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**“EVALUATING ICT MATURITY AND IT GOVERNANCE FOR COMMERCIAL  
COMPANIES IN RWANDA”**

*(Case Study: Bralirwa Brasseries et Limonaderies du Rwanda)*

By

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## Certification page

I hereby declare that this study was under taken independently and it is my original contribution to knowledge. It is not replication of any work either published or unpublished. All references made in this study are due acknowledged. Finally, all aspects of this study have been discussed with and approved by my supervisor, Prof. Dr. Eng. Ir. M. Looijen.

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I declare that this dissertation was written under my supervision and that the Student has been consistent in his interaction with me for guidance and direction. He has my consent to present it for assessment.

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Date .....

Prof. Dr. Eng. Ir. M. Looijen

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## Abstract

This research project focuses on assessing the ICT maturity and the IT control (Governance) systems and their impact on Rwanda commercial companies, with emphasis on Bralirwa (Brasseries et Limonaderies du Rwanda).

Through this research, an assessment of the current user profile as well as the current ICT controls and procedural processes will be critically analysed to determine the effect they have on growth and productivity of Bralirwa.

A set of guidelines and a framework as alternatives will be suggested for better skilled use of the information system for better ICT control processes.

The present project is divided in two parts:

1. The first part focuses on the Capability Maturity Model Integration (CMMI) of ICT in the company (Bralirwa).
2. The second part focuses on the ICT controls and governance processes within the company.

NB: The assessment approach presented in this research is similar to "From today to tomorrow" method used in getting a general idea of any MCM situation in disciplined approach. The method follows a seven steps process. (Looijen. M, 2008).

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## **List of Abbreviations**

- **Hls:** *Hectolitres*
- **EBIT:** *Earnings Before interest and taxes*
- **Frw :** *Franc Rwandais (Rwandan Francs)*
- **ITIL:** *Information Technology Infrastructure Library*
- **CobiT:** *Control Objectives for information and related Technology*
- **CMMI:** *Capability Maturity Model Integration*
- **MCM:** *Management, Control and Maintenance*
- **SLA:** *Service Level Agreement*
- **ISHA:** *Information System Heineken for Africa*
- **SCM:** *Supply Chain Management*
- **ERP:** *Enterprise Resource Planning*
- **TOPs:** *Technical organisation processes and security*
- **OpCo's:** *operating companies*
- **CIO:** *Chief Information Officer*
- **CEO:** *Chief Executive Officer*
- **COSO:** *Committee of Sponsoring Organisations*
- **CCTA:** *Central Computer and Telecommunication Agency*
- **OGC:** *Office of Government Commence*

## **Chapter 1 :INTRODUCTION**

### **1.1 Aim**

The aim of the research is to evaluate ICT maturity and ICT controls, and their impact on the productivity, competitive advantage and growth of the company (Bralirwa).

The outcomes of the research are:

- i. a set of guidelines and a framework for higher CMMI, criteria of user profile and change management processes necessary to exploit new technologies.
- ii. a framework for a better control system and usage of ICT applications.

### **1.2 Problem Statement**

Many of the experienced personnel with sound knowledge of the ICT use are retiring from Bralirwa, The present generation of employees, to a large extent, lack the experience required to replace those retiring. As result errors in the use of computer skills are becoming increasingly a problem. Lack of knowledge of the ISHA system, in particular, is quite a serious matter. This leads to a fall in productivity, effectiveness and efficiency.

For example, an employee may enter wrong data in ISHA, and as usual the system gives an error message. However the employee does not know that there is an error message displayed on the screen. Sometimes, such people have to rely on ICT management team.

There is always training offered by the ICT team and a consistent reminder but again



the employees lack that basic insight, the reason being lack of sufficient knowledge of computer basics, or lack of adequate knowledge of the system (ISHA).

Furthermore the company has employees mastering one specific ICT application and the personnel find it very hard to be interested in any other application. So, introduced, such employees rarely adopt it, to the detriment of the company.

The company is pushing hard in implementing control systems and procedural process policies but still it is obvious that the ICT control management systems, need upgrading.

For example, an employee, with a certain access rights, may login and leaves his workstation to someone with less access rights to the system: the security protocol is overlooked.

The misuse of the system by the employee may be due to the fact that there is lack of professionalism or because the employee thinks that the ICT management does not have the necessary tools to trace how the system is used. Besides, ISHA can be used to identify the user ID, but one need to look at how ISHA is managed on tracing the misuse of the system.

### ***1.3 Research Questions***

One main question is asked, ***“What Are the ICT maturity and the IT governance (Control) systems within Rwanda commercial companies, specifically in Bralirwa, and do they have an impact on productivity, competitive advantage, and growth?”***

However, in order to answer the above question, more sub questions are defined as follows:

1. *How are ICT applications utilised in Bralirwa? (E-culture)*
2. *Is there any ICT strategy alignment with the business in Bralirwa? (Meaning if an ICT strategy exists and whether it is aligned with business strategy).*
3. *What are the ICT skills of the personnel of the company (Bralirwa)? (ICT user profile)*
4. *What is the focus, within Bralirwa, of ICT management? (ICT managerial paradigm)*
5. *Does any predefined ICT management process exist in Bralirwa and how well is it established? (ICT governance)*
6. *What is the ICT management level in Bralirwa? (ICT organisation)*
7. *Do the managements of the company (Bralirwa) ensure that internal controls are effective and efficient?*
8. *Are ICT risks, Controls, compliance and performances measured and reported within Bralirwa?*
9. *What is the impact of the ICT maturity and ICT controls on productivity and*



*growth in Bralirwa?*

*10. Does ICT maturity and ICT controls in Bralirwa favour competitiveness of the company?*

#### **1.4 Context of the Research and Stakeholders**

Bralirwa “Brasseries et Limonaderies du Rwanda” is the Rwandan Brewery that produces beer and Soft drinks. The head office is located at Kicukiro, Kigali Urban Prefecture and the brewing factory at Gisenyi is producing soft drink as well, while the Kigali factory produces soft drink only.

The vision and the mission statement of the company are as follows:

1. To become a world class sustainable beverage producing company in Rwanda with high quality brands that satisfy needs and give enjoyment to its customers, with respect for the people, society and environment we live in.
2. To achieve 6.7 billion Frw EBIT (8.5 Million Euros (€)) in 2008
3. Sell 1.200.000 Hls (711.250 Hls beer, 428.750 Hls soft drinks and 4.5 Hls Heineken)
4. Be the most respected company in Rwanda

BRALIRWA has 674 employees, including senior managers, staff members and casual workers. This Figure does not include the 86 workers contracted on daily basis.

### ↓ The Company Culture

Bralirwa is a company that focuses on the customer. For that reason the involvement of the stakeholder is crucial. The company is owned by:

- Heineken Group 70%
- Rwanda Government 30%

BRALIRWA is the sole producer in its sector in Rwanda. Its market share is estimated at 90% of total consumption, the difference being constituted, by imported beers. Its turnover is estimated to be more than 33.000.000.000 Frw (2008).

### ↓ Information Sharing

The company has two different locations in Rwanda, with different departments; there is the Human Resource Department, the Finance Department, the Sales and Marketing department, and Production Department.

The ICT department is under the management of the Director of Finance. The Director of Finance reports to the Managing Director of the company.

The head office in Kigali controls and monitors the information of all sites that is why the Kigali server is the only one that is used for storage and data access.

The IT department has three services, which are:

1. Software Development (for small applications)



## 2. Infrastructure Maintenance

## 3. The ISHA System (directories),

In Rwanda, one of the problems is, there are two factories in two different locations. The head office now controls and monitors information of all sites including information of and depots across the country.

The same Information System is used to check all the processes from the order of raw material to the warehouse data processing.

### ↓ Technology used

The company uses a LAN, WAN, Internet, and Servers.

There is one main system called ISHA (Information System Heineken for Africa), which is used in African Heineken Breweries. This system is suppose to combine the Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems with the exception of Human resource which uses the SAP application.

This main system can be classified as a Transaction Processing System, because it virtually records data from the different departments, from the two factories and depots across the country.

### **4 Data Captured**

The data which are captured differ from order of materials to stock, personnel, and quantities in production.

The relationship between the stakeholders and the information system is that there are database access rights on different levels in the company. Information can be assessed and stored on the servers. The drivers of the company are:

1. Business: The Company deals in the production of alcoholic and gaseous drinks.
2. Human: The Company employs 674 workers
3. Technology: The Company uses computers, network facilities, servers.

The system works well. It allows the integration of all Heineken Operating Companies Group in Africa. The main benefit is its control and information sharing.

However, once the ISHA system is down, it is hard to update it due to errors in the manual reporting system used while the system is down.

### **Stakeholders of the research**

1. Heineken Group (African and Middle East)
2. Bralirwa
3. Osei Tutu II, Institute for advanced Studies (Kumasi, Ghana)



### **1.5 Research Design and Research Methods**

This research involves both theoretical and analytical studies.

As shown in the Figure 1-1 below, the first phase of the study includes gathering primary data by conducting semi structured interviews, formulating questionnaires to determine the ICT maturity in different departments in the company and to determine the ICT controls in the company.

The technique used for data collection, includes reading published materials on ICT management and materials on CobiT and ITIL frameworks, which constitute the secondary data; the selected technique for primary data collection is the semi-structured interviews and questionnaires.

The first seven (7) weeks, which are actualised after a two month period of industrial placement, will be essential in gaining an understanding concerning where the company is and where it wants to be in terms of ICT management strategy and ICT governance.

The senior management and departmental managers of the company will be interviewed to identify what needs to be structured in terms of controls, monitoring and compliance.

The advantage of using semi-structured interviews is that the interviewer is allowed to explore with a view to clearing up vague responses or to ask for elaboration of incomplete answers. It offers the opportunity to have a face-to-face discussion with interviewee and allows the possibility of reviewing the framework on the spot and clearing up any misunderstanding, and reordering questions to facilitate the flow of the

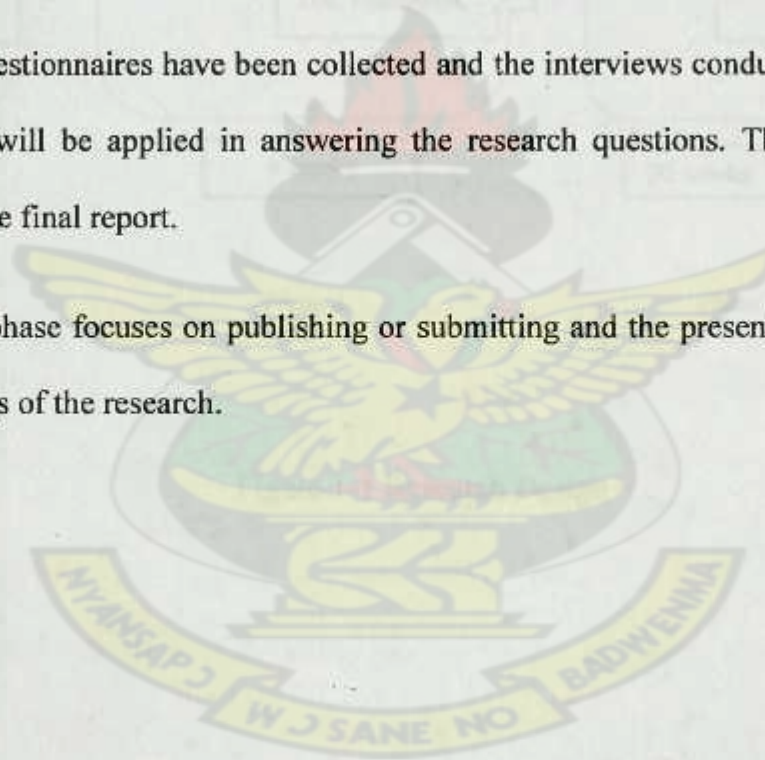
discussion. This may avoid any deadlock or misunderstanding that could occur. (*Tshinu S. M, Botha. G and Herselman. M, 2008*)

The second phase, that takes nine (9) weeks, includes literature review that covers the theoretical background of ICT maturity and governance using journals, articles and books.

The third phase, that covers a twenty week period, focuses on analysing the data collected.

After the questionnaires have been collected and the interviews conducted, an analytical description will be applied in answering the research questions. This phase includes writing of the final report.

The fourth phase focuses on publishing or submitting and the presentation (defend) the final findings of the research.





## ❖ Research Methodology

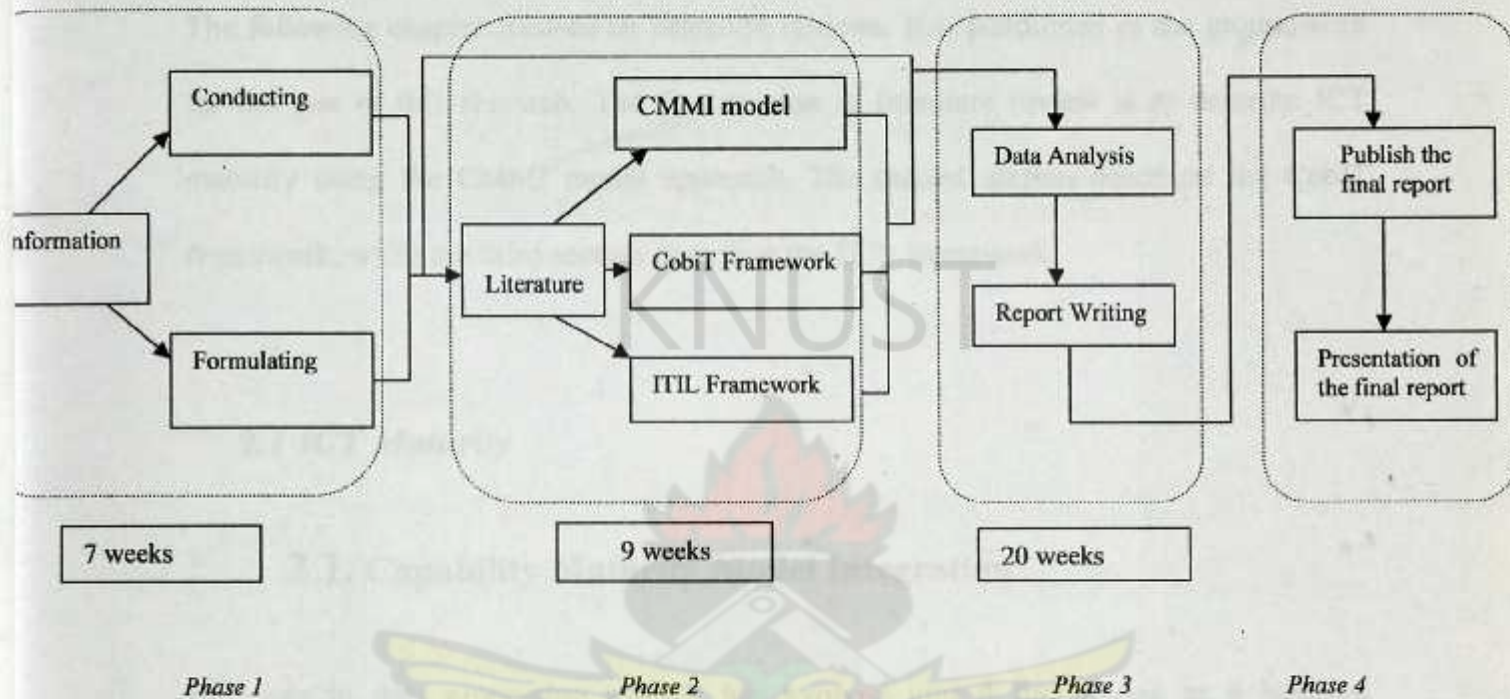


Figure 1-1 Research Design

## **Chapter 2 : LITERATURES REVIEW**

The following chapter focuses on literature reviews. It is positioned as the groundwork for the rest of this research. The first section in literature review is to describe ICT maturity using the CMMI model approach. The second section describes the CobIT framework, while the third section describes the ITIL framework.

### ***2.1 ICT Maturity***

#### **2.1. Capability Maturity Model Integration**

ICT role in data processing support has evolved into it functioning as a business resource of strategic importance and competitive advantage. This new role requires an update of ICT management strategies. *(CMMI model, 2007)*

Maturity modelling for management and control over ICT processes is based on a method of evaluating the organisation; this allows the company to assess itself from a level of non-existent (0) to optimised (5). This approach derives from the maturity model that the Software Engineering Institute defined for the maturity of software development capability. The maturity levels are designed as profiles of ICT processes that an organisation would recognise as descriptions of possible current and future states.

Using the maturity models developed, management can identify:



- The actual performance of the organisation (Where the organisation is today)
- The current status of the industry (The comparison)
- The organisation's target for improvement (Where the organisation wants to be)

### ❖ **The five levels of CMMI in the ICT context**

- ❖ **0 Non-existent;** Complete lack of any recognisable ICT processes. The organisation has not even recognised that there is an ICT issue to be addressed.
- ❖ **1 Initial;** There is evidence that the organisation has recognised that the ICT issues exist and need to be looked at. There are, however, no standardised ICT processes; instead there are ad hoc approaches that tend to be applied on an individual or case-by-case basis. The overall approach to ICT management is haphazard and lacks focus.
- ❖ **2 Repeatable;** ICT Processes have been developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of ICT standard procedures, and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and, therefore the incident of errors is high. However, repeatable processes based on practical experience are possible.

❖ **3 Defined;** ICT Procedures have been standardised and documented, and communicated through training. It is, however, left to the individual to follow these processes, and it is unlikely that deviations will be detected. The procedures themselves are not sophisticated but are the formalisation of existing practices.

❖ **4 Managed.** It is possible to monitor and measure compliance with ICT procedures and to take action where processes appear not to be working effectively. Processes are under constant improvement and provide good practice.

❖ **5 Optimised;** ICT Processes have been refined to the highest levels and the best practices, based on the results of continuous improvement and maturity modelling with other organisations. ICT is used in an integrated way to automate the workflow, providing tools to improve quality and effectiveness, making the organisation quick to adapt.



## ❖ *ICT and CMMI*

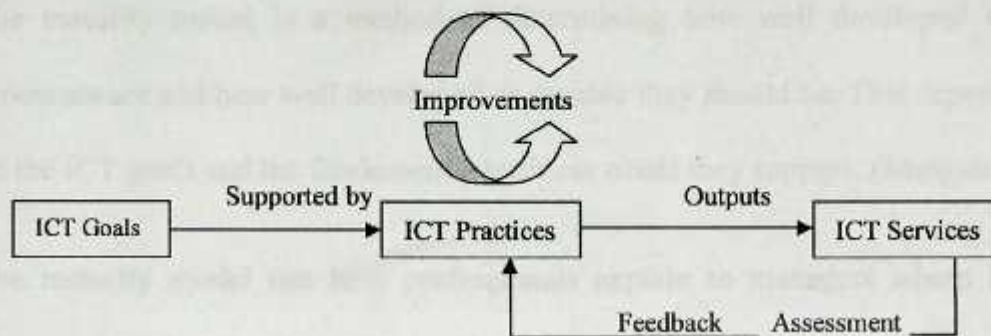


Figure 2-1 ICT CMMI key Ideas

Figure 2-1 describes the relationships between ICT goals and ICT practices and services. The application of CMMI is a process of constant improvement that links goals, practices, and ICT services.

ICT Goals are supported by and influences ICT practices of an organisation. In turn, the outputs of the ICT practices are confirmed in the services that the ICT deliver, produce or procure.

The ICT services are assessed and measured to permit the organisation to have a need for improvement. The reason why ICT practices are constantly improved is to guarantee better ICT services and this is done according to the customer or end user demands. Different methods exist to assess ICT services. The scorecards method is one of them. Nonetheless the CMMI model can be used as well. For example the ICT department may assess its ability of information security as at maturity level 1 (Initial level) or its

ability in respond to a request of change as maturity level 3 (Defined).

The maturity model is a method of determining how well developed management processes are and how well developed or capable they should be. This depends primarily on the ICT goals and the fundamental business needs they support. *(Marquis. H, 2009)*

The maturity model can help professionals explain to managers where ICT process management shortcomings exist so that they can set targets for where they need to be. The correct maturity level is subjective of the organisation's business objectives, the operating environment and industry practices. Particularly, the level of management maturity will depend on the enterprise's dependence on ICT, its technology sophistication and, most importantly, the value of its information. *(CobiT, 2007)*

In summary, maturity models provide a generic profile of the stages through which organisations evolve for management and control of ICT processes and are:

- a set of requirements and the enabling aspects at the different maturity levels
- a scale where the difference can be made measurable in an easy manner
- a scale that lends itself to pragmatic comparison
- the basis for setting as-is and to-be positions
- support for gap analysis to determine what needs to be done to achieve a chosen level
- taken together, a view of how ICT is managed in the enterprise.



In the following section an introductive presentation, first of the Control Objectives for information and related Technology (CobiT) framework, and then the Information Technology Infrastructure Library (ITIL) framework for quality of ICT services in the company will be presented.

## **2.2 IT Governance Framework**

For several organisations, the ICT that maintains it represent their most valuable but not always or usually less understood asset. Successful companies identify the benefits of ICT and use it to drive their stakeholders' value. These organisations also understand and manage the associated risks, such as increasing regulatory compliance and critical dependence of many business processes on ICT.

IT governance is defined as specifying the decision rights and accountability framework to encourage desirable behaviour in the use of ICT. It integrates and institutionalises good practices to guarantee that the organisation's ICT supports the business goals. (CobiT, 2007)

IT governance consequently facilitates the organisation to take full advantage of its information, in this manner maximising benefits, capitalising on opportunities and gaining competitive advantage. (Simons. G, 2005)

In today's multifaceted environments, management is continuously searching for accurate and timely information to make difficult decisions on risk, on change as well as

on control swiftly and successfully it is in light of this that IT governance structure is the most important forecaster of getting value from ICT. Effective IT governance encourages and leverages the ingenuity of a company's personnel in using ICT, not just the leaders. At the same time it ensures compliance with an organisation overall vision and principles. (CobiT, 2007)

### **2.2.1 Control Objectives for Information and related Technology (CobiT)**

CobiT is a framework and supporting tool that allow managers to close the gap in terms of control requirements, technical issues and business risks, and communicate these levels of control to stakeholders. Therefore, CobiT has become the integrator for ICT good practices and the umbrella framework for IT governance that helps in understanding and managing the risks and benefits associated with ICT.

The CobiT framework identifies 34 Information Technology (IT) processes divided across 4 Domains, a high-level approach to control over these processes, as well as 318 detailed control objectives and audit guidelines to assess the 34 ICT processes.

CobiT is intended to be an IT governance support to management in their understanding and managing of the risks and benefits linked with information and related technology. (CobiT, 2007)



## ❖ CobiT Framework

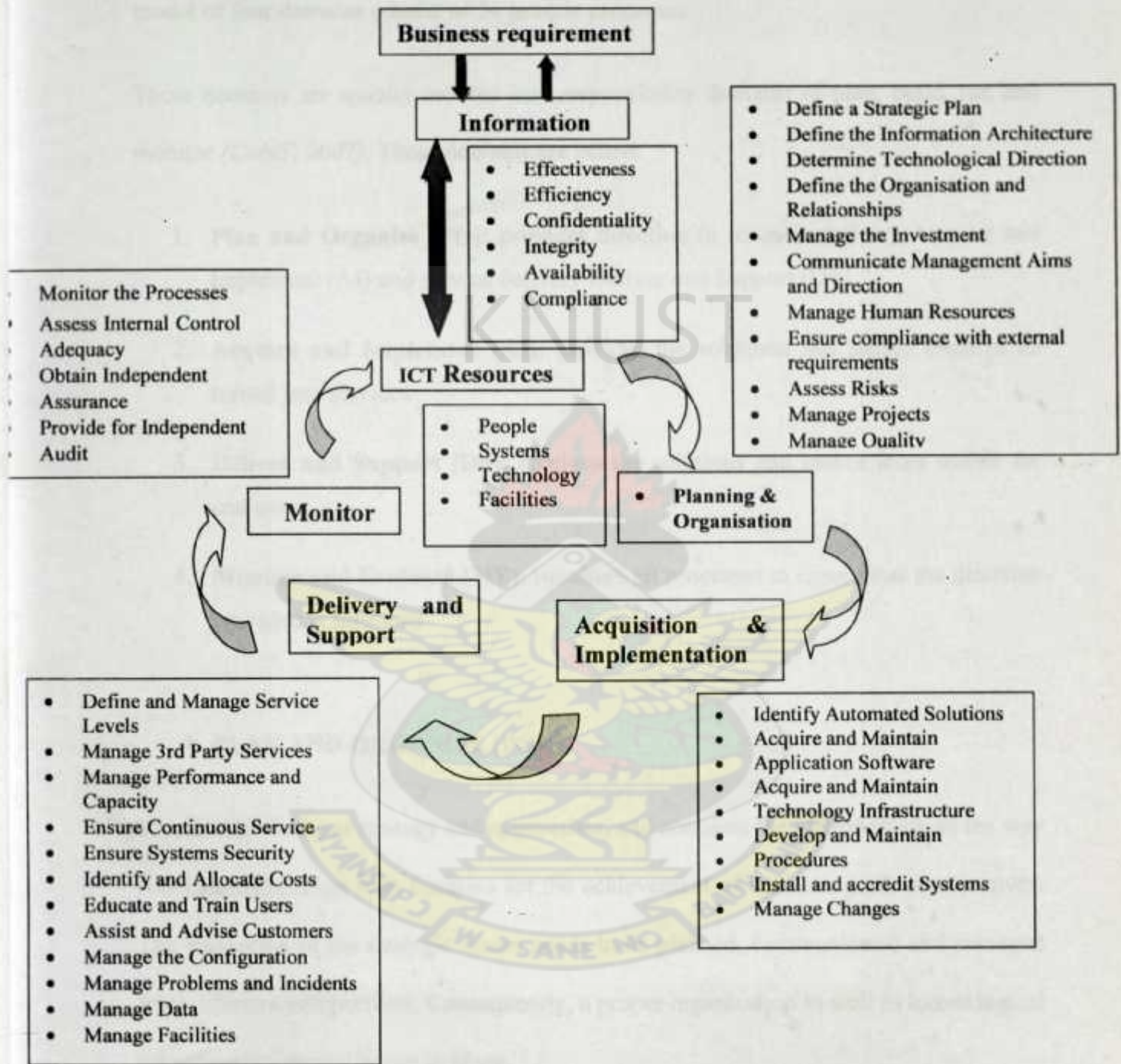


Figure 2-2 CobiT Framework

The overall CobiT framework as shown graphically in Figure 2-2, with its process model of four domains consist of 34 generic processes.

These domains are usually ordered into responsibility domains of plan, build, run and monitor (*CobiT, 2007*). These domains are called:

1. **Plan and Organise (PO):** provides direction to solution delivery Acquire and Implement (AI) and service delivery Deliver and Support (DS)
2. **Acquire and Implement (AI):** provides the solutions and passes them to be turned into services
3. **Deliver and Support (DS):** receives the solutions and makes them usable for end users
4. **Monitor and Evaluate (ME):** monitors all processes to ensure that the direction provided is followed

#### ❖ PLAN AND ORGANISE (PO)

This domain looks at strategy and approaches, and concerns the identification of the way ICT can better align with business for the achievement of business goals or objectives. The realisation of the strategic vision needs to be planned, communicated and managed from different perspectives. Consequently, a proper organisation as well as technological infrastructure should be put in place.



#### ❖ ACQUIRE AND IMPLEMENT (AI)

To achieve ICT strategy, solutions related to ICT need to be identified, developed or acquired, as well as implemented and integrated into the business process. Therefore, changes and maintenance of existing systems are covered by this domain to make sure the solutions continue to meet business objectives.

#### ❖ DELIVER AND SUPPORT (DS)

This domain focuses on the delivery of mandatory services which include service delivery, management of security and continuity, service support for users, and management of data and operational facilities.

#### ❖ MONITOR AND EVALUATE (ME)

ICT processes need to be regularly assessed and measured over time for their quality and compliance with control requirements. This domain addresses performance management, monitoring of internal control, regulatory compliance and governance.

#### 2.2.2 The Information Technology Infrastructure Library (ITIL)

The information Technology Infrastructure Library (ITIL) was established in 1989 by the UK former central computer and telecommunication agency (CCTA) to improve its ICT organisation. ITIL is now managed by the UK office of Government commerce (OGC) and is supported by the ICT Service Management Forum. To improve the focus on the customer in the planning, development and delivery of ICT, ICT

service management has become increasingly important. Nowadays ICT management is focussing particularly on the de facto standard ITIL (IT Infrastructure Library) for implementing ICT service management. (Marquis. H, 2009)

#### ❖ ITIL Processes Framework

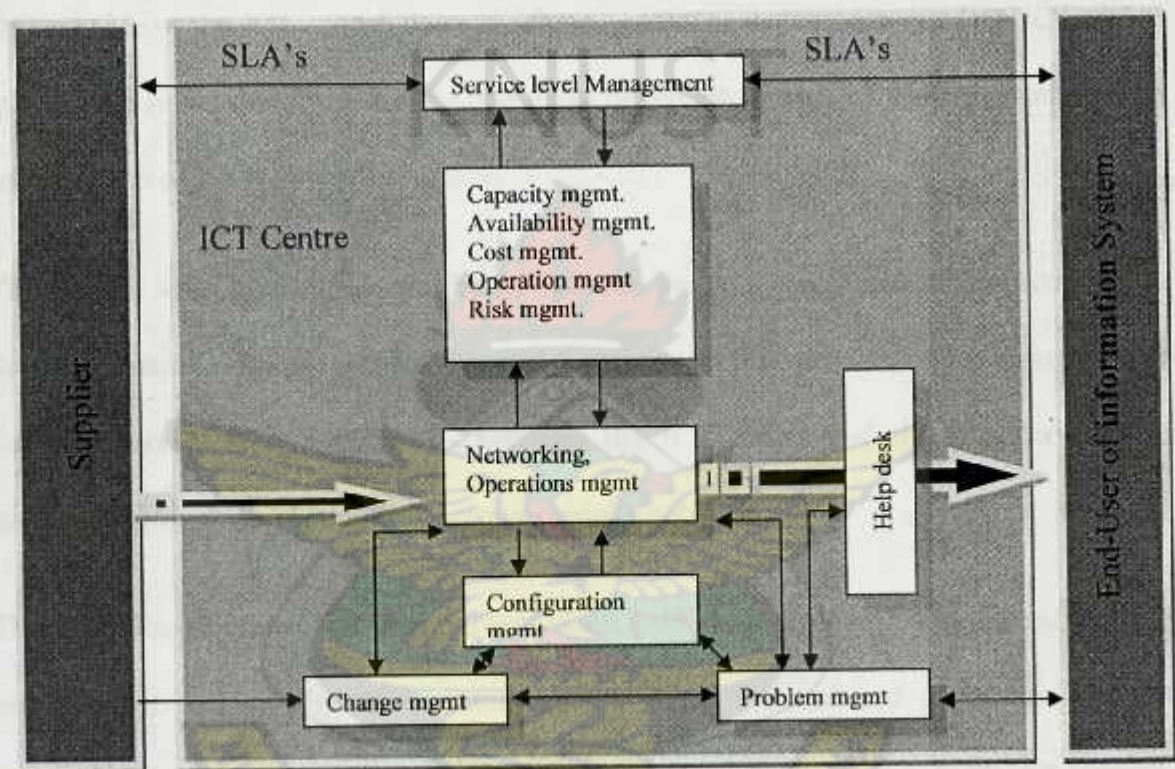


Figure 2-3 Relationship between ITIL processes



Figure 2-3 illustrates the relationships that exist between the supplier and the ICT centre; and between the end-user and ICT centre. The arrows show what generally might occur in practice with the ITIL processes. The ICT centre is responsible for the technical management of the communication network which is available to different organisations.

On one side of the ICT centre, there are the suppliers or the customers of the ICT centre and, on the other side there are the end-users or the employees of the organisation who are the users of the information system.

The service level agreements are drawn between the ICT centre and the departments in the organisation, indicating the rights and the duties of the various parties, though, there are also service level agreements between the ICT centre and the suppliers of the products which form part of the communications network.

There are also relationships with the processes: help desk, problem management, change management and configuration management. These management processes hold an important place in reporting incidents, when problems occur, and in removing failures. They can be referred to as change management processes being responsible for smooth proceeding of changes made in ICT. (Looijen. M, 1998)

Reasons for change varies, it may be due to new technologies, or errors in the system that require replacement. In addition capacity management, availability management, contingency planning and cost management, plays very important roles in the ICT centre. They are referred to as continuous processes constantly being focused on

capacity, availability, control and costs of the communications network. For example a user of an information system realises that certain software does not function properly. There is a reporting system of incidents to the help desk where the incident may be directly dealt with to the satisfaction of the user or sent to the process problem management.

However, once the incident is reported to problem management, from that moment, it is considered as a problem and problem management will have to establish the cause of the problem. In a bid to eliminate the error, a request of change is introduced an input to the process change management. Once the request is sent, this process controls all configuration items (CIs) which are stored in a configuration management database.

ITIL describes a range of subjects which try to cover the whole field of ICT management. The approach of ITIL is process based and has a strong connection with computing centres (Looijen. M, 1998)

#### ❖ ITIL Service Support processes

ITIL Service Support describes five disciplines which are: *Release Management, Configuration Management, Incident Management, Problem Management and Change Management.*



### **1. Release Management**

The objective of Release Management is to ensure that only authorised and correct versions of software are made available for operation. The activities are: *Release Planning, Distribution, Implementation of software and hardware into production, Management of Definitive Software Libraries and Definitive Hardware Store.*

### **2. Configuration Management**

Configuration Management aims at managing the ICT infrastructure by identifying, recording and controlling all configuration processes.

### **3. Incident Management**

The objective of Incident Management is to provide continuity by restoring the service in the quickest way possible by whatever means necessary (temporary fixes or workarounds). These activities are: *Detection and Recording, Classification and Investigation, Diagnosis and Resolution, Recovery.*

### **4. Problem Management**

The objective of Problem Management set out to ensure the stability of ICT services by identifying and removing known errors in the ICT infrastructure. The activities are: *Problem Control, Error Control, Proactive Problem Management, and Management Information.*

## **5. Change Management**

Change Management has to do with ensuring that standardised methods and techniques are used for efficient and immediate handling of all the changes to the ICT infrastructure while minimising change related incidents. The activities are: *Acceptance and Classification, Assessment and Planning, Authorisation of changes, Control and Coordination, Evaluation.*

### **❖ ITIL Service Delivery processes**

ITIL Service Delivery has five disciplines which are: *Service Level Management, Capacity Management, Availability Management, IT Continuity Management and Financial Management.*

#### **1. Service Level Management**

Service Level Management ensures continual identification, monitoring and reviewing of the optimally agreed levels of ICT services as required by the business. This is done in close cooperation between ICT services providers and customers. The activities are: Establish Function, Implement SLAs, Manage Ongoing Process and Review Periodically.



## **2. Capacity Management**

Capacity Management supports the optimum and cost effective provision of ICT services by helping organisations match their ICT resources with business demands. The activities are: *Application Sizing, Workload Management, Demand Management, Modelling and Capacity Planning, Resource and Performance Management.*

## **3. Availability Management**

Availability Management allows organisations to sustain ICT service availability in order to support the business at a justifiable cost. The activities are: *Realise Availability Requirements, Compile Availability Plan, Monitor Availability, and Monitor Maintenance Obligations.*

## **4. ICT Continuity Management**

ICT Continuity Management helps to ensure the availability and rapid restoration of ICT services in the event of a disaster. The activities are: *Risk Analysis, Management Contingency Plan Management, Contingency Plan Testing, and Risk Management.*

## **5. Financial Management**

Financial Management provides insight into, monitors and if necessary recovers cost of ICT services from customers.

The main purpose of ITIL is to facilitate enhancement in efficiency and effectiveness, and consists of an inter-connected set of best practices for lowering the cost, while

improving the quality ICT services, and management of the ICT infrastructure within a company.

It is important to note that though CobiT takes the perspective of audit and control, ITIL takes the perspective of service management, yet the two frameworks are more complementary than competitive and components of both can be taken to build a governance framework (Symons. G, 2005)

At this stage it will help us to differentiate between a model and a framework; there is a thin line between a model and a framework and has been confusing to many people. A model is a graphical representation of the real world or of a situation and usually has an input, transformation process and an expected result. Frameworks, on the other hand, have a broader definition but can be seen as sets of guidelines, graphical representations or structural representations that try to outline the possible courses of action to a preferred and reliable approach to an idea or a thought.



### Chapter 3 : METHODOLOGY

In this chapter we attempt to answer the questions we raised earlier in chapter 2 (Research Questions). The answers are the description of the current or the “as-is” situation of the Bralirwa in specific areas of ICT. An assessment of how the ICT department is currently perceived in Bralirwa or the “as-is” will be constitute our reference point. It is from this that directives and framework or the “to-be” situation will be drawn.

The assessment of the current situation of the company will be based on firsthand experience and information this researcher had while working for the company vis-a-vis what is supposed to be an integrated ERP system ISHA in use there

A series of semi structured interviews with the managements of different departments were conducted, the respondents include the *former Director of Finance (now the Managing Director of Bralirwa), the Internal Audit Manager, the company's Legal Representative, Accounting Manager, Control and Planning Manager, the ICT System Manager, the HR Manager, Marketing Manager, Planning and Logistics Manager and former ICT System Manager, and the Kigali Warehouse Chief.*

Secondly questionnaires, they were distributed to a selected sample of end-users. The method applied to get the respondents from the company is purposive or judgmental sampling, which is a non-probability sampling technique.

The advantage of applying the method is the researcher can select the units to be

observed on the basis of his own judgment about who will be the most useful or representative (Tshinu. S. M, Botha. G and Herselman. M, 2008).

### 3.1 Findings

Two of the problems faced by the company were *that of unskilled personnel in computing and the little ICT controls (IT governance) processes in place*. These problems were seen as contributing the factors to low productivity, ineffectiveness, inefficiency, which lead to low organisation growth.

In addressing these problems, one main question is asked, *“What Are the ICT maturity and the IT governance (Controls) systems within Rwanda commercial companies, specifically in Bralirwa, and do they have an impact on productivity, competitive advantage and growth?”*

However, in order to be able to answer the above question, more sub-questions are asked and are defined as follows:

Research Question 1 <i>How ICT applications are utilised in Bralirwa? (E-culture within Bralirwa)</i>
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This question focuses at the e-culture, on the attitude of the employees of Bralirwa towards the system within the company.



Respondents who were interviewed include: the *former Director of Finance, the Internal Audit Manager, the ICT System Manager, the HR Manager, Marketing Manager, Planning and Logistics Manager and former ICT System Manager, Financial Manager, Control and Planning Manager and the Kigali Warehouse Chief*, in answering question 1, the following questions were asked during the interview:

- a) Are Bralirwa assets and operations protected (including mobile assets, laptop)?

According to all interviewees, the assets of the company are protected. This is based on the perception that there is anti-virus software installed on the server, a passwords login system and access rights levels into system ISHA. However by the time I left the company, there was a virus in a number of computers of the company.

Regarding the use of mobile assets (laptops), plug-in devices (external drivers), the company relies on the professionalism of the employees. When asked about the water linkage in the server room, the System Manager noted the company needed to get a technician from outside Bralirwa to repair the air conditioning system.

- b) What is the e-culture within the company? (attitude of employee towards ICT)

The attitude of the employees is improving as compared to some few years ago. They feel that ICT is a major component of the corporate company but again feel that tasks can be performed without ICT (manual process) and they still use both.

Respondents feel that top management should do more in terms of educating users because the feeling is that ICT users do not know much about the new concepts objectives. For this reason they overlook ICT usage in general.

**c) Is awareness of ICT usage emphasised enough within the department, what about in the company?**

The company tried to put much emphasis on e-culture or the usage of ICT resources but the emphases are not strong enough and they are overlooked according to the respondents yet they admit that there had been a great improvement and more needed to be done. For example E-mails are sent now and then to remind the end user of the importance of the password sharing.

However, a follow up to enforce compliance is ineffective and is still a process that is still a challenge by the company.

**Research Question 2** *Does Bralirwa have any ICT strategy alignment with the business, meaning if ICT strategy exists and whether it is aligned with business strategy?*

This question focuses on ICT alignment with the business in the company, analyses the ICT objectives and tries to find out if they are aligned and communicated to the users (awareness of the ICT goals) in Bralirwa.



Respondents who were interviewed included: *former Director of Finance, the ICT System Manager, Marketing Manager, Financial Manager, Control and Planning Manager, Planning and Logistics Manager and former ICT System Manager, and the Kigali Warehouse Chief*, to arrive at an answer to Question 2, concerns were raised

**a. Are there any ICT objectives in Bralirwa?**

All the respondents acknowledge that the company (Bralirwa) had a well documented manual of ICT strategy and it is as in alignment with the business strategy. But this is because the manual had been developed and produced by Heineken Group the major partner.

Nonetheless, the manual stipulates that all the operating companies (OpCo's) have to implement all controls and required consideration in the strategy, unless these conflict with local laws and regulations. *(Ten Berg. P, 2008)*

In fact the ICT objectives are not known to all, the respondents, but this is because they are not communicated across the company. The company has a repository where all policy statements are stored but this repository is not accessed regularly by the employees. Some admitted never making any effort to access information in the repository.

**b. Does everyone in the organisation understand the value ICT to the business?**

Not all user or employees understand the added value of ICT. This was admitted by both Financial and was again mentioned by HR Managers. Generally, Bralirwa has an

efficiency expectations view of ICT organisation as a necessary business asset but do not subscribe to the idea that it can improve business performance or capabilities. The focus here is on maintaining the minimum service levels constant and at lowest cost.

**c. How do you see ICT? And why?**

The company (Bralirwa) consider ICT as a support system of the business but in putting premium on efficiency, its culture seems to be of much emphasis on producing and selling the products more than anything else.

**d. Is ICT and the business strategy are aligned?**

Respondents believe, in principle that ICT and business strategy were aligned but again noted that the quality of the ICT system was not entirely appropriate for the business (some modules not in use) and not entirely delivered in line with the business priorities as well.

It is true that, there are always additional patches in trying to make ISHA simple, adaptive to requests of changes by the users in different OpCo's but this makes it difficult for the general management of the system.



Research Question 3 *What are the ICT skills of the personnel of a company (Bralirwa)? (ICT user profile)*

This question focuses on ICT skills of the personnel within Bralirwa. The aim is to evaluate user maturity or knowledge of basic computer skills.

Respondents who were interviewed include: *former Director of Finance, the ICT System Manager, Marketing Manager, HR Manager, Planning and Logistics Manager and former ICT System Manager*, to answer the above question, the following other questions were asked during the interview:

**a. What are Computer skills within the company?**

Bralirwa employees have little knowledge of computer skills. This of course makes the company mislay in terms of productivity, efficiency and effectiveness as stated earlier.

According to one of interviewees, The Human Resource department, sometimes in the recruitment process, feels that there is no need to test a candidate for computer skills since the person will be working in a department which is different from the ICT department”.

However, the Human Resource Manager noted that respondents were not tested during recruitment on the assumption is that, a candidate with a university degree would have the basic computer skills. As for others without a degree; a basic computer certificate was required.

**b. How do you determine in what area and at what degree a personnel has to improve? (measurement indicators)**

All respondents acknowledged that a scoring scheme was not the best as employees were evaluated on group basis rather than on individual performances. The company uses a group performance basis as key performance indicator and individual annual objectives; it is from these annual objectives that a scoring scheme is carried out to evaluate the group performance. However, these individual objectives are not key performance indicators or goals for the ICT as a department.

**c. Does ICT in the Bralirwa stimulate innovation and learning?**

Training is offered to the new workforce but they are of short duration and limited in scope. The company seem to adopt this approach, and sees it as being the best alternative. However, not much is achieved by the new employee in terms of skills. The issue becomes worse in the light of the incidents of individuals calling for support and so do not feel the need to upgrade themselves.

Trainings to update and improve skills of senior staff offered but the putting such gained skill to use is limited.



**d. Is the company able to attract/ retain the talent it needs?**

Bralirwa is one of the best and leading commercial companies in Rwanda alongside MTN Rwanda but almost all the interviewees agree that its culture does not favour retaining the needed talents. For this reason young experienced employees of Bralirwa get better offers elsewhere and leave the company. The company is used as a platform of gaining work experience after which individuals resign when better opportunities arise elsewhere.

Research Question 4 *What is the focus, within Bralirwa, of ICT management? (ICT managerial paradigm)*

This question focuses on ICT managerial paradigm; the aim is to assess the ICT department as to how management and the user of ICT work together.

Participants in the interview include: former *former Director of Finance, the ICT System Manager, Planning and Logistics Manager and former ICT System Manager*, in finding answers to the above question, the following other issue were raises:

**a. What is the focus ICT management (ICT paradigm)?**

The general viewpoint is that the MCM paradigm helps to get the overview of the real system (ICT usage), and the information system. (Looijen. M, 1998)

Everyone interviewed admitted that the focus of ICT management, in general, was to

deliver services as the circumstance allowed; it is situational dependent, making sure the minimum service level was given and the minimum service operational.

**b. Are the ICT costs being optimised by Bralirwa?**

ICT costs are not optimised. This is the views of the interviewees, Bralirwa is suffering in terms of usability of ICT because, on one hand are the unskilled personnel and on the other hand is the structure of the ICT department. The level of ICT service delivery do not facilitate the process in the company.

**c. Does the business understand the value of ICT to the company?**

It was admitted that to some extent, Bralirwa understood the value of ICT but its activities were not a priority to the business process. The company's culture is the quality of its product and satisfies to its customer.

**Research Question 5** *Does any predefined ICT management process exist in Bralirwa and how well it is established? (ICT governance)*

This question focuses on assessing if there is any ICT controls (Governance) in Bralirwa, and how well these controls are established within the company.

Those who Responded include: *former Director of Finance, the Internal Audit Manager, the ICT System Manager, Planning and Logistics Manager and former ICT System Manager*, in answering this question, the following sub-questions were asked during the interview:



**a. Is there ICT governance (controls) in the company?**

Respondents acknowledge that ICT controls were observed on ad hoc basis; and no real force was exercised by management for the company to realise its full ICT potential.

However, there were some improvements in ensuring that employees complied with rules. All who responded believed that it was a progressive change.

**b. Are ICT activities understood and being managed?**

Not all ICT activities were understood; the ICT department is in a way isolated from other departments and the company's focus is making money by producing and selling. The ICT service levels are kept constant and at the lowest cost. When asked about the Disaster Recovery Plan, respondents acknowledge that the project had been pending for a while this was because of the little consideration or lack of understanding of its importance by the company's top management.

**Research Question 6** *What is the ICT management level in Bralirwa? (ICT organisation)*

This question focuses at the structure of ICT department with an aim to assess the management level within the company.

Respondents who were interviewed include: *former Director of Finance, the Internal Audit Manager, the ICT System Manager, Planning and Logistics Manager and former ICT System Manager*. In answering the above question, the following sub-questions were asked during the interview:

- a. Are ICT services being delivered in line with business priorities or appropriately?

The graphical representation below describes the relationship between ITIL processes within the company and shows how the ICT department operate.

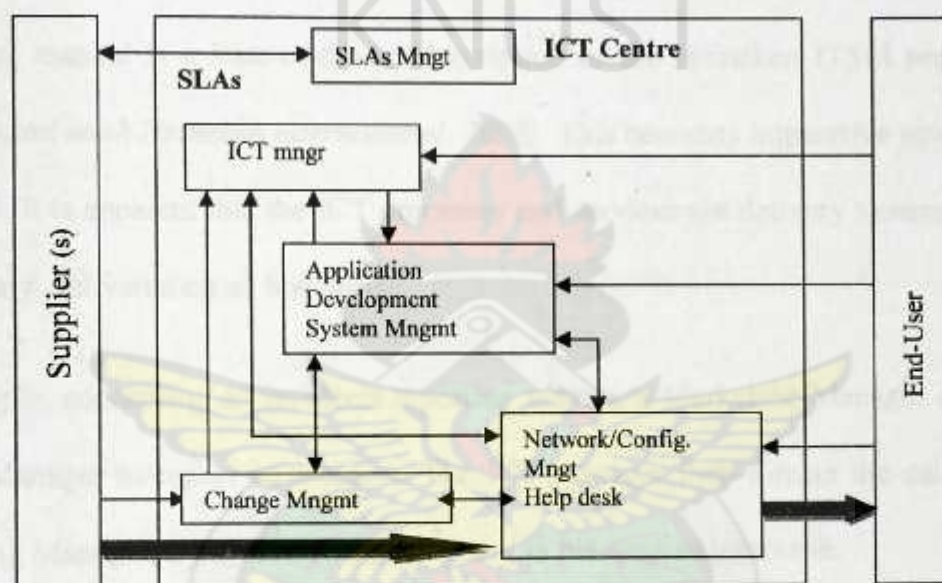


Figure 3-1 Representation of processes within Bralirwa

This Figure 3-1 characterises the ICT processes in the company. There are no standardised ICT processes. For that matter they tend to be applied on an individual or case-by-case basis.

From what is demonstrated as to how ICT operates in the company it is clear that; there is no formal incident reporting procedures, anyone can call or report an ICT incident to anyone in the ICT team. This approach makes it hard for the department to have an



adequate incident reporting system and the same interventions are repeated over and over again.

However it was reported that the company was studying the implementation of a new project called Information Technology Service Management (ITSM).

It is in response of the above state of affair that the ITSM project is trying to provide a compact reference work for the Heineken Group ICT Service Management framework. The project manual is a state-of-the-art description of the Heineken ITSM processes. (*Process hand book Heineken international, 2008*). This becomes imperative since from Figure 3-1, it is apparent that the ICT processes and services are delivery system within the company, delivered on ad hoc basis.

For example, concerning an incidents reporting system, a Marketing Manager can call the ICT Manager to report an incident. The ICT manager then directs the call to the Networking Manager, System Manager or to any in his team to intervene.

The ICT management level within the company is that, as mentioned earlier, the company subscribes to the idea of maintaining the ICT processes and services at a reasonable level of operation, constant but at the lowest cost as possible.

From the individual who responded to this Question there is some awareness of ICT, however, there are indications that processes; usability is reasonable, employees can perform their tasks to some extent and performance measurements exist but are not the best and are reported at informal basis.

**b. Are adequate security measures (confidentiality, integrity and availability) of information in place?**

Much has been done on security measures; acknowledged the interviewees. Access rights have been established, login password security system are applicable.

When asked about integrity, some personnel recognise that information is not as accurate as it should be; there is always a difference in fiscal data.

According to the Financial Director, there are delays in availability but these did not limit the ability of making important decisions.

**c. Are ICT's activities within Bralirwa measured to detect problems before it is too late?**

It comes to light that since ICT activities were not measured to detect problems. Problems were solved as they came and no formal detailed reports were filed and presented as long as the problem was solved.

*Research Question 7 Does the managements of the company (Bralirwa) ensure that internal controls are effective and efficient?*

This question focuses at efficiency and effectiveness of internal controls, and whether other managers in different departments feel that emphasis on controls is part of their tasks.



Those who were interviewed included: *former Director of Finance, the Internal Audit Manager, the ICT System Manager, the HR Manager, Marketing Manager, Planning and Logistics Manager and former ICT System Manager, Control and Planning Manager, Financial Manager, and the Kigali Warehouse Chief*. In finding answers to the above question, the following sub-questions were asked during the interview:

- a. Does top management ensure that internal controls are effective and efficient?**

Unfortunately the organisational culture and the control environment in the company are not supportive of the value delivery. Management is not reactive enough in addressing the requirements of the ICT control. Other departments believe that it is the ICT department responsibility to ensure that effective and efficient control of the system was maintained.

There were internal and external Audit processes are in place in order to measure and analyse the performance of ICT within the organisation.

However, it was noted by the Internal Audit Manager that the internal audit focused much on information security whereas the rest of the ICT processes were not audited or were given little consideration.

- b. What can the management of the company do to improve so that ICT can meet its objectives?**

Everyone who participated in the of interview believed that the top management had a task in hand in improving ICT perception in the company.

It was generally acknowledge that ICT adds value to the business process but its inefficiency in delivering is a handicap to Bralirwa.

**Research Question 8** *Are ICT risks, Controls, compliance and performances measured and reported within Bralirwa?*

This question focuses on measuring ICT risks, performances and compliance of the company's ICT department. The aim is to assess the procedural processes of the ICT department and the reporting system.

Those who were interviewed include: *former Director of Finance, the Internal Audit Manager, the ICT System Manager, Planning and Logistics Manager and former ICT System Manager, and the Kigali Warehouse Chief*. To facilitate answering this question, the following sub-questions were asked:

- a. What are the key performance indicators of ICT?**

As mentioned earlier, the key performance indicators of ICT are modules used in the system ISHA; it is according to this measurement that external audit (TOPS) evaluates the ICT department. (Adeleye. B, 2008)



The company uses groups of individuals as key performance indicator and individual annual objectives; it is from these annual objectives that a scoring scheme is carried out to evaluate the group performance.

**b. How are ICT processes monitored, and how often?**

Unfortunately, locally, the ICT department does not monitor its processes. The assumption is that as long as there is minimum ICT services are delivered, business processes are not interrupted.

**c. Are risk, control, compliance and performance measured and reported?**

According to everyone interviewed, ICT risks, controls are considered on ad hoc basis and casual assessments of project risks take place as determined by each project. Regarding compliance, the company relies on individual professionalism of employees which at best is really very limited.

The assumption here by the department is policies are there and well known to everyone no serious attempt are made to ensure that they are implemented.

**Research Question 9** *What is the impact of the ICT maturity and ICT controls on productivity in Bralirwa?*

This question focuses on the impact ICT skills of the employee (maturity) and the controls in place have on productivity of the company.

Respondents who were interviewed include: *former Director of Finance, the Internal Audit Manager, the ICT System Manager, Marketing Manager, Planning and Logistics Manager and former ICT System Manager*, to answer the above question, the following sub-questions were asked.

**a. Can ICT performances be linked back to business productivity in general?**

Bralirwa being the sole producer in its sector seems not to be bothered by competition. It has control of the market. For this reason, the management does not see any reason to invest more since everything is working well to a certain extent. Data processing may delay but decisions can be made.

In fact, the Director of Finance believed that despite the global economic crisis, Bralirwa has been protected from the effects despite anticipations of a setbacks but not losses in year (2009).

According to the Financial Manager, one cannot talk about productivity without referring to the productivity paradox. To him, rapid change in technology innovation and investment had brought global expectations of higher productivity and growth.

Theories on the productivity paradox; Professors and Authors like M. Porter, and R. Solow argue that though we can see the computer age everywhere, the productivity statistics seem to indicate that investment in a diffusion of ICT may not be bearing the expected fruit. *(Hughes. A and Morton. M. S, 2007)*



Professor M. Porter in his article "*Strategy and the Internet*" argues on the basis that internet innovation did not create new businesses or create anything new but has enhanced the existing businesses. (Salle. M, 2004)

In the same, Professor R. Solow argues that there is little evidence to suggest productivity has anything to do with technology innovation.

Other writers suggest otherwise. For example, Tapscott et al in the article "*Digital Capital; Business Webs*" has different views from those of Prof M. Porter. Tapscott argues that there is clear evidence to suggest that the internet has revolutionised e-business.

#### **b. Looking at ICT in Bralirwa, does it enable or hold back growth?**

This research assesses productivity in terms of usability of the information systems by employees upon this score, the respondents admit that productivity can be defined in many ways but looking at how ICT in general is utilised; in Bralirwa, and the fact that only few in the company have the requisite skills. Coupled with the complexity of the system not much growth could be attributed to ICT usage.

Physical movement of employees from one department to another is a common practice in the company, often making some unproductive.

Based on that point of view, the ICT department cannot be attributed credited as having contributed to productivity in general in the company. The Finance Manager admitted

that this could be due to the ad hoc processes approach to ICT.

Research Question 10 *Does ICT maturity and ICT controls in Bralirwa favour competitiveness of the company (Bralirwa)?*

This question aims at assessing if the ICT maturity and controls in the company favour competitiveness and growth especially with Rwanda adhering to the East African community.

Respondents who were interviewed include: *former Director of Finance, the ICT System Manager, Marketing Manager, Planning and Logistics Manager and former ICT System Manager, Control and Planning Manager, Financial Manager*. In finding answers to question 10, the following sub-questions were asked during the interview:

- a. **Does ICT put the company on a map to compete and to meet future market demands, especially with EAC adhesion of Rwanda?**

It has been observed in the last few years that there had been an inflow of foreigner companies especially from Kenya and Uganda into Rwanda. In fact a new brewery plant was being built.

The former Director of Finance confirmed that Bralirwa is set to embark on a regional market strategy in an effort to stamp its mark on the region following Rwanda joining the East African Community (EAC). According to the Director, the company with its ICT department are ready and up to the challenge even though he acknowledges that it require some changes in the user attitude.



**b. Are there adequate ICT systems, processes and controls within Bralirwa that allow competitiveness?**

Respondents acknowledge that, since there is no competition the system, controls and processes in place only operate at minimum level.

To the ICT System Manager, all this has to do with the company's culture: as long as there is no shortage of their products there is less consideration of the value of ICT.

According to the Planning and Logistics and Marketing Managers, ICT has helped in reports generation that allows decision to be taken and in controlling the market share even with products from neighbouring countries and members of EAC.

### ***3.2 Conclusion of the findings***

This section of this chapter describes what is lacking items are after assessing the "as-is" situation of the company this will be the determining factor in knowing what elements need to be modified and which new interventions should be added to make ICT use more beneficial in Bralirwa.

Based on the accepted list of items below, an assessment of what is missing items within Bralirwa is described. Source (Looijen. M, 1998)

- *Availability of ICT*; The ICT to be available when and where necessary
- *Compatibility of ICT*, the ICT to be compatible to various computers systems.
- *Confidentiality of data*, The data level of accessibility that guarantee privacy and confidentiality

- *Controllability of ICT*, the ICT to indicate controls measures with respect to data processing, information management processes.
- *Personnel allocation*, where technical and academic personnel allocation are available
- *Flexibility of ICT with respects to changes*, the ICT to be flexible to variation of information systems
- *Standardisation of ICT and compliance*, the standardisation of ICT to comply with.
- *Performance of ICT*, the ICT to indicate to what speed the information is processed
- *Reliability of operation of all component of ICT*, the ICT to be relied on with respect of correctness, completeness, deliverability, timeless and authorisation while used.
- *User-friendliness of ICT*, the ICT indicate the user convenience and the operability of ICT
- *Awareness of policies of ICT*, the ICT to facilitate awareness of policies
- *Alignment of ICT*, The ICT to facilitate alignment with the business processes
- *Productivity of ICT*, The ICT indicate the productivity associated with ICT in general
- *Measurements of ICT*, the ICT to facilitate measurement and benchmarking.

It is necessary to note that this list has been extended to cover additional issues from

which to select those to be presented in the research.



It is from this assessment of the current situation that the “to-be” situation and framework will be derived and presented in the next chapter.

**Question 1** *How ICT applications are utilised in Bralirwa? (E-culture within Bralirwa)*

**a. Are Bralirwa assets and operations protected (including mobile assets, laptop)?**

- Firstly, the ICT department has no measures to discipline those found not respecting the rules and regulations of ICT usage. No penalty for the misuse of ICT seems to exist.
- Secondly, the ICT department lacks the power to take responsibility and initiatives in any ICT process. It tends to depend on the Heineken group a lot and does not feel compelled to address these problems. Where anything is tried to instil discipline it is simple perfunctory.
- Nor is there any real pressure from either the ICT or the top management in emphasising the importance of respecting and compliance with ICT usage in general.

**b. What is the e-culture within the company (attitude of employee towards ICT)?**

- The company does not enforce implementation of its e-culture policies and compliance among staff.
- Many of the employees lack the required education on usability of ICT across the company.

**c. Is awareness of ICT usage emphasised enough within the department, what about in the company?**

- The department as well as the company in general lacks a strong tone and responsiveness to the use of the ICT resources (equipment).
- The department is not empowered to enforce effective of compliance with the company's ICT policy.

*Conclusion:* ICT applications usage is still a big challenge for Bralirwa. Much of the problem has been attributed to the unfriendliness of the ERP system.

This research, however, revealed that ICT department lacks a sense of responsibility and needs to do more regarding communicating processes, objectives, policies, e-culture, compliance as well as IT governance (controls).



The predicament is how one can reprimand someone who does not know the ICT controls ethical regulations and laws of a company when the same one is not respecting these laws and regulations.

**Question 2** *Does Bralirwa have any ICT strategy alignment with the business, meaning if ICT strategy exists and whether it is aligned with business strategy?*

**a. Are there any ICT objectives in Bralirwa?**

- The company (Bralirwa) lacks the complete implementation of ICT objectives even though they are aligned with the business strategy. The department focus is more on the usability of ERP system modules.

**b. Does everyone in the organisation understand the ICT objectives?**

- The company lacks on effective communication system which can highlight its ICT objectives as well as its ICT goals.

**c. How do you see ICT? And why?**

- In general feelings here show Bralirwa appreciates the contribution of ICT to its main business. ICT is seen as an appendix rather than an integral part of the business.

**d. Is ICT system (ISHA) well managed to deliver against the business strategy?**

The company has a well documented manual of the ICT system; every single module has its own documentation, but:

- the company lacks an effective ERP system; additional patches are developed in trying to make ISHA adaptive to required changes by the users in OpCo's but this makes it difficult for its general management.
- it lacks an adequate internal audit process. The focus of internal audit is on information security whereas the rest of the ICT processes are not audited or are given little consideration.

*Conclusion:* The alignment between ICT and the business is a major ICT governance issue, the Management has to define elements of requirements and control environment for ICT, aligned with its management philosophy and operating style it is only then that ICT can deliver against its expectations.

**Question 3** *What are the ICT skills of the personnel of a company (Bralirwa)? (ICT user profile)*

**a. What are Computer skills within the company?**

- Bralirwa lacks sufficient personnel with the required skills to utilise and perform tasks on the computer.
- The company lacks an effective recruitment process: a general test is administered to applicants regardless of the department recruiting.



**b. How do you determine in what area and at what degree a personnel has to improve?**

- The company lacks a modern scoring scheme, the scheme does not point out employees who do not perform accordingly since individuals are not assessed per se.

**c. Does ICT in Bralirwa stimulate innovation and learning?**

- The company does not benefit from the knowledge and skills acquired by trained workforce; the training is short and limited to new employees. For existing staffs the exercising of the required skill is still limited to just few individuals who acquire the skills.

**d. Is the company able to attract/retain the talent it needs?**

- Bralirwa has struggled especially in the ICT department in retaining its experienced workers. The company is used as a platform for gaining work experience after which employees resign when better opportunities arise.

*Conclusion:* Bralirwa should train its workforce a modern different approach when training and educating its personnel in accordance with its financial resources. The current approach is seen as being the best option because of the cost effectiveness but in terms of developing the required skills it is woefully inadequate.

The assumption that a University degree holder is computer literate and has ICT skill should be stopped. Every business process, nowadays, is automated and more

sophisticated ERP systems are now being used. Therefore each applicant, irrespective of academic status should be tested for computer literacy

Question 4 *What is the focus, within Bralirwa, of ICT management? (ICT managerial paradigm)*

**What is the focus ICT management (ICT paradigm)?**

- The management lacks an adequate structure that will address ICT issues. Because of the use of the method of “From Today to Tomorrow”, where the MCM paradigm is described, ICT processes work ad hoc.

**a. Are the ICT costs being optimised by Bralirwa?**

- The company lacks the required competences to optimise the value of ICT; the required ICT skills required and their applications must be seen as a sine qua non of growth and optimum productivity.

**b. Does the business understand the value of ICT to the company?**

- The company does not understand added value of ICT. The extent to which the value of ICT is understood in the business is not sufficient into make substantial input or contribution to the business process.

**Conclusion:** The general focus of the ICT department seems to be on minimum services with the attitude of “as longer as everythings work well”. However, this attitude does not help the operations of the department and in being part of the business.



The ICT management should change its focus and image by changing its attitude. It should set the example and should reinforce its policies.

**Question 5** *Does any predefined ICT management process exist in Bralirwa and how well it is established? (ICT governance)*

**a. Is there ICT governance in the company?**

- The company is deficient in robust IT governance or ICT controls processes implementation within the company.

**b. Are ICT activities understood and being managed?**

- Bralirwa lacks the management procedures in managing its ICT activities let alone understanding them fully and does not subscribe to the idea that ICT can improve business performance or capabilities.
- There is no Business Continuity Plan, no storage facility for the backups (magnetic tapes), it exists in theory very little consideration is given it. There is need to understand and factor ICT strategies into company's operation.

**Conclusion:** The ICT management processes should be well defined, so that ICT can deliver and enhance the business processes. IT governance is all about leadership and organisation structure and processes that ensure that ICT is sustainable and extends the company's strategy and objectives.

**Question 6** *What is the ICT management level in Bralirwa? (ICT organisation)*

**a. Are ICT services being delivered in line with business priorities or appropriately?**

Using the maturity model to illustrate what is seen by the ICT System Manager, the level of ICT management can be classified as being still at, the initial level (level1); this was noted by the Director of Finance as well.

- There are no standardised ICT processes, and in terms of accountability, individuals assume their responsibility, and are generally held accountable, even if this not formally agreed.
- The ITIL framework adopted in project (ITSM) which is being introduced is just a part of the framework. It does not give the full benefit of the framework
- There are no service level agreements between departments; only with third party as noted by every candidate.

**b. Are adequate security measures (confidentiality, integrity and availability) of information in place?**

- There are no conscious strategies to ensure integrity of information. Information is not as accurate as it should be; there is always difference in fiscal data.



- The company does not take efficient steps to ensure availability of information; delays are recorded in reports even though it does not limit the ability of making an important decision.

**c. Are ICT's activities within Bralirwa measured to detect problems before it is too late?**

- The department has not measurement metrics; ICT activities are not measured to detect problems or unwanted events.

*Conclusion:* The ICT organisation can be seen as operating on ad hoc ICT maturity level, ICT processes are informal; the department operating style is problems are solved as they come" no formal detailed report is filed and presented as long as the problem is solved. Optimising ICT investments should, in fact, must be a priority for Bralirwa.

**Question 7** *Does the management of the company (Bralirwa) ensure that internal controls are effective and efficient?*

**a. Does top management ensure that internal controls are effective and efficient?**

Unfortunately the organisation culture and the control environment within the company are not supportive of the value delivery.

○ The management is deficient in creativeness in addressing the requirements of ICT control; other departments believe that it is the ICT department to ensure controls is effective and efficient.

○ The department lacks adequate structure that conveys developed ICT procedures; its operational are ad hoc and compliance is informal and inconsistent.

**b. What can the management of the company do to improve so that ICT can meet its objectives?**

○ The company lacks the “top down” approach in addressing and emphasising the value of ICT.

*Conclusion:* It is disheartening to see how little importance is attached to ICT and how other departments believe that ICT control is responsibility of the ICT department only.

The company has no defined element of control setting for ICT; these elements include requirements regarding delivery of ICT services, ethical values, accountability and responsibility to all users of the information system.



**Question 8** *Are ICT risks, Controls, compliance and performances measured and reported within Bralirwa?*

**a. What are the key performance indicators of ICT?**

- The company lacks adequate key performance indicators of ICT.
- The company has no effective controls and compliance policies in place, so most of the employee have the attitude of “don’t care” towards the ICT system.

**b. How do ICT processes monitored, and how often?**

- Unfortunately, locally, the ICT department does not seriously monitor its processes.
- The department does not express risks in financial terms; this makes the company spend as little as possible on ICT.

**c. Are risk, control, compliance and performance measured and reported?**

The risk mitigation strategies are adopted to minimise residual risk to an accepted level.

The question one can ask is “what is the accepted level within the company”?

- The company does not have any strong ICT risks management; risks are considered informally, casual assessments of project risk take place as determined by each project.
- The company lacks adequate reporting and measuring system for risks,

compliance, controls, professionalism of employee vis-a-vis compliance is really very limited. Not all users are professionals.

*Conclusion:* The ICT department seems to subscribe to the idea of measurement metrics but the key performance indicators, the monitoring of processes and compliance policies are not fully adopted and implemented. The department should make sure to create awareness of policies among the staff of Bralirwa.

The evaluation process of the performances (individual and department) is just not working; because employees who are underperforming are recognised on an observation basis rather than on the scoring scheme.

**Question 9** *What is the impact of the ICT maturity and ICT controls on productivity in Bralirwa?*

**a. Looking at ICT in Bralirwa, does it enable or hold back growth?**

Bralirwa being the sole producer in its sector seems not to be bothered by the competition; the company still has the control of the market.

- o Unfortunately be the company's ICT maturity and controls do not enable productivity and growth.

**b. Can ICT performances be linked back to business productivity in general?**

Respondents admit that productivity can be defined in many ways but looking at how ICT in general is utilised; not only are required computer skills are minimal but the complexity of the ERP system (ISHA) also militate against productivity in general.



- The company has no adequate automated systems; physical movement of employees from one department to another is normal practice. And one can argue on these bases that ICT in Bralirwa is unproductive.

*Conclusion:* There is productivity associated with ICT, limiting physical movements of users by automating processes, having skilled personnel and having appropriate ICT capabilities can provide efficiency, effectiveness, productivity and growth yet Bralirwa does not position itself to take advantage of these benefits of ICT.

The company needs to subscribe to this idea, which will make her appreciate ICT added value to the business.

**Question 10** *Does ICT maturity and ICT controls in Bralirwa favour competitiveness of the company (Bralirwa)?*

**a. Does ICT put the company on a map to compete and to meet future market demands, especially with EAC admission of Rwanda?**

- The company has no strong ICT maturity of the personnel that would favor it in a competitive market as well as meeting future market demand if it is to extend its market share to other EAC members

**b. Are there adequate ICT systems, processes and controls within Bralirwa to allow competitiveness?**

- The company lacks adequate ICT systems, controls processes that would put her in a position to compete with Kenya for example where usage of more advanced ICT systems has evolved considerably.

*Conclusion:* The Company has controlled the market share (90%) but as the geographic expansion of the free trade zone is increasing, considering the EAC membership, the company should consider upgrading its strengths and taking corrective measures against its weaknesses vis-à-vis ICT if it is to compete favorably with other players in the market in future.





## Chapter 4 : PROPOSED DIRECTIVES AND FRAMEWORK

This chapter focuses on outlining the proposed directives of what needs to be done or the “to-be” situation; and framework for better ICT controls, higher CMMI maturity level and desired behaviour of employees towards ICT in Bralirwa.

Referring to the assessment in Chapter 3, statements and a framework are presented in this chapter with indication to address those missing items so as to develop a clear overview of what needs to be modified and what needs to be changed entirely.

The key to implementing an Information Management Technology framework is to add structure to unstructured information, to address elements such as ICT Controls, System Security, Storage and monitoring and compliance. (Tshinu. S. M, Botha. G and Herselman. M, 2008)

Question 1 *How ICT applications are utilised in Bralirwa? (E-culture within Bralirwa)*

As previously stated, the company has a well documented portfolio or policy statement repository in terms of every ICT process, but the portfolio is not accessed. In the proposed conceptual framework this question is descriptive in the key activities where awareness, accountability and responsibility are the cores of culture Bralirwa should adopt.

**a. Are Bralirwa assets and operations protected (including mobile assets, laptop)?**

- If there are strongly worded reprimands in the individual reports that are sent to the top management, the employees will feel compelled to follow the regulations of ICT usage (e-culture)
- The ICT department of Bralirwa need take responsibility and the initiative (even though Heineken has a hand in the development and documentation of policies) in the implementation and compliance of ICT policies.
- There should be a constant reminder excised locally; by the ICT department as well as the top management (including the internal audit) focusing on the importance of respecting and compliance of the ICT usage and ICT in general.

**b. What is the e-culture within the company (attitude of employee towards ICT)?**

- Bralirwa, especially The ICT department, is required to implement ICT policies and be strict on compliance.



- Educating employees on usability should be part of the induction process as portrayed in the research and the ICT department should once in a while organise meetings or seminars to address issues related to ICT in general.

**c. Is awareness of ICT usage emphasised enough within the department, what about in the company?**

- The management of Bralirwa needs to set a strong tone and responsiveness for its policies. The ICT department should insist on usage of its resources (equipment as well as the applications)
- There is no tool to effectively follow up on compliance but this should be inspired by Bralirwa's culture and politics.

**Question 2** *Does Bralirwa have any ICT strategy alignment with the business, meaning if ICT strategy exists and whether it is aligned with business strategy?*

In terms of business alignment, it will be best understood of the company's philosophy of consistent communication regarding values, strategies, initiatives, goals and objectives are visible.

From the conceptual framework this question is described in the ICT goals and objectives that are aligned with the business objectives, where ICT strategies and directions are adoptive in enabling the business processes.

**a. Are there any ICT objectives in Bralirwa?**

- The ICT department does have professionals that can make sure that the ICT strategy is pursued so that its goals and objectives can be achieved and they should, of course, be aligned with the business strategy.

However, these professionals should not limit their sights to the usability of the ERP system modules only but on every single ICT process.

**b. Does everyone in the organisation understand the ICT objectives?**

- Strong communication is required in conveying ICT objectives and ICT goals from the ICT department. At the start, all employees of Bralirwa need to be taught and informed about the significance of IT governance and how it is actually implemented across Bralirwa.

**c. How do you see ICT? And why?**

- The ICT should be perceptive and contribute to the business processes in general, by adding value to business. From this Bralirwa will consider ICT as being part of the business, then ICT will be seen as a necessary cost to the company.



**d. Is ICT system (ISHA) well managed to deliver against the business strategy?**

The company has a well documented manual of the ICT system; every single module has its own documentation, but:

- Bralirwa's ERP system is just like any other system, even though additional patches are developed and will not stop, Bralirwa needs to change the mindset of the employees mind set on its culture by educating them through communication.
- Bralirwa needs to review its internal audit process by making sure that every single ICT process is audited.

**Question 3** *What are the ICT skills of the personnel of a company (Bralirwa)? (ICT user profile)*

Lack of ICT skills in Bralirwa has been seen as one of its major disadvantages. In the conceptual framework, this question is generally descriptive in ICT controls objectives where skills and expertise are the heart of excellence.

There is no doubt that the Bralirwa needs, in terms of skilled labour, to subscribe to the following submissions:

**a. What are Computer skills within the company?**

- *Testing*; computer skills (literacy) should be mandatory requirement during recruitment interviews.

**b. How do you determine in what area and at what degree a personnel has to improve?**

- Bralirwa can adopt the CMMI model or scorecard method as a valuable scoring scheme. One of these schemes will point out employees who do not perform accordingly when used on individual performance.

**c. Does ICT in the Bralirwa stimulate innovation and learning?**

- *Invest*; Bralirwa need invest more into human resource development by educating and training of its workforce. An example is this project executed at Osei Tutu II, Institute of advanced ICT Studies in Ghana, where training is contract bounded, is one of the options in complementing the usual practice of training staff.

**d. Is the company able to attract/retain the talent it needs?**

- *Attract and retain*. Skilled labour in ICT is "hot cake" in Rwanda; companies rely much on ICT, nowadays. Bralirwa should rethink its position in retaining its talents, by creating the enabling environment for individuals to develop their talents. Such training should be encouraged and rewarded.



Question 4 *What is the focus, within Bralirwa, of ICT management? (ICT managerial paradigm)*

The ICT department need to maintain a clear and accessible repository of ICT policies (Explicit ICT policies and standards). In the conceptual framework, this question is descriptive in ICT control objectives where ICT controls policies, Risks, Procedures and standards are core elements. Each member of staff, from top level management to the junior staff should be made conversant with the repository. Management should then empower the ICT department to enforce compliance.

**a. What is the focus ICT management (ICT paradigm)?**

- *Streamlining.* The ICT department of Bralirwa should streamline itself by adopting ITIL framework in terms of its operations and services delivery, ICT staff are well equipped but the fact that the business does not fully understand the value of ICT makes its substantial input quite negligible.

**c. Are the ICT costs being optimised by Bralirwa?**

- Bralirwa is required to have competences to optimise the cost of ICT. This can be achieved by recruiting and maintaining effective and efficient skilled personnel.

**d. Does the business understand the value of ICT to the company?**

- *Exemplary behaviour.* The department requires demonstrating behaviours that will encourage responsibility and reinforce the importance of its added value to the business by ensuring that ICT is made part of the business.

**Question 5** *Does any predefined ICT management process exist in Bralirwa and how well it is established? (ICT governance)*

For the ICT department to overcome the misconception about its added value to the business it needs to adopt. In the conceptual framework this question is descriptive in ICT control objectives where IT governance is the central principle element.

**a. Is there ICT governance in the company?**

- Bralirwa is deficient when it comes to IT governance or ICT controls processes. The ICT department needs to implement controls and this can be done by adopting CobiT framework.

However, one should recognise that CobiT framework is very huge cumbersome to implement if Bralirwa can focus on only the control model and the focus areas of the framework it can improve dramatically its ICT controls (Governance).



**b. Are ICT activities understood and being managed?**

- *Proposed Framework.* Because this framework takes into consideration some aspect of ICT in Bralirwa regarding ICT controls and policies leading to accountability, awareness, compliance as well as skills of the y would be ideal in managing its ICT processes.

**Question 6** *What is the ICT management level in Bralirwa? (ICT organisation)*

The Bralirwa organisational structure does not help the ICT department in terms of conveying or making personnel understand the ICT value to the business. In the conceptual framework this question is descriptive in the ICT key objectives where responsibility is the centre of Bralirwa's structure or organisation.

The department is under the direction of the Finance Department, where ICT issues are not fully understood. As consequence there is minimum investment the company needs. The issues raised by discussing the question below:

**a. Are ICT services being delivered in line with business priorities or appropriately?**

There are no standardised ICT processes, and in terms of accountability, individuals assume their responsibility, and are generally held accountable, even if this not formally agreed upon.

- *The full ITIL process framework*; Bralirwa has just started using the framework but in part. When the framework is used fully Bralirwa will benefit in improving its effectiveness, efficiency, reporting of incidents as well as in managing the ICT infrastructure.

**b. Are adequate security measures (confidentiality, integrity and availability) of information in place?**

- *ICT Control framework*; It is imperative that ICT controls be implemented in Bralirwa, Management, by developing a control framework that fits Bralirwa for all ICT processes would take into consideration aspects such as availability, confidentiality and integrity.

**c. Are ICT's activities within Bralirwa measured to detect problems before it is too late?**

- *Adopting the CMMI model*. Bralirwa will be able to identify gaps in capability and will be able to explain ICT processes management shortcomings and set targets for where it wants to be.

Three frameworks are presented here. A combination of CobIT, ITIL and CMMI can be adopted since ITIL is being implemented but the ICT control framework that is being developed for Bralirwa can then serve the purpose of addressing this question.



**Question 7**     *Does the managements of the company (Bralirwa) ensure that internal controls are effective and efficient?*

The CobiT framework manual as well as the King II report describes IT governance as being the responsibility of the executive board of directors. This governance consists of the leadership, organisational structure and processes that ensure that the organisation's ICT sustains and extends the company's strategies and objectives. (CobiT, 2007)

The top management including the audit processes, as previously stated, does not fully support and assess the ICT controls, nor does it make sure compliance of the controls is in order.

In the conceptual framework this question is descriptive in ICT control objectives and the ICT key activities where expertise and responsibility are the core elements of leadership.

**a. Does top management ensure that internal controls are effective and efficient?**

Unfortunately the organisational culture and the control environment within the company are not supportive of the value delivery.

The management of Bralirwa in order to ensure that internal controls to see that are effective and efficient should take the following measures

○ Developing a tool that provide:

- Develop a tool that provides robust control objectives that define the goal of implementing policies,
- Makes sure that these policies are respected at all department levels (compliance),
- Measure and report performances

○ Making the audit department involved in supporting and operating adequately by conveying and auditing ICT processes and procedures.

**b. What can the management of Bralirwa do to improve so that ICT can meet its objectives?**

The ICT department is under the direction of the Finance department, where ICT issues are not fully understood. As a consequence there is a minimum investment. The company needs a:

- *CIO (Chief Information Officer)*, One of the most effective ICT operatives, who will be reporting to the Managing Director of Bralirwa. The CIO role is to act as a liaison for the business and ICT, and he/she communicates the implication of ICT to the business and articulates the needs of the business back to ICT. Without this seat in Bralirwa, ICT will always be limited to a support role as opposed to an enabler of the company.



**Question 8** *Are ICT risks, Controls, compliance and performances measured and reported within Bralirwa?*

Generally, risks mitigation strategies are adopted in order to minimise residual risks at an accepted level. Now the challenge is risks assessment should be understandable to the stakeholders and expressed in financial terms.

In the conceptual framework this question is descriptive in ICT measurements where risk mitigation is the core element.

**a. What are the key performance indicators of ICT?**

- ICT department of Bralirwa needs to adopt adequate key performance indicators by adopting the scorecard method or even the CMMI model with specific indicators, these should be guided by the Heineken Tops report management as well as Bralirwa's internal audit.

**b. How do ICT processes monitored, and how often?**

- *ITIL framework.* ICT processes should be monitored. The department and Bralirwa need to adopt the ITIL framework; which will be sufficient in monitoring the ICT processes.

**c. Are risk, control, compliance and performance measured and reported?**

The risk mitigation strategies are adopted to minimise residual risk to an accepted level.

The question one can ask is "what is the accepted level within the company?"

- o ICT department should adopt ITIL in addressing issues related to reporting and measuring of the risks, controls and performances management.

**Question 9** *What is the impact of the ICT maturity and ICT controls on productivity in Bralirwa?*

By inferring productivity in the context of this research, the conception of inputs goes beyond the traditional dimensions, where inputs are typically restricted to labour, physical capital and materials consumed. In the conceptual framework this question is descriptive in the ICT control objectives where skills and expertise is the centre of growth. The productivity of the company has not been attributed to ICT contribution but rather to the business satisfying the customer.

**a. Looking at ICT in Bralirwa, does it enable or hold back growth?**

The company (Bralirwa) being the sole producer in its sector, seems not to be bothered by the competition. It still has control of the market.



- For ICT to promote growth in Bralirwa, it is required to train its personnel in acquiring the computer skill needed so they can effectively and efficiently use the system productively as using adequately ERP system. By improving the information system Bralirwa can have the benefit of growth.

**b. Can ICT performances be linked back to business productivity in general?**

For Bralirwa to achieve productivity in the ICT context, the company should:

- *Consider automation systems* which limit employee movements from one department to another. This will enhance productivity and effectiveness in a practical way.

Technology innovation such as “expert systems” software, better ERP systems and the new generation of internet should be vigorously used.

The productivity paradox cannot be ignored here, but the difficulty is how to attribute the company's productivity to ICT performance.

As mentioned earlier, one should prove that the productivity and growth are related to ICT innovation. Looking at ICT performance in the company and taking into consideration the company's culture, it will be incorrect to conclude that the company's productivity has anything to do with ICT performance. On the other hand, there is little evidence to show that computers are unproductive even though some researchers have tried to point to the shortcomings of productivity measurements.

**Question 10** *Does ICT maturity and ICT controls in Bralirwa favour competitiveness of the company (Bralirwa)?*

Normally, from the performance viewpoint, the competitiveness effect of ICT is drawn from the impact that ICT has upon the productivity of the dynamic inputs. In the conceptual framework this question is descriptive in ICT control objectives where skills and expertise are the heart of competitiveness. The ICT maturity and controls in Bralirwa have been proved ineffective and inefficient to put the company in a competitive market share.

**a. Does ICT put the company on a map to compete and to meet future market demands, especially with EAC admission of Rwanda?**

- Bralirwa is required to equip its personnel based on computer knowledge. Improving the ICT maturity of its personnel, would favor Bralirwa in the competitive market as well as meeting the future market if it is to extend its market share to other EAC members.

**b. Are there adequate ICT systems, processes and controls within Bralirwa allow competitiveness?**

Bralirwa should consider the following:

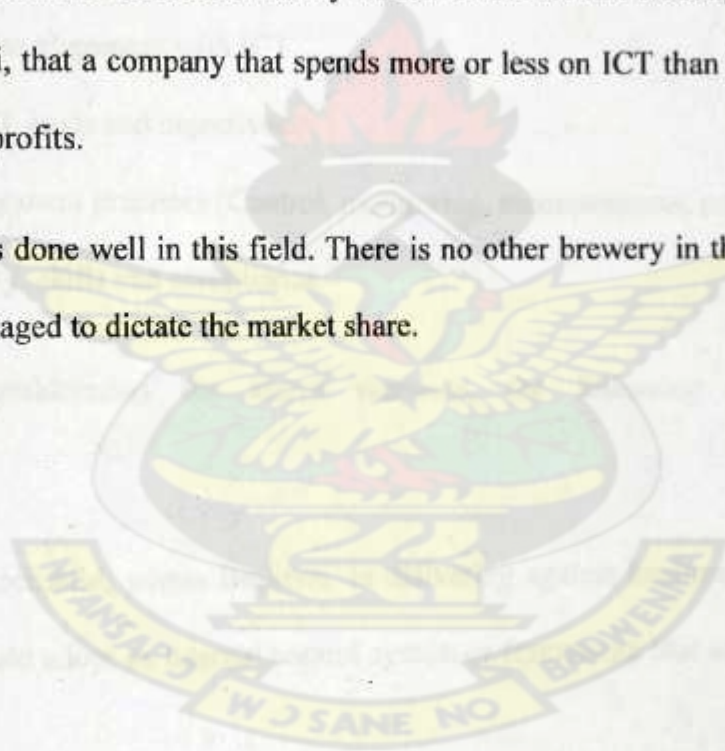
- *To learn*, learning about its competitors so as to adapt to the competition as quickly as possible since the geographical scope is expanding even though the market share has been controlled for a long time.



- *Use Porter's competitive forces*, Porter's competitive advantage model can be adopted in enabling the company to create superior value for its customer.

As Prof M. Porter has argued, in the competitive market with free entry, companies cannot earn sustainable gross profits because it will encourage other companies to enter and drive the prices down. However, there is a possibility of getting an unusually profitability opportunity in a short run, just the time for your competitors or new entry to get your strategy, because of the availability of ICT to all. For this reason, it will be hard to expect, a priori, that a company that spends more or less on ICT than its competitors will have higher profits.

The company has done well in this field. There is no other brewery in the country, and Bralirwa has managed to dictate the market share.



#### 4.1 Conceptual framework

The main objective of the conceptual framework is to give directives of what needs to be done or the "to-be" situation; and framework for better ICT controls, higher CMMI maturity level and desired behaviour of employees towards ICT.

Developing an ICT management framework requires considering elements such as:

- understanding the business as well as business processes
- business alignment with ICT
- the ICT goals and objectives
- management practices (Control, monitoring, measurements, policies)
- security, skills and compliance

Taking into consideration the above elements, the following framework is conceptualised.

For ICT to be successful, within Bralirwa, in delivering against business requirements, management should adopt an internal control system or framework that addresses issues, such as:

- organising ICT key activities into generally accepted best practices.
- identifying the major ICT resources and activities to be measured and controlled.
- defining the management control objectives to be considered



- creating a link to the business requirements

The Figure 4-1 below illustrates conceptually the ICT system management, which derives from Chapter 1 and describes what, has to be done. It includes the people, processes and technologies control and management of ICT services and infrastructure.

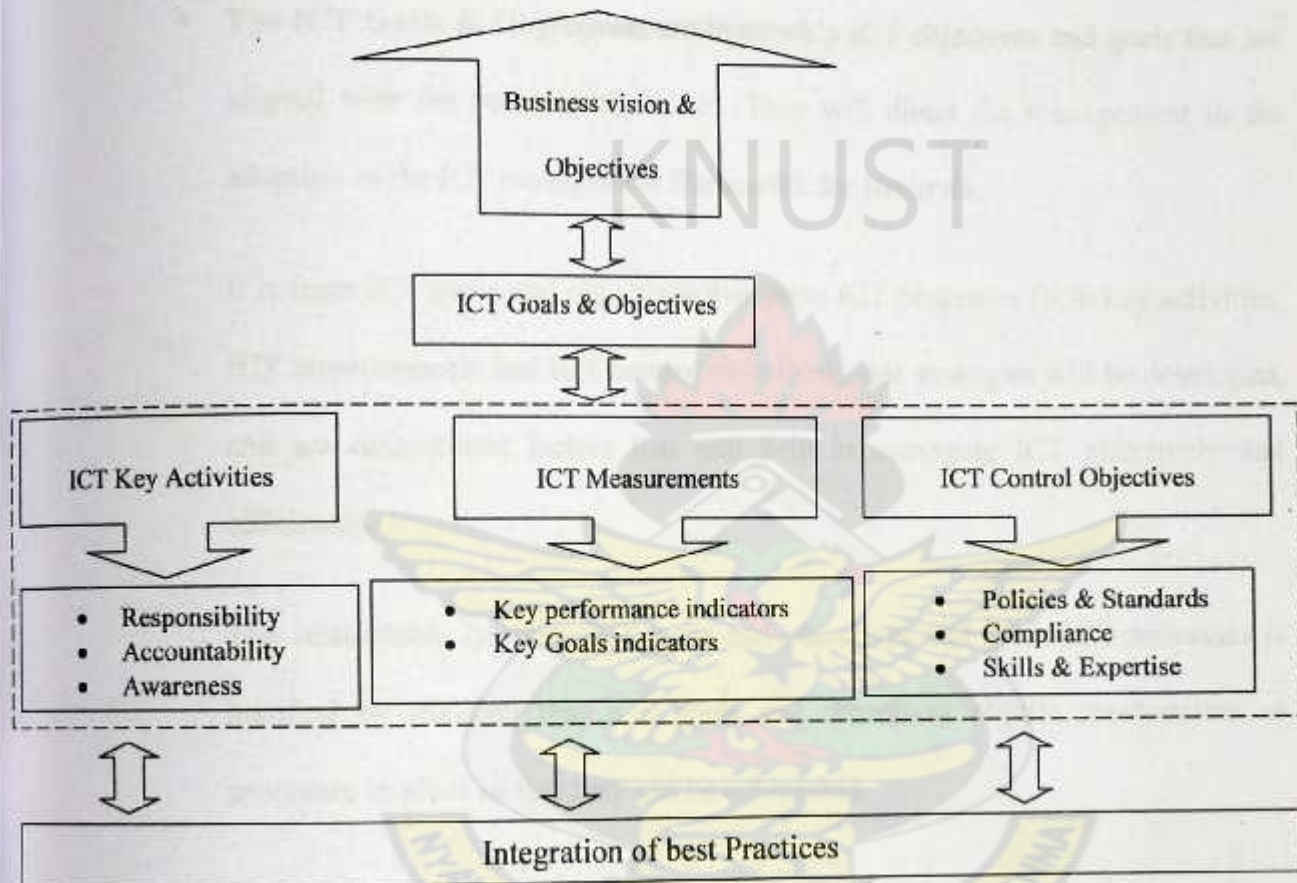


Figure 4-1 Conceptual Framework

- **The business's vision and objectives** are the foundation of Bralirwa's goals upon which the strategies and operational policies are based; they are the reason of the existence of the business in the first place and they lead to the implementation of the ICT capabilities.

The relationship between the business objectives and the ICT strategy is that there are requirements from the business to be satisfied by the ICT and the ICT provide services that will enable the business initiative in terms of strategy and decisions making.

- **The ICT Goals & Objectives;** are Bralirwa's ICT objectives and goals that are aligned with the business objectives. They will direct the management to the adoption of the ICT management framework for Bralirwa.

It is from ICT goals and objectives that these ICT processes (ICT key activities, ICT measurements and ICT control objectives) that strategies will be developed, and are determinant factors that will help in managing ICT effectively and efficiently.

The relationship between ICT goals and objectives and these ICT processes is justified by the fact that ICT goals and objectives require mechanisms or processes in place so that they can be achievable.

- **ICT key activities;** are Bralirwa's ICT activities performed on daily basis to carry out tasks. They make users accountable; have a sense of responsibility and the awareness of the ICT strategy not only for the ICT department but in every single level of management.

**1. Accountability;** is defined as the ethical concept of one being answerable for action towards information system usage within Bralirwa.



2. **Responsibility;** is defined as the ethical role everyone plays in performing daily activities in Bralirwa.
  3. **Awareness;** is the concept of informing, employees of Bralirwa being empowered with knowledge of the ICT goals and objectives, ICT controls, ICT policies including e-culture and compliance.
- **ICT measurements;** are defined as quantifiable measurements that evaluate the department on “what is to be done” and “How it should be done”, these measurements will determine the key goals and performance indicators of the individuals as well as the performance of the department.
    1. **Key performance indicators;** Are quantifiable measurements of individuals as well as of Bralirwa, agreed to beforehand that reflect goals or critical success factors and are used by Bralirwa to evaluate how well it is performing.
    2. **Key Goal indicators;** are measurements of what has to be accomplished in terms of ICT in general and used by Bralirwa to evaluate if the process goals or targets have been achieved.

The paramount idea here is that the evaluation of Bralirwa should not be restricted to a financial evaluation only but should be supplemented with ICT user satisfaction, in the context of recognising that ICT is an internal service provider that has the ability to innovate as well.

- **ICT control objectives** are Bralirwa's objectives of IT governance that will lead into determining the ICT standards, ICT policy statements, Skills or Expertise as well as ICT budget and resources that will encourage a control environment that is based on a culture that supports value delivery of ICT.

1. **Policies and Standards;** are formal documents, that describe a plan of actions so that decisions are guided to achieve logical results (policies). The other describes the already established uniform technical norms, methods, processes and practices of Bralirwa (standards).

2. **Compliance;** is defined as the concept of conforming to policies, standards, laws and regulations of Bralirwa that have been clearly defined.

3. **Skills and Expertise;** are both characteristics and knowledge of an individual and are consequences of human learning capacity for extensive adaption.

- **Integration Practices;** are the adopted best practices that are based on Bralirwa's culture that should promote growth, productivity, efficiency, effectiveness and innovation.

In this particular framework are techniques or methods from ITIL, CobiT framework and CMMI model through study and research which will prove reliable and the outcome lead to desired result.

The relationship between the ICT processes and the integrated practices is



that these ICT processes ensure that Bralirwa ICT goals are sustainable through integrated best practices.

It will be necessary to note that it is practically impossible to realise all these changes; but short and long terms resolution or goals are needed and should be looked at.

#### **4.2 Short Term Directives**

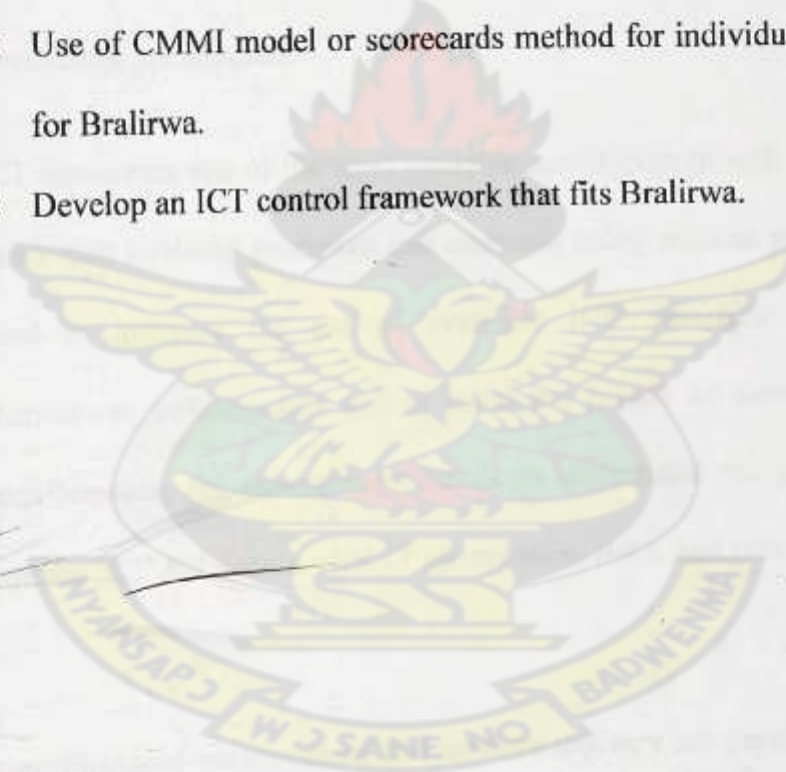
In the short term Bralirwa should consider:

- Test, educate and train its personnel
- Retain its elite ICT personnel
- Implement all of its ICT policies
- Change the attitudes towards ICT
- Implement robust controls of ICT
- Measurements of ICT processes as well as individuals

### **4.3 Long Term Directives**

In the long term Bralirwa should consider the following:

- Restructure ICT
- Fully implement the ITIL framework
- Implement the CobiT framework
- Use of CMMI model or scorecards method for individuals as well as for Bralirwa.
- Develop an ICT control framework that fits Bralirwa.





## **Chapter 5 : BENEFITS OF DIRECTIVES AND FRAMEWORK**

This chapter focuses on describing the benefits of the proposed directives and framework introduced in the previous chapter. In Chapter 4, directives and a conceptual framework are introduced. The main purpose of this chapter is to underline advantages and disadvantages of the short and the long term directives that are expected if these directives and framework are adopted.

For Bralirwa, ICT represents one of the most valuable assets even though many, within the company, think that business processes can continue using manual processes. The management need to optimise the use of available ICT resources this includes applications, information, infrastructure and of cause the people or users. In order to address these requirements, the management needs to understand the position of its company structure for ICT and decide what IT governance, risks, and control need to be provided.

In ICT controls, performance measurement and services delivery are paramount reasons for the integration of best practices of three frameworks which have been proposed.

These are:

1. **CobiT framework**, focusing on ICT controls within Bralirwa,
2. **ITIL framework**, focusing on ICT service delivery in Bralirwa,
3. **CMMI model**, focusing on evaluating the ICT maturity performance in Bralirwa

CobIT, CMMI and theoretical framework best practices are integrated and adopted to manage the business activities in general in relation to business alignment with ICT, while the ITIL and CMMI best practices are integrated and adopted in managing the technical aspects of ICT infrastructure as well as the service delivery. However CobIT and CMMI can as well be used for the technical part of ICT.

The list of benefits of short and long term directives is expected to be long and clear but due to the fact that there are missing implementations, in some cases, it is not fully clear due to the missing information.

### **5.1 Short term directives advantages:**

1. *Individual assessment.* The benefit in castigating is in the form of a statement that reflects the individual report sent to top management. Not only can it be seen as an individual assessment but it can make the employees perform accordingly.
2. *Exemplary behaviour.* The benefit of setting a behavioural philosophy in support of the business goal is that the ICT department will be proactive in changing environment and be able to shape its destiny.
3. *Constant reminders;* are essential in term of awareness of ICT policies as well as compliance of usability of ICT resources. This can be reinforced by being audited.
4. *Implementing policies.* Bralirwa will gain, by implementing these policies through a framework of control throughout all levels of management leading to severity on compliance.



5. *Educating employees on usability.* By doing so Bralirwa will benefit from the creation of elite or professional workers who are effective and efficient using ICT in general.
6. *Setting the tone,* Top-Down approach is proposed in setting the tone for the ICT objectives, goals, ICT controls, risks and e-culture. This approach is basically essential as a communicating system approach that starts from the top management where decisions are taken and goes down to the grassroots level in the company. Benefits in adopting this approach, include the following:
  - Simplicity and Speed in making decisions because of the few people involved in the process
  - Deeper implementation of processes when completed
7. *Compliance;* the only tool that can effectively follow up on compliance is the culture and the politics of Bralirwa that inspire compliance. The benefit is that everyone in Bralirwa will have common understanding and common drive in achieving the business goal or goals.
8. *Testing candidate in the recruitment process;* Bralirwa will benefit in cost reduction on the training and education scheme, and will as well have personnel with certain level of computer skills.
9. *Educating and training company's staff;* Bralirwa will not only adjust staff to match demands reflected by technological innovations, but it adjusts to expertise and skills as well.

10. *Change the mind set*; Bralirwa will benefit, by educating through communication, on accepting and embracing changes which will continue to happen as long as ISHA is still in use and ICT innovations are inevitable, if only the process of change management in the ITIL framework can be optimised. Then patches of the system ISHA can be well understood.
11. *Attract and retain*. Skilled labour in ICT is “hot cake” in Rwanda; every single company relies much on ICT, nowadays. Bralirwa should rethink its position in retaining its talents with certain bonuses.
12. *Exemplary behaviour*. The benefit of setting up a behavioural philosophy in support of the business goal is that the ICT department will be proactive in changing the environment and be able to shape its destiny.
13. *Implementing IT governance*. Since there is ICT governance manual developed by the Heineken group, Bralirwa needs only implementing it to derive immense benefits.
14. *Automation systems*. The automated tools are needed in Bralirwa's main area to support improvement of processes and automatically monitor, and detect controls irregularities.

#### 5.1.1 Disadvantages

- Being very rigorous because everything (policies) is clear.
- Not being able to realise benefits of the solution very quickly.



- Cost involved for automation
- Unemployment

By implementing these short term goals, Bralirwa will benefit a lot in term of laying the foundation for long term goals as well as reduce cost by effectively and efficiently using ICT.

### 5.1.2 Critical Success Factors for Short term directives

The Critical success factors define the most important issues for management to achieve control over and within its processes. They must be management oriented implementation directives and indentify the most important things to do, strategically, technically and procedurally these are:

1. User involvement,
2. Senior management support, (Including Heineken Group Management)
3. Clear understanding of:
  - Business requirements
  - Service to be delivered
4. Training and educating end-users,
5. Strong communication in conveying information.

## 5.2 Advantages of long term directives:

1. *Clear strategies.* Having clear business requirements and clear understanding of services to be delivered, the ICT management would be able to have clear strategies that will help define the ICT resources, and capabilities including computer skills required to execute its role as part of Bralirwa.
2. *Strong Communication.* In communicating about IT governance across, Bralirwa will exhibit the excellent approach described earlier, top-down approach, and will allow an open and honest (360 degree) of communication policy that maximises information flow to and from key stakeholders.
3. *Enabler of the business.* The benefit of adopting the concept of ICT enabler of the business is that investments are not limited and ICT contributes to the business in general by adding value to the transformation process of the business.
4. *Audit processes.* The benefit of having ICT internal audit process fully developed is that Bralirwa will promote compliance, accountability as well as responsiveness to control processes of ICT in general.
5. *Scoring scheme.* The benefit of having a valuable scoring scheme, which assesses individual performances, is that Bralirwa will be able to point out employees who do not perform accordingly.
6. *Streamlining.* By restructuring or streamlining the ICT department, Bralirwa will gain the advantage of focusing and describing the processes with respect to improving its services as well as the management of ICT infrastructure.



7. *Competence*; Bralirwa by having competences will be able to optimise the cost of ICT. This can be translated into effectiveness and efficiency of skilled personnel.

8. *The full ITIL process framework*. The framework will be beneficial to Bralirwa in improving upon its effectiveness, efficiency, reporting of incidents and in managing the ICT infrastructure. There are many benefits in adopting the ITIL framework including:

- *Reduce costs*, ITIL framework helps in reducing cost by increasing labour efficiency. An example, is the labour savings and improved operation efficiency of an ERP system compared to the time required to acquire similar operation of the information manually.
- *Improving productivity*, it is possible to increase productivity and revenue through defining, tracking, and optimising the availability of services to users of Bralirwa.

9. *ICT Control framework*. Can be used as a supporting tool that allows the managers to close the gap between control requirements and technical issues business risks. This also communicates level of control to all stakeholders.

The benefits of implementing these frameworks as a governance framework include:

- *Common understanding between stakeholders*. When developed well, not only will every single stakeholder be evolved but it does get everyone in

Bralirwa to be on the same page and moving in the same direction.

- *Alignment between business and ICT.* The value of ICT to the business when aligned includes considering ICT as part of the business, effectiveness, efficiency as well as performance measures that are used to reinforce and align company behaviour.

10. *The CMMI model*, will provides the following benefits:

- *Effectiveness, efficiency assessment and improvement.* Bralirwa by assessing its ability of information system and its process management shortcomings will be able to set new targets.
- *A common, integrated vision of improvement.* This is a common understanding by all stakeholders of improvement principles including mission and objectives of Bralirwa.

11. *The CIO.* A CIO is involved with analysing and reworking existing business processes, identifying and developing the capability to use new tools, reshaping the organisation's physical infrastructure and network access, and identifying and exploiting the organisation's knowledge resources.



The benefits of having a CIO are that, such on individual:

- *translate the ICT issues into business terms*
- *demonstrate that the ICT delivers value to the business*
- *act as liaison between ICT and the business*
- *ensures that ICT is part of the directors team where strategy discussions begin and end.*

**12. Learning;** the benefit of learning about its competitors and adapting accordingly is to try and be a step ahead of the competitors on the way they operate in their respective countries and try to avoid surprises.

**13. The benefits of Porter's five forces are.** Porter's five forces is a tool used in knowing where power lies in a business situation.

1. It is useful in the sense of knowing the strength and weakness of your competitiveness and the position you want to move into.
2. It provides insight on productivity.

**14. Finally the adoption of these proposed directives and framework will enable, Bralirwa to benefit in ensuring that:**

- ICT and business are aligned,
- ICT is seen as an enabler of the business and maximises its benefits,
- ICT resources are used responsibly and risks managed accordingly,
- ICT cost reduction, and Better ICT service delivery.

### 5.2 1 Disadvantages

1. High cost of training if not careful.
2. Lack of support from the management of Bralirwa.
3. Framework not designed to address specific technologies
4. Inability to fully implement the frameworks
5. Lack of tools and infrastructure to support the full implementation
6. Audit personnel not being able to use these frameworks as internal control tools
7. It may be difficult to estimate cost of these projects.
8. A big salary package for a CIO
9. Underestimate the importance of the strengths or the weaknesses of other companies

Despite these disadvantages, it must be pointed out that by implementing these long term goals Bralirwa will benefit in better ICT controls (governance) as well as a better level of CMMI. Of course this gives Bralirwa the edge of competitiveness in a shared market.

### 5.2.2 Critical Success Factors of Long term directives

The Critical success factors for the long term directives are:

1. Involvement and training of the user,
2. Senior management support, Including Heineken Group Management
3. Funds



## Chapter 6 : CONCLUSION

The research has helped in understanding how ICT is still perceived in Bralirwa in particular and Rwandan commercial companies in general. Even though the Rwandan government is advocating ICT advancement and this brings people's reform in people's perception of the ICT industry, still more has to be done on the level of Bralirwa and by implementing, other commercial companies.

Regarding ICT or IT Governance, there is no "silver bullet" solution but investing time and funds in understanding the various facets of Bralirwa's business model, operating mode and its culture will facilitate the drawing or developing of a robust and compatible IT governance and ensure that it is in line with, and is supported by, the corporate culture and operational environment.

Every single company has a unique "personality" that reflects the company's culture and operating style. For this reason, implementing IT governance does not follow a one-size-fits-all state of art. Nevertheless, for the IT governance to be effective for Bralirwa, there is needs to reflect the general culture and be combined into the operational basics of the company.

At Bralirwa, in the short term, a big shift in the company's culture, developing skills as well as a new perception of ICT in general (including e-culture) are major requirement if she wants to be productive and perform excellently in addition Bralirwa should develop

an integrity strategy (moral authority) for its employees and insist in them a sense of satisfaction in every task they perform.

In the current economical crisis the ICT department like any other department is required to cut costs. In the proposed frameworks ICT will be able to contribute not only by being part of the business and helping in taking steps on cost cutting but also by effective use of ICT systems and business alignment.

However if change is needed in Bralirwa perception of ICT, it should start from management and the employees will follow.

The Top-down approach is mandatory in restructuring Bralirwa so that the ICT department can influence the business and finally ICT controls would become everyone's concern even though the tone is set from the top.

Improvement has been one of the most articulated expressions during my industrial attachment at Bralirwa, through the importance of this term cannot be controverted, it is necessary to measure the extent to which it is achieved in the company.

The necessity of Bralirwa's ICT department to facilitate this idea of "measurement-driven"; demands that the department should know its ICT status and decide what level of management, services and controls it should provide.

Creating effective IT governance is critical if Bralirwa is to exploit ICT to achieve its business performance goals and, as it has been demonstrated throughout the research; IT governance is a responsibility of senior management and must fit together with other

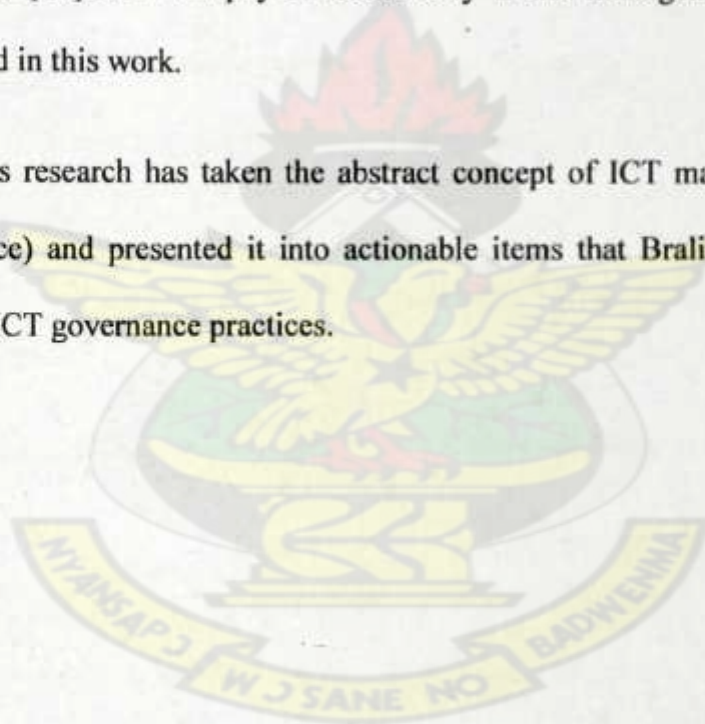


governance structure of the company.

There is no doubt that a good ICT governance framework pays a big dividend, Bralirwa will need to make sure it has a comprehensive and coordinated accountability framework that streamlines and focuses its resources to provide maximum and sustainable ICT value.

However, the proposed directives and frameworks require investment in terms of effort and support, money and time due to the fact that ICT levels at Bralirwa are still relatively poor. The proposal will pay dividend only if the management adapts the measures articulated in this work.

It is hoped that this research has taken the abstract concept of ICT maturity and ICT controls (governance) and presented it into actionable items that Bralirwa can use to strengthen its own ICT governance practices.



## 6.1 Future Work

This research is the first of its kind with regards to Bralirwa. If the management needs to record a higher improvement in its most key business performance it will need to invest more in this kind of assessment.

This research can be used as a platform for future research not only for Bralirwa but for all other commercial companies in Rwanda in terms of ICT maturity, ICT controls (governance) as well as the development of tools to measure improvements.





## References

1. CobiT 2007, Control Objectives for Information and Related Technology) 4.1, ISBN 1-933284-72-2.
2. Simon. G, 2005, IT Governance Framework, Structure, processes and communications.
3. Marquis. H, 2009, Article on Justifying ITIL framework.
4. CMMI model, 2007, version 1.1 and 1.2 overview, Carnegie Mellon University.
5. Adeleye. B, 2008, TOPS (Technical organisation processes and security) performance report for Heineken group, focus on Quarter 3 of Bralirwa.
6. Looijen. M, 1998, Information System Management, Control and Maintenance, ISBN 90-267-2846-8.
7. 2009, International Journal of IT and management, ISSN 1461-4111, volume 8 no 1.
8. Hughes. A and Morton. M. S, 2007, ICT and productivity growth: the paradox resolved?
9. Looijen. M, 2008, Hand outs "From today to tomorrow" method.
10. Tshinu S. M, Botha. G and Herselman. M, 2008, An integrated ICT management framework for commercial banking organisation in South Africa, volume 3.
11. Salle. M, 2004, IT service management and IT governance: review, comparative analysis and their impact on utility computing, HPL-2004-98.
12. 2008, ITSM (Information technology Service management) process hand book

Heineken international.

13. Ten Berg. P, 2008, Heineken Information security policy manual, (Minimum requirements for Information security and IT control).
14. Beugelsdijk. M, 2008, Heineken change management manual, version 1.1.
15. Erkelens. R, 2008, Heineken configuration management manual.





## Appendix A

### *Interview Questions*

In the process of gathering primary data a set of interviews were conducted and questionnaires distributed; and for the purpose of this thesis participants included the departmental managers and the Finance Director of the company.

The interview questions were mainly developed and derived from the sub-questions of this research. As for the questionnaires, they were developed with regards to user profile, user work experience and user computer skills.

The first two questions are general questions, they were asked in establishing the responsibility and position held by the interviewee or candidate.

↓ *Can you tell me more about (your job) what you do?*

↓ *Are there any ICT objectives in Bralirwa?*

↓ *How ICT applications are utilised in Bralirwa? (E-culture)*

- a. Are Bralirwa assets and operations protected (incl mobile assets, laptop)? *Linkage in the server room*
- b. Is the personnel able to use the ICT systems productively, efficiently, affectively and safely?
- c. Is awareness of ICT usage emphasised enough within the department, what abt in the company?

↓ *Is there any ICT strategy alignment with the business in Bralirwa? (Meaning if ICT strategy exists and whether it is aligned with business strategy).*

- a. Are there any ICT objectives in Bralirwa?
- b. Does everyone in the organisation understand the ICT objectives?
- c. How do you see ICT? And why?
- d. Is ICT and the business strategy are aligned? if yes, *looking at ISHA (ERP & SCM)*

↓ *What are the ICT skills of the personnel of the company (Bralirwa)? (ICT user profile)*

- a. What are computer skills within the company?
- b. How do you determine in what area and at what degree a personnel has to improve?
- c. Does ICT in the Bralirwa stimulate innovation and learning?
- d. Is the company able to attract/retain the talent it needs? *Dissatisfaction of employees*

↓ *What is the focus, within Bralirwa, of ICT management? (ICT managerial paradigm)*

- a. What is the focus ICT management?
- b. Are the ICT costs being optimised by Bralirwa?
- c. Does the business understand the value of ICT to the company?



✚ ***Does any predefined ICT management process exist in Bralirwa and how well it is established? (ICT governance)***

- a. Is there ICT governance in the organisation?
- b. Are ICT activities understood and being managed? *Given the example of  
DRP*

✚ ***What is the ICT management level in Bralirwa? (ICT organisation)***

- a. Are ICT services being delivered in line with business priorities or appropriately?
- b. Are adequate security measures (confidentiality, integrity and availability) of information in place?
- c. Are ICT's activities within Bralirwa measured to detect problems before it is too late?

✚ ***Do the managements of the company (Bralirwa) ensure that internal controls are effective and efficient?***

- a. Does top management ensure that internal controls are effective and efficient?
- b. What can the management of the company do to improve so that ICT can meet its objectives?

✚ ***Are ICT risks, Controls, compliance and performances measured and reported within Bralirwa?***

- a. What are the key performance indicators of ICT?
- b. How do ICT processes are monitored, and how often?
- c. Are risk, control, compliance and performance measured and reported? *If so How, if not why.*

✚ ***What is the impact of the ICT maturity and ICT controls on productivity and growth in Bralirwa?***

- a. Looking at ICT in Bralirwa, does it enable or hold back growth?
- b. Can ICT performances be linked back to business productivity in general?

✚ ***Does ICT maturity and ICT controls in Bralirwa favour competitiveness of the company (Bralirwa)?***

- a. Does ICT put the company on a map to compete and to meet future market demands, especially with EAC adhesion of Rwanda?
- b. Are there adequate ICT systems, processes and controls within Bralirwa allow competitiveness?



## Appendix B

### *Research Questionnaires*

The purpose of this questionnaire is an academic research; I'm researching on "assessing the ICT maturity and IT controls (Governance) for commercial companies in Rwanda" case study Bralirwa.

The information you will provide will be used for academic purpose only and will be treated with confidentiality. Please tick the appropriate box and answer the questions in the space provided.

Your contribution to the success of this work is highly appreciated.

#### 1. What is your age group?

- Less than 18 ☐
- 19-24 ☐
- 25-29 ☐
- 30-34 ☐
- 35-39 ☐
- More than 40 ☐

#### 2. What is your education background?

- High school ☐
- Higher education (University) ☐
- Masters ☐
- PHD ☐
- Diploma ☐
- Others (please specify) ☐

#### 3. How long have you worked for this company?

- Less than year ☐
- 1-5 ☐
- 6-10 ☐
- 11-15 ☐
- 16-20 ☐
- More than 20 ☐

**4. What application do you use in your kind job?**

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.....

.....

.....

**5. How comfortable are you with the ICT applications you use?**

- Less comfortable ☐
- Comfortable ☐
- Very comfortable ☐
- Indifferent ☐

**6. What are the main faced problems with these ICT tools?**

.....

.....

.....

**7. How often do call ICT Help desk for support?**

- Less often ☐
- Often ☐
- Very often ☐
- Never ☐



8. How would like to change the main ICT tool (system) you use?

.....

.....

.....

9. Are you aware of the consequences of misuse of ICT?

Yes ☐ No ☐ not sure ☐

10. How do like your work environment?

- Don't like ☐
- Like it ☐
- Love it ☐
- Indifferent ☐

11. How well do you know ISHA system?

- Not well ☐
- Well enough (use one module) ☐
- Well (use more than one module) ☐
- Very well (use all the modules) ☐

How easy is the ISHA system?

- Not easy ☐
- Relatively easy ☐
- Easy ☐
- Very easy ☐

12. How many database systems do the company uses?

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**13. Do you feel pressured to be effective in using ISHA?**

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**Do you know the ICT objectives?**

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.....

NB: this questionnaire was randomly distributed to a selected sample of fifteen (15) end-users, and was translated in French to allow French speakers to make their contribution.

Thank you very much