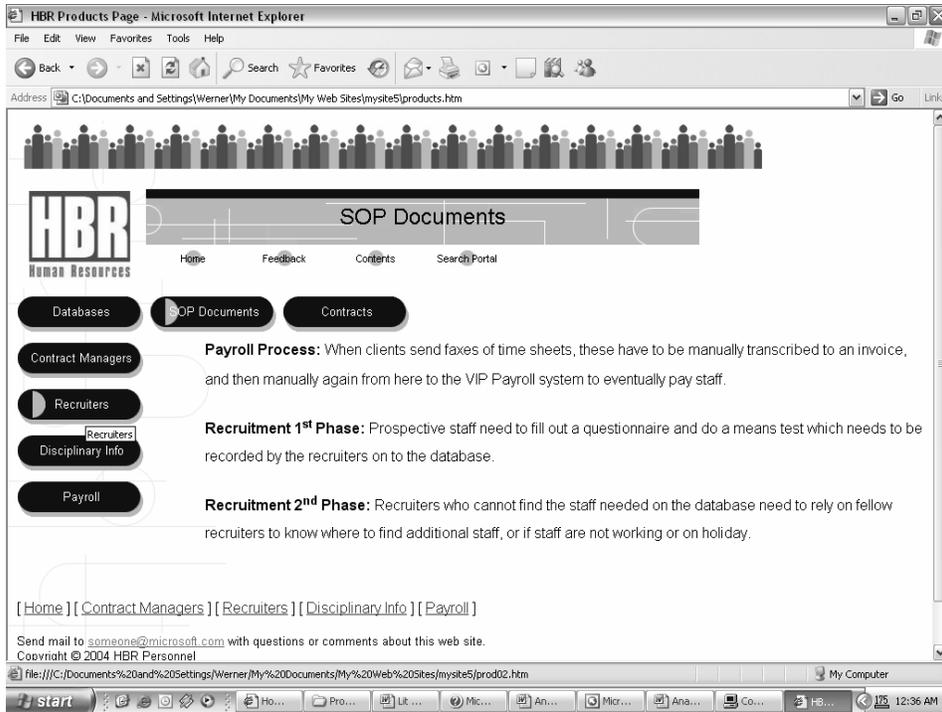
HBR Portal 4

- The diagram HBR Portal 5 below is a drilled down view in test form, showing would be users in the recruitment function how to proceed with each step in the process.

HBR Portal 5

If HBR were to take full advantage of integrating their systems (in conjunction with Section 3) it is evident from the above that a portal would benefit HBR most in relation to the problem statement in Section 1.3 . Furthermore, following the practices associated with developing a successful portal one could argue that it would also increase HBR's organisational dynamics and further increase their competitiveness.

It is however important to draw attention to the fact that a portal is simply not just a technology implementation. The underlying platform is technology based, which supports database queries, communication, document links and search capabilities. The most important aspect in the implementation of a portal for HBR would be the human element which uses it, the communication that takes place on it, the sharing of information with documents and ideas shared, generated and challenged. HBR will need to implement various strategies which take into account strained human relations, such as power struggles, jealousy and need for reward. The following needs to be taken into account:

A portal is able to bring out the worst and the best in people, meaning that if there is no trust in the organisation then there will be no sharing. This is a failed portal. However, if there is a measure of trust, people are more willing to share information, a precursor to knowledge sharing. The transition from a technology based solution to knowledge sharing and

transference may seem a bold step, but with careful attention to detail and methodologies involving communities of practice a HBR portal may well serve the organisation.

5.3 Limitations

This assignment has not covered the design of the actual databases for the payroll system as the scope would have been too wide if this were to be done. Furthermore, implementing the portal where the system is live in the HBR system environment was not feasible due the nature of the current client/server stability issues.

Moreover, the portal is not a solution for integrating the databases; these have to be developed separately. It rather integrates all the systems and databases where they can be accessed from one point.

5.4 Future Recommendations

The systems currently employed at HBR can be further investigated. The development of an integrated Payroll system can be initiated, and the employee databases can together with the Payroll System be integrated into a portal.

Furthermore, an investigation into change management initiatives is recommended. The proposed changes for the system are likely to cause changes in work flow, certain staff will become redundant, and the work environment will change. These changes may represent an environment of uncertainty for the staff and certain change management initiatives could be investigated so as to alleviate staff angst.

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7 Appendix
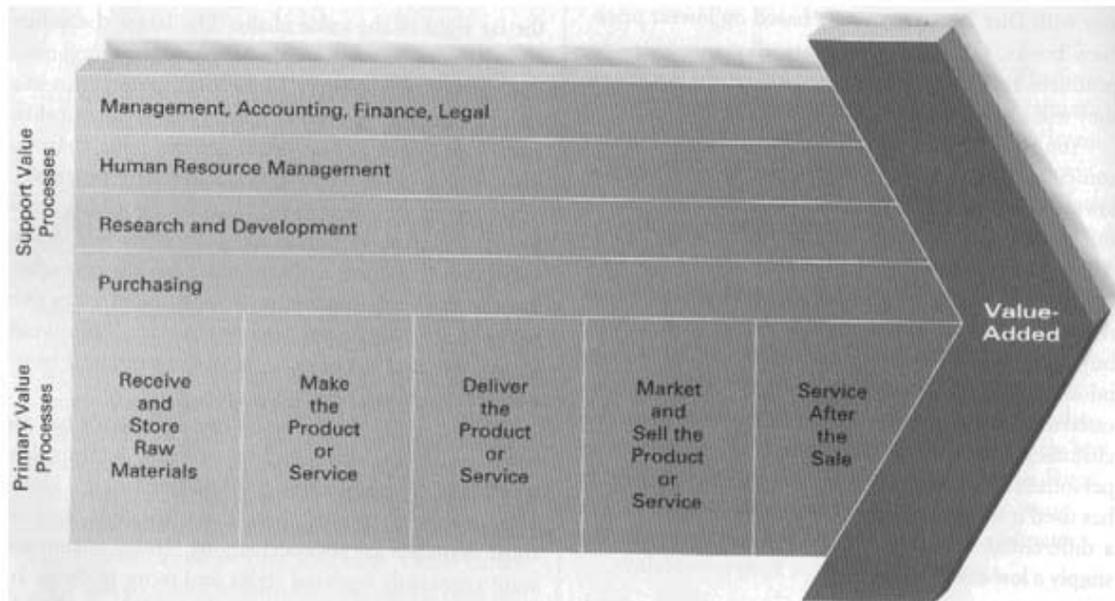
Annexure 1

(Source: Haag et al., 2002)

Annexure 2

(Source: Rayport and Sviokla, 1999)

Ethernet LAN Diagram: HBR Human Resources

System Diagram 1