CHAPTER 2

THEORETICAL

This chapter will explain some basic concepts and theories that relating to the issues which will be discussed by the researcher as a basis understanding and implementation of a system and method that would be used for the development of the system itself.

2.1 Basic concepts of the system

In defining the system there are two groups or ways of systems approach, i.e. systems that put more emphasis on procedures and elements. Procedure is defined as an exact sequence of stages and instructions that explain what to do, who is working, when to do and how to do it (Gerald.J.1991). Adherent element approach, Robert G.Murdick (1993), defines the system as a set of elements that are integrated with the same intent to achieve a certain goal. Thus, the definition of this will have a very important role in approaching the system to be analyzed. The systems approach which is a collection of components or elements or subsystems is a broader definition than the systems approach which put more emphasis on the procedure. This definition is more acceptable due to the fact that a system is composed of subsystems. The systems approach puts more emphasis on components that will be easier to learn for analysis and system design.

2.1.1 Elements of the System

Elements that contained in the system includes: the purpose of the system, system constraints/limitations, control, input, output and feedback. The relationship between the elements in the system can be seen in the picture below.

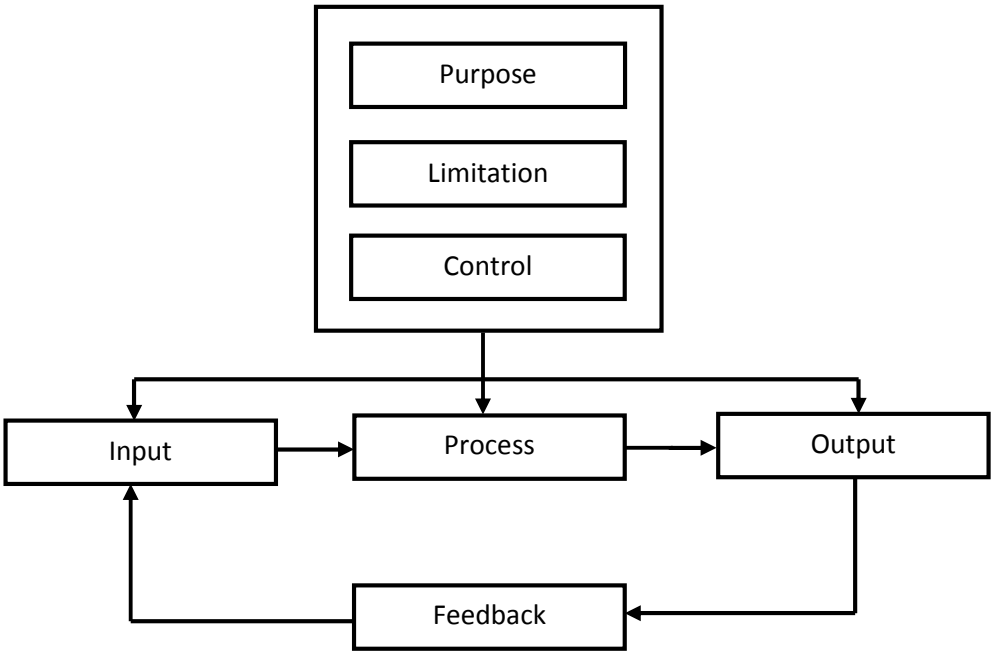


Figure 2.1 Elements of the system

Source: Robert G.Murdick (1993) Adherent element approaches.Information system engineering and development,

From the picture above, it can be explained as follows: goals, constraints and control system which will affect the input, process and output. Input that is inputted in the system will be processed to produce the output. The output will be analyzed and will be fed back to the receiver and from the feedback it will emerge all sorts of considerations for the next input.

a. **System objective**

The purpose of the system is that the goal of the system has been made or been achieved. The purpose of the system may be the goals of the organization, organizational requirements, existing problems within an organization and sequence of procedures to achieve organizational goals.

b. **System limitations**

Limitation of the system is something that limits the system to achieve the goals of the system or organization. Restrictions may be regulatory for the system – the rules exist in an organization, the costs, people who within the organization, the facilities and infrastructure as well as other restrictions.

c. **System control**

Control or supervision of a monitoring system to implement the objectives of the system. Control system can be a control of data entry (input), treaded control data output (output), control of data processing, feedback control and so on.

d. **Input**

Input is an element of the system whose job is to receive the entire input data, where the input can be either type of data, frequency of data entry and so on.

e. **Process**

The process is an element of the system that served to cultivate or process all input data into more useful information.

f. **Output**

The output is the result of the input that has been processed by the part processing and then goes to the final system destination.

g. **Feedback**

Feedback is an element in the system which is assigned to evaluate the part of the output which is issued, where this element is very important for the progress of a system. Feedback can be a repair system, maintenance system and so on.

2.1.2 System Classification

From every perspective, the system can be classified into several parts:

a. Abstract system and physical systems

An abstract system is a system that cannot be seen with the human's naked eyes and these systems are usually in the form of thoughts or ideas, example of this system may be a system of abstract philosophy. On the other hand, physical system is a system that can be seen with the human's naked eyes and which is usually or often used by humans, example of such a system is the computer system.

b. Natural systems and artificial systems

Natural systems are systems that occur due to the influence of nature, such as the system of rotation and gravity systems. Whereas an artificial system is a system that is designed and manufactured by man. Artificial systems involve

human interaction with a machine called human – machine system or sometimes called man – machine system.

c. Closed systems and open systems

A closed system is a system that is not related with the outside of the system and are usually unaffected by the condition outside of the system. These system works automatically without any interference from the outside parties. In theory this closed system is exist, but in fact there no system is completely closed, however the only one that exist is relatively closed system (relatively closed, but not true – totally closed).

2.2 Basic Concepts of Information

The information in a company or an organization is very important to support the continuity of organization's development, thus it is a reason that the information is necessary for a company. Therefore, when less information is gained within the specified time the company will experience the inability of resource control, so when making a decision – a strategic decision is severely disrupted and in turn would probably defeat the environmental compete with the competitors. In addition, information systems that owned often cannot work well. The main problem is that the information system is full of data. Understanding the basic concepts of information is very important or vital in designing an effective information system. Setting up steps or methods of providing quality information is the goal in designing the new system. From the definition above it can be

concluded that the information is set of data that is processed into a form that is more useful and more meaningful to those who receive it. Without the information, the system will not run smoothly and can eventually die. An organization without information perhaps cannot walk or operate further.

According to Gordon B.Davis (1985) defines “information as a data which has been processed into a form that is more meaningful and useful to the recipients to make decisions today and in the future”. According to Raymond McLeod (1995) defines “information as a data that has been processed into a form that is more meaningful to recipient”. Usefulness of information can reduce uncertainty in the decision making process when any situation arises. The value of information is determined from two things: the benefits and cost of getting it. One information is said to be worthy when the benefit is more effective compared with the cost to obtain such information.

2.2.1 Cycle of Information

The data is still a raw material if it is not processed thus the data will not be useful. The data will be useful if it produces information when processed through a model. The model used for processing such data is called data processing model, or better known as data processing cycle. Consider the following picture.

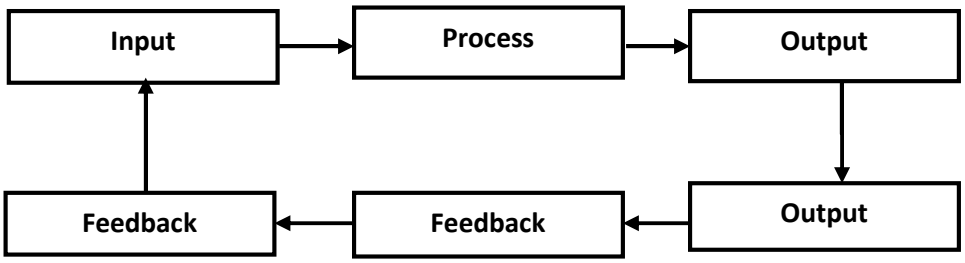


Figure 2.2 Data processing cycle

Source: Gorden B. Davis (1985) Computer Science and Information System Engineering 3rd edition

From the picture above it can be explained that the data is an event that describes the reality of the matter that is passed through the element input and then the data is processed into an output and the output perhaps is the required information. Such information will be received by the user or recipient, the recipient will provide feedback in the form of an evaluation of the information. The reverse is that the data will be entered into the input again for further procession.

2.2.2 Quality of Information

The quality of information depends on 3 things which are so dominant and they are : the accuracy of information, timeliness of information and relevant. These three can be described as follows:

a. Accurate/Accuracy

The resulting information should be free of errors and need not misleading to the people or an organizations who receiving the information.

b. Timely

Information must be received on time, because if the information is received later than it is expected then the information is not useful anymore. Information received too late does not have a good value, thus if it is used as basis for making some critical decision or some decision, surely the decision made will be fatal to the organizations. These conditions led to the high value of information, so the speed of obtaining the information, fast process and fast deliverance of vital information requires the latest and the newest technology.

c. Relevant

The information should have a favorable benefit or necessary for the recipients, because this information may be used for making critical decisions in the breakdown of issues in an organization. Not just an information but the most required information for the organization because if an organization use information other than they really need to make decisions for the organization it may bring disaster to the organization.

2.3 Basic Concepts of Information Systems

An information system (IS) can be any organized combination of people, hardware, software, communication networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organization. People rely on modern information systems to communicate with one another using variety of physical devices(hardware), information processing

instructions and procedures(software), communication channels (networks), and stored data (data resources), Sonil Ghandi Kiula, ,2012.

In addition, the data also play the important role in information systems. The data that is included in an information system can be function as forms, procedures, and other forms of data. In addition, information systems can be defined as follows :

1. A man – made system consisting of components within the organization to achieve a goal that information is presented.
2. A set of organizational procedures when implemented will provide information for decision makers and or control of the organization.
3. A system in an organization that brings transaction processing needs, support operations, supports managerial and strategic activities of an organization and provides certain outsiders for reports that are required.

2.3.1 Components of Information System

To support smooth running of an information systems it takes some vital components to function in the information system. Information system components are as follows: input, process, output, technology, database and control. In detail components of the information system can be described as follows:

a. Input

In this case, the input here is all the data that is inputted into the information system.

b. Process

The process is a set of procedures that will manipulate the input and then may be stored in the database section and will be processed into an output that will be used by the receiver.

c. Output goal designing information systems

The output is all the output or result of a model that has been processed into useful information and can be used by the receiver. This component would deal directly with the user information systems and the ultimate.

d. Technology

The technology here is the part that serves to incorporate inputs, process inputs and produce outputs. There are 3 parts in this technology that includes hardware, software and of course human.

e. Database

The database is a collection of data that are interconnected to one another which are stored in computer hardware and that would be processed using the computer software. The database itself is a collection of files that have links between other files to form one building data.

f. Control

Control in this case is all the actions taken to maintain the information system in order to run smoothly and not impaired. This component is very important

that the overall system has high validation and integrity. These components of control are necessary to: backup the file and testing the accuracy of the data entry with fast processing and delivered on time.

2.4 Case Designed

The case that was designed in this research is the Civil Registration Information System at Baiyer District Administration (BDA) of Western Highlands Province, Papua New Guinea so that the necessary data can lead to the case.

2.4.1 Definition of the BDA

Baiyer District Administration is the government branch responsible for providing statistical information to support policy making in the Parliament. It collects data directly, through surveys, census and assessments and indirectly from other government departments. It is one of the branch national stakeholders in citizen data collection and management.

2.4.2 Understanding Administration

According to Bryan F. Griffin there are two (2):

1. It says administration, also referred to as business administration, is the management of an office, business, or organization. It involves the efficient organization of people, information, and other resources to achieve organizational objectives. And basically it involves administrative activities in a office such as (notes, typing, compiling and arranging files, duplicating/photocopying), and so on.

2. It also says administration is the process of cooperation between two or more people under a certain rationality to achieve goals along predetermined.

   Based on the above explanation, the administration is the process of organizing work done together to achieve the goals set.

   Administration both in the broad and narrow sense is to make implementation is realized through management functions, which consist of planning, organizing, implementing, and monitoring.

   So the administration is implementation, and management is people who organize the work. So the combination of the two is organizing work done by people together (cooperation) to achieve the goals that have been put in place. There are kinds of administration that are discussed in District Administration, namely:

   a. Administration is an overall activity of data recording and information about all activities in a district administration.
   b. General administration is an activity of recording data and information at district /village government.
   c. Administration of the citizen is of recording data and information of the citizens in the district administration book.

      The shape of the citizen administration in outline on the municipality there are two (2) services, namely :

      a. Resident Registration services
      b. Citizen Registration services

The form of administration of the citizen (Citizen Registration Services)

1. Citizen Card
2. Certificate of Marriage
3. Certificate of Birth
4. Certificate of Death

2.5 Software Support

In early 1995, Rasmus Lerdorf made a product called PHP/FI (Personal Home Page/Forms Interpreter) product which is the fore runner of PHP. This is written in C, and have the ability to communicate with the database and create dynamic pages.

November 1997, Rasmus released PHP/FI version 2.0 later, Andi Gutmans and Zeev released PHP version 3.0 generated by rewriting PHP/FI. In 1998 direct written PHP and 2002 it was officially released PHP version 4. PHP version 4.2.0 was released on April 22, 2002. Finally at the end of June 2003 PHP version was launched with the with the released of Beta deployed since December 2004. Several bugs (errors) especially to upload files through the browser were found in previous versions has been much improved, and the version of PHP being developed to date.

2.5.1 PHP (Hypertext Preprocessor)

PHP is a script for server-side web programming, script that create HTML documents on the fly, HTML documents resulting from an application rather than HTML documents created with using a text editor or HTML editor. By using PHP, the maintenance of a website is pretty easier. Process updates can be done using the

application created with PHP script.PHP is fundamentally unable to do all that can be done by CGI programs such as get data from the form , generate the content of the page dynamic web, and accept cookies. Capability (feature) PHP is the most reliable and significant support to many databases. Creating web pages using data from the data bases can be done with great ease. PHP support databases such as dBase, MySql, ODBC, SQLite etc.

PHP also supports to communicate with other services using the IMAP protocol, SNMP, NNTP, POP3, and HTTP. Programmers also can open raw network sockets and interact with using other protocols.

The PHP script is used in conjunction with HTML. Extensions HTMPL document that is equipped with PHP script is .php. Script PHP begins and ends by using a special tag. There are four (4) kinds of ways that can be used to write a PHP script in a HTML document. That is:

Method I.

< ? Echo (“PHP script”) ;?>

Method II

<? Php echo (“PHP script”) ;?>

Method III

< % Echo (“PHP script”); %>

Method IV

<%=$varrname ;%>

Example:

<Html>

<Head>

<Title> Example of how to write PHP script</title>

</head>

```
<body>
<h1> The text is written from a PHP script </h1>
<?
Echo “PHP script with method I”;
?>
Review
<? PHP echo “PHP script with method II”;
?>
Review
<% echo “PHP script with method III”;
$str “PHP script with method IV ;%>
Review
<%=$str ;%>
</body>
</html>
```

2.5.2 MySQL

MySQL is a relational database management system (RDBMS) which is an open source. MySQL was created by Michael “Monty” Widenius, David Axmark, and Allan Larson in 1995. The initial goal of MySQL is a program written to develop a web application that will be used by one client. MySQL AB is a consulting firm and developer of database software (still using the company name TcXData Consult AB). MySQL version 1.0 was released in May 1996 and its use is limited among internal only. In October 1996, the MySQL 3.11.0 was released to the public under “Open but limited” which means it can be used for non-commercial use. If it is required for commercial activities has to be paid for the license.

In June 2000, MySQL AB announced that starting from MySQL version 3.23.19 of the General Public License as (GPL), which means “Anyone can use it either for non-commercial or commercial”.

With the privileged of the open source, MySQL developed into one of the famous relational database management system that is internationally recognized. MySQL uses a standard language SQL (Structured Query Language) as interactive languages in managing the data.SQL commands are often also called the query.

In addition to its MySQL is a database that is pen source and requires a low cost (relatively free), MySQL also has the speed and good stability compared to other database servers. Commands and rules of the MySQL installation is relatively easy and used and MySQL can run on some different operating systems such as Linux, Microsoft Windows, Novell NetWare, MacOSX etc. One thing that makes MySQL remains the top choice of the web developer is the ease of use, simple, and highly integrated PHP with MySQL.SQL language can be divided into two (2) types:

1. Data Definition Language (DDL), a standard language used to create a new table, create index, alter table, specify the table storage structure, and so on
2. Data Manipulation Language (DML), a form of language database is useful for manipulation of data and retrieval of data in a database. Manipulation of the data could be insertion/addition of new data to a database, the elimination of data from the database, and converting data to a database. The result of the compilation is a DDL varieties of tables stored in a special file called a data dictionary.

2.6 Network Configuration

The computer network is the set of interconnection between two computers autonomous or connected to the cable or transmission media without cable (LAN). If a computer can create other computers neither restart, shut down, nor perform other control, then these computers not autonomous (no control of other computers with full access).

Two units of computers are said to be connected if two can be mutually exchange of data or information, share resources owned, such as files, printers, storage media, (hard disk,cd-rom, floppy disk, flash disk). Data in the form of thus allowing computer users in computer networks can be exchange files or data to print on the same printer and use hardware or software that is connected together in a shared network.

2.6.1 Types of Computer Network

According to Azhar Susanto (2004: 242), there are four major categories of computer networking, and they are:

1. **LAN (Local Area Network)**

   LAN is used to connect computers that are within a small area such as inside a building or campus. Distance between the computers can reach 5 to 10 mile. One LAN typically works at speeds from 10 Mbps to 100Mbps.

2. **MAN (Metropolitan Area Network)**

   MAN is a network whose scope covers a city. MAN could reach 10 miles to several hundred miles. One MAN usually work at a speed of **1.5 to 150 Mbps**

3. **WAN (Wide Area Network)**

   WAN is designed to connect computers located on a wide geographical coverage. WAN coverage can include 100 km to 1000 km, and the inter-city speed can vary between 1.5 Mbps to 2.4 Gbps.

4. **GAN (Global Area Network**)

   GAN is a computer network that can connect countries around the world. GAN speed ranging from 1.5 Mbps to 100 Gbps and can scope thousand kilometers.

2.6.2 Computer Network Topology

The network topology or network architecture is an overview of planning the relationship between computers in a Local Area Network that is generally using wires (as the transmission medium) , with connectors, an Ethernet card, and other supporting devices.

There are several types of topologies found in relation to the computer a local area network, such as :

1. **Bus Topology**

   This topology is a stretch both ends of the cable along the nodes. Signal in the cable with this topology is passed in one direction so as to allow a collision occurs.

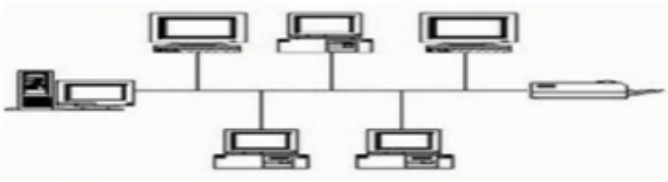


Figure 2.3 Bus Topology

Source: Azhar Susanto (2004: 242), Computer Networking and Engineering, 3rd edition

2. **Ring Topology**

   The network topology in the form of a closed loop that contains the nodes. The signal flows in both directions so as to avoid the occurrence of collision to enable the fast movement of the data .All computers connected to each other in a circle like bus but ends spliced bus. Data sent is given a address objectives so as to lead the destination computer.

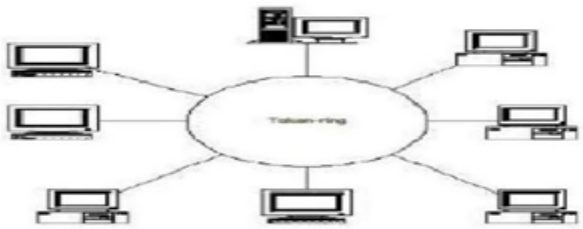


Figure 2.4 Ring Topology

Source: Azhar Susanto (2004: 242), Computer Networking and Engineering, 3rd edition

3. Star Topology

Characteristic of this network topology is a node (station) communicates directly with other stations through the central node (hub/switch), traffic flow data from nodes to the central node and forwarded to the node (station) purposes. If one segment of wire is broken, other network is not affected.

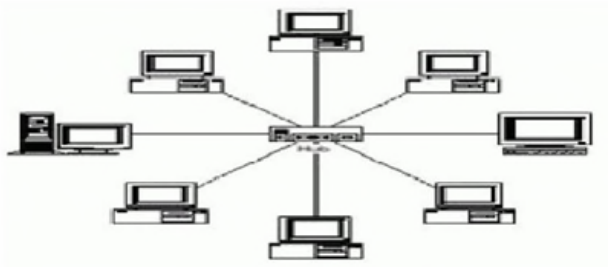


Figure 2.5 Star Topology

Source: Azhar Susanto (2004: 242), Computer Networking and Engineering, 3rd edition

4. Tree Topology/hierchical

A tree topology combines characteristics of linear bus and star topologies. It consists of groups of star-configured work stations connected to a linear bus back bone cable. Tree topologies allow for the expansion of an existing network, and enable schools to configure a network to meet their needs.

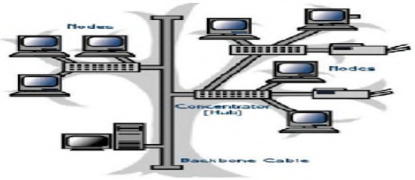


Figure 2.6 Tree Topology/Hierchical

Source: Azhar Susanto (2004: 242), Computer Networking and Engineering, 3rd edition

2.7 Client Server System

Client server can be defined as the ability of a computer to request a data to other computers in a computer network created. Computers that request data are referred to as client service, while providing a service called as a server. In a sense the client did request information or send commands to the server to respond and get back information. The server will receive commands and orders the client. Then the server will process the request based on returns from the client as a result of a process that has been done.

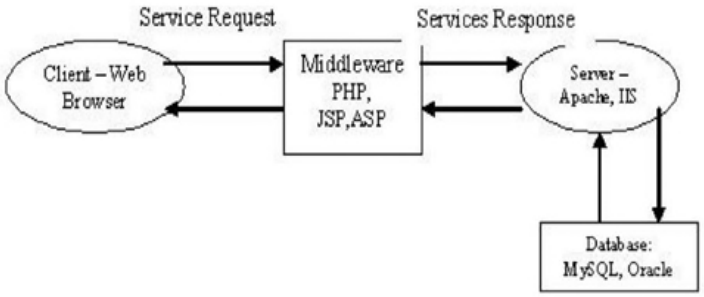


Figure 2.7 Client Server architecture Model

Source: Azhar Susanto (2004: 242), Computer Networking and Engineering, 3rd edition

a. Service request is the request of the client in the form of data request or commands to the server.
b. Service response in the form of a reply from the server on demand from client in the form of process.

Data requested by the client can be retrieved from the database on the service side often called the database server, are like e.g. MySQL, PostgreSQl, Oracle, or SQLServer. Characteristics of client server:

1. Client and server are items process (logic) that separately working together on a computer network to provide services as required.
2. Service : Provides separate different services
3. Shared source: Server can serve multiple clients at the same time and accessing the resources set.
4. Asymmetrical Protocol: Between the client and the server in one to many relationships. Client initiates communication with sending request to the server. Server is waiting for request from the client. This condition also allows communication call backs.
5. Transparency Location: The process server can be place on the same machine or separately with the client. Client server will hide the location of the server from the client.
6. Mix-and- match: Do not depend on the platform.
7. Message-based-exchanged: between the client and server communicate with message exchange mechanism.
8. Encapsulation of service: Message tells the server what will be done.
9. Scalability: System C/Scan be expanded both vertically and horizontally.
10. Integrity: Code and data is currently managed servers, while client remains on the computer itself.