ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
SCHOOL OF INFORMATION STUDIES FOR AFRICA

A Computer Based Criminal Records Management System
Case Study of the Addis Ababa Police

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of Master of Science in
Information Science

By
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May, 1999

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A COMPUTER BASED CRIMINAL RECORDS MANAGEMENT: THE CASE STUDY OF THE ADDIS ABABA POLICE

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DECLARATION

The thesis is my original work and has not been presented for a degree in any other university.

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The thesis has been submitted for examination with our approval as university advisors.

Ato Tilahun Teshome

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DEDICATION

This thesis is dedicated to the Ethiopian Forces gallantly fighting against the Eritrean aggression.

ACKNOWLEDGEMENT

The completion of this research paper could have been much more difficult, had it not been for the encouragement and full support of many people and institutions who indeed, deserve my heartfelt gratitude at this juncture.

Foremost among those are the management and staff of the Ethiopian Federal Police and Addis Ababa Police who, throughout the study, were always ready and willing to share their precious time to answer my questions, which were numerous; and provide me the necessary materials needed for the work.

I would also like to express my appreciation to the management of the Security, Immigration and Refugee Affairs (SIRA), who, making the necessary arrangements, in easing the load in my official work, allowed me to persue my post graduate studies.

I am particularly indebted to Ato Hadera Abera, Advisor of the General Manager of the SIRA, whose help and encouragement was considerable through out my post graduate study and particularly in this study. My heartfelt thanks also goes to Ato Abera Mengistu, head of the main department for Technical supports of SIRA, for providing me wise valuable help especially in developing the prototype of the proposed system.

My special thanks and gratitude also goes to Ato Tilaun Teshome, my thesis advisor, for reading, correcting and providing me comments particularly in areas of the study that had legal dimensions. I would also like to express my gratitude to Ato Sisay Fissha,co-advisor of my thesis, whose help was indispensable in readily answering my numerous questions, for tirelessly reading and correcting the manuscript, and for providing me valuable comments.

I am particularly indebted to Weizerit Rahel Bantyirgu, staff member of the main department for Technical Support of SIRA, for her important help, particularly in the technical part of the thesis and for her readiness to support me which was very encouraging, indeed. I

would also like to express my gratitude and appreciation to Ato Dessalegn Nigussie, staff member of the Main Department for Recruitment and Training, for his valuable work in the edition of this thesis.

I would like to express my gratitude to Weizerit Tsega Tadesse, staff member of the Refugee Affairs of SIRA, for the tireless effort and devotion she displayed in typing this paper. I would like to express my appreciation to Weizerit Tirsit Teka, staff member of the Ministry of Foreign Affairs of Ethiopia, for her generous assistance in typing the final edition of this thesis.

Finally, I would like to express my gratitude to all my friends and colleagues for all their support and encouragement.

In the detail design phase, entities about which the system maintains data, have been specified and their relationship which are important to the system, established. The data items maintained by the system are also normalized in order to avoid redundancy with regard to inserting, deleting, and updating data into the database.

Furthermore, a prototype database is designed to demonstrate how the proposed criminal record management system will operate in the real life situation.

Finally, conclusion and recommendations are presented in order to highlight the findings of the study and for further completion of the analysis and implementation phases of the proposed system.

ABSTRACT

Proper flow, management and use of records in any organization, whether profit oriented or nonprofit, is critical as blood is for the life of the human being. It is difficult to imagine the existence of an organization without a sound record management system.

This fact is particularly true to complex organizations like the Ethiopian Police Force, whose entire operational activities mainly depend on the management and maintenance of crime records. This calls for the introduction of modern crime record management tools for the efficient and effective maintenance and use of police crime records.

However, the existing means and tools of crime record management system in the Ethiopian police force is both traditional and manual. The existing traditional crime record management system cannot cope with the large flow of crime information which the system is required to handle on a continuous basis. Furthermore, the prevailing crime record management system lacks basic crime classification methods and hence the institution is forced to deal with crimes in their aggregate form. Police officers cannot also specialize on specific types of crimes.

The main objective of this project is, therefore, to analyze the existing crime record management system and to identify its problems and design a computer based criminal records management system.

To this end, the analyst has made an effort to learn the current system and has identified the requirements of its users. For this, the researcher has made several discussions with various internal and external users of the system and has gathered sufficient data that helped to analyze the existing system and specify the requirement of the users.

Once the existing system has been analyzed, then different design alternatives that would solve the existing problems are considered. Finally one design alternative, that would best satisfy the requirements of users, is selected and sufficiently dealt with.

In the detail design phase, entities about which the system maintains data, have been specified and their relationship which are important to the system, established. The data items maintained by the system are also normalized in order to avoid redundancy with regard to inserting, deleting, and updating data into the database.

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CHAPTER I

INTRODUCTION

1.1 BACKGROUND INFORMATION ABOUT THE WORKING ENVIRONMENT

1.1.1 General

People need to live and work without fear for the safety of their lives and property. One of the main tasks of any government is, therefore, to ensure law and order for the safety of its subjects. Hence, apart from the promulgation of laws for the regulation of crime, governments have to set up different law enforcement agencies and institutions to make sure that these laws and regulations are universally abided by and applied to all their citizens.

In the Ethiopian context, among the many government institutions responsible for the maintenance of law and order is obviously, the Ethiopian Police Force (EPF). In broad terms, the main task of the Ethiopian Police Force is the prevention of crime. It also investigates crime incidents to apprehend criminals in order to prevent future crimes.

1.1.2 Establishment

The Ethiopian Police Force was established in 1942 under proclamation No. 6 as an autonomous body, with enforcing law and order through the prevention of crime as its main objective. Later on, in 1966, the then Ministry of Interior was made to be in charge of the Ethiopian Police Force, the latter having been made to function as an autonomous body within the structure of the former under proclamation No. 46/66.

The Ethiopian Police Force had, from its earliest days, organized and structured itself from the national level at the centre, down to the then regional, awraja, woreda and at times kebele levels thereby trying to discharge its duties and responsibilities. However, the tasks of preventing crime and enforcing law and order as its main task was not adequately performed all those years and this got further deteriorated with the emergence of the military junta which took power in February 1974. The reason for this deterioration was because the regime considered it as a lucrative source of trained manpower readily available for its war efforts against its opponents throughout the country. It is when the Transitional Government of Ethiopia assumed power in May, 1991 that the Ethiopian Police Force was reorganized in a manner that would enable it discharge its traditional police duties (Source: Federal Police Head Office).

1.1.3 General Objectives and Tasks of the Ethiopian Police Force

Though the objectives of the police force kept on changing under the successive regimes in Ethiopia, the main objective of police, in accordance with proclamation no.3/8/1991, is basically the prevention of crime. Therefore, apart from building institutional capacity to prevent crimes, the police has to establish harmonious relationship with the people starting from the upper level down to kebele (the smallest administration unit in the country) for the proper flow of information with regard to crimes. Moreover, the police force protects the interests of government and public institutions. It investigates crimes committed against the government and the public. In addition, it presents cases to the concerned judicial bodies in accordance with the laws of the country.

1.1.4 Organizational Structure

During the Dergue years and before that, the Ethiopian Police had been a highly centralized government institution. When the Transitional Government took power in 1991, the police force was decentralized along with the new federal administrative setup in the country. Based on the new administrative structure, the Federal Government and all the regional federal states have been made to have their own independent police forces. According to the Ethiopian constitution, Federal Government would only help regions in matters concerning training and would interfere when conflict arises between the regional states and if only invited by one or more of the states under conflict. Apart from this, the regional states have their own administrative autonomy.

Based on the current structure, the Federal Police Force (FPF) of Ethiopia is organized into different departments (see the organizational structure of FPF on appendix 1). The main departments of the FPF are the Federal Police Central Bureau, National Police Research Center, National Crime Investigation and Crime Prevention Department.

From these, the department which is responsible for the management of criminal records is the National Crime Investigation Department. This department is responsible for investigating economic crimes, crimes against public organizations, crimes against private companies and crimes committed against the people. It investigates crimes which ought to be handled by the Central Bureau as would be specified by rules and regulations. It gives professional and technical support to regions in keeping crime records and providing information to concerned bodies. It organizes technical instruments to strengthen modern investigative methods that create conditions which would enable to organize the investigation process in a scientific way.

The Addis Ababa Police Force, in turn, is organized into four main divisions and one special division namely, the Crime Prevention and Investigation, Administration and Finance, Traffic Control, Fire Danger Prevention and Control, and Crime Information and Research Center. Among these, the core police division, where most of the policing functions are performed, is the Crime Prevention and Investigation Division. This division is organized at the head quarter of Addis Ababa Police and in each of the 28 Woredas of Addis Ababa, which are also responsible for handling criminal records (see the structure of Addis Ababa Police on Appendix 1).

1.2 JUSTIFICATION FOR THE STUDY

1.2.1 The high flow of records to the Woreda Police Stations of Addis Ababa and to the Criminal Records Center of the Federal Police.

According to the discourse of the officials of Addis Ababa Police, each Woreda maintained over 2000 criminal records over the last five years alone. In addition, each Woreda sends fingerprints of crime suspects to the FPF criminal records center for classification. Further, the Addis Ababa Police Crime Information Center collects case records of crime suspects on the average 104, 3,121, 37,767 per day, month and year respectively (source: Addis Ababa Police Head Office).

The Federal Police Criminal Records Center also maintains about 120,000 criminal records since its foundation. Suspects record flow to the criminal record section of the FPF at an average of 50, 1,500, 18,000 per day, month, and year respectively (source: FPF criminal Record Office). Therefore, this high flow of information from Addis

Ababa and other regions to FPF Criminal Records Center and the volume of the record held in the Woredas and the FPF criminal records center necessitated the need for improved means of criminal records management system.

1.2.2 Traditional and Manual Means of Management of Criminal Records

The existing means of management of the criminal records in Woreda Police stations of Addis Ababa and the Federal Police Criminal Records Center is traditional and manual. The existing system could not cope with the high volume of records and high flow of case records.

Criminal records have been collected for around 50 years and have hardly been used with regards to currency. There are no modern tools and techniques which facilitate the handling of records. As a result, it is certain that many of the existing records could be discarded either because the person to whom the record is attributed is dead or has not committed any other offence for many years. In addition, the records are not updated when courts convict a criminal or when he/she is released after finishing his/her prison terms. There is no clear policy that gives guidance as to what to do with records which remained inactive for a number of years or some times for decades.

The criminal records also suffer from longer process of manual procedures. When a suspect is arrested he/she is fingerprinted (though there is no standard procedure as to when to take fingerprints), a personal description is completed (using a form), and the modus operandi, (MO) of the crime is recorded. Then, the file is sent to the Woreda criminal records center. After the file reaches the Woreda Records Center, it is documented and archived on paper forms. The record may be retrieved sometime later

when it is needed by the courts or the top police management. However, all these activities are performed through the use of human labour and paper. This traditional record management system could not satisfactorily handle the large volume of information flowing in daily, which calls for the introduction of modern techniques and tools which would facilitate the activities of the Police Force.

1.2.3 Computer Assisted Management of Records has become Important in the Criminal Record Management System

With the emergence of the Information Revolution a good deal of human activities are being devoted to the acquisition, processing and handling of data. The time needed for such activities is significantly minimized by the application and use of computers. Computers have the ability to process information at incredibly lesser time than the human being. They can store vast amount of information using different devices such as CDs, and retrieve the needed information immediately from its location. In addition, data stored in computer is easier to update and can give online services. Also, computer communication networks can transmit data over different areas to different categories of users within a fraction of a second.

Because of the increased suitability of computers to process and deliver a vast amount of data to users, computer based information systems have influenced the activities of all non-governmental and governmental organizations. Today computer systems are directed towards the process and delivery of appropriate, accurate and timely information, to specific types of users according to their needs.

Such computer assisted information systems are particularly useful in government organizations like the police force especially to process, update, and provide online service of criminal records to users. Computers are very useful in the police environment to prepare cases for courts, to record the detail of suspects arrested, control of traffic accidents and violations, command and control of the police activities, and generally to the management of police information system.

They have been particularly useful, with regard to criminal record, in storing the details of people arrested, including the reasons for their arrest and the actions taken during their detention. In addition, computer systems support in producing various standard documents such as charge sheets, forms that help to record details of cases reported to the police. And it is also possible to immediately report crime incidents using computers.

Computerized systems also help to classify fingerprint of criminals and to retrieve their previous crime records. And they are accessible to users from different geographical locations.

In this regard, currently computer information systems have been applied for quick and easy identification of criminals using images of photo and fingerprints to share information among widely dispersed parts of police and related organizations.

Computer based criminal records management systems have been applied in many parts of the developed world. For example, UK, Canada, US, and Japan have computerized their criminal records management systems nearly two decades ago. Japan has widely used computer based criminal records management system. In the UK, there is a National Strategy for Police Information Systems (NSPIS) which provides a detail

technical and application framework for building the future of Information Technology in the police service (http://www/ cleve land police UK/ authority/ info.html). The strategy will help to have an access to criminal records of their concern and they can report within a fraction of a second to higher decision makers.

So, as proved from practice, computerization of criminal records management system assists in disposing the routine administrative and clerical tasks of police function. It reduces delays and opportunities for human error, it assists in providing information for case decisions, helps for rapid verification of past criminal histories and interagency coordination and provides the necessary and fast information for policy maker and managers to control it.

As we have seen earlier, the existing traditional management system of criminal records has become an obstacle for the activities of the Ethiopian Police Force. Therefore computerization of the system may provide a useful solution. However, buying computers and converting the existing data into digital form by using one of the relevant softwares alone may not provide effective and efficient solution. Although computerization of EPF criminal record management system is essential, the following factors should be adequately analyzed to decide whether the criminal record management system should be automated.

These are:-

1. Detail Investigation into the problem of the existing system.

2. The need for the computerization in the organization should be fully explored and the needs of the potential users of the system should be examined carefully.

3. Studies should be conducted whether the software packages in market can readily be applied or there is a need to develop in house programmes suitable for the management of criminal records.

Failure to make such studies in the process of computerization may lead to loss of opportunities for integrated sharing of information and unnecessary duplication of effort. Hence, the cost of computerization may be higher than its benefit. So, careful study need to be done before the idea of computerizing the criminal records management system is considered.

1.3 OBJECTIVES OF THE STUDY

1.3.1 General Objectives

The general objectives of this research is to investigate into and examine the problems of the existing traditional way of criminal record management system of the Ethiopian Police Force with special emphasis on Addis Ababa Police, and, then, to introduce modern techniques and tools of criminal records management system which would help the police force to improve its services by facilitating its operations.

1.3.2 Specific Objectives

The Specific Objectives of this research are:-

- To examine the criminal records management system currently in use in the Police Force and investigate its major problems.

- To identify the potential users of the criminal record within the Police Force itself, other law enforcement agencies, other governmental and non-governmental organizations and the population.
- To identify the potential users of the criminal records within the Police Force and investigate its major problems.
- To assess and analyze the information needs of the different categories of users and define their information requirements.
- To identify and define the different types of data required in the process of preparing, storing, and disseminating criminal records.
- To define and design the major functions performed by the proposed criminal records management system and design the database of the criminal records management system.
- To define and propose a network system between the Federal Criminal Records Center, Addis Ababa Police Head Office and Addis Ababa Woredas Police Stations.
- To design a prototype computer assisted Criminal Records Management System and demonstrate how it stores, retrieves, updates, criminal records and how it provides report of suspects to courts.
- To suggest ways and means of developing and implementing the proposed computer assisted criminal records management system.

1.4 SIGNIFICANCE OF THE WORK

From the several discussions conducted with the management of the Federal Police Force of Ethiopia and Addis Ababa Police, the analyst came to understand that, they have recognized the problems of the existing criminal records management system.

In order to improve its operations, the management has already identified the Criminal Records Center as the focal point for the computerization of police activities.

In light of this, the work that has been reported in this study is believed to serve as a basis for the automation of the criminal records management system. Noting its significance, the management of the Federal Police Force and Addis Ababa Police and the staff of the criminal records management system were very enthusiastic in the work and have extended their support throughout the conduct of the project.

1.5 METHODOLOGY

1.5.1 Methods of data collection

Fact finding or data collection is central to any systems analysis and design process, and much of the analysis activity was collecting data using the following methods.

1.5.1.1 Back Ground Reading

In order to thoroughly familiarize oneself with the objectives, activities of the functions of the criminal records management system, the researcher had undertaken a background reading of the various journals related with criminal records management system, application of Information Technologies to the police area, procedures, manuals of criminal records management system of the EPF, different forms and cards to process, the written manuals and, procedures, reports, of the criminal record management system had been given special emphasis to familiarize oneself and to investigate the problem.

1.5.1.2 Interviews

Planned, face to face discussion was conducted using interviews with the potential users of the criminal records management system and different hierarchical officials of the FPF and Addis Ababa Police. In addition, the line management of the Federal Police and Woreda Criminal Record Centers and staff members were interviewed. The interview was based on covering all aspects and problems of the existing system and, their information requirements. For this, sampling method was used from Woredas of Addis Ababa. Out of 28 Woredas 7 were taken as a sample. Procedurally the Woredas are homogenous. The sampled woredas were recommended by the Addis Ababa Police Management considering the experience of the staff members and the flow of records to the selected police stations. So, based on the recommendation of the management, detail interviews were conducted with three Woredas namely woreda 2,5, and Addis Ababa Police Crime Investigation Department. The problems identified in the three woredas have been checked in the remaining four woredas using on site observations.

1.5.1.3 Observation

On site observation was carried out to identify features of the existing system, flow of criminal records, work condition of the criminal records centers. In addition, methods of producing, storing and communication of information within and among the Federal Police Criminal Records Center, Addis Ababa Head Office and Woredas of Addis Ababa were observed.

1.5.2 Sources of Data

The main sources of data for this study were the criminal record center of Addis Ababa Police, Addis Ababa Police Woreda Stations, and Federal Police Criminal Record Center.

Other agencies of the criminal records management system such as courts, prosecutors and Ministry of Justice were also used.

1.5.3 Methods of Presentation and Arriving at Conclusion

Data collected by the different methods from the different sources is thoroughly analyzed and the results of the study are presented using structured tools of systems analysis and documentation techniques.

These structured system analysis and design methodologies are Data Flow Diagrams, Data Dictionary, System Flow Carts, Entity Relationship and relational data modeling. They are used to show the current and proposed logical and physical flow of data in the criminal records management system.

1.6 SCOPE AND LIMITATION OF THE STUDY

As we shall see in the chapter dealing with literature review, police criminal records include case records, arrest records and identification records. There are also other records such as property records and drivers records. In the Ethiopian context, the main records of police used traditionally are the ten fingerprint record as a means of identification and the case records. So, this research attempted to analyze the problems related to ten fingerprint records and the crime cases commonly known as case files. Thus, the other types of police records are beyond the scope of this thesis.

The other point which should be raised is that the data used for the analysis is collected only from the Federal Criminal Records Center and the Addis Ababa Woreda Police Stations.

Although the analyst believes the data collected from these areas, by and large, represent the overall problems of the management of police criminal records system, collection and analysis of police criminal record management systems of the regional states falls out of the scope of this study.

Finally, although the benefit of a carefully analyzed computerization project far out weighs its disadvantage, the analyst did not make cost benefit analysis of the alternatives for the proposed system due to time constraint.

1.7 ORGANIZATION OF THE THESIS

The first chapter, which has been discussed so far, consists of an introduction and covers such topics as background about the working environment i.e. the police force in general and Federal Police and Addis Ababa police in particular, justification of the study, objective of the study, significance of the work, and methodologies employed etc.

The second chapter provides a general picture of police records, and it includes literature review and covers records in general, police criminal records, police reports, experiences of law enforcement agencies elsewhere and the experiences from computer based criminal justice information systems.

The third chapter describes the existing system. In this chapter data gathered about the current system are analyzed in detail to provide a clear picture of what the existing system does, how it does it. In addition, the problems of the existing system and the general requirements of the new system are identified. The existing system is also described using different levels of data flow diagrams.

Chapter four presents the general design of the proposed system. In this chapter an attempt is made to model the logical and physical system of the proposed system. Based on the logical view of the system, different alternatives are presented each having its own strengths and weaknesses, and, then; one design alternative which satisfies the requirements is recommended.

Chapter five describes the detail design of the proposed system. In this chapter the recommended system is further elaborated in terms of its output; input, processing, control and security requirements, data base design, and networking considerations and human machine interface.

Chapter six, which is the last one, summarizes findings of the study and provides further recommendations for implementing computer assisted criminal records management system.

CHAPTER II

LITERATURE REVIEW

2.1 RECORD GENERAL

Records are information that flow from outside to inside or from inside to outside of a business entity. This flow of information can be via telephone wires, satellite, graphics, or the mail or whatever written, verbal, photographic or computer captured form. From outside comes the daily mail consisting of correspondence, proposals, invoices, project reports, and answers to problems from a data base. The company also sends out correspondence and information about itself, or work completed, to other companies. Within the company circulate interoffice memos, procedures and policies, salary checks, requisition slips, and reports from each department (Suzannel Gill, 1993). Records are, therefore, valuable assets for any organization. They are facts to support decisions made and facts upon which to base future decisions.

Record, in an organization, has its own cycle. Record moves in logical steps from creation through its use, storage; and retention in active files, to its transfer to inactive files, storage and finally disposal. This record cycle needs management. For this, the filing system designed, makes the management of records, retrieval, disposition and retention very efficient.

To manage the records of an organization, one needs to know the specific nature of the records in that organization.

2.2 POLICE CRIMINAL RECORDS

Police records are records which are related to crimes other than the administrative records of the police itself. According to the International City Managers Association (1961, fifth edition) the categories of police criminal records can be divided into three general classifications.

1. Case or complaint records
2. Arrest records
3. Personal identification records

The case or complaint record is the master record of all records in the police and the arrest and identification records are geared to it. Each is numbered serially, and therefore, there are case numbers, arrest numbers, and identification numbers.

2.2.1 Case Records

This record contains information regarding complaints and reports received by the police from citizens and other agencies, and actions indicated by the police. In addition, any property records and correspondence relating to a particular case are filed with it.

For this purpose, different countries classify case records to manage their recording and reporting system. For example, if we take the Federal Bureau of Investigation (FBI) as an example, it divides crime cases into uniformly five classes, case I, Case II, Case III, case IV and case V.

Case I includes all offences that are ordinarily known or reported to the police. These are: homicide, rape, robbery, aggravated assault, burglary, larceny and auto theft.

Case II are all offences not included in part I. These are: assaults, forgery and counterfeiting, embezzlement and fraud, stolen property (buying, receiving, possessing), weapons (carrying, possessing), prostitution, sexual offenses, offenses against the family and children, violating drug laws, violating liquor laws, drunkenness, disorderly conduct, vagrancy, gambling, driving while intoxicated, violation of road and driving laws, parking violations of traffic and motor vehicle laws, and others.

Case III (lost and found) –reports of lost and found persons, animals, and property are included in this division.

Case IV (Casualties) - are cases involving the sick, injured and/or traffic accidents. In this group all traffic accidents, suicides, bodies found, sick cared for and mental cases are included.

Case V (Miscellaneous) – this category includes records that don't fall into an offence; lost or found items or causality. It also includes such administrative reports as special and general orders and reports of violations of rules and regulations.

Case records are, therefore, considered as the heart of any police records system. Case record basically deal with recording crimes and other incidents reported to the police and are used for controlling investigations through the filing of additional reports. They are the basis for an analysis of offenses and the methods by which they are committed.

A case record is necessary to assure satisfactory disposition of each case. For example, when an incident is reported using telephone or whatever, officers are dispatched. The dispatched officers record all information related to the incident and the results of their investigations. Then, before the end of their tour of duty, they prepare investigation reports concisely summarizing all of the facts concerning the case. After that, the investigation reports are sent to the record office where they are attached to the case sheet.

The case sheet is the basic record of offenses and has three major purposes:-

1. It serves as a foundation or base on which to build the record of the case, since all other items are attached to it.
2. It aids as a control device by recording assignment and follow up information; and
3. It records statistical information in a uniform and readily obtainable manner.

Based on the case or complaint records, the investigation officer investigates the case and finishes his/her duty. He/She normally does this by preparing a written report. All of the investigation reports and other documents are clipped finally together or assembled in a folder. This accumulation of records becomes the case file. The final outcome of a case or complaint records is a case file and statistical reports.

2.2.2 Arrest Records

These types of records originate at the time of booking. In this classification all records are included relating to the control of prisoners, court procedures, and release of prisoners. In other words, these types of records deal with the arrest of offenders, their

control, and disposition. The scope of arrest records covers every step from the beginning.

An Arrest record should be prepared at the time a prisoner is booked and should include the following information: name and alias of the arrestee, physical description, nature of the offense charged, the name of the arresting officer, indication of whether the arrestee was released and whether such release was on bail; and an arrest number.

The arrest records are filed by arrest number and cross-indexed by name and all known aliases. The name and alias index cards should bear the fingerprint classification and be filed in the general index file. It should also carry the serial number of the case sheet.

2.2.3 Personal Identification Records

The third major division of police records embraces those records dealing with personal identification. Various devices have been employed to facilitate the recognition and positive identification of criminals. Names and general descriptions do not suffice because false names can be substituted and many characteristics change with time or may be deliberately altered. According to O.W. Wilson (1950) photographs are also unsatisfactory for two reasons.

1. The powers of observation and the memory of persons called upon to make identifications have certain limitations.

2. It is also difficult to classify and file photographs by identifiable characters.

In the late 1990's the use of cosmetic surgeries have made it difficult to use photographs as a means of identification.

So far, the finger print system is the most widely used and positive means of personal identification. Friction ridges on finger and thumb tips furnish the means for this distinctive method of identification. The distinctiveness of finger prints and the fact that they can not be changed throughout the life of the individual makes them the most reliable means of identification.

Fingerprints are therefore the heart of the identification system. While the finger print record assures positive identification, it should be supplemented by a record of physical characteristics and, in some cases, a photograph to permit visual identification.

In assuring the positive identification of suspects, the most commonly used method is the Henry Classification Method. The Henry Classification Method is based on the prints of all 10 fingers. The principal use of such classification is to identify persons who have previously been finger printed. By using the Henry Classification method, it is possible also to compare latent prints left at the scene of the crime with those of known suspects whose prints are available.

The Fingerprint Method is also useful in the identification of dead bodies or persons suffering from amnesia and in cases of injury with prolonged unconsciousness. In these cases also it is of course necessary that the finger prints have been previously filed.

Though fingerprints are used as positive means of identification, the following identification records are also needed (O.W. Wilson, 1950). These are: description

cards, ten digit finger print cards, single finger print cards (not used in all police organizations), photographs of criminals and criminal histories.

In order to identify a suspect using his past record, a number assigned to the person is used to identify records relating to him/her. In this case the same number should be used for each subject, regardless of the number of times he/she may be arrested or fingerprinted. The Identification number should appear on the fingerprint card, the description sheet, the criminal history sheet, and the photograph. Finger prints are recorded chronologically in a board with entries to include the name, identification number, case number, finger print classification and date.

When an individual is suspected of committing a crime, fingerprint is taken and an identification number is assigned in the manner described above. Then, the finger print card is clipped to the appropriate description sheet, and is forwarded to the records division. The fingerprint clerk there classifies and searches the alphabetical index file. Again, it is searched in the finger print file. From this it is possible to indicate whether the person had any previous record and whether he is wanted on some other charge or not.

From the above description, it could be observed that the maintenance of criminal identification records is an integral part of the total records job. Therefore, finger prints, photographs, and physical descriptions of known suspects and descriptions of unknown perpetrators and their methods should be centrally maintained in the records division.

Information regarding the known and the unknown must be brought together if identifications are to be made and crimes solved. The interrelationship between the

suspect and the crime he/she may have committed is so close as to leave no doubt that identification records are crucial component parts of the police records management system.

2.2.4 Other Police Records Related With Crimes

In this regard, traffic violations and accidents, property control and identification record can be mentioned.

Traffic violations are recorded on a driver file. A driver file contains the names of persons who have been involved in automobile accidents or violation of traffic law. The records of traffic violations are held separately from the criminal record. This is because the volume of accident cases and violations is so immense that it is not manageable with the criminal records.

Property records include a system for identifying lost, stolen, pawned, and found property consisting index cards describing the articles which are reported lost or stolen locally or by circulars from other departments. These records also include prisoner property and other property coming under the control of the police department. Police departments therefore handle property records by establishing a separate system from the criminal records. Of course, if the property belongs to prisoners, the identification number of their property should be registered in their case file and their fingerprint card.

In addition to these police records, there may be other accident records which include reports of suicides, dead bodies found, sick people attended, mental cases, accidental

injuries etc. Police have also other administrative records which fall beyond the scope of this thesis and are not hence discussed here.

2.2.5 Procedures For Managing Police Records

Police records must be arranged, filed, and indexed if they are to be conventionally available for routine use and for the analysis and follow – up so essential to the effective control of police operations.

The first and initial activity in managing police records for effective usage is to index the records. Unless they are indexed one can not retrieve the records on time and one can not use them for the needed task.

In indexing police records (Leonard, 1951) the first task should be to have a general alphabetical index file. A general alphabetical index file is maintained for the purpose of determining the case number, the arrest number, the identification number, the fingerprint classification, or the previous records of any person who may have been the subject of police inquiry or action. A single alphabetical index for a single person is suggested for the following reasons.

1. There is only one file to be searched in determining whether the police have any record about the subject.
2. There is only one place to file alphabetical index cards and the chance for errors in filing is reduced.
3. A single file makes it unnecessary to duplicate index cards

This kind of indexes may be prepared from the case record to which are attached all related records, including a copy of the arrest record, the description bearing the fingerprint classification, and property record cards.

The other main category of indexes is Driver's Index. Driver's index contains the names of person who have been involved in automobile accidents or who have been arrested or served with citations, notices of violation, or warning tickets for moving violations. A Driver index is justified when the volume of accident cases and traffic tickets makes burdensome the search of a large general index for the driving history of the offender.

Acquiring the general index, other indices should also be prepared based on the classification of the crimes committed. Hence, classification of indexes is also very important. Some of the purposes are, they furnish material for statistical summaries, they aid in selecting cases which may have been committed by the same criminal, and thus serve as a simple form of modus operandi file. In addition, they enable the records staff to locate a case in which the name and exact data may have been forgotten, if the nature of the complaint of offense is known. So, based on the classification of the crimes committed one can have different types of indexes. For example, one can have an accident locate index, auto-theft index, stolen property index, arrest and juvenile offender indexes etc.

Filing records also becomes based in the general order of the indices and their classifications. Nevertheless, great care should be taken in filing records, since misfiling makes locating of them difficult and time consuming.

2.3 POLICE REPORTS

The police record system described above can not supply the information which is indispensable to the measurement of results, unless certain consolidated reports and analyses are compiled from such a system. Facts contained in basic police records must therefore be extracted and compiled, so that accomplishments can be appraised and comparisons made.

According to the International City Manager's Association (1961, fifth edition) and O.W.Wilson (1950) the major police reports are prepared daily, monthly and yearly. Furthermore, the authors say, crime reports should include complete knowledge of crime conditions, results obtained from investigation, persons arrested and the disposition of their cases, distribution of personnel and police problems in general.

The management of the police and the chief administrators of the city or any other region should have placed at their disposal a complete picture of the significant activities of the police organization on a daily, monthly and annual basis.

2.3.1 The consolidated Daily Report

Because a copy of this report should be on the desks of the chief, the division heads, and the regular or city manager each morning, the consolidated daily report is some times referred to as the morning report.

The consolidated daily report shows briefly the crime and personnel conditions for the past 24 hours, with space for bringing the months statement up-to-date, as well as for comparing the figures with those of the same day of the previous month and of the same

month of the previous year. According to the International City Managers Association (1961, fifth edition) the daily report should be compiled by a records officer during the early morning hours from the compliant records, accident records and arrest records. It provides a summary report.

Such a summary report thus, enables the chief and his division heads to become familiar with the characteristics of crimes and other events during the past 24 hours.

2.3.2 The consolidated Monthly Report

Significant data should be compiled monthly and presented to the administrative head of the city as well as to top police officials. Generally speaking, the consolidated monthly police reports disclose crime tendencies and conditions as well as the effectiveness of the organization in coping with them.

The monthly report covers results of investigations, accidents, arrests, enforcement, juvenile offenses and other police activities. It affords sufficient comparisons with other periods to point out significant trends. The report may be compared to the monthly operating or financial statement of a large corporation. It serves as a valuable aid to the chief and the division heads in evaluating the work of the force; planning new assignments, and directing attention towards areas deserving a greater patrol or enforcement pressure. The monthly report may be distributed in the same manner as the daily report. In some organizations such as the FBI, the monthly report is also a standard report form and is designed to serve as a source document for the compilation of the annual crime returns.

2.3.3 The Annual Report

Just as the morning and monthly reports are indispensable for studying police work over a relatively short period of time, the annual report is essential for analyzing police operations for the year.

According to O. W. Wilson (1950) one of the purposes of the annual report is to provide comparisons with the previous year and years further back. The data for 5 year comparisons can be presented satisfactorily when the annual report is printed. Moreover, this report has the important function of informing the citizens about the police organization, both in their capacity as tax payers and as persons whose cooperation must be secured for the effective execution of police duties.

The annual report includes strength and distribution of the force number and disposition of persons charged by the police, and stolen and recovered property. Moreover, it contains discussion and analysis of long range police problems.

In addition to the yearly reports, spot maps are also useful to indicate the locations of traffic accidents and traffic enforcement efforts, the residence of accident drivers and potential offenders and the location of crimes.

2.4 EXPERIENCES OF LAW ENFORCEMENT AGENCIES

2.4.1 International and National Law Enforcement Agencies

To have a broader view of the management system of police records, it is important to summarize some of the experiences of police information systems in the developed countries. Therefore, some experiences from the INTERPOL, the system of Canadian

Police Information Center, United Kingdom Police Agencies and some Municipal Police Agencies in the United States is summarized as follows from the book of John M.Carroll, 1991, other journals and documents.

The experiences presented here indicate the information storage and retrieval systems, the files held by the organizations and their communication systems.

2.4.1.1 INTERPOL

On the International level, storage and retrieval of police information is made possible by the International Criminal Police Organization, better known by its cable address the INTERPOL.

INTERPOL's main functions are the recording, analysis and dissemination of information contributed by the police of member countries. The main activities of the INTERPOL focus on three categories.

1. Criminals who operate in more than one country,
2. Criminals who remain in one country but whose crimes affect other countries.
3. Criminals who commit crimes in one country, and then flee to other countries to escape the consequences of their actions.

INTERPOL's Criminal Records Office contains information regarding the identities, aliases, associates, and methods of working (modus operandi or MO) of international member countries by radio or confidential circular.

The criminal record system of the INTERPOL is already computerized. According to John M.Caroll (1991) there were 135,000 identifiable persons (international suspects) and another 57,000 known aliases in the computerized criminal record files of the General Secretariat of the INTERPOL. There were also some 30,000 property files.

The criminal record of the INTERPOL identifies attributes of criminals from material submitted to the General Secretariat by the National Crime Bureaus (NCB) of the member countries. The data sent to the INTERPOL by member countries consists of criminal charges /warrant particulars, conviction records, name, date of birth, aliases, personal identification numbers (passports), and modus operandi. Property files also contain narrative descriptions of stolen items and identification numbers.

Private individuals can not retrieve INTERPOL criminal information. Only the NCB's of member countries are structured to receive it. The NCB of each country transmits, receives, and processes criminal information for qualified law enforcement and judicial officers in a given country and serves as a unit for communication with other NCB's and with the General Secretariat.

2.4.1.2 National Crime Information Center (NCIC)

The U.S Federal Bureau of Investigation (FBI) operates the computerized NCIC. The NCIC was established as a service to the criminal justice community, Local, State, and Federal Law enforcement agencies to enter data in to, and inquire the system.

NCIC maintains files of: wanted persons, foreign fugitives, missing persons, unidentified persons, U.S secret service protection officers, stolen vehicles, stolen license plates, stolen articles, stolen or recovered guns, stolen securities and, stolen boats.

According to John M. Carroll (1991) there were 8,253,417 active records in NCIC, as of November 1, 1989. These records can be used by an agency which meets the definition of a criminal justice agency or any agency under the management control of a criminal justice system. An agency meeting these criteria becomes eligible to receive NCIC information by applying to a state terminal control agency (state criminal justice agency that maintains a state system interface with the NCIC system) for authorization to access through a state system.

An authorized user may request specific information by initiating the appropriate inquiry transaction for the desired information on a terminal linked to a Federal or state system that interfaces with the NCIC system. If a qualified agency has no terminal access to the NCIC system that agency may request the information through an agency that does have terminal access to NCIC.

Information in the NCIC system is entered and periodically validated by the agency holding the source document (warrant, missing person or theft report, or unidentified person report) for the information. Data in the NCIC files is exchanged with and for the official use of criminal justice officials of federal, state and local governments in the 50 states, the district of Colombia, Puertorico, US Possessions, and Canada.

2.4.1.3 Canadian Police Information Center (CPIC)

General Information of the System

The system of Canadian Police Information Center (CPIC) is a police information under the Royal Canadian Mounted Police (RCMP). The CPIC has three categories of agencies.

1. Accredited police agencies having full peace officer powers – primary duty is law enforcement.
2. Agencies with a limited law enforcement role that is secondary to the primary role of the organization.
3. Agencies complementary to law enforcement that provide direct assistance but have no direct enforcement authority.

There are different levels of access and transaction privileges to CPIC.

Levels of access to CPIC

1. Full Access – enables the agency to access the investigation identification, and ancillary databanks and the CPIC communications system.
2. Special Access – All of the above plus access to the intelligence databank.
3. Limited Access – Restricts the agency to specific files, categories within files, and/or the communications system.

There are two levels on transaction privileges:-

1. Full privilege – Allows the agency to perform maintenance (add, modify, locate, or remove), query (standard, special, unique, or restricted off line search, and message switching)
2. Limited privilege – Enables an agency to perform a subset of the above transactions and/ or limits the completeness of response.

Each record placed on CPIC must be backed up by a police file maintained by the originating agency. The agency is responsible for the accuracy and validity of the record and must be able to confirm it on request 24 hours a day, 7 days a week. In addition, it must validate the record 6 months after entry and once every year thereafter. Only the originating agency can modify or remove a record, and policy dictates that this should be done as soon as the requirement for it has expired.

Records stored in CPIC may be used only for law enforcement purposes. Each agency having full access may disseminate information to other law enforcement agencies. In addition, the attorneys general and solicitors general of Canada and of her 10 provinces and 2 territories may approve release of CPIC information to other agencies.

The CPIC system consists of one automated central facility located in the RCMP head quarters complex in Ottawa. It operates on a year – round, 7 days a weak and 24 hour a day basis. The system has backup computers and other processors for its day to day activity. To this system more than 1500 terminals afford direct linkage. (John M. Carroll, 1991). The terminals have the following features.

- Preformatted screens for all CPIC input forms, editing capability, and high lighted mandatory fields.
- Ability to store, retrieve, and redirect incoming messages
- Capability of operating in English or in French
- Full auto print for selective printing
- Recovering of transmission, printing and received messages at system start up.
- Diskette storage of agency – created narrative traffic and formatted and unformatted messages.
- Capability of placing the terminal in a secure mode that requires entry of a valid password to operate.

CPIC Databanks

There are four principal Databanks

- Investigative
- Identification
- Ancillary and
- Intelligence

Investigative Databank are used in direct support of police investigations. The databank consists of such files as vehicle, marine, persons property, and major crimes.

Identification databank is used to complement investigative information, for security and reliability checks, and for court purposes. It maintains the criminal record synopsis file and the complete criminal record file.

Criminal Record Synopsis consists of the record file number and fingerprint classification of the individual, the latest available description of the individual and the date the description was recorded. Moreover, it contains the date that the identification service file was opened, the categories of the types of offenses the record subject has been charged with and the names used by the subject of the record.

Complete criminal records are available by query using the person's fingerprints number and they are removed from the system only when the fingerprint (FPS) file is destroyed or information is removed from the file by identification services. The FP file retention period is:-

1. One year after notification of death when death is supported by fingerprints from the cadaver.
2. When an individual reaches age 70, unless the individual:-
    a. Has been charged with an offense within the previous five years.
    b. Has been serving a sentence or has been under judicial control, that is parole or probation order within the previous five years.
    c. Has been convicted of a sexual offense.
    d. Has an extant warrant pending or an interest has been expressed by an agency engaged in the execution or administration of the law.
3. Files retained under (2) are reviewed each year and destroyed when:-

a. The reason for retention no longer exists
b. A sex offender is at least 80 years of age and has been inactive during the previous 10 years.
c. A person on life parole is at least 80 years of age and is criminally inactive.

4. When a charge does not result in a conviction, the accused person may request the destruction of the fingerprints and the removal of the offense information from the FPs file and CPIC.

If the non-conviction charge is the only information on file, the complete file in identification services is cancelled, and the entry is removed from CPIC. If there are other charges, only the non-conviction information is removed from the FPs file CPIC.

Ancillary Databank contains, motor vehicle registration, drivers license and inmates of correctional services of Canada whereas Intelligence database contains surveillance file, focus file and criminal's intelligence file. In ancillary databank record maintenance and integrity for this databank is the responsibility of various non-police agencies such as motor vehicle branches whereas in intelligence databank this same task is the responsibility of members of the police community in charge of gathering criminal intelligence.

The files in intelligence databank were designed to provide storage, retrieval and analysis of all criminal intelligence. The information in the

intelligence databank is used to reveal the existence of organized criminal activity, identify group members, and establish their criminal activities, their internal administration, sources of income and vulnerability.

2.4.1.4 Police Information in the United Kingdom (UK)

The police of the United Kingdom have a criminal record office. Files that are maintained in this office are: individual case record, the nominal index, the wanted/missing persons index and the criminal record office (CRO) files.

Individual records are kept on all persons who are convicted of a crime. The information shown on the nominal index slip enables a searcher to identify a person by name; date of birth, height, deformities, abnormalities, marks and scars, date and place of first conviction, modus operandi, if recorded, and CRO numbers but no details of the criminal record.

The wanted/missing persons index is used to search records related to wanted and missing persons.

A criminal record office file contains the following: a full personal description aliases, deformities, abnormalities, marks and scars, date and place of first conviction, modus operandi, name under which the individuals was convicted and, the latest available photograph.

The criminal record office file also contains an antecedent history sheet of the subject's personal background which includes date and place of birth, schooling,

employment and domestic circumstances. The domestic circumstance includes details of any escape from detention, admissions to hospitals, changes of circumstance of detainees.

In addition, there is a result for each of the convictions on the descriptive form with list of cases taken into consideration when the subject was convicted if that is applicable.

Information from a CRO file is available to police on request either by allowing officers to see the file or by sending them the comprehensive description form.

The UK police system also has Police National Computer Organization (PNC). The PNC has a nominal index of the details of persons with convictions for reportable offenses together with details of convictions for those convicted since 1981.

The PNC keeps the following files:-

1. Stolen and suspected vehicles
    - Vehicle registration numbers
    - Chassis and engine numbers

2. Vehicle Owners

This contains information on more than 30 million vehicles registered in England, Scotland, and Wales and allows police to determine the names and addresses of current owners

3. Fingerprint

This is a coded version of the national fingerprint collection held at New Scotland Yard. It is used at a limited number of terminals to identify persons appearing before the courts and charged with serious crimes and to help identify fingerprints found at scenes of crimes

4. Criminal's Names

This file gives names and brief particulars about persons awaiting trial for, or convicted of, serious offenses.

5. Wanted and Missing Persons

This is a file of persons wanted or sought by police in connection with police inquiries and persons missing or found.

6. Disqualified Drivers

These are also identified by the PNC. The PNC also has the capability for:-

Vehicle descriptive – the vehicle files can be searched on the basis of a partially known registration number on a partial description.

Broadcasting – it can help police send messages to a particular force or group of forces such as all forces along a motorway or at sea or airports.

Cross Referencing – it permits reference numbers of criminal records to be referenced to other police records.

Crime Pattern Analysis – It holds information on serious crimes; such as murder and serious assault, rape and serious sexual assault, robbery and burglary, to determine whether or not crime incidents are linked.

2.4.2 State Police Information Systems

In some countries with federal government structure, states have their own police information systems. The New York State Information and Intelligence System (NYSIIS) is an example of the state police information systems. New York Police Information system is selected here only because of the availability of adequate information.

The New York Police Information System has the following files:-

1. Fingerprint
2. Name Files
3. Summary Case History Files (rap sheets)
4. Wanted and Missing Persons Files

1. Fingerprint– The fingerprint records include both criminal and non criminal records. Fingerprints are received by law from police agencies, penal institutions and governmental agencies involved in employment or licensing activities. Arrest fingerprint cards are received in New York State Division of Criminal Justice Services (DCJS) over a state wide facsimile network, making it possible to classify and search such fingerprints and transmit any prior criminal record information back to the arresting agency within a matter of hours.

2. Name File - The name files contain name and alias cards pertaining to individuals for whom there is one or more sets of fingerprints in the file.

3. Summary Case History File – These computerized files contain a chronological listing of the arrest and incarceration fingerprints that are on file. Copies of the computerized summary case histories are forwarded to authorized governmental agencies who submit fingerprint cards to DCJS. In addition to the chronological listing of fingerprint cards, the summary case history also includes identity information such as name, date of birth, FBI number,… etc.

4. Wanted and Missing Persons File - this is a totally computerized file. This information is received from authorized governmental agencies (primarily police agencies) and includes name, sex, year of birth and data about the crime for which the individual is wanted … etc.

   The validity and uptodateness of the file are checked periodically throughout the year to confirm wanted or missing status.

2.4.3 Municipal and Metropolitan Police Agencies Information System

The great bulk of police work is done at the local level. It follows that the greatest concentration of records is generated in local and Municipal Police Information systems with wide variances in the content and handling of such records. Example of such type of police information systems are (John M. Carroll, 1991) Los Angeles, New York, and Toronto Cities.

The records held in the aforementioned Municipal and Metropolitan Cities police systems can be classified in the following files

Common files

The heart of any police records system, large or small, is the master card index, often called a name index. This is logically equivalent to a card index alphabetically by subject names listing all people contacted by police in day – to day operations including: suspect, victim, witnesses involved in any reported crime, missing persons, theft violations, people with gun permits, locally licensed individuals.

A record in a name index includes: name of the subject, date of birth, physical description, reason for contact, offense or circumstance, case number, charge or booking number if subject is arrested.

Other commonly held files in Municipal Police Systems are: accident and incident report files, identification and criminal history files, arrest files, and recovered or stolen vehicle files.

In some Metropolitan Cities, cities with a population of over 2 million, a central index, a complaint file and an accused person's file are maintained.

Central Index

The key element in accessing the police records of this system is the Central Index. Each entry consists of: name address, file reference and brief personal description.

Entries are made on the basis of phone calls from district commands and later substantiated by comparison with the official report. The kinds of entries found in the Central Index are:-

- wanted persons
- missing persons
- persons having criminal records (felonies)
- persons having summary conviction records (misdemeanors)
- operations license suspensions
- interdicted persons (those prohibited from buying liquor)

- persons on probation
- parolees
- juvenile offenders
- arrest reports

Complainant and accused persons Files

These files constitute an index to occurrence reports. They denote the kind of occurrence and are filed alphabetically by the last name of the complainant and the accused person. Complainant and accused persons file contain the following elements:-

- general occurrence reports used in cases of crime and mental illness, specifically crimes of assault, robbery, burglary, and larceny.
- supplementary reports on occurrences already reported
- fraudulent check offences
- bicycle and tricycle occurrences
- motor vehicle occurrences
- impounded or held vehicle reports
- missing person reports
- lost and found reports
- homicide or sudden death reports
- records of arrest

2.4.4 Lessons drawn from the experiences

Police information systems are well developed at International, National, State, Municipal and Metropolitan levels and small towns.

In Federal governments like the USA there are national, state and municipal police systems and they all have their own Information systems. They exchange information but the types of records they maintain and the way they manage their information differ. The files held at the hierarchical level of the government decrease from lower to higher level, e.g. the USA.

All the police record systems of the countries taken as examples are computerized. Thus, as their police records are computerized, the classification and the types of files are many. For example, there are 11 types of file in FBI and there are many different types of files in the police information systems of the other countries.

Since almost all police record systems are computerized an authorized justice agency can access information from any state or national level and the information systems are well networked.

Access to information is limited (every country's information system has its own entry, retrieval , retaining system).

The records held differ based on the specific conditions and environment of each country, even within one country the records maintained can differ considerably depending on the specific conditions of crimes in each state, region etc. If we take the situation in the USA records held by FBI, New York State, New York City, and Los Angeles are different.

CHAPTER III

DESCRIPTION OF THE EXISTING SYSTEM

3.1 INTRODUCTION

System analysis is essentially about identifying and defining the problems of an organization which are worth solving within the resources likely to be available. Without systems analysis, there is a real danger of designing and implementing systems which do not meet the user's need. Thus, the primary task of a system analyst is collecting information on the current state of the system under study and the requirements of its users. For this purpose the analyst needs to collect information about the organisation, what it is, what it does, why and how it does and how those activities can be performed more efficiently.

Therefore, the analysis process is a process of gathering and inter-relating the facts about a system focused on producing a specification of the user-system requirements in user terms (William S. Davis, 1983). In other words, system analysis is to get agreement on all the outputs, inputs and processing requirements but substantially divorced from any detailed consideration of how these are to be satisfied by any new system. Therefore, this is a very crucial step in order to lay down a foundation for the design of the future system and to make its operation more effective.

This chapter, therefore, deals with the analysis of operations and current problems of the police criminal record management system using the techniques of structured system analysis. It investigates what and how the current system works, identifies the major problems, and then establishes, in a broader context, the requirements for the proposed

computer assisted police criminal record management systems without going to detail consideration of how all these could be fulfilled by the new system.

To describe the existing system an attempt has been made to analyze every aspect of the police criminal record management system which covers the main aspects of the functions and activities in order to see how far they meet their objectives and to identify what remains to be accomplished by the new system.

The results of the analysis process are documented using data flow diagrams and data dictionaries. Using these structured analysis and design tools an attempt has been made to develop a logical model of the existing system.

As mentioned in chapter one, the information used for the analysis has been obtained from direct observation and face to face discussion with the top management, line managers and staff members of the Federal and Addis Ababa Woredas Police Criminal Record Centers. Therefore, the analyst has tried to build an over all picture of the system from the discussion held with different users and direct observation at different levels of the system.

3.2 CURRENT SYSTEM DESCRIPTION

This section deals with the description of the system starting from the outputs to the users of the output.

3.2.1 Outputs of The System

The output of police criminal record management system can be classified into three broad categories.

3.2.1.1 Case File of an Individual

When a case is presented to investigators, or when an individual is arrested on account of crime suspicion, investigators gather the relevant data about the suspect from his words, the accuser and witnesses. In addition, his past record is retrieved and checked before his file is sent to prosecutors and courts. Finally, a case file is prepared. As the case file of a suspect is one of the outputs of the system, it is essential for the subsequent actions of the prosecutors and courts.

3.2.1.2 Crime Clearance Certificate

Citizens request crime clearance certificate when they need employment or when they need to travel cross boundaries. So, the Police Criminal Record Center prepares a certificate of crime clearance when requested by citizens. This is also an important activity in the Federal Police Criminal Center. All regions send finger print to the Federal Police for checking before they issue crime clearance certificates to applicants.

3.2.1.3 Statistical Report

Police management should followup the overall crime situation of a country. Its operations are based on the overall condition of the country, region, zone and Woreda. For this, each level of the police crime information and research center prepares daily, weekly, monthly, bi-annual and annual crime statistical reports.

These reports are used by all police management and other governmental organizations at both the Federal and regional levels.

3.2.2 Inputs of The System

3.2.2.1 Case Application

Investigations of cases by the police investigators are the bases for the case file of a suspect. Investigation may be initiated either by the notification of the public to the Woreda Police stations, about suspected individuals who may have committed crimes of larceny, Fraud, Burglary, Robbery, Assault, Rape and Sexual Assault, Homicide, Arson, etc. Or the case may be reported to the police directly by the accuser or it may come as a result of police followup.

In whatever form the notice comes, the investigator fills a sheet which is called a "Preliminary Investigation" based on the written application of the accuser. Then, the investigator fills another sheet based on the words of the accuser, the suspect and witnesses. In addition, the investigator collects technical data from the crime scene. These technical data may be equipments used in committing the crime, latent prints, drops of blood etc. (see the three types of sheets for investigation in appendix two). After the initial investigation, if the investigator believes that the suspect has committed an offence, he orders to have his finger print taken and his past record checked in the Federal Police Ten Finger Print Record Center.

The case can also be initiated or reported by the INTERPOL. In this case, the fingerprint or the photograph of the wanted person is sent from the INTERPOL

to the Federal Police Criminal Records Center. The Federal Police Criminal Record Center investigates the fingerprint or photograph of the wanted person against the criminals database and provides an answer to INTERPOL. If the wanted suspect has a record or resides in the country the police takes appropriate measures based on the report.

3.2.2.2 Case Records

In each of the Woreda police stations, and in the Criminal Investigation Department of Addis Ababa daily crime cases are recorded. The crime record sections do not use formal sheets to record the daily crime cases. These sections prepare, daily crime report and continue to prepare weakly, monthly semi-annual and annual reports. In this regard although police investigators claim they are trying to check whether any reported case record has actually taken place, the Ministry of Justice complains that most of the reported case records are not committed and hence the report is exaggerated. In most cases, case records maintained on daily basis are not updated after the investigators completed their investigation. Furthermore, there are cases which are dropped by the prosecutors and courts for lack of evidence. Therefore the case records are exaggerated. According to the police, there were 58,619 crimes reported in 1997/98 alone. (Source Addis Ababa Police Head Office). This figure, however, is not readily accepted by the Ministry of Justice for some of the reasons indicated above.

3.2.2.3 Request of Crime Clearance Certificate

As mentioned earlier, if any citizen is offered with an employment or wants to travel across the territory of the country, some employers or countries request the individual to provide a certificate that he/she is clean from any crime. The applicant comes directly to the Federal Police Criminal Record Center if he is from Addis Ababa and his/her fingerprint is sent, through the regional police department, if the person is residing outside the capital. All applicants from the capital present themselves physically to the reception section of the Federal Police Criminal Record Center and supply their fingerprint. The fingerprint is then classified, verified and searched upon, and sent to the concerned body.

3.2.3 Processes currently performed by the system to produce the outputs of criminal record management system.

The major processes carried out by the system to prepare suspect case file, to issue Certificate of Crime Clearance and to prepare a crime statistical report are described below.

3.2.3.1 Police Investigation Process

Any suspect record data starts from the investigative activities of a police investigation officer. In this process there should be a case for the initiation of an investigation by the police officer. If there is a case which the police believes should be investigated, the investigating officer fills a sheet called

"Preliminary" and fills another sheet based on the words of the accuser, suspect, and witnesses. In addition, he collects other technical data provided by the technical experts from the crime scene. Thus, the police investigation is an initial process for the preparation of a suspect case file.

This process necessitates manual involvement of the investigators. The police investigator needs to discuss with the accuser in order to identify the core points of his complaint. He should also discuss with the offender and witnesses to further verify how the reported crime was committed. Based on the discussions held, he has to fill in the sheets the core points of the reported case. Hence, the investigation file of a case is composed of the words of the accuser, the words of the accused or suspect, witnesses and other technical information collected from the crime scene. This file serves as a core source of information for the subsequent actions undertaken by prosecutors and courts. This process includes:-

- Preliminary investigation
- Record of the statements of the accuser, suspect and witnesses
- Record of data collected by technical experts. These data may vary depending on the type of crime committed.

3.2.3.2 Technical evidence record process

The collection of technical evidence includes ten finger print, photograph, voice print etc. The most commonly used technical evidence in Ethiopia is the ten finger print.

Ten fingerprint is used for identification of suspects. This could be used either to identify the past records of a person suspected or to identify latent finger prints collected from a crime scene.

The process of technical record logically comes after the investigating officer finishes his investigation. If he completes his investigation and, if he also believes that the fingerprint of the suspect should be taken his/her ten fingers are printed in a finger print sheet at the place where the crime is committed or at the Woreda police station. Then his/her physical description is filled in the description sheet. If the fingerprint is collected by the "Woreda" Police Stations, the criminal record section in the Woredas send the fingerprint to the Federal Police Criminal records Center. The fingerprint is then classified, searched in the name index and the ten fingerprint catalogue, and finally the result is sent by the Federal Police Criminals Record Section to the concerned police stations. The result can be positive or negative. If the result is positive and the suspect has a previous crime record the result is sent to the concerned body by a report sheet called "Punishment Notice Sheet". If the result is negative and the suspect has no previous crime record, the report is sent by a sheet called "Beginners Criminals Notice Sheet." (see the fingerprint, personal description, punishment notice sheets and beginners criminal notice sheet in appendix two).

If the fingerprint is collected by the Criminal Investigation Department of Addis Ababa Police, the result is prepared in two copies. The first copy is sent to the Federal Police criminal Record, while the second copy is kept in the Ten

Finger Print record Center of the Addis Ababa Criminal Investigation Department. This is because some of the regional police offices including Addis Ababa region have started to keep their own finger print records beginning from 1995.

In processing the technical record of a suspect, initially the finger print is presented to the reception section of the Federal Criminal Record Center. Then it is sent to classifiers through a distributor. The classified fingerprint is again sent through the distributor to the name and ten fingerprint catalogues, respectively, to check if the subject at hand has a previous crime record. The result, positive or negative, is sent to the criminal history record section. In this section the punishment notice sheet or the beginner criminals notice sheet is filed and is sent to the reception section or directly to the concerned police station. If the person has no previous record in the ten fingerprint catalogue he/she is recorded as a beginner offender in the criminal record file and his ten finger print is held in the ten fingerprint catalogue.

During these processes users in the police criminal record system face two problems. First, the process from reception up to criminal history record preparation is very long. On the average it takes not less than 15 days to prepare the criminal history of a single individual. This is because, apart from being traditional and manual, the size of the fingerprint record at the Federal Police Record Center is extremely large for it serves as the central fingerprint repository of the entire police structure in the country.

The second problem is associated with the record of first time suspect. The fingerprint of first time suspects is recorded in the catalogue of ten fingerprint and indexed by name. However, all suspects may not be convicted. Many of them are released by the courts for lack of sufficient evidence. So, maintaining the fingerprint of persons who are not convicted becomes debatable. The general view held by many experts in the field is that police records should only contain fingerprint of suspects who are proved to be guilty and legally convicted by the competent courts. The Federal Police Record Center does not follow this procedure. The fingerprint of any person who happens to visit the center on criminal charge is kept by the center indefinitely even if the person in question is not convicted. This unnecessarily increases the record size of the center and complicates the searching process of the fingerprint catalogue.

The other factor that makes processing finger print too long is the manual nature of the job. To begin with, fingerprint is taken manually. A person is made to provide his fingerprint using ink and paper. Then, the characteristics of the fingerprint are classified by the classifiers and searched in the fingerprint catalogue by the fingerprint experts through their necked eyes. The process is time consuming and tiresome, which has caused eye sickness on the experts.

The same process applies to issue crime clearance certificate to ordinary citizens and to identify latent fingerprints collected from crime scenes.

3.2.3.3 Statistical Report Preparation Process

Police Statistical report is very crucial for the management of the police and other law enforcement agencies.

The process of preparing police statistical report is essentially based on the daily crime occurrence. The daily case record sections in the Addis Ababa Criminal Investigation and Woreda Police Stations record daily crime cases. Then, they report to the crime information and research division of Addis Ababa Police. The stations also summarize the crime report on weakly, monthly, biannual and annual basis. The report is summarized at zone level and it is then reported to the division of Crime Information Research at Addis Ababa level. The Addis Ababa Crime Information and Research Center, in turn, summarizes the reports it received from all zones weakly, monthly, biannual and annual based on sex, literacy, occupation, marriage, urban, rural, type of crime, age etc. Crime statistics at national level, which includes all the regions and Addis Ababa, is prepared by the Federal Police Information Center.

In the course of preparing police statistical report, there are two basic problems raised by the users. First, the process is completely manual and it entirely depends on human labour. Due to this, users at all levels can not obtain these statistical reports ontime.

Second, according to the users in Ministry of Justice, the reports prepared are highly exaggerated. The statistical reports are prepared long before the suspect is legally convicted by the courts. Furthermore, the record is not updated after each case is closed by the courts

3.2.3.4 Process of communication with the prosecutors and courts

The suspect's file is sent to the prosecutors and courts after all the investigative activities are finalized by the police investigators.

The communication with prosecutors and courts is a process by its own and it is mainly done by the case file record section of Woreda police stations. The complete case file of a suspect is sent to this section and from there to the prosecutors. Some clerical activities such as filling of forms, are involved in this section before the file is finally sent to the prosecutors. If the case file is not complete as per the requirements of the prosecutors the file is sent back to the investigators again involving many clerical works in the process. If the case file is complete and the case is closed either by the prosecutors or by the courts, the final verdict is recorded and archived by the record section

In addition to filling in different forms and archiving the files, the case file record section is responsible for the daily communication made with the courts. It is also responsible to physically present suspects, and witnesses before the court when it is ordered to do so.

Therefore, the section has to write memorandum of confirmation on daily bases to the courts to inform the later whether its orders have been communicated to and signed by the offenders and witnesses that have been ordered to appear before the court.

There are two problems here. First the clerical work involved in sending and receiving investigation files to and from the prosecutors and courts is routine and tiresome task. The forms and paper files used to send and receive the case files are not standardized and some times the clerks use additional forms on their own, thereby complicating record maintenance.

Second, the process of informing the accused persons and witnesses to appear before the court and the process of writing memorandum of confirmation to the courts is a routine task which heavily depends on human labour and paper work.

3.2.4 Information Currently Held By The System

The types of information held by the system can be categorized depending on the processes involved in the production of different outputs by the system.

3.2.4.1 Case Records

Case record is maintained based on the daily crimes reported to each Woreda Police Station. This information is kept until the record work sheet opened for this purpose is finished. The completed record worksheet is then sent to the case file record section. Case records are maintained at both the woreda Criminal Investigation Department and at Addis Ababa Criminal Investigation Department.

3.2.4.2 Case Files

Case files are basically prepared in two copies by the police investigators. Case files are classified and stored in the case file section depending on the status of each case. some of these include:-

- Files sent to the prosecutors
- Files that carry closed cases
- Files sent back by the prosecutors

- Files with dropped cases
- Files with pending court cases. etc.

3.2.4.3 Finger print records

All ten finger print files are centrally kept at the Federal Police Criminal Record, except the Addis Ababa criminal investigation which has started to maintain its own ten finger print records. Fingerprint files contain the following records.

Name Catalogue

The name of every suspect whose ten fingerprint is taken is indexed and catalogued to facilitate the fingerprint searching and retrieving process.

Finger print catalogue

Single fingerprint of every suspect is catalogued for checking fingerprint records. Hence, the record of any incoming suspect is first searched against this fingerprint catalogue. This is the largest record, maintained by the Federal Police since 1944, containing more than 120,000 people, many of whom have died several years ago, if not decades.

Criminal History Records

The record of notorious criminals who commit repetitive crimes is maintained separately by the Federal Criminal Record Center for easy identification. This

record normally consists of the numbers and types of crimes committed by the criminal.

These are the most basic types of information maintained by the criminal record center. In addition to these, the center has recently started to keep the photographs of wanted and notorious criminals.

3.2.5 Users Categories and Their Respective Tasks

The main task of the police criminal records management system are producing crime record of a suspect, crime clearance certificate and statistical reports. The potential users of these outputs can generally be categorized as internal and external users of the system.

3.2.5.1 Internal users

Police Investigators

Police Investigators are direct users of the system. The initial collection of information is basically performed by police investigators. After the initial collection of information about the suspect, his fingerprint is taken and checked to verify if the suspect had previous crime record. The complete case file is then sent to the case file record section.

Technical Clerks

These are clerks directly involved in the activities of reception, taking finger print, distribution, classification, searching in name and fingerprint catalogues,

etc. These are the users involved in the production of criminal history record and crime clearance certificates.

Report preparation clerks

The main task of these clerks is to register twenty four hours crime report at Woreda level and in the Criminal Investigation Department of Addis Ababa. These same clerks prepare weekly, monthly, biannual and annual crime statistics reports.

Police management

The task of police management is to lead and control the overall police activities. This body directly uses the crime statistical reports for operational planning and other administrative tasks.

3.2.5.2 External Users

Prosecutors

The task of prosecutors is to file a charge against suspects and follow up the prosecution process based on the case files presented to them.

Courts

The objective of a court trial is to establish the innocence or the guilt of an accused. This is mainly based on the criminal records file of the police and the

public prosecutor. Past records on the antecedents of the accused will also help the court in the sentencing process as mentioned in the penal code.

The Accusers

The accuser directly follow the progress of the investigation of the crime committed against them through the respective Woreda Police Case File Records Section.

The Suspect

The suspects or offenders need to know the progress of the investigation to make sure that their case is well represented in the courts.

Addis Ababa Administration

Uses the statistical reports for administrative purposes.

INTERPOL

INTERPOL uses the statistical report of the police record for research activities. It also follows wanted criminals by accessing the national police records.

3.2.6 The Logical Data Flow Diagram of The Existing System

The basic operations of the existing system have been explained in the previous sections. In order to support or clarify the information presented in the previous sections, the system will be discussed below using data flow diagram.

Data flow diagram is a graphic representation of a system that shows data flows to, from and within a system, processing functions that change data in some manner, and the storage of this data (William S. Davis, 1983). Data flows are useful to assess the accuracy of the knowledge of present system and the completeness of the information gathered during the interview and observation. The data flows are helpful in describing:-

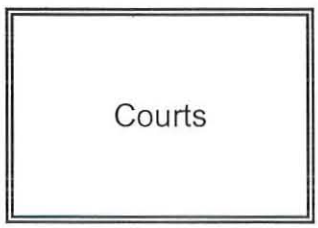
- How information flows into, within and leaves the system,
- What function transforms the information in the system, and
- Where information is kept within the system.

Hence, in the analysis and design parts of this study, data flow diagrams are used to show the inflow and outflow of data to and from the system and also processes involved to change the data to the required output.

Data flow diagrams are constructed using the following standard symbols.

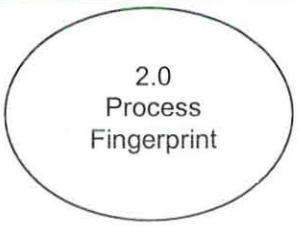
External eneity (sources/destination)

This is the entity which orginates or receives data or information from or to the system sources/destination.



Process

Sometimes it is called a bubble or a transform. The process identifies the transformation of input data flows into output data flows. Processes are described by use of strong verb (present tense, singular) and an object upon which action is taken. Each process symbol has its unique identifying number (such as 1.0, 2.0, 3.0, and so forth) that can be used to identify it clearly from any other processes in the data flow diagram as presented below.



Data store

A data store symbol portrays a file or database in which data resides. In reality this can be where data is deposited or stored by the system whether in cards, files, magnetic media or disks. Data stores are represented by an open – ended rectangle symbol lettered D1, D2, D3, etc. and by descriptive name of the information held inside it as shown below.

D1:	Ten Finger Print Records

Data Flow

Data flow is a movement of data between process bubbles and other processes, sources/destinations, or data stores. A data flow always must flow to or from a process. In other words, one end of the data flow always must connected to a

process. Data flow can be in physical forms such as letters or in other forms such as telephone calls or other electronic methods. A data flow is represented by an arrow denoting the direction of the flow and annotated with the name of the document or information flowing as shown below.

Fingerprints 

The context diagram shown in figure 3.1 is used to represent the entire process of the police criminal record management system.

Context diagrams are constructed to show the high level model of the system. They are used to represent, pictorially, the area under study. Therefore, in the analysis part of the project a context diagram is used to show what should be included in the area under study. In other words, context diagram is used to provide and overview of the area under study and the external entities with whom it directly relates through the flow of data.

Therefore, as shown in the figure, the system takes input from accusers, courts, prosecutors, police management, applicants, INTERPOL and the Addis Ababa Administration. The inputs, on the other hand, are represented by the direct arrow lines which are case application, orders, guide lines, request for crime clearance certificate, request of a statistical crime report, and record of international criminals. The system processes the inputs and finally releases outputs to those entities in the form of information, crime statistical reports, case files, crime clearance certificates and criminal reports.

Fig 3.1 **Context Diagram Of The Criminal Record Processing System of The Ethiopian Police**

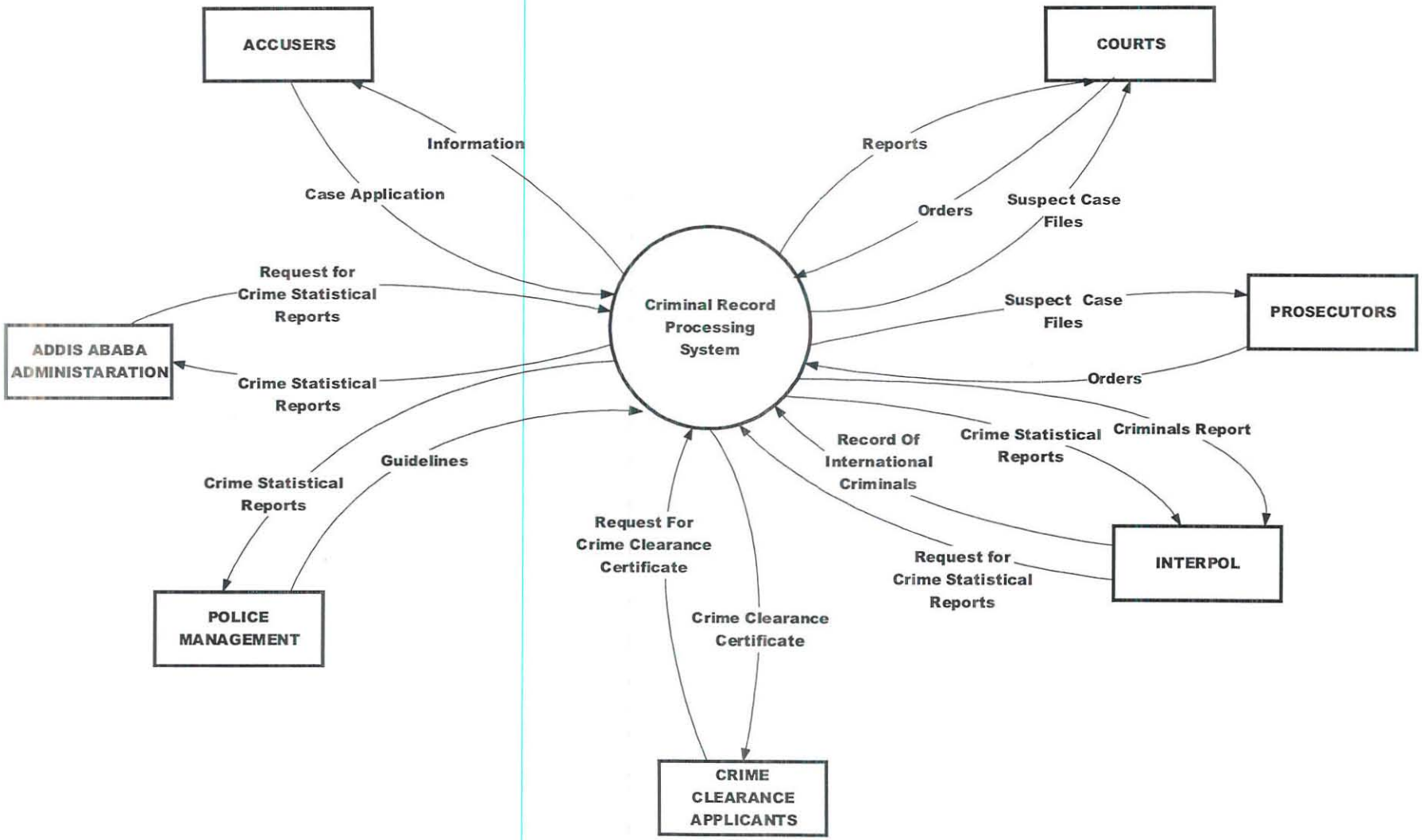


Fig 3.2 **Level 0 Data Flow Diagram Of The Exiting Criminal Record Processing System (CRPS)**

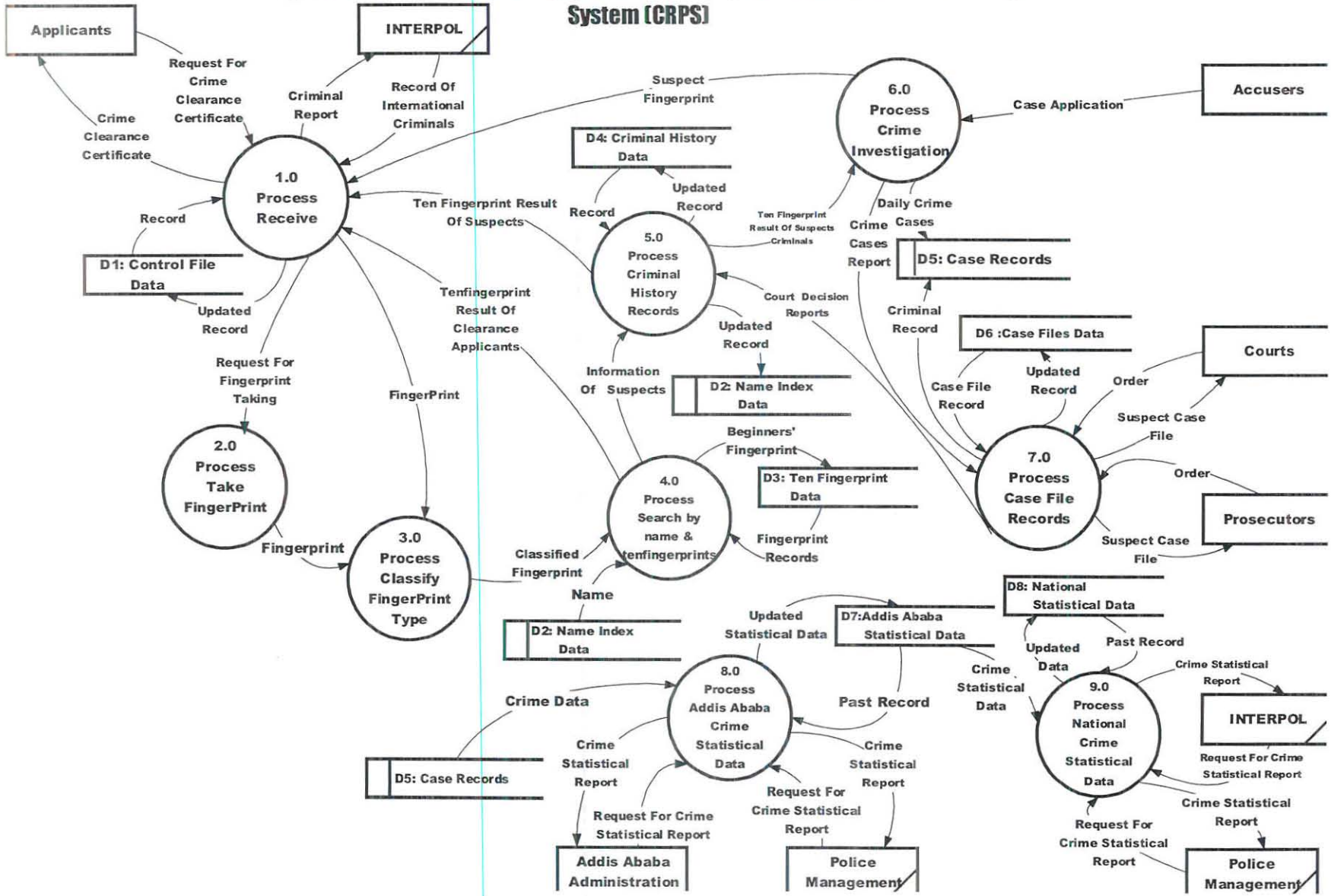
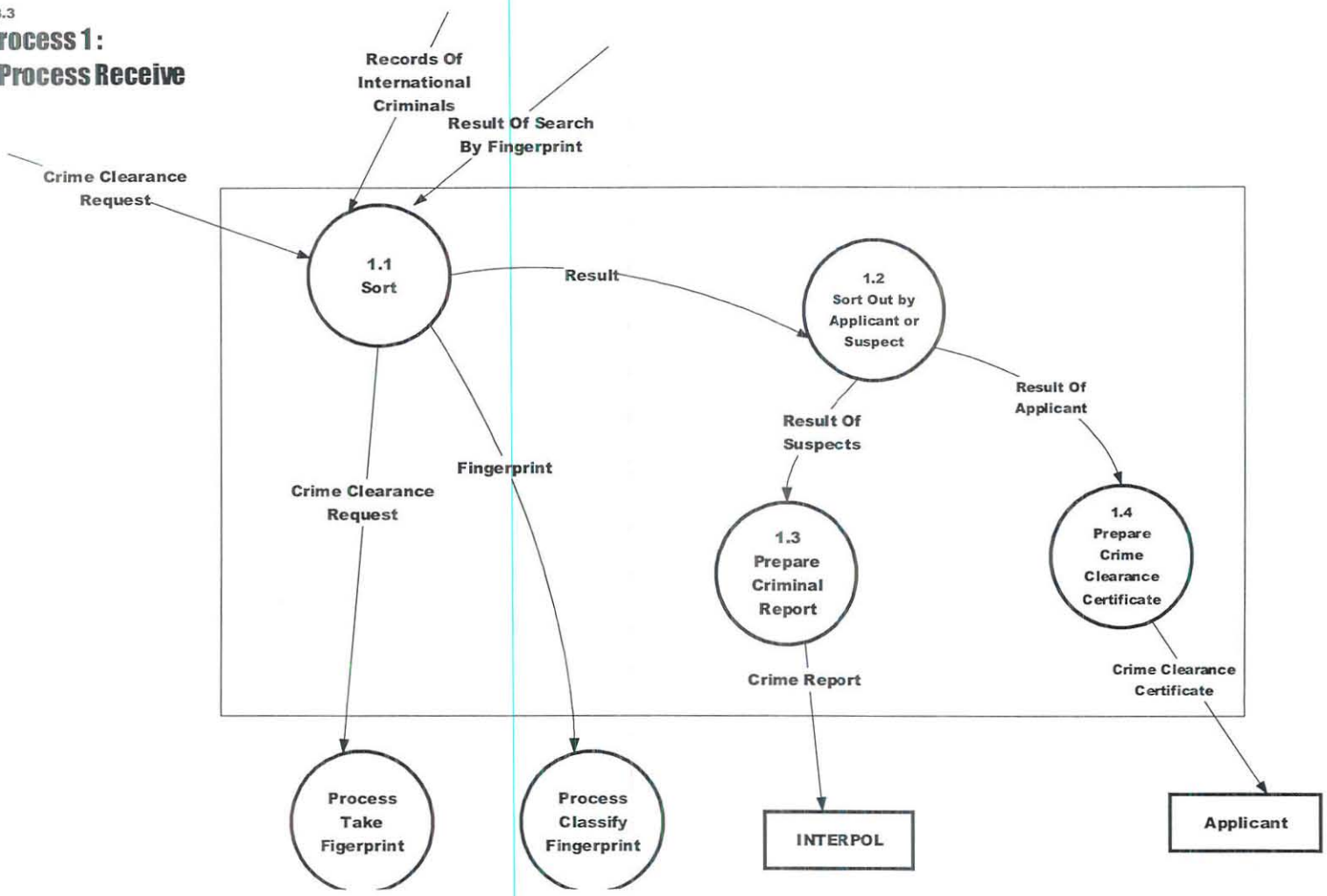


Fig 3.3

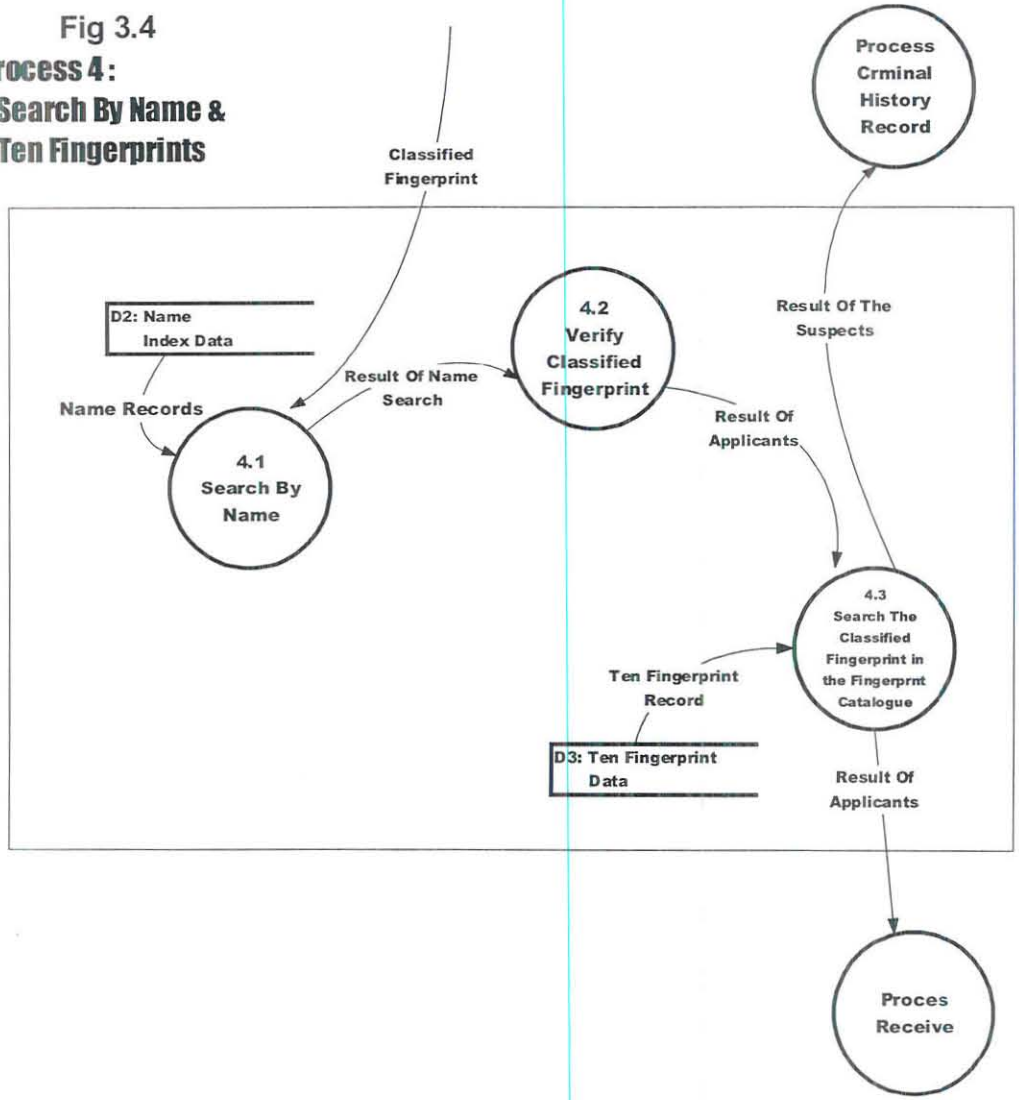
Process 1 : Process Receive



The process is initiated with the arrival of request of crime clearance from applicant's, records of International criminals from INTERPOL and result of tenfingerprints from Process Crime History Record. Then Process 1.1 sorts the arrivals. If the arrivals are crime clearance request and tenfingerprints, it sends them to Process Take Fingerprints and Process Classify Fingerprint Type, respectively. If the arrivals are result of search by fingerprints it sends them to Process 1.2 which sorts them by applicant and suspect . Finally Process 1.3 prepares crminal report for the results of the suspect and send to the user which is INTERPOL. And Process 1.4 prepares crimeclearance certificate and gives to the applicants.

Fig 3.4

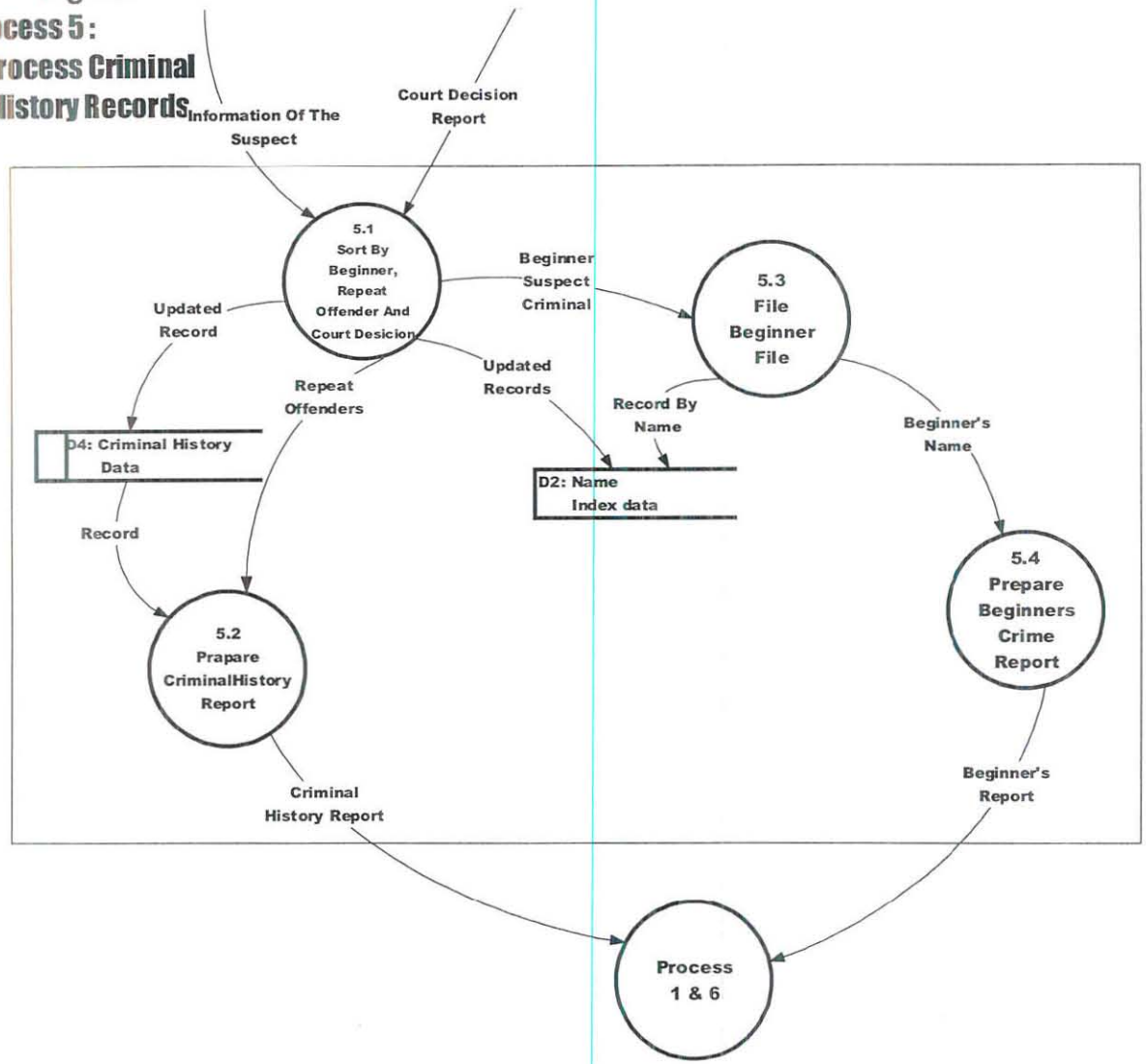
Process 4 :
Search By Name & Ten Fingerprints



This process performs search by name and tenfingerprint. After it searched the classified fingerprints by name, verification is done to the code of classification. Then the classified fingerprint is compared with the relative tenfingerprint and the respective result is sent to Process Receive and Process Criminal History Records.

Fig 3.5

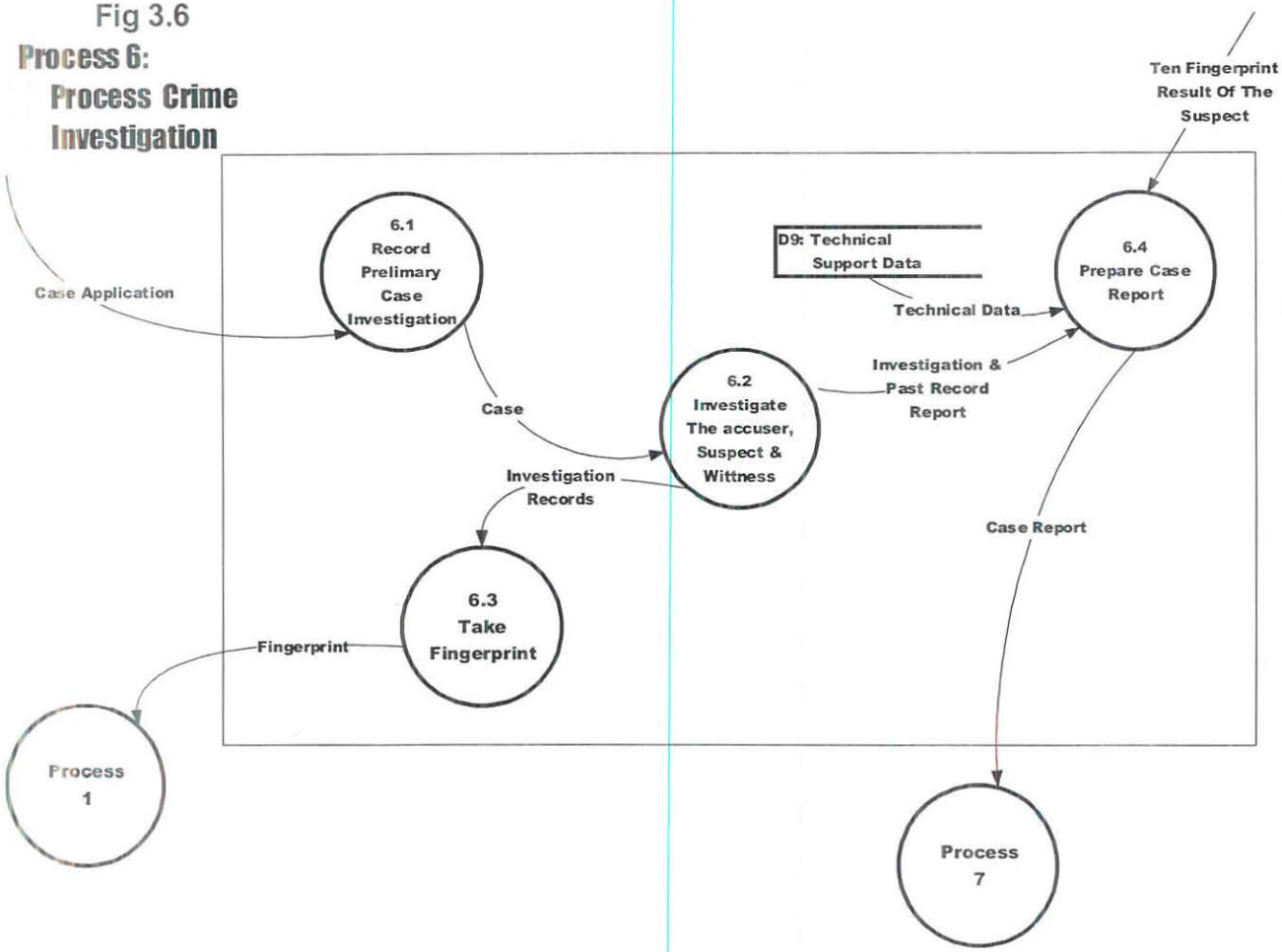
Process 5 : Process Criminal History Records



The process of Individual Crime Record File is triggered by the arrival of information from the suspect criminals and reports of decision by courts. Then if the information of the suspect criminal indicates that he/she is a beginner, he/she is filled in the beginner's file and is finally sent as a beginner's report to Process 1 & 6. If the information shows that he/she has a record, criminal history report is prepared and sent to Process 1& 6.

Fig 3.6

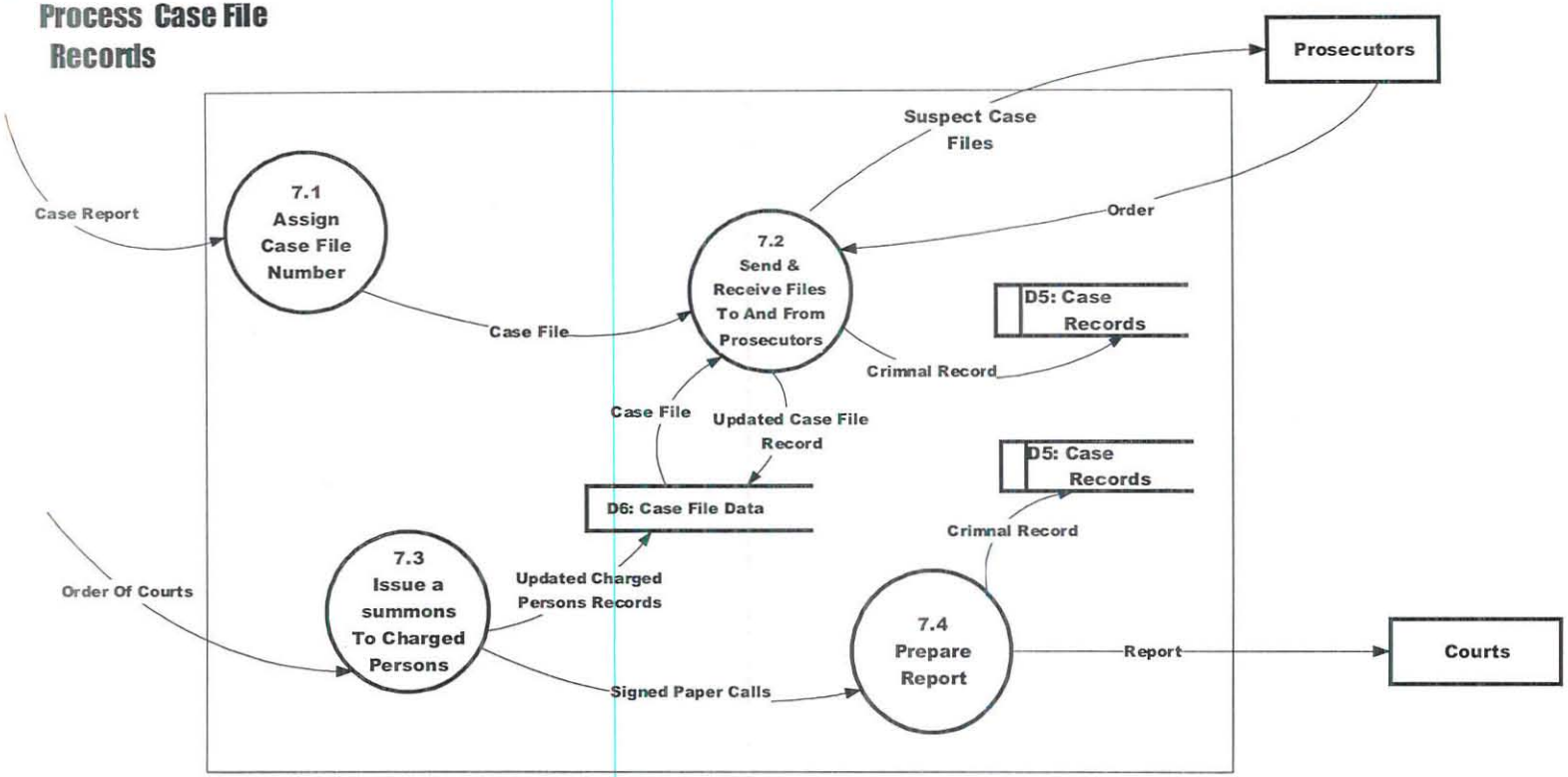
Process 6:
Process Crime Investigation



By receiving case application from the accuser, the process performs its function by recording the case, and then investigating the case. Finally, after receiving the Crime History of the suspect, case report is prepared and sent to Process 7.

Fig 3.7

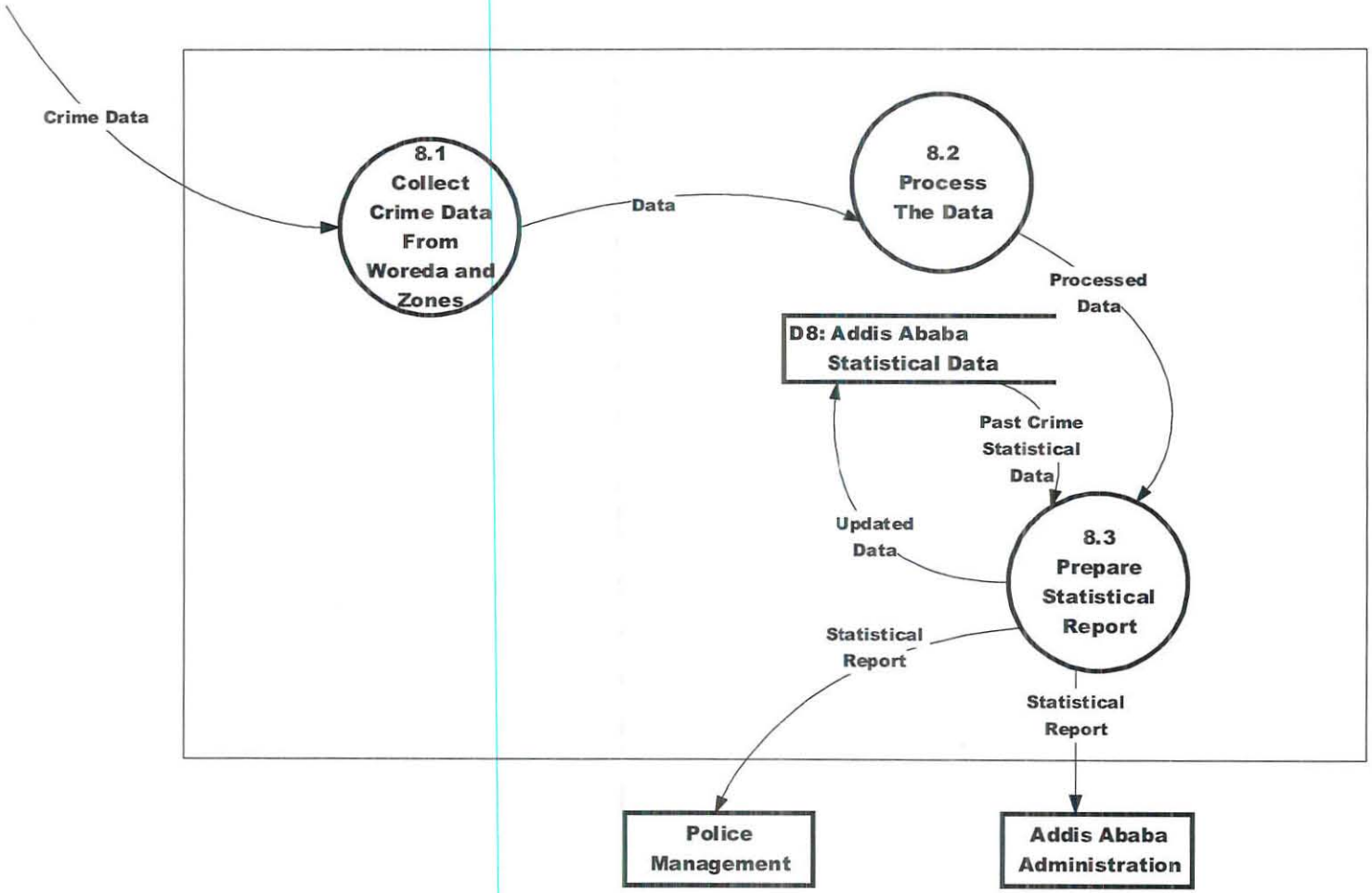
Process 7:
Process Case File Records



Based on the investigation & past record, report of the suspect, Process 7 starts its function by giving file number to the report sent by the investigator. Then the file is sent to prosecutors. After the prosecutors charge the suspected person, the respective courts send an order. Then the charged person is served on summons and is reported to the courts.

Fig 3.8

Process 8:
Process Crime Statistical Data



3.2.7 Existing Computer and Human Power Resources in the System

There are three computer sections operating under the Federal Police Criminal Record Center and Addis Ababa Criminal Information and Research Center (See the existing computer and printers in Table 3.1).

The computer section operating under the Federal Police Criminal Record Center is one of the most poorly organized and staffed units. There are 6 professionals working in this unit who did not go through adequate formal computer related training and most of them have acquired the skill of operating the existing facilities by themselves and on the job training.

At present the unit is not providing useful service to the center, in facilitating their day to day operations. Since 1998, it has started retrospective conversion of criminal records. So far, it has managed to convert only 38,000 records which were recorded since 1989. However, the existing extremely large amount of records is posing a formidable conversion problem.

There are also other computers at the crime information and research centers of both the Federal and Addis Ababa Police. Their purpose is more or less similar.

The computer located at the Federal Police Crime Information and Research Department uses a software called Microsoft Access 97/ALPAS 2.00 (Amharic Interface Software). It has 3 professionals. The professionals have similar problems as indicated above. The software can process data collected from regions and Addis Ababa. But it has only the capacity to input data by type of crime, sex,

Table 3.1 Existing Computer and Printers in the Sytem

MICRO COMPUTERS

Location	Model	Qty	Processor	Ram	Hard Disk	Bit-Processor	Clock Speed	O/ System	Software
A.A Police Station	Gateway 2000 LP-mini-Desktop	1	Pentium	16MB	2.1 GB	32 Bit	150 Mhz	Win'95	▪ MS Office Professional 97 ▪ MS Office 97/ALPAS 2.00 Amharic Interface
Federal Police Crime Record	Gateway 2000 LP-mini-Desktop	3	Pentium	32MB	1.2 GB	32 Bit	150 Mhz	Win'95	
Federal Police Crime Record	Getway 2000 LP-mini-Desktop	1	Pentium	48MB	1.2 GB	32 Bit	200 Mhz	Win'95	
Federal Police Statistics	Gateway 2000 LP-mini-Desktop	1	Pentium	32MB	1.2 GB	32 Bit	150 Mhz	Win'95	

PRINTERS

LOCATION	TYPE	QUANTITY
A/A Police Station	(HP) Laserjet 5L	1
Federal Police Criminal Record Center	(HP) Laserjet 5	1
Federal Police Criminal Record Center	(HP) Laserjet 5	1
Federal Police Statistics	(HP) Laserjet 5L	1

occupation, urban, rural etc. The software is developed in house and the programmers were not ready to expand its services due to budget constraint in the organization. Except for data inputting, the software does not perform other statistical data analysis like the computation of averages, mean, median percentage etc. which are normally required by the users.

The computer used in the Addis Ababa Police Information and Research Center is also loaded with the same type of software with that of the Federal Police Information and Research Center. The data conversion process is underway and so far it has managed to convert the data of the last five years. There are three professionals having similar problems with these just mentioned in the Federal Police.

3.3 SUMMARY OF PROBLEMS OF THE EXISTING POLICE CRIMINAL RECORD MANAGEMENT SYSTEM

Most of the activities of the police criminal records management system described so far, start at Woreda level police stations. All the information about suspects is collected through technical and investigation methods. Technical methods of collection differ depending on the type of offence committed. Technical methods may also be used to support the investigation by the investigator for identification purpose. In any police system the most important concern is the identification of a suspect. Although there are different methods of identification, the most widely used and reliable one is the fingerprint. Hence, most of the problems of the existing police criminal record management system are associated with taking, checking, storing and retrieving finger print of a suspect.

The other major activity related to the police criminal records management system is the police investigation. Police investigation includes collecting information related to the suspect from the accuser, from the accused person himself and witnesses. Once the investigation is finished past crime record is attached to the complete case file and is sent to prosecutors and courts. After courts passed decision and the suspect is convicted, the police records are updated. Therefore, looking into these processes also reveal the problems associated with police crime record management system.

3.3.1 Problems of Fingerprints collection

The fingerprint form currently in use is the best means of identifying suspects. Therefore, taking fingerprint of a suspect becomes a vital search tool to check crime history records. The decision for taking the fingerprint of a suspect depends on the will of the investigator. There is no clear procedure which indicates the circumstances under which the fingerprint of a suspect should be taken. Some investigators collect fingerprints from all cases presented to them. Some times fingerprints are collected from insignificant cases or cases which can not be charged by the Ethiopian Law and Penal Code.

Similarly, there is also no clear procedure when to take a fingerprint. This also depends on the will of the investigator. If an investigator feels that any particular crime has been committed by the suspect, he/she can order to have his fingerprint taken. But there are many problems and loopholes associated here. For instance, some investigators order the collection of fingerprints after the case file is sent to the prosecutors which delays the justice process.

How to collect the fingerprint of suspects also poses another problem. Since the collection of fingerprint is manual, the risk of interchanging right with left-hand or vice versa or one finger with another is very high. Besides, the fingerprint quality is not good. All these problems complicate the fingerprint classification process. These problems arise mainly out of the type of technology used in fingerprint collection and the level of skill of the technical personnel involved in the fingerprint data collection.

The type of technology used by the existing system to collect fingerprint data is manual and outdated. It completely depends on human labour. The low level skill of the technical personnel involved in the process of taking fingerprint is also another source of problem.

There are common human errors emanating from the completely manual nature of the job. Some data elements are not properly filled in the fingerprint form or are sometimes forgotten altogether. The most common problem, in this regard, is forgetting to fill the case file number on the appropriate place, ultimately confusing which fingerprint belongs to whom.

3.3.2 Classification Problem

Once the fingerprint of a suspect is collected, the resulting data has to be classified. Classification is a process by which the fingerprint data is codified based on its characteristics. Unless it is correctly classified it would be difficult to retrieve and use the data in the future.

Under the existing system, since classification requires professional technical knowledge, it is centrally done by the Federal Police Criminal Record Center. Whatever fingerprint data is collected by the police stations in Addis Ababa, it is sent to the Federal Police Criminal Record Center for classification.

The classification process, again, is done manually. It is done through the naked eyes of the professionals aided by magnifying glasses. Classification, apart from being tiresome is an occupationally hazardous job, for it causes a very serious sight problem. No professional classifiers can stay healthy in the center for more than five years. Almost all of the professional classifiers working in the center have to wear sight glasses after only working for a year or two.

3.3.3 Retrieval Problem

One of the most serious problems in the police criminal records management system is the process of retrieving stored police records both at the Federal and Woreda Police Stations.

Retrieval problems at the Federal Police Criminal Record Center Level

The fingerprint of any new suspect is sent to the Federal Police Record Center for checking against past crime records. The fingerprint data is then classified and searched in the name catalogue indexed alphabetically. Since there are over 120,000 name catalogues and the searching process is done manually, it is subject to common types of human errors.

Once, searching in the name catalogue is completed, the fingerprint catalogue is searched based on the search results from the name catalogue. Regardless of the outcome of the search in the name catalogue, the actual searching process is performed in the fingerprint catalogue. Name search is only used to facilitate the searching process in the fingerprint catalogue.

During the process of searching in the finger print catalogue, first the classification of the fingerprint data is verified. After determining to which classification the fingerprint data belongs, the searching process takes place in the appropriate classification. The fingerprint at hand is then checked manually against similar fingerprints within the classification. If any matching fingerprint record is found, it means that the suspect has a previous crime record. If no matching record is found, it is assumed that the suspect has no previous crime record and is registered as a bignner.

As mentioned earlier, the process of searching in the ten finger print catalogue takes long time and is a tiresome task. This is because:-

- The process of searching is manual and very laborious.

- The daily flow of fingerprint information is very high.

- There is no a clear policy as to when and what types of cases require fingerprint. The absence of this policy is alarmingly increasing the load of the Federal Police Criminal Record Center.

- Fingerprint records are not regularly updated as the law requires every 5 years when the charge becomes no more important even if the convicted person commits another crime after that period of time. Furthermore, there is no policy of purging out inactive finger print records by the center. Finger print records are not discarded even when the value of keeping that record is no more important, when, for example, the convicted criminal is dead. Due to this, the center is forced to carry fingerprints records kept since 1944.

These problems are complicating the fingerprint checking and searching process. The minimum response time required by the Federal Police Record Center is 15 days. In fact, this only applies to requests coming from Addis Ababa woreda police stations. Obviously, it requires more days to process fingerprint requests coming from police in the regional states outside Addis Ababa.

The inability of the system to provide ontime response to fingerprint checking requests is contravening the basic human rights enshrined in the constitution particularly if the suspect is under custody.

The search results are not even accurate due to the manual nature of the task. Positive or negative identification of a suspect against the fingerprint record is not uncommon. The fingerprint record is so huge that sometimes suspects are falsely identified by the system as having previous crime records.

Retrieval problems at Woreda police level

Case files maintained at Woreda police are those that are still handled by the courts, the prosecutors or by the police itself. Therefore, the volume of files

maintained by the woreda police stations is much larger than those maintained at the Federal Police level.

Most of the problems we have seen at the record center of the Federal Police equally exist at the woreda police station record centers. The daily transaction of case files from the police investigators to and from the prosecutors and courts is highly intensive. To handle the back and forth movement of case files, the clerks at the record center use numerous forms, and cards which increased the paper work, and redundancy.

The record centers are also required to provide written report to courts when ordered. And it is all done manually. There is no universal file classification procedure adopted by all the record centers. Some try to classify their file by the type of crime, others use the name of the investigator for file classification. There are also record centers at the Woreda police stations which do not use file classification method at all.

Lack of standardized file classification method again complicates file searching and retrieving process. File misplacement is the most acute problem in this regard.

3.3.4 Problem of Updating Records

The major obstacle in the management and maintenance of police crime records is the problem of updating records. As mentioned in the previous sections police crime records maintained at the Federal level are collected from all over the country. These

records ought to be updated immediately after the suspect is convicted and the case is closed by the courts. However, police records are not regularly updated as per the decisions of the courts or prosecutors or the police itself for many reasons. First and foremost, there is no clear understanding by all the parties involved, in the law enforcement process as to whose responsibility it is to notify the decision of the courts to the criminal record centers. The record centers have no means in place to know the legal status of a case which has been sent to the courts. Nor do the courts communicate their decision about a particular case to the respective police record centers. Similarly, legal cases settled by arbitration are not made known to the police criminal record center.

Some investigation files never return to the police stations even if the case is settled and closed either by the courts or prosecutors.

Since police criminal records are not regularly updated, courts and prosecutors are losing confidence on police records. The prosecutors, particularly do not use the punishment notice table sent to them by the Federal Police Criminal Record Center since it does not indicate previous verdict by the courts.

These problems still persist and all the agencies of the justice system have no clear idea as to how they should coordinate their efforts to ensure that there is always available current, credible and reliable crime record.

3.3.5 The Problem of Using Numerous Forms

The forms used particularly by the Woreda Police Record Centers are many in number and lack uniformity. The existence of numerous forms has increased the paper work

load. Furthermore, each Woreda tends to design and use its own forms, which it thinks is suitable for its requirements. This further exacerbates the retrieval problem.

3.3.6 There is no standard classification procedure for case files and sequential name indexes are not appropriately used.

As we have seen in the description section cases (files) are classified into three. These are finger prints records, criminal history records and case files.

Fingerprint records and criminal history records are related to the fingerprints. But case files can be categorized and specialized depending on the crime situation of the country. For instance, FBI has 11 types of files including the ten fingerprint records. UK and Canada have also different types of files depending on the specific types of crime in their respective countries. In the Ethiopian case, however, crime records are not maintained based on the specific types of crimes commonly committed in the country. It is very difficult to readily get drug, homicides, race related, etc., case files. This creates lack of essential knowledge of crimes and knowledge based police operations. In addition it creates heavy labour work to manage the case files.

The second point is that, though there are sequential name indices, they do not include all the necessary data items and are not appropriately used. As already indicated in the literature review chapter, almost all US, UK and Canada police systems have sequential name indices. These name indices are used to know the brief crime history of a suspect. Nevertheless, in our case, the name indices are used to facilitate the searching process of ten fingerprint records. As a result, it is difficult to use the name index to know the crime history of a suspect for it does not contain crime data about the criminal other

than simply his/her name. They don't include data items such as person's identification number, crime charged/punished, brief modus operandi etc.

As a result, if an officer wants the past crime record of any given suspect (for example for the purpose of verification) it should be searched in the ten fingerprint catalogue. And if the suspect is not fingerprinted before, it would be difficult to get the previous crime record of the individual.

3.3.7 Problem of Producing Statistical Reports

One of the main activities of the woreda police stations of the Addis Ababa Police and the Federal Police is the preparation of crime reports.

At woreda level daily crime reports are registered. Based on these records and the progress of previous crime reports, daily, weekly, Biannual and annual reports are prepared and sent to zones. Zonal police stations compile the reports they receive from the woreda police stations under their administration and send to the Addis Ababa crime Information and Research Center. The latter in turn, compiles the reports it receives from Zonal police stations and send it to the Federal Police Crime Information and Research Center. The information center at the Federal Police, finally produces different national level statistical reports.

As we have seen earlier, the base for statistical reports are the reported case records. However, the case records reported to and from each police station lack standard classes of cases.

As we have seen in the literature review part, for example, FBI has 5 standard classes of cases used to record and report. Every police station records and reports based on these classes. However, in our case, crime cases are recorded sequentially as they occur and are reported in 24 hours. So far, it has only been tried to categorize in to classes (but not in to standard classes of cases) in the weekly, monthly, biannual, and annual reports. Thus, such means of recording and reporting system creates heavy labour and paper works. Moreover, the hierarchical management of the police will not have the full picture of the crimes committed in the area under their administration unless this report is prepared.

At the Addis Ababa Police, although they have recently acquired computers, they have not started using them in producing statistical reports. At the Federal Police they have already begun to use computers in recording crime reports. However, the software loaded can not analyze and generate different statistical reports suitable to the needs of different users.

Since preparation of statistical reports is the most frustrating task ever done manually by the police system, its production and usefulness for managerial and research purposes is declining from time to time.

3.3.8 Communication Problems

Under the existing police system, the most commonly used media of communications are the telephone, radio, correspondence and human messenger. Woredas collect crime information using telephones and radios. They send fingerprints for classification and receive the result daily through errands. They have to provide case files to prosecutors

and report to courts daily using human labour. Communication both within and outside the system, therefore, heavily depends on human labour. Taking the volume of case files and crime records into account, communication has really become a frustrating task.

3.3.9 Policy Problems and Lack of Awareness

Although most of the problems under the existing system emanate from the manual nature of the tasks, lack of an integrated policy that govern the relationship and communication required by all the agents of the justice system is also complicating the situation.

There is no coordination of efforts in the management of information among all the law enforcement agencies. Moreover, there is no clear procedure that coordinates their activities.

There is also lack of awareness on the part of the management, about the existence of modern technological tools that would simplify the cumbersome task of managing police criminal records. And when the awareness is available, the idea is not taken into account due to the budgetary and resource constraints, which in reality may not always be true.

The other policy related problem is the removal of inactive records. As was previously indicated, the police system, in particular and the country in general do not have clear cut policy as to what to do with inactive records that remained dead for a number of

years. This in return, has resulted in the accumulation of hundreds and tens of thousands of records at both the Federal and Woreda level police stations.

The Ethiopian Penal Code provides that any convicted person may be reinstated and can remove his/her record 5 years after he/she serves the sentence or completes the punishment. The record can be removed from the police archives upon the order of the courts when requested by the charged person.

However, many citizens are not aware of this legal provision. Therefore, the records remain in the archives of the police until requested to be removed, if any such request comes at all. This unnecessarily swells the size of the records thereby complicating the management of police records.

3.4 REQUIREMENTS OF THE NEW SYSTEM

The objective of defining the new system requirements is to assemble an overall picture of the inputs, outputs, operations and resources required by the new system to meet the present and future needs of the organization.

In line with the objectives of the study, information gathered through interview, observation and document analysis and based on the problems identified through analysis of the existing system, the overall requirements of the new system are stated in this section.

In broader terms, most of the prevailing problems under the existing police crime record management system are related, directly or indirectly, to the traditional and manual nature of the task involved. It is becoming increasingly difficult to retrieve a piece of information

from the vast police archives that have never been updated since their inception. The system does not respond ontime to the query of users. Furthermore, the most important users of the system, courts and prosecutors, are losing confidence on the credibility of data produced by the system.

Basically, there are two major processes carried out by the system. The Federal Criminal Record Management System provides centralized service to woreda police stations about the past crime records of suspects. On the other hand, there are woreda criminal record systems which provide investigated cases and past crime records to the prosecutors and courts. Therefore the main tasks of police criminal record management systems are storing and retrieving crime records and providing investigated cases to prosecutors and courts.

The goals of the new criminal record management system should, therefore, be to provide useful information about suspects to prosecutors and courts and crime statistical reports helpful for the operations and planning of the police management.

To achieve these goals the new criminal record management system should have the following requirements.

3.4.1 Functional Requirements

3.4.1.1 Expected outputs

The new system is expected to provide the following outputs for the under mentioned users.

Courts and Prosecutors

Provide usable and accurate information about suspects.

Past record of a suspect: the type of charge, punishment, date, the court presided over the case etc.

- Past crime record and the new investigated case compiled in one file.
- Timely report to courts.
- Online access to past records.

Crime Clearance Applicants

- Providing crime clearance certificate to applicants from the police station near their residence within a limit of not more than one hour.

Police Management

- Online access to crime record
- Ontime crime statistical report helpful for police managerial operations and planning. The reports should include daily, monthly, quarterly, biannual, annual.
- Online provision of a statistics of cases which need special attention. For example, armed robbery, crimes related to special crime cases.

INTERPOL

- Online access to International Criminal Records (for the specified section data base)
- Annual crime statistical reports.

3.4.1.2 Expected Inputs

In this regard the out put of one sub-system may be used as an input to the other subsystem:-

- Cases presented by accusers or notices of the public
- Finger prints of a suspect
- Past crime record of the suspect
- Daily crime related records (daily crime records, charged by prosecutors, persons with adjourned court cases).
- Request for crime Clearance certificate
- International Criminal records from the INTERPOL

3.4.1.3 Major processes

- Investigation Process
- Fingerprint process
- Communicate with courts and prosecutors
- Preparation of statistical reports

3.4.2 Databases Requirements

As commonly known there are three types of database design options, namely decentralized, centralized and distributed systems. Decentralized option is a situation where the criminal record management system will use separate computer facilities to serve the needs of each major section. This option is less complex, can easily serve and

give more rapid response to the users in the system. However, this option duplicates effort in terms of hard ware, software, personnel and data.

The second option is the centralized one. Centralized system is a situation where the hardware for the criminal record system is located on one site and all the computerized sections of the system are executed by this single machine. This option greatly reduces duplication of efforts in the Management of criminal records. In addition, it avoids the problem of data duplication in terms of consistency and accuracy. It offers security easier to exercise over a single facility than decentralized system. Nevertheless, since, it contain large volume of data, it requires large number of application functions. The system may also be too complex and large to operate. Since the central database serves large number of terminal users, the response time can also be slow.

The third option is a distributed system. A distributed system is a combination of decentralized and centralized system which captures the advantages of both while minimizing their weaknesses. Under this option users sections in the criminal record management system will have their own computer facilities connected to a central and larger computer facility which may consist of a microcomputer.

Based on these alternatives, the recommended system for the Ethiopian criminal record system is the distributive system. This is because there is high flow of criminal records in each Woreda and they need their own automated data processing facilities. At the central level the woredas need common databases of fingerprint services, sequential name indices and other criminal record files at Addis Ababa and Federal Police Departments.

Based on the distributive system three types of databases will be required.

- Central database accessible by the Criminal Justice Agencies and part of it by the INERPOL
- Addis Ababa Criminal Records Database
- Woreda Criminal Record Database

Then, each database will have the following sections:

Central Database

- Fingerprint records database section:
- Sequential Name Index
- Selected Case Files Database Section

Addis Ababa Police Database

- Fingerprint Records Database Section
- Sequential Name Index
- Case Files Database Section

Woreda Police Station

- Case File Database

Some database sections seem redundant , but if the data they contain is clearly defined there will not be redundancy of data and duplication of effort. For example, the fingerprint records database is important to be kept at country level. This is because there would be wanted persons or notorious criminals which may be reported from all

regions to the Federal Police Criminal Record Center. Such database is also important at Addis Ababa level. In this regard the finger print database will be available to all Woreda, which require past crime records to process case files. The logic of having case files database is also similar to that of fingerprints database at Federal Police International level. Addis Ababa Police also has case files related to its operation. The importance of having sequential name index at Federal and Addis Ababa level is also similar to the fingerprint records database.

3.4.3 Hardware and Software Requirements

As we have seen in the database requirement part, the databases of Federal and Addis Ababa Criminal Records Management will be a distributive system. For this a local Area Network (LAN) is needed. In addition, the Federal Police and Addis Ababa Police are located in different areas though they are all in Addis Ababa city. Woreda Police Criminal Records centers are dispersed in the Whole city of Addis Ababa and hence the need for a Wide Area network (WAN). Therefore the hardware and software required by the new system should be based on the distributive nature of the system and should satisfy the LAN and WAN hardware and software requirements.

3.4.4 User Interfaces

As we have seen in the analysis part of this chapter, the system will have external and internal users. Therefore, the user interface should support the communication requirements of both the internal and external users. User interface requirements of the new system will contain at least the following menu items.

1. Cases
2. People
3. Testimonies
4. Statements
5. Report

When user need the demographic data of the relevant cases, they can use the menus of cases and people. When they need information about technical and documentary testimonies, they can use the menu of a testimony. Further, if they need statements of a suspect and accomplices or statement/testimony of an accuser and witness they can use statements menu. Finally, if they need past crime records and crime statistical reports, they can use report menu. These menu items will have also submenu items as specified in the detail design.

3.4.5 Control and Security Level

The system will have a control interface to protect and limit the access privileges to the databases. The central database which will be accessed by the criminal justice system agencies will be restricted to others. For this purpose appropriate softwares equipped with security features will have to be used.

3.4.6 Performance Criteria of the New System

The major goal of the new system is to provide timely and relevant information about suspects to courts and to present statistical reports helpful for the operations and planning of police management. The new system should, therefore, be able to produce

the required information ontime and at a reasonable cost compared with the old system by removing duplication of efforts.

The new system had to start at the critical parts of the existing system and will have to develop into its full capacity in a relatively short period of time. The new system should minimize the time required to retrieve records and reduce error level. The new system, particularly, the process of provision of statistical report should be able to generate analytical statistical reports. The system is required to operate 24 hours a day with no or minimal system breakdown or failure. The system should have adequate control and security mechanisms. The existing labour force will have to be trained to operate the new system.

3.4.7 Critical Assumptions

In preparing the requirements of the proposed system, the following assumptions were made.

The introduction of policy which coordinates the activities of the agents of the justice system.

The existence of archiving policy

The existence of efficient communication policy that bring together the agents of the justice system, the different departments of the police force and INTERPOL.

3.4.8 Recommendations

The analyst believes that, using modern information technology as a tool, and implementing modern supportive techniques, it is possible to solve the problems

identified during the analysis of the existing system. A computerized system that will facilitate the communication between the Federal Police Criminal Record Center, Addis Ababa Police Stations and courts would improve the organization's criminal record management system.

In other words, through properly designed and implemented computer based management of criminal records system, the organization's management of records will improve and the other direct users will be in a position to acquire accurate and relevant information.

Based on these critical assumptions and recommendations, the analyst will deal the design aspects of the new system in the following chapters.

CHAPTER IV

GENERAL DESIGN OF THE NEW SYSTEM

Once the analysis part of the existing system is completed, the analyst will have full understanding of problems of the existing system and the requirements of the users. In line with the users requirements, the analyst should, therefore, design the new system.

4.1 LOGICAL VIEW OF THE PROPOSED SYSTEM

In chapter three, the current system's data flow diagram was observed depicting how the system works. Using the analysis of the existing system, we have also seen the current problems experienced by the users and defined their requirements.

In designing a new system, it is therefore, important to amend the existing system based on the requirements of users before proposing alternative design systems. The amendment may be adding a new system process, creating a new data flow, changing the sequence of operations on information, eliminating redundant or unnecessary processes, combining two or more processes, and adding new data and changing processes to use this data (I.T. Hawrysizkiewyez, 1997). Such amendment enables to set the actual logical data flow of the system.

4.1.1 Logical Data Stores

The data stores related with process of ten fingerprint are control file, applicant's record, beginner's name file, name catalogue, ten fingerprint records and criminal history records.

Applicant's record is not currently maintained by the existing system. After the fingerprints data of applicants is processed, there needs to be a data store which contains the data of the applicants for a certain period of time. In the current system, the beginner's name file is combined with the data store of criminal history records. Beginner's file has not any importance in being retained with the data store of criminal history records. It would be better handled if it is associated with the process of ten fingerprint, because if the fingerprint of a new comer is identified as a beginner, the result can directly be sent to the reception.

In the existing system, there is a data store called name catalogue. This is used to search the crime history record of suspects through the name. However, whether the name of the suspect is found in the name catalogue or not, the ten fingerprint record has to be checked.

Thus, the benefit of name search to the overall performance of the system is very minimal. These records can be modified to include ten fingerprint classification code, arrest file number, name, modus operandi, criminal record file number, the crime he/she committed, and the punishment. But this should not serve to search only in the ten fingerprints but it should also be used for general information.

Other data stores which are related to the Woreda police activities are:-

Case records

Addis Ababa crime statistical report

Case Files

However, in the data stores related with the work of Addis Ababa Police Crime Investigation Department, there is a data store of ten fingerprints. In this data store only ten fingerprints of suspects investigated by the Addis Ababa Police Crime Investigation are held. However, there is no clear benefit gained by maintaining ten finger record at the Addis Ababa Police Station level. Because the ten fingerprint of any suspect is sent to the Federal Criminal Record for classification thereby creating the chance for duplication of records both at Addis Ababa and Federal Police Departments. So, the fingerprint record at Addis Ababa level should clearly define its difference with that of the Federal Police. By defining its difference, it is possible as well as important to have the fingerprint records at Addis Ababa level.

4.1.2 Logical processes and Data Flows

Based on the logicalization principle some processes which need the same data flows can be combined into one process. These processes (fig. 3.2 processes 2,3,4) are related to the flow of ten fingerprint and they all process ten fingerprints. The processes are take ten fingerprint, classify and search in the fingerprint catalogue. So, these processes can be combined into one process. The data flows can also be combined into ten fingerprint and the request for fingerprint taking.

Based on the principles of logicalization of processes and data flows, processes that will be supported and/or replaced by the computer system will mainly include the following:-

Process Receive:-

- Process sort by incoming requests and types of applications
- Sort by applicant or suspect

- Prepare Criminal Report
- Prepare Crime Clearance Certificate

Process search by Name and Ten Fingerprint

- Search by name
- Verify classified fingerprint
- Compare the classified fingerprint with the related fingerprints

Process Criminal History Records

- Sort by beginner, repeating offender and punishment
- Fill beginner's file
- Prepare beginner's crime report
- Prepare criminal history report

Process Crime Investigation

- Record the preliminary case investigation
- Take Finger Print
- Prepare case report

Process Case File

- Assign case file number
- Prepare and provide reports to courts

Process Crime Statistical Data

- Collect crime data from Woredas and Zones
- Process the data
- Prepare crime statistical Report

On the other hand, processes that will remain clerical are:-

Process Crime Investigation

- Investigate the accuser, suspect and witness

Testimonies given by the accuser, suspect and witness are collected by face to face discussion with the investigators which cannot be automated.

Process Case Files

- Serve a summons to charged person
- Moving of case files to courts and prosecutors.

The logical and physical data flows of the new system are presented below.

Fig 4.1. **Logical Data Flow Diagram Of The New System**

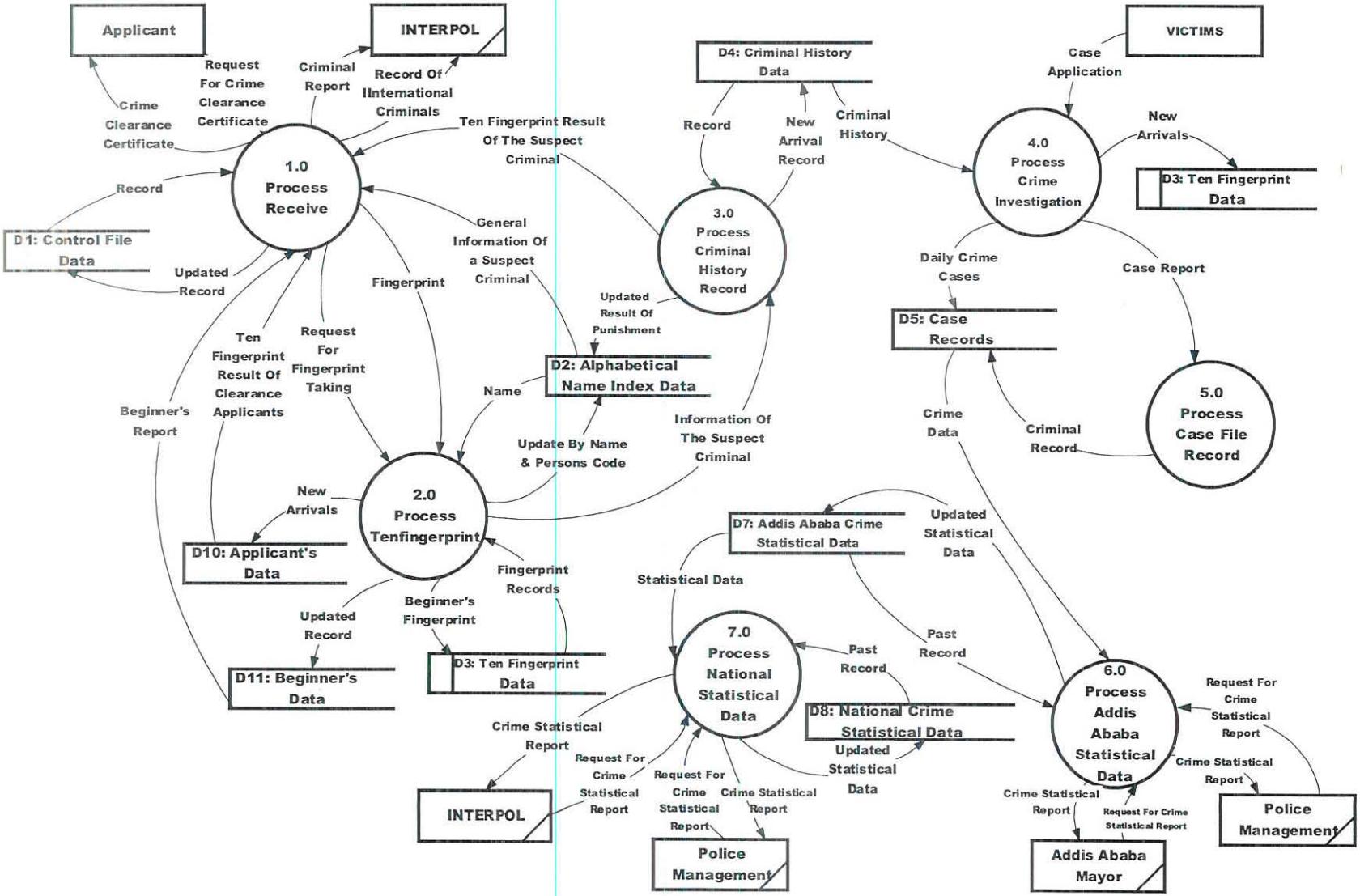


Fig 4.2. **Physical Data Flow Of The New System**

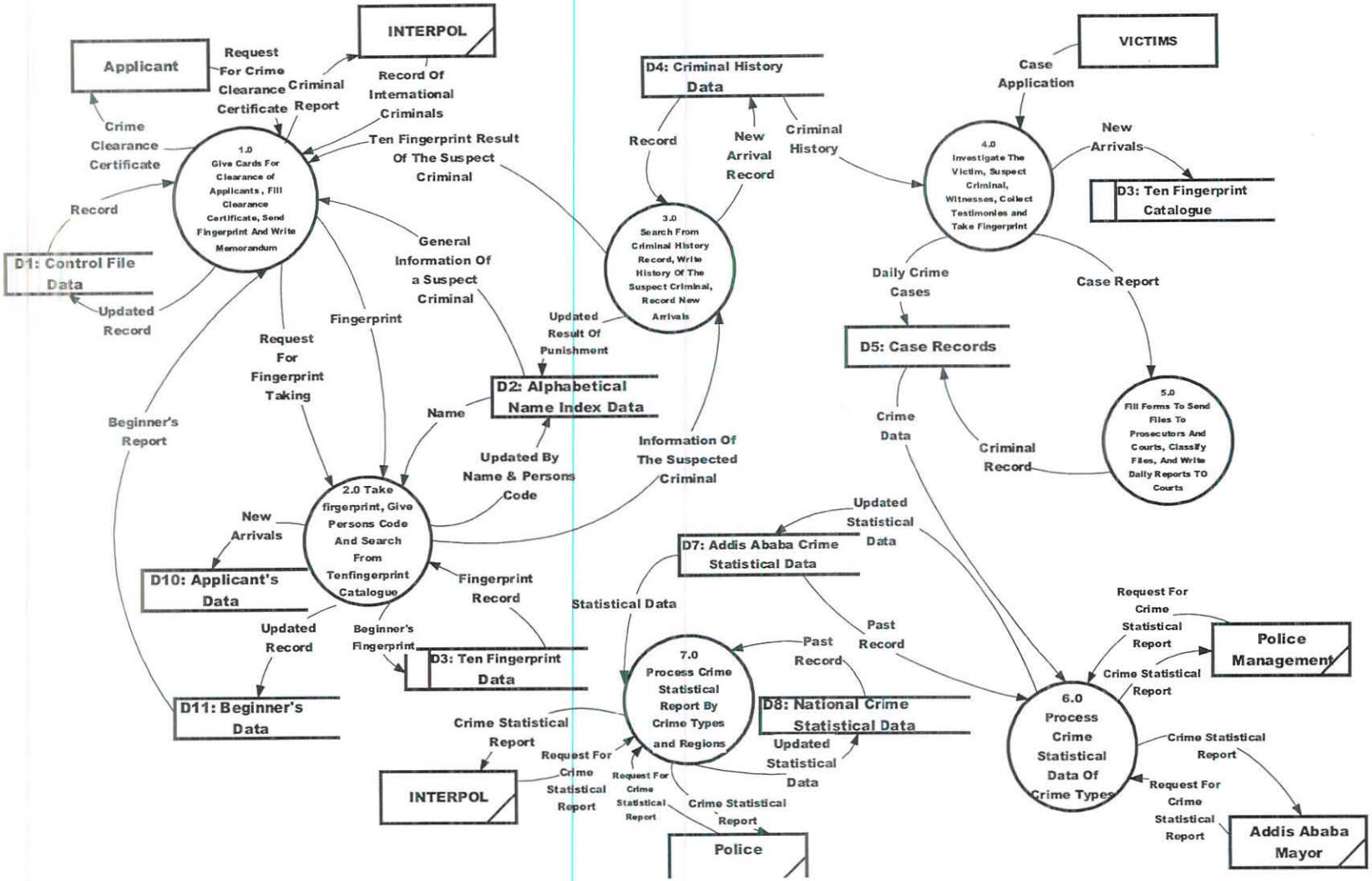


Fig. 4.3 Flow Chart Showing the Logical Design of the New System

Flow Chart No.: 1

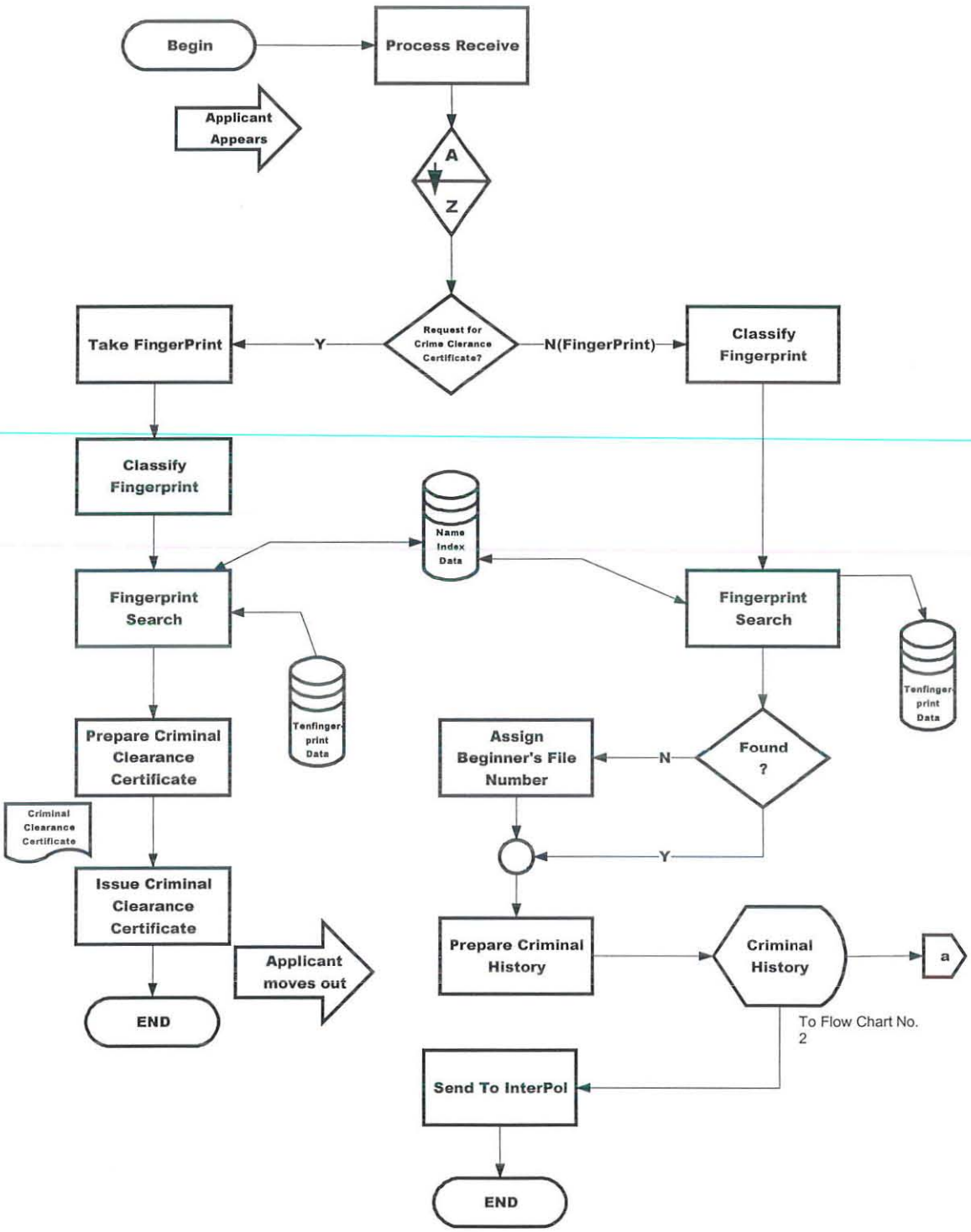


Fig 4.3 Cntd.

Flow Chart No.: 2

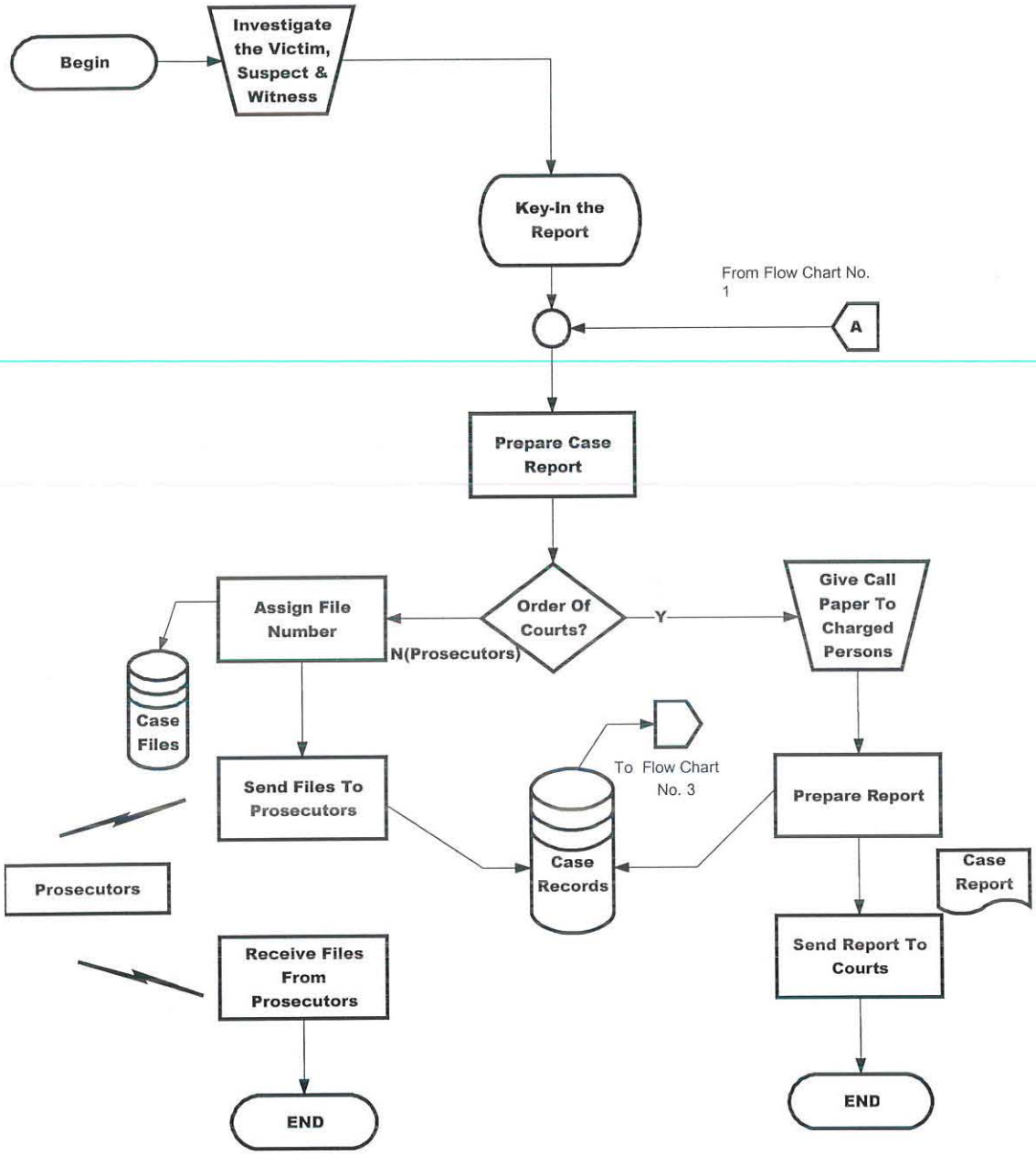
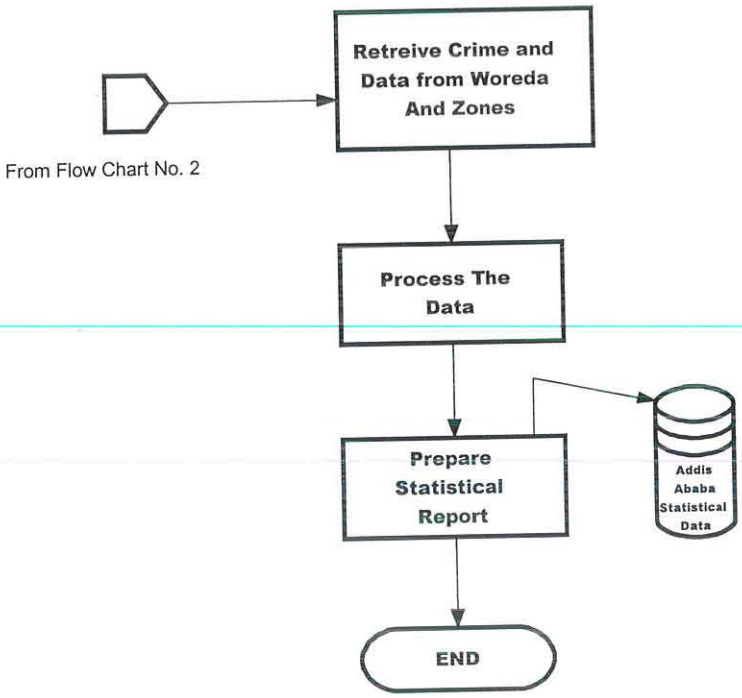


Fig. 4.3 Cntd.

Flow Chart No.:3



4.2 Design Alternatives for the Proposed System

The overall objective of the proposed computer based system is generally to facilitate the information management of the police system with the following specific objectives:-

- To facilitate the creation and maintenance of records in the Federal Criminal Record Center, Addis Ababa Police and Addis Ababa Woreda Police Stations.
- To enhance access and retrieval of criminal records in the Federal, Addis Ababa and Woreda Police Stations.
- To improve the management of records in all the Federal, Addis Ababa and Woreda Police Stations.

To achieve these objectives, many design options can be proposed but there are basically two design alternatives which can meet the above objectives in one way or another.

4.2.1 Alternative One

The objective of design alternative one is to automate the activities of the criminal record management system of the Ethiopian Police Force. This will include all the process, data flows and data stores that are amenable to automation.

Processes included in design alternative one are:-

Full Automation

- Process Receive

- Process ten fingerprint
- Process criminal history record
- Process Addis Ababa crime statistical data
- Process National crime statistical data

Partial Automation

Process crime investigation

- Record the preliminary case investigation
- Take fingerprint
- Prepare case report

Process case file records

- Assign case file number
- Prepare and provide reports to courts

See the human -Machine boundary of alternative one in fig. 4.4 and System Flow Chart in Fig 4.5

Fig 4.4. **First Alternative Human-Machine Boundary for CRPS**

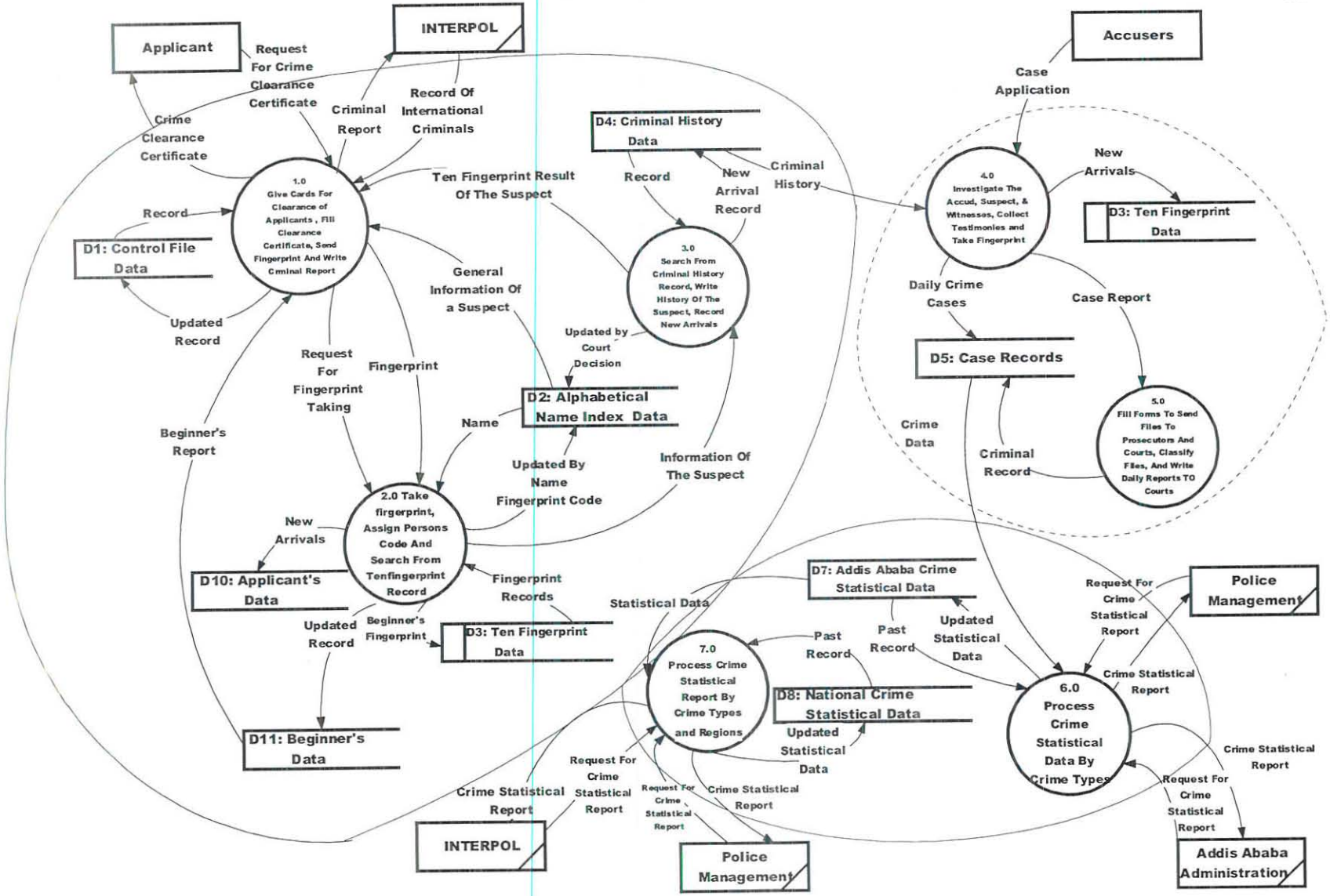


Fig. 4.5 Flow chart showing the First Automation Alternative for the CRPS

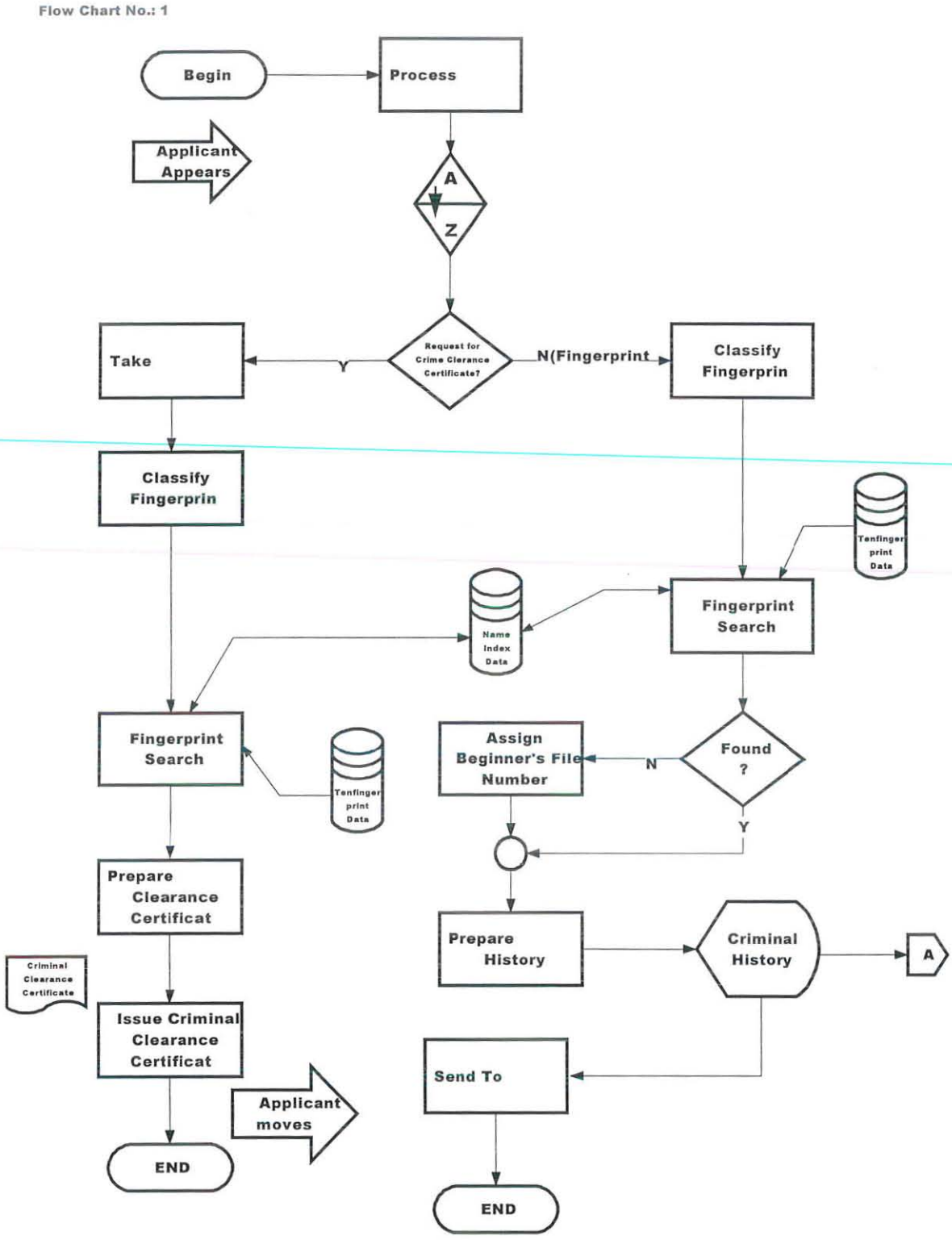


Fig. 4.5 Cntd.

Flow Chart No.: 2

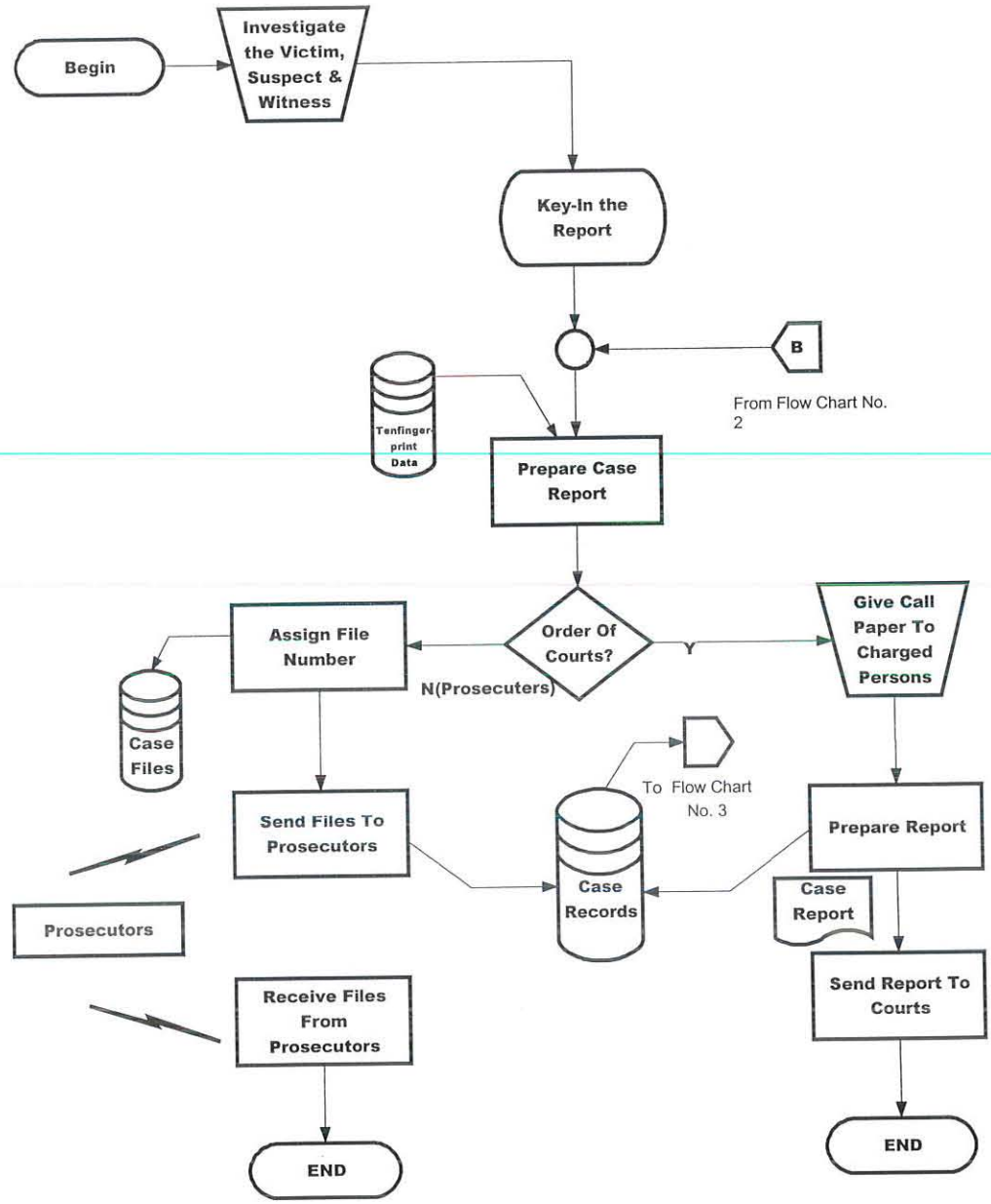
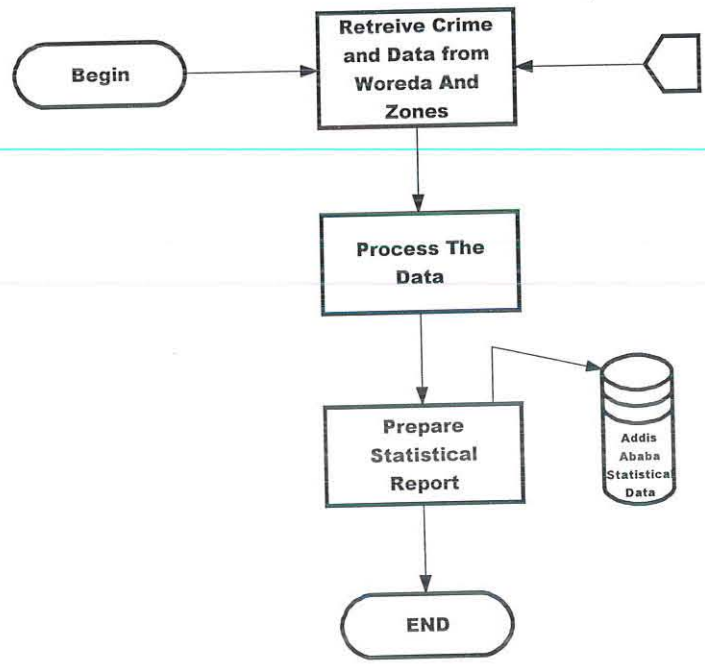


Fig. 4.5 Cntd.

Flow Chart No.:3



Advantages and disadvantages of the first design alternative.

Advantages:-

- Facilitates creation and maintenance of records
- It enables to have an access and retrieval system within the police and other law enforcement agencies.
- Can be implemented phase by phase
- It is fully accepted by the internal and external users
- It is an appropriate design to the purpose specially in solving the problems of criminal records management system.
- It is integrated. One can update the content of the entire database having the same data element.

Disadvantages:-

- It is relatively costly. Unless it is implemented on a phase by phase basis, it may become too costly to implement all the elements of the system at the same time.

4.2.2 Alternative Two

The objective of design alternative two is to automate the activities and processes of fingerprint and Criminal History Record System. This alternative leaves the process of preparing statistical reports and case file processes as they are, because fingerprint records management is mission critical that affects the activities of almost all the agencies of the justice system. Processes included in design alternative two are :-

Full Automation

- Process receive
- Process ten fingerprint
- Process criminal history records

Partial Automation

Process crime investigation

- Take fingerprint

Advantages

It solves the critical problem of delay in processing fingerprints and other problems related with that. As a result, Woreda police stations can get past crime record histories through the computer system within a fraction of seconds.

Even external users such as courts, prosecutors can have access to this system.
It gives more chance to solve the updating problem related with the decision of courts.

It is less costly than design alternative one and can be implemented within a relatively short period of time.

Disadvantages

Still this alternative does not solve the routine and tiresome job of preparing statistical reports. Because it does not automate the case file record process, it will not have an interface regarding case files with courts and prosecutors. So, some problems related

with case files will still continue to linger. (See Human Machine Boundary and alternative two in Fig 4.6 and flowchart Fig. 4.7)

4.2.3 Recommendation

The analyst recommends the first alternative for further detail design. This is so, because although it is relatively costly, it solves all the problems of the criminal record management system. To minimize the burden of capital budget, however, it can be implemented on a phase by phase basis and the implementation procedure can be based on the processes and systems that are highly critical to the overall performance of the entire system.

Fig 4.6. **Second Alternative Human-Machine Boundary for CRPS**

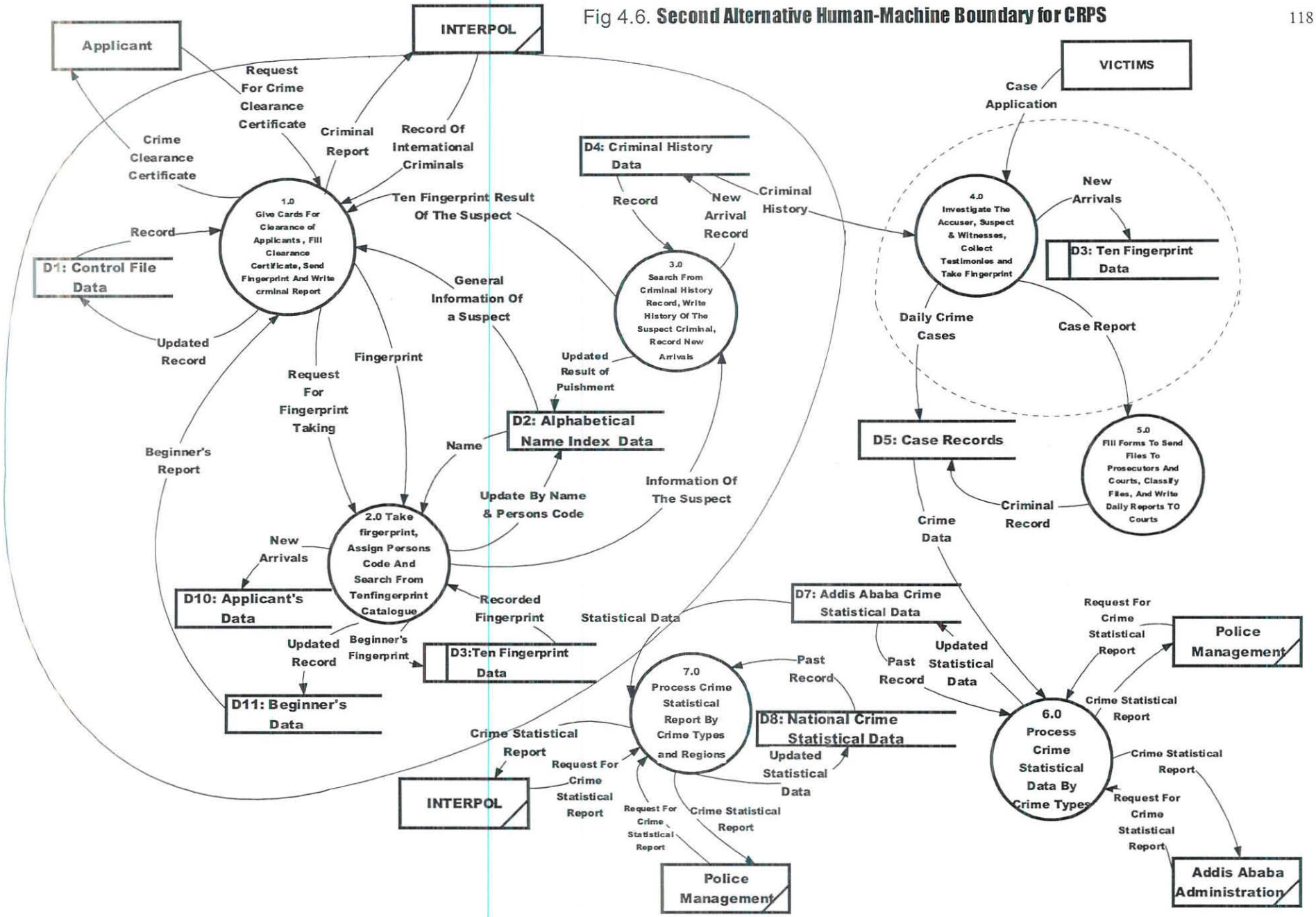
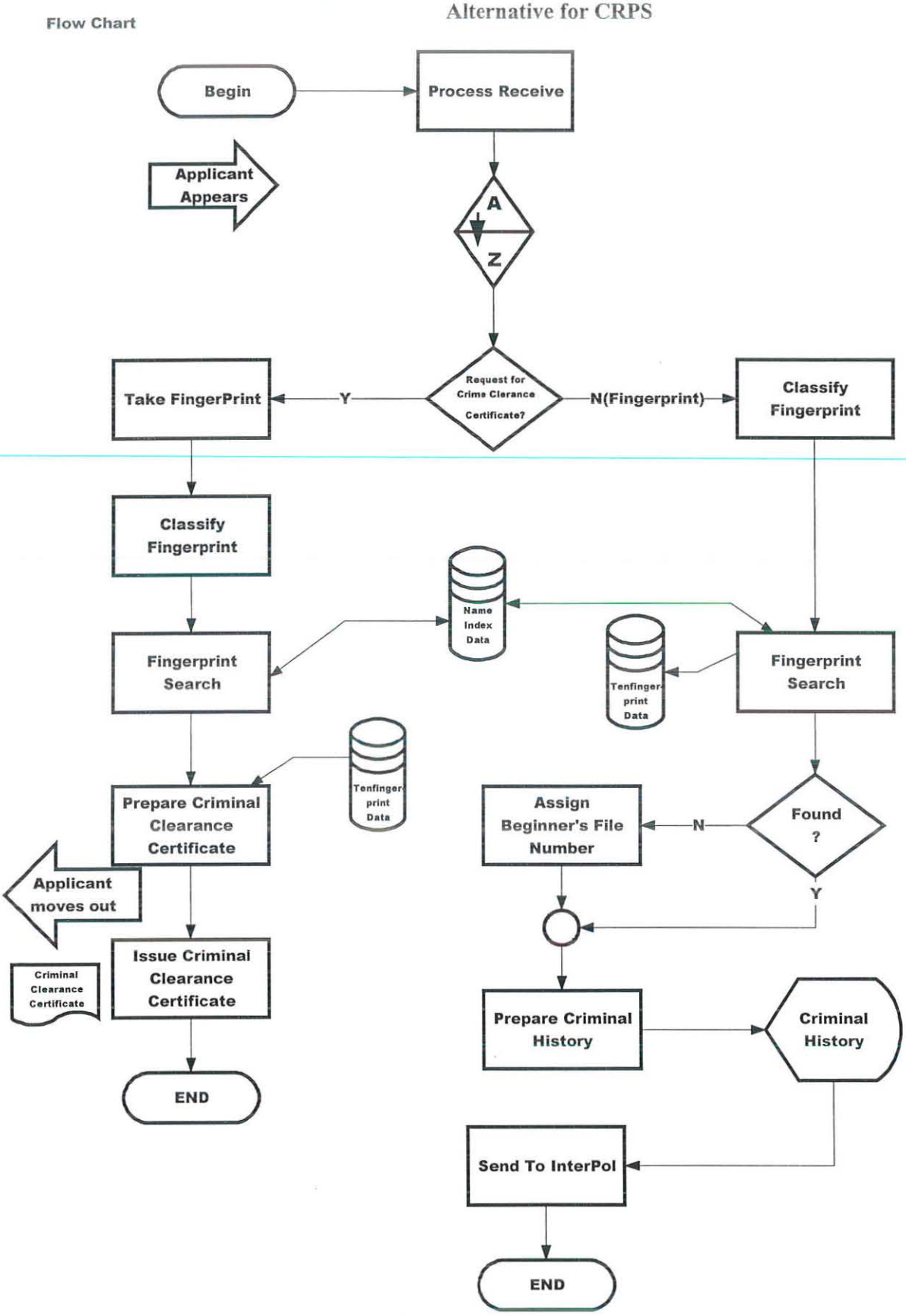


Fig. 4.7 Flow Chart showing the Second Automation Alternative for CRPS



CHAPTER V

DETAIL DESIGN OF THE NEW SYSTEM

5.1 FUNCTIONAL DESIGN OF THE NEW SYSTEM

The functional design of the new system includes output, input, and process design. The detail functional design is based on the recommended design option, which is alternative one.

5.1.1 Output Design

Output of any system can be generally classified as external and internal outputs. External outputs are outputs whose destination is outside the organization and which require special attention because they project the image of the organization. Internal outputs are whose destination is within the organization and which require careful design because they are the users main interface with the computer. Based on this, the types of outputs of the proposed system are presented below.

5.1.1.1 Types of Outputs for external users of the Proposed System

The system provides outputs to external users such as courts, prosecutors, Addis Ababa Administration, INTERPOL and to applicants seeking crime clearance certificates.

Courts

Courts need usable and accurate information from the system about suspects:-

- Criminal History Records
- The type of charge
- The crime committed
- Court decision
- Date
- The court presided over the case

New Investigation Reports

- Suspect's statement
- Accuser's statement
- Witness's statement
- Technical and circumstantial evidence

The past crime record and the new investigation report should be compiled in one file called a case file.

Timely report to courts – The system provides daily report to courts about the suspects.

Online access to criminal history records – Courts should have online access to criminal history records.

Prosecutors – All the information available to courts should also be made available to prosecutors except the daily report about the suspects.

Crime clearance certificate applicants:-

- Providing crime clearance certificates to applicants from the police station near their residence within a limit of not more than one hour.

Addis Ababa Administration:-

- Crime statistical reports

INTERPOL

- Criminals report
- Crime statistical report

5.1.1.2 Contents of the outputs

The type of outputs produced by the system are basically composed of :

- Case files and criminal history reports
- Crime clearance certificate and
- Statistical reports

These outputs could be presented to the users, both internal and external, in the form of alphanumeric and numeric characters and have no fixed range of values. The content of screen-based case file outputs and criminal history reports are presented in the prototype section.

5.1.1.3 Format

Types of Output	Hard Copy Only	Screen	Both
Investigation Reports			✔
Criminal History Records			✔
Criminal Reports			✔
Crime Clearance Certificate	✔		
Daily Statistical Reports		✔	
Statistical Reports - Others			✔

Investigation reports presented using the computer system are the summaries and the full text. But this does not necessarily mean that these reports are the only ones presented to courts. All the reports prepared manually by the investigators are presented to courts.

5.1.1.4 Location, Frequency and Response

Investigation reports which are part of case files are kept at the Woreda criminal record centers. Criminal history records are maintained in the Federal Police Records and Addis Ababa Police Records. They are transported with the investigation report in a form of hard copy to prosecutors and courts and can be transmitted through the computer system for cross-reference. The summary and full text of investigation reports are also transmitted through the computer system for cross reference.

Statistical reports are maintained in Woredas, Addis Ababa, and Federal Police Stations. Daily statistical reports are transmitted through the computer system and the remaining reports can be transported or presented in hard copy.

With regard to the frequency, investigation reports and criminal history records are prepared when the investigation process of a suspect is finalized. They are sent to prosecutors and courts when the investigation process is completed. In addition, the summary can be obtained online after the investigation process is completed.

Crime clearance certificate is prepared on hourly basis. But, statistical reports are prepared on a daily, monthly, biannual and annual basis.

The system provides immediate response for online crime data requests. Thus crime clearance certificates should be provided in one hour, whereas statistical reports should be provided on a daily, monthly, biannual, and annual basis. To provide these outputs, the system will use different forms and formats specifically designed for users. The data items in the forms will be edited to suit the new purpose.

5.1.1.5 Output Media

The choice of output medium will be affected by various types of considerations but the main ones will be:-

- The suitability of the device to the particular application
- The need for hard copy and number of copies required

- The response time required
- The location of users
- The availability of software and hardware
- The cost

Based on these considerations the system will use the following media:-

Output Methods	Advantages	Disadvantages
Printer	▪ Flexible in types of output location and capability ▪ Handless large volumes of output ▪ Reaches many inexpensively ▪ Highly reliable with little down time ▪ Affordable	▪ May be noisy ▪ Compatibility problems with computer software ▪ May require special, expensive supplies ▪ Still requires some operators intervention ▪ Depending on model may be slow
Specialty printers, label makers envelope printers, etc.	Can easily accomplish special tasks that would be difficult on a standard printer Speeds up the job at hand	▪ Incurs additional cost of the printer and specialty labels ▪ Adds clutter to desks ▪ Cannot be networked
VDT	▪ Interactive ▪ Works in on-line,	▪ Requires cabling and set

	real time transmission through widely dispersed network ▪ Quiet ▪ Takes advantages of computer capabilities for movement within databases and files ▪ Good for frequently accessed, ephemeral messages.	up space ▪ Still may require printed documentation ▪ Can be expensive if required for many users
Electronic Output (Email, Faxes, and Bulletin Boards)	▪ Reduces paper ▪ Can be updated very easily ▪ Eliminates "telephone tag" ▪ Can be broadcast	▪ Has generally lower resolution ▪ is not conducive to formatting (e-mail_ is difficult to convey context of messages) (e-mail)

5.1.1.6 Types of Outputs for Internal Users

The second type of output is produced for internal users. These are basically for the consumption of internal users within the police itself. They include:-

- Online access to the criminal history records

- Ontime crime statistical report helpful for police managerial operations and planning. The reports should include:-
  - daily
  - Monthly
  - quarterly
  - biannual
  - annual

Online provision of information about case that require special attention. For example, armed robbery, crimes related to special crime cases etc.

These outputs are presented in numeric and alpha numeric form. The statistical reports particularly will have totals, percentages and other statistical analysis. They are presented in a softcopy formats. The statistical reports are transmitted using wide area network from Woreda's police stations to Addis Ababa Police and from Addis Ababa police to Federal Police information centers. The frequency of statistical reports is monthly, quarterly, biannual and annual. Daily reports are provided online. There will be online and immediate response regarding queries about notorious criminals.

5.1.2 Input Design

Input design is a part of overall system design which requires careful attention. Thus, the designer need to have a clear objective in designing input format. However, the main considerations are:-

- To produce cost effective methods of input
- To achieve the highest possible level of data input accuracy
- To ensure that the input is acceptable to and understandable by the user staff.

5.1.2.1 Input Types

As we have seen in the output design, the inputs of the system can also be categorized into external and internal inputs.

External inputs are:-

- Cases presented by accusers or notices of the public
- Fingerprints of a suspect
- Fingerprint of an applicant for crime clearance certificate
- Daily crime related records (daily crime events, charged by prosecutors, persons on pending court cases).
- International criminal reports from the INTERPOL

Internal Inputs

- Police followup results
- Criminal History

5.1.2.2 Input Media

Apart from the common input devices the first classification of input devices may be source document conversion devices, like for example, key-to-disk and key-to-diskette, data input devices.

There are also direct data capture devices. In this regard the input device used is an optical mark reader. This is a device used to change a fingerprint to computer readable. This device is linked to the computer and after receiving the fingerprint data of a person it can be processed by the computer without any human intervention or verification process.

There will also be an online data entry mechanism to search the database about notorious criminals, etc.

5.1.3 Process Design

As was discussed in the requirements for the new system, the major processes of the proposed system are:-

Investigation process
Process ten fingerprint
Reporting to courts and prosecutors
Preparation of statistical reports

As the police investigator receives application of a case from the accusers, the system should record the case. After the police investigator completes his investigation, he prepares investigation reports. In addition, by retrieving the past record from the criminal history file, he prepares the case file of the suspect.

In order to retrieve the past record of a suspect from the criminal history record, the finger print of the suspect should be taken. So, the process of ten fingerprint starts by taking the fingerprint of the suspect using an automatic device attached to the computer. Once the fingerprint of the suspect is taken, the fingerprint classification is assigned with an identification number and matched against the fingerprint records automatically. Then, if the system identifies the fingerprint positively, the result is displayed from the criminal history record through a form designed for this purpose. If the match is negative it means that the suspect has no previous crime record.

The system should also be able to communicate with the courts and prosecutors. The system provides the outputs of investigation process and the results of the ten fingerprints search in a form designed for use by the prosecutors and courts. The system fills different forms, updates the case file based on the decision of courts, prosecutors and the police. It also updates the case records, prepares reports to courts related to arrested people and other suspects. Archiving is done based on the classification of the case files.

Finally, the system should prepare crime statistical reports using the case records held initially when the investigation process of a case starts. First, the system collects case records, and then sorts it based on the required statistical output design. Finally, it analyses and prepares different statistical reports based on the requirement of the users.

5.2 LOGICAL DATABASE DESIGN

To design a computer based information system for an organization it is necessary to know what information should be held by the computer and how it is organized. Thus, it is

essential to identify entities of the system about which information must be held, to examine precisely what data items are required about each of these entities and how these data items are to be kept in the computer database.

To this end, two widely used data modeling techniques are discussed. These are, entity relationship modeling and normalization.

Entity relationship approach is regarded as a top down approach to data modeling primarily concerned with identifying the main entities of a system and the relationships that exist between these entities. Normalization, on the other hand, is concerned as a bottom up data modeling approach, which puts more emphasis on the data on which a database is built, on the analysis of functional dependencies between the data items in order to minimize potential modification irregularities.

Therefore, the first part of this chapter discusses, entities about which the criminal record management system maintains information. Moreover, the relationships that exist between these entities are identified and analyzed. In the second part, the data items maintained about these entities are investigated and analyzed in order to produce flexible and well organized data items that form the basic input for the physical contents of the proposed databases.

5.2.1 Entity Relationship Model

Entity Relationship Model is one of the most popular modeling techniques employed by entity relationship approach to analyze and design a complex set of relationship between system entities. For this reason it would be convenient and important to define entities, attributes and relationships.

5.2.1.1 Entities

In an information system environment, an entity is defined as any object or event about which someone chooses to collect data. (E.Kendall, Ekendal, 1995). Therefore, an entity may be a person, place, or thing. For example, a sales person, a city, or a product are examples of entity. An entity can also be an event or unit of time such as a machine breakdown, a safe, or a month or year.

Generally, for an entity to be called an entity, the following criteria must be satisfied (Ashworth and Goodland 1990)

- An entity should have more than one attribute
- An occurrence of one entity must be associated with at least one occurrence of another candidate entity
- An entity must have multiple occurrences; and
- Each occurrence of an entity must be uniquely identified.

Based on these criteria, entities which are of particular significance to, and about which information is maintained by, the criminal record management system are the following: suspect, applicant, accuser, fingerprint, investigator, crime cases, case files, prosecutor, courts.

These represent the major entity types of the criminal record management system where each of them share common name and common description.

5.2.1.2 Attributes

Entities are described in terms of their attributes. An attribute is some characteristic of an entity. Thus, there can be many attributes for each entity (E.Kendall, 1995) for example, a case is characterized in terms of case file number, the name of the charged person etc. A suspect is similarly described in terms of his/her full name, address, date and place of birth etc.

5.2.1.3 Relationships

A relationship is an association between two entities that is of significance to the system. (E.Kendall, 1995). Thus, there are three types of associations between entities. The first type of relationship is a one – to one relationship designated as 1:1. The second type of relationship is a one – to many (I:M) association. Finally a many – to many relationship (Designated as M:N) describes the possibility that entities may have many associations in either direction.

5.2.1.4 Modelling the System Using Entity Relationship Model

In the Entity Relationship Model, it is important to examine if there are occurrences of any entity, say, fingerprint, which are directly related to occurrences of another entity, say a suspect, to determine and establish the relationship between any two pairs of entities.

That direct relationship is of interest to the system. In some cases, there may be a direct relationship between two entities but one which is not relevant for the system to conduct its day - to – day activities. For example, there may exist a direct

relationship between different occurrences of crime clearance applicants about whom the system maintains control records. But this relationship is not important for the purpose of processing and maintaining control records. This means that the system is not interested in knowing whether one crime clearance applicant is related to another in one way or another.

Once the existence of direct and important relationship between entities is identified, the degree of this relationship must be further examined. To determine the degree of relationship between two entities, it is essential to ask if, for example, one occurrence of the entity accuser can be related to more than one occurrence of the entity, case file. The outcome of this investigation provides whether the type of relationship between two entities is one – to - one, one - to – many or many – to - many.

In addition to the degree of relationship, it is also important to examine the membership class of each participating entity. Membership class between two entities can be obligatory or non obligatory (optional). A relationship is said to be obligatory if, for example, an occurrence of the entity case file does not exist without a related occurrence of the entity accuser. On the other hand, a relationship is said to be non-obligatory or optional if, for example, an occurrence of the entity case file exists without a related occurrence of the entity accuser.

If membership is obligatory, then an entity occurrence may not be recorded unless its relationship occurrence is recorded at the same time. On the other hand, if membership is not obligatory, the entity occurrence may be recorded without the occurrence of its relationship. Based on this, direct and relevant relationships that exist between entities of the system and degree and membership class of each entity

participating in the relationship are identified and analyzed below. The semantics of these relationships have been discovered by analyzing the criminal record centers rules, constraints and statements on each of the entities, attributes and their domains.

Suspect and case record relationship

The relationship which exists between a suspect and case record is directly important to the system if a case is reported to the system. This means that the criminal record center should have to collect the type of crime committed, the place of crime, date etc. And if the center recorded the case, it should also collect data about the suspect in order to follow up or to complete the case file of the suspect. Therefore, the relationship between suspect and case record is important to the department.

As to the degree of the relationship between these two entities, one occurrence of a suspect can be related to more than one occurrence of a crime case and an occurrence of a crime case can be related to more than one occurrence of suspect. This is because the fact of that one suspect can commit different crimes and one case of crime can be committed by different suspect.

With regard to the membership class of these two entities, an occurrence of a suspect can not exist without a case record. This is because for a suspect to exist, there should be a reported crime case. However, the occurrence of a case record can exist without the suspect. Some cases are reported without identifying the suspect. Thus, in the case of case records there are many records which are not related with a suspect. This shows that the relationship between an occurrence of a suspect and a

case record is not obligatory. Meaning that the occurrence of one can be recorded with out the occurrence of the other.

Suspect and Case file

The relationship between a suspect and a case file is also important to the criminal record management system. If there is a suspect the system should collect information regarding the suspect from the accuser, witnesses, and other testimonies. These evidences should be organized in a form of case file.

With regard to the relationship between these entities, there is many to many relationship. This means that the occurrence of a suspect can be related to different case files. And one case file can be related to different suspects. Therefore the relation is many to many relationship.

Both entities can't exist one without the other. For example, if there is a suspect, there should also be a case file. Other wise police investigators couldn't accomplish the investigation process. If there is a case file also, there should be at least one suspect, because case file is initiated by the occurrence of a suspect. Thus, the relationship between suspect and case file is obligatory.

Suspect and Fingerprint

The relationship of these entities is highly important to the police record management system. The existence of a suspect necessitates the collection of data about the suspect. In addition, in order to collect other data about the suspect, it is also

important to identify the suspect. Therefore, the police record management system takes the suspect fingerprints. So, this relationship has special importance in the police information criminal record management system.

The relationship between these two entities is one to one, because if a suspect is fingerprinted, the fingerprints have the same characteristics through out his life time. Therefore, one suspect is related with only one fingerprint and one fingerprint is related with only one suspect. One suspect may be required to provide his fingerprints many times when he committes different crimes. But still all the fingerprints taken have the same characteristic features and they are related to only one person. Therefore, one suspect is related to only one fingerprint. This is the most fundamental relationship for the effective operation of the police system.

However, the relationship between a suspect and fingerprint is not obligatory. Every suspect may not necessarily have fingerprint record if he has no previous crime record. Thus, a suspect can exist without a fingerprint. Similarly, every fingerprint is not necessarily related to a suspect. Applicants for crime clearance certificate provide their fingerprints in order to obtain crime clearance certificates. Therefore, the relationship between these entities is not obligatory.

Accuser and Case Record

The relationship between an accuser and a case record has also great significance to the police criminal record management system, as the relationship between a suspect and a case record. A reported case necessitates the collection of information about the accuser in order to trace the suspect.

There is many to many relationship between these entities. The occurrence of an accuser can be related to the occurrence of many cases. In other words, many persons can be victimized by a single crime case. Similarly, many cases can also be related to one accuser, in which case many types of crimes can be committed against a single individual. Hence, the relationship between these two entities is many to many.

However, the relationship between these entities is not obligatory. If there is a reported case, it does not mean that there is always an accuser. Some reported cases may not be related to any particular accuser. However, the occurrence of an accuser is directly related with a case record. Thus, the relationship between these entities is not obligatory.

Accuser and Case File

There is a direct relationship between the occurrence of an accuser and a case file which is of an interest to the criminal record management system. Because the initiation for having a case file may be the complaint or the application of an accuser.

In the case of their relationship they have many to many relationship. One accuser can have different case files and the occurrence of a case file can be related to different accusers.

With regard to the class of their relationship, the occurrence of an accuser may not necessarily lead to a case file. However, a case file can't exist without a specific accuser, so that, the relationship is not obligatory.

Case record and Case File

This relationship is again important to the system. Because in most cases the occurrence of a case record leads to the opening of a case file about a suspect.

In this relationship there is one to one relationship. The occurrence of a case record leads to the occurrence of one case file. A single case which is committed by one suspect or group of suspects is only related with one case file. Similarly, the occurrence of a case file is related with a single case record.

But in a single case record many suspects may be involved. However, regardless of the number of suspects the case record is one event.

The occurrence of case record may not always lead to the opening of a case file. However, if there is a case file there should be a case record. Because unless it is reported as a case record, investigators can not open a case file to a specific case. Therefore, the relationship between these entities is not obligatory.

Case File and Investigator

The relationship between a case file and an investigator is also important to the system. If there is a case file there should also be an investigator. Moreover, the data

values or the data items of the entity of case file are completed by the investigator. Therefore, if there is a case file, the responsible investigator should be known to the system.

The relationship between these entities is many to many. The occurrence of a case file can be related to a group of investigators and one investigator can manage a number of case files.

The relationship between a case file and an investigator is obligatory, meaning one can not exist without the other. If we consider a case file, for example, there is always an investigator assigned to handle it. And if we consider an investigator he/she is there on the job to at least handle one or more case files.

Case File and Fingerprint

The relationship between these entities is essential to the system. Cases of a suspect and accusers are completed using the data of case files and fingerprints. So the organization should collect information about these entities.

The relationship between these entities is many to many. Because within a single case file there may be many suspects, in which case they are all required to supply their fingerprints. Conversely, the occurrence of fingerprint can also be related with many case files. Because a single suspect can commit different crimes on different time and can have different case files.

The relationship between these entities is not obligatory. One can exist without the other. For example, all case files may not necessitate the existence of the fingerprint

of a suspect. However, fingerprint of a suspect can not exist without a case file. If a suspect is going to supply his fingerprint there should be a case file related with the suspect.

Case file and Prosecutor

The relationship between these two entities is important to the system because the final output of the system is to present the case files to prosecutors in order to charge the suspect before the courts. Thus, the system is required to maintain information regarding the relationship between these two entities.

The occurrence of a single case file can be related to more than one prosecutors and one prosecutor can manage a number of case files. Therefore, the relationship is many to many.

Their existence is not obligatory. Some case files may not reach the office of the prosecutors. Many case files can be closed by the police itself for lack of sufficient evidence. However, the existence of a prosecutor is related with the existence of case files. If there are no case files, there is no need for maintaining data about a prosecutor.

Case File and courts

The importance of the relationship to the system, the degree of relationship and the class of the relationship is similar with that of the relationship that exists between case file and prosecutor.

The Data Structure Diagram (DSD), which shows the entities and their relationships, is presented in fig. 5.1

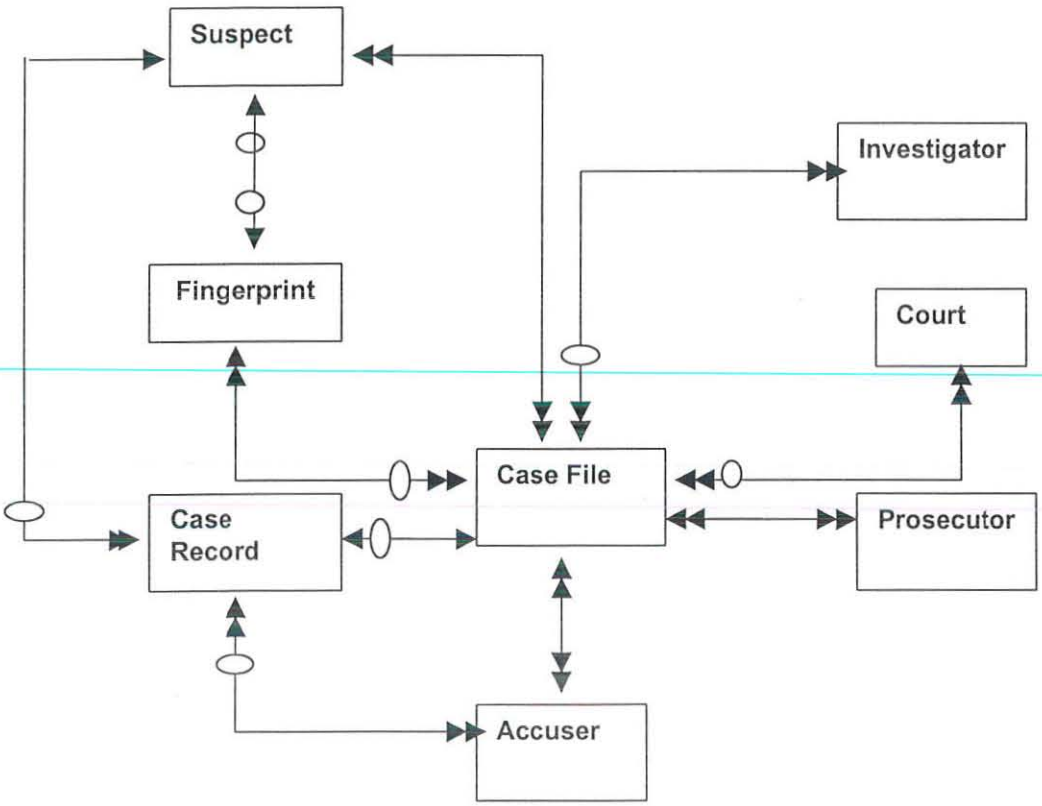


Fig.5.1 Data Structure Diagram

- Single arrowhead in both directions indicates a one-to-one relations
- Single arrowhead in one direction and a double one in the other represents one-to-many relationships
- Double arrowhead in all direction indicates many to many relationships
- The circle at one of the ends of the line on the diagram shows the relationship is non-obligatory or optional
- Two circles at both ends show that the relationship is non-obligatory or optional for both entities
- No circle in both ends shows that the relationship is obligatory

5.2.2 Modelling System Data

5.2.2.1 Relational Data Analysis – an overview

While describing entity – relationship model, an attempt was made only to examine the relationships which exist between entities of the system. Our effort in developing the entity – relationship model was limited to identifying the entities and their relationships. However, it is also important to prepare complete and detailed logical data design based on the analysis of data items and their relationships. This approach to data modeling is commonly known as relational data analysis.

The main objective of relational data analysis, is to organize all of the system's data items into a set of well-normalized records so that redundancies are removed, there by avoiding update anomalies such as problems associated with modifying, inserting, and deleting of records maintained in a database.

5.2.2.2 Normalization of System Data Items

In order to achieve a well defined model of data for the database designed, input and output data items of the system have to pass through certain stages of normalization known as normal forms. Although there are five stages of normal forms, the analyst has gone through up to the third normal form. This is because at the third normal form, the process reaches a stage whereby the same fact will never be stored more than once.

The success of normalization also depends on the sources of the data items used. Hence, all the sources of the data items used are from the sources compiled for the analysis. The data were collected from the following cards and sheets.

a) Case file record sheet
b) Description of a suspect sheet
c) Ten fingerprint record card

The data collected about entities, attributes and relationships from these cards and sheets are documented in the data dictionary presented in Appendix VI. The data dictionary contains definitions, type, and size of selected data stores. These data stores are case file record, ten fingerprint records and criminal history records, and these data stores are the main components of the system. Although it was important to normalize all the data items contained in all the existing data stores this was not possible due to time constraint.

The normalization of the data items is presented first by presenting the unnormalized form, then the normalization process continues up to the third normal form.

Case File Management System Data Items Normalization

Table 5.1

1. **Case File:**

Unnormalized form

case file date items

Case file number

Suspect's name

Father's name

Grand Father's name

Aliases

Photograph

Sex

Date of birth

Place of birth

Citizenship

Family status

Religion

Education

Occupation

Region

Zone

Woreda

Kebele

House number

Crime accused

Crime scene

Motive

Date accused

Date of arrest

Accomplice's name

Father's name

Grandfather's name

Aliases

Photograph

Sex

Date of birth

Place of birth

Citizenship

Family status

Religion

Education

Occupation

Region

Zone

Woreda

Kebele

House number

Accuser's name

Father's name

Grand father's name

Sex

Date of birth

Place of birth

Citizenship

Family status

Religion

Education

Occupation

Region

Zone

Woreda

Kebele

House number

Witnes's Name

Father's name

Grand father's name

Sex

Date of birth
Place of birth
Citizenship
Family status
Religion
Education
Occupation
Region
Zone
Woreda
Kebele
House number
Suspect's statement number
Summary statement
Full Statement
Date
Accomplice's statement number
Summary statement
Full Statement
Date
Accuser's statement number
Summary statement
Full Statement
Date
Witness's statement number
Summary statement
Full Statement
Date
Documentary Testimony Number
Document reference number
Date
Subject
Author
Technical Testimony number
Document reference number
Date
Subject
Author
Police Investigator ID Number
Name
Father's name
Grandfather's name
Title
Name of the Prosecutor
Prosecutor's case file number
Trial court
Court Finding
Court case file number
Court decision
Case dismissed by (police station)
Date Case dismissed
Authorized person

Tab.5.2

FIRST NORMAL FORM

CASE

Case File Number

Crime accused
Date accused
Date of arrest
Police Investigator ID number
Name
Father's name
Grand father's name
Title
Name of the prosecutor
Prosecutor's case file number
Trial court
Court case file number
Court decision
Case dismissed by (Police Station)
Date Case dismissed
Authorized person

SUSPECT

Case file number

Suspect's Persons Identification Number (PIN)

Suspect's name

- Father's name
- Grand Father's name
- Aliases
- Sex
- Photograph
- Date of birth
- Place of birth
- Citizenship
- Family status
- Religion
- Education
- Occupation
- Region
- Zone
- Woreda
- Kebele
- House number

ACCOMPLICE

Case file number

Accomplice's Persons Identification number (PIN)

Accomplice's name

- Father's name
- Grand Father's Name
- Aliases
- Photograph
- Sex
- Date of birth
- Place of birth
- Citizenship
- Family status
- Religion
- Education
- Occupation
- Region
- Zone
- Woreda
- Kebele
- House number

WITNESS

Case file number

Witness's person's Identification number (PIN)

Witness's name

- Father's name
- Grand Father's Name
- Sex
- Date of birth
- Place of birth
- Citizenship
- Family status
- Religion
- Education
- Occupation
- Region
- Zone
- Woreda
- Kebele
- House number

ACCUSER

Case file number

Accuser's person's Indentification number (PIN)

Accuser's name

- Father's name
- Grand Father's Name
- Sex
- Date of birth
- Place of birth
- Citizenship

Family status
Religion
Education
Occupation
Region
Zone
Woreda
Kebele
House number

SUSPECT'S STATEMENT

Case File Number
Suspect's PIN
Statement number
Summary statement
Full Statement
Date
Police investigator ID

Accomplice's Statement

Case file Number
Accomplice's PIN
Statement Number
Summary statement
Full Statement
Date
Police Investigator ID

Accuser's Statement

Case File Number
Accuser's PIN
Statement number
Summary statement
Full Statement
Date
Police investigator ID

Witness's Statement

Case File Number
Witness's Statement Number
Summary statement
Full Statement
Date
Police investigator ID

DOCUMENT TESTIMONY

Case file number
Document testimony number
Reference number
Date
Subject
Author

TECHNICAL TESTIMONY

Case file number
Technical testimony number
Reference number
Date
Subject
Author

Table 5.3

SECOND NORMAL FORM

CASE

Case file number
Crime accused
Crime Scene
Motive
Date accused
Date of arrest
Police Investigator ID number
Name of the prosecutor
Prosecutor's case file number
Court case file number

SUSPECT

Case file number

Suspect's PIN
Suspect's name
Father's name
Grand Father's Name
Aliases
Sex
Photograph
Date of birth
Place of birth
Citizenship
Family status
Religion
Education
Occupation
Region
Zone
Woreda
Kebele
House number

ACCOMPICE
Case file number
Accomplice's PIN
Accomplices name
Father's name
Grand Father's Name
Aliases
Sex
Photograph
Date of birth
Place of birth
Citizenship
Family status
Religion
Education
Occupation
Region
Zone
Woreda
Kebele
House number

WITNESS
Case file number
Witness's PIN
Witness's name
Father's name
Grand Father's Name
Sex
Date of birth
Place of birth
Citizenship
Family status
Religion
Education
Occupation
Region
Zone
Woreda
Kebele
House number

ACCUSER
Case file number
Accuser's PIN
Accuser's name
Father's name
Grand Father's Name
Sex
Date of birth
Place of birth
Citizenship
Family status
Religion
Education
Occupation

Region
Zone
Woreda
Kebele
House number

Suspect's Statement

Case File Number
Suspect's PIN
Statement number
Summary statement
Full Statement
Date
Police Investigator ID

Accomplice's Statement

Case File Number
Accomplice's PIN
Statement number
Summary statement
Full Statement
Date
Police Investigator ID

Accuser's Statement

Case File Number
Accuser's PIN
Statement number
Summary statement
Full Statement
Date
Police Investigator ID

Witness's Statement

Case File Number
Witness's PIN
Statement number
Summary statement
Full Statement
Date
Police Investigator ID

DOCUMENT TESTIMONY

Case file number
Document testimony number
Reference number
Date
Subject
Author

TECHNICAL TESTIMONY

Case file number
Technical testimony number
Reference number
Date
Subject
Author

INVESTIGATOR

Case file number
Police Investigator's ID
Name
Father's name
Grand Father's name
Title

COURT

Case file number
Court Case File number
Trial court
Court finding
Date decided
Decision

Table 5.4

THIRD NORMAL FORM

CASE, INVESTIGATOR, and COURT relations have no transitive dependency

problem. But, suspect's statement and accomplice's statement; accuser's statement and witness's statement; DOCUMENT Testimony and TECHNICAL TESTIMONY have transitive dependency and could be further normalized to:-

Statement

Case File Number

Statement number

Person's (PIN)

Summary statement

Full Statement

Police Investigator's ID

DOCUMENT TESTIMONY

Case file number

Document testimony number

Document Reference number

TECHNICAL TESTIMONY

Case file number

Technical testimony number

Document Reference number

DOCUMENT

Document reference number

Date

Subject

Author

Furthermore, SUSPECT AND ACCOMPLICE PERSON relation contain record of persons having similar nature. Both will be accused until proved innocent. Therefore, the relation could further be normalized to:

SUSPECT

Suspects (PIN)

Case file number

Statement Number

ACCOMPLICE'S PERSON

Person's (PIN)

Case file number

Statement number

Accused Person Detail

Person's (PIN)

Name

Father's name

Grand Father's name

Aliases

Photograph

Sex

Date of birth

Place of birth

Citizenship

Family status

Religion

Education

Occupation

Region

Zone

Woreda

Kebele

House number

With the same analogy, WITNESS AND accuser relation could be further normalized to:

ACCUSER

Accuser's PIN

Case File Number

Statement Number

WITNESS

Witness's PIN

Case file number

Statement Number

PERSON DETAIL

Person's (PIN)

Name

Father's name

Grand Father's name

Sex

Date of birth

Place of birth

Citizenship

Family status

Religion

Education

Occupation

Region

Zone

Woreda

Kebele

House number

Family status

Religion

Education

Occupation

Region

Zone

Woreda

Kebele

House number

Face Colour

Eye

Build

Height

Beard

Hair

Nose

Teeth

Special Mark

Crime accused

Crime scene

Motive

Date accused

Date of arrest

Crime convicted

Trial court

Court Findings

Court decision

Court crime file number

Dismissed by (police station)

Date case dismissed

Authorized person

2. CRIMINAL HISTORY DATA ITEMS

Table 5.5

Unnormalized form of Criminal History Record Data Items

Case file number

Criminal's name

Father's name

Grand Father's name

Aliases

Sex

Photograph

Date of birth

Place of birth

Citizenship

Table 5.6

FIRST NORMAL FORM

Criminal record number

Case file number

Person's Identification number (PIN)

Criminal's name
Father's name
Grand Father's name
Aliases
Sex
Photograph
Date of birth
Place of birth
Citizenship
Family status
Religion
Education
Occupation
Region
Zone
Woreda
Kebele
House number
Face Colour
Eye
Build
Height
Beard
Hair
Nose
Teeth
Special Mark
Crime accused
Crime scene
Motive
Date accused
Date of arrest
Crime convicted
Trial court
Court Findings
Court decision
Court crime file number
Case dismissed by (police station)
Date case dismissed
Authorized person

Table 5.7

SECOND NORMAL FORM

CRIME

Case file number
Criminal record number
Person's Identification number (PIN)
Crime accused
Crime scene
Motive
Date accused
Date of arrest
Crime convicted
Trial court
Court findings
Court decision
Court crime file number
Case dismissed by (police station)
Date case dismissed
Authorized person

CRIMINAL

Criminal's name
Person's Identification number (PIN)
Father's name
Grand Father's name
Aliases
Sex
Photograph
Date of birth
Place of birth
Citizenship
Family status
Religion
Education
Occupation

Region
Zone
Woreda
Kebele
House number
Face Colour
Eye
Build
Height
Beard
Hair
Nose
Teeth
Special Mark

COURT

Court crime file number
Court findings
Court decision

THIRD NORMAL FORM

All relations in the 2NF do not have transitive dependency, therefore, the 2NF could Automatically be Taken as the third normal form.

Table 5.8

Unnormalized form of fingerprint Data Items

Name
Fathers name
Grand father's name
Aliases
Region
Zone
Woreda
Kebele
House Number
Face Colour
Eye
Build
Height
Beard
Hair
Nose
Teeth
Special Mark
Right hand Thumbprint
Index fingerprint
Middle fingerprint
Ring fingerprint
Small fingerprint
Palm print
Left hand Thumbprint
Index fingerprint
Middle fingerprint
Ring fingerprint
Small fingerprint
Palm print

Table 5.9

FIRST NORMAL FORM

FINGERPRINT

Person's Identification Number (PIN)
Name
Father's name
Grand father's name
Aliases
Region
Zone
Woreda
Kebele
House Number
Face Colour
Eye
Build

Region
Zone
Woreda
Kebele
House number
Face Colour
Eye
Build
Height
Beard
Hair
Nose
Teeth
Special Mark

COURT

Court crime file number
Court findings
Court decision

THIRD NORMAL FORM

All relations in the 2NF do not have transitive dependency, therefore, the 2NF could Automatically be Taken as the third normal form.

Table 5.8

Unnormalized form of fingerprint Data Items

Name
Fathers name
Grand father's name
Aliases
Region
Zone
Woreda
Kebele
House Number
Face Colour
Eye
Build
Height
Beard
Hair
Nose
Teeth
Special Mark
Right hand Thumbprint
    Index fingerprint
    Middle fingerprint
    Ring fingerprint
    Small fingerprint
    Palm print
Left hand Thumbprint
    Index fingerprint
    Middle fingerprint
    Ring fingerprint
    Small fingerprint
    Palm print

Table 5.9

FIRST NORMAL FORM

FINGERPRINT

Person's Identification Number (PIN)
    Name
    Father's name
    Grand father's name
    Aliases
    Region
    Zone
    Woreda
    Kebele
    House Number
    Face Colour
    Eye
    Build

Height
Beard
Hair
Nose
Teeth
Special Mark
Right hand Thumbprint
Index fingerprint
Middle fingerprint
Ring fingerprint
Small fingerprint
Palm print
Left hand Thumbprint
Index fingerprint
Middle fingerprint
Ring fingerprint
Small fingerprint
Palm print

Table 5.10

SECOND NORMAL FORM

PERSONAL DETAIL

Person's Identification Number (PIN)
Name
Father's name
Grand father's name
Aliases
Region
Zone
Woreda
Kebele
House Number
Face Colour
Eye
Build
Height
Beard
Hair
Nose
Teeth
Special Mark

FINGERPRINT

Person's Identification Number (PIN)
Right hand Thumbprint
Index fingerprint
Middle fingerprint
Ring fingerprint
Small fingerprint
Palm print
Left hand Thumbprint
Middle fingerprint
Ring fingerprint
Small fingerprint
Palm print

All the relations in the 2NF do not have transitive dependency. Therefore, the 2NF could automatically be taken as the 3NF.

5.3 USER INTERFACE FOR CASE MANAGEMENT SYSTEM

User Interface Design

The design of a particular user interface depends on a number of factors. However, the most important consideration which directly affects the design of a particular user-interface is the experience and the frequency with which the user gets in touch with the system.

A good interface should provide instruction to the novice user but should also give a short cut means of manipulating the system for more expert user (Hadera, 1995).

Based on the above overview, the Police Criminal Record Management Sections of the police system can be categorized as novice, since they have no prior exposure to computer-based systems. Therefore, the initial feature of the interface should be designed in a way that would cater for the need of these category of users. In addition, the interface should also expand with the change of experience of the users and the increase of the load.

For this, the analyst has selected a mixture of menu selection and form filling. With menu format the users are shown a list of options and are expected to choose the appropriate option by positioning a cursor or by pressing the number or letter associated with each option. Forms-based screen dialogue are used particularly for those activities which involve data entry functions. Based on this, the layout of the menu is presented hierarchically in the prototype development and operation section.

5.4 NETWORK CONSIDERATIONS

5.4.1 Background Information

As we have seen in the chapter dealing on the description of the existing system, communication is a serious problem in the management of criminal records. There are three computers in the Federal Criminal Record Center which are used for data conversion. And there is only one computer in the Federal head Office which is used for crime statistical purposes. There is also one computer in the Addis Ababa Police again used for statistical purposes. The computers used for data conversion and the computers used for statistical purposes are not networked. Except the computer in the Federal Information and Research Center, the computer located in the Addis Ababa Police Information and Research Center, is not providing active service, apart its use for data conversion.

During the analysis of the existing system, we have seen that there will be a need for three types of databases which will have sub databases under each one of them. The three main types of databases are:-

- Federal police database
- Addis Ababa Police database
- Woreda police database

The Federal and Addis Ababa Police databases, in turn, will have the following sub databases under them:-

- Fingerprint database
- Case file database
- Sequential name index

The application used for the databases have to make sure that all the databases speak to one another. In addition, police investigators should be able to register case records on daily basis. Moreover, the statistical clerks need to have access to these case records as well as to the case file database. For this purpose, there is a need for LAN in Addis Ababa Police Criminal Record Center. The same logic also applies at the Federal Police Criminal Record Center level.

In the Woreda Police Stations, there are case file databases which the investigators need to have access. Statistical clerks as well, should have daily access to the case records. Therefore, LAN is likewise required in the woreda police stations.

However, as the need of communication is not limited to LAN alone, there is a need, also, for Wide Area Network (WAN). Although the databases mentioned earlier are located in Addis Ababa, they are geographically dispersed. For example, the Federal Police and the Addis Ababa Police stations are located about 3 kilometers away from each other. Moreover, there are 28 woreda police stations in the city. Their location is dispersed, and the distance among them markedly varies. Taking the average, they are located 9 km away from the Addis Ababa Police.

The Addis Ababa and Woreda Police Criminal Record Centers are located far apart from each other and away from their respective prosecutors and courts, 3 kilometers on the average.

The above mentioned facts indicate that in order that the databases be able to communicate among themselves, there is a need for the use of a Wide Area Network (WAN).

Having seen the importance of LAN and WAN in the Criminal Records Management Systems of the Federal Police and Addis Ababa Police Stations, it becomes imperative to consider the network requirement. In this paper, since the specification and cost of the requirements could be analyzed at the implementation phase, requirements alone are considered at this level.

5.4.2 Network Requirements

5.4.2.1 Objectives

The objectives of networking are the following:-

- To work the criminal record management system of Federal Police, Addis Ababa and Addis Ababa Woreda Police Stations with the criminal record management system of the respective courts and prosecutors regardless of the computers used.
- To help users add, read and retrieve data from the databases based on their access privileges.
- To keep outsiders from reading the files of the Federal, Addis Ababa and Woreda police criminal record centers.

5.4.2.2 LAN Considerations

A LAN is a Local Area Network within a single building or similar geographical location. A LAN helps one to connect a group of personal computers together. Using LAN, one can share, transfer and access files, share applications and

printers etc. So, to maintain the databases in each of the Federal, Addis Ababa, and Woreda Police stations LAN will be required.

For this it is, therefore, important to consider the requirements of Workstations, File servers, LAN cables, Network adapters, cards, Network operating system software, and LAN application software.

Workstations

- They can be of intermediate speed,
- They have to have good quality colour or black and white scale VGA monitors, as well as high quality keyboards.
- The computers used in the Federal Criminal Record Management Center and Addis Ababa Police should be used only for workstation purposes. There should also be central file server.
- The hard disks can be inexpensive and relatively small, because all work stations will have file servers locally within their network.

File Servers

There will be file servers in each of the Woreda, Addis Ababa Police and Federal Police Criminal Records Centers.

The file servers of Federal and Addis Ababa Police should relatively be faster than the Woreda's.

The file servers in Woreda Police Stations can also be used as work stations. But the file servers at the Federal and Addis Ababa Police Stations should be specifically dedicated for that purpose.

The monitors for the file servers at the Federal and Addis Ababa Police Stations can have only monochrome monitors and inexpensive keyboards. But the monitors at the Woreda police stations should be of better quality because they will also be used as workstations.

The hard disks used by all should be large and faster enough because they store large amount of records.

Network Topologies

There are different types of topologies. The most commonly known are star, ring, and linear bus LAN topologies. However, in practice, the most commonly used one is a hybrid of the topologies. The recommended one is star-wired-bus. This topology has advantages and disadvantages.

Advantages

- Fault diagnosis and isolation are relatively easy.
- The modular design results in a network that is easy to expand

Disadvantages

- Network configuration can be technically complicated
- The cabling system is complicated

LAN Cables

After defining the requirements for work stations, file servers, network topologies then comes the issue of LAN cables. At this level, we can only consider the different alternatives for LAN cables. The most recommended ones are:-

- Thin Coaxial wire
- Thick coaxial wire (thick net)
- Shielded twisted pair (STP)
- Unshielded twisted pair (UTP),
- Fiber optic cable

Taking these alternatives, networks of Woreda Police Stations may have relatively lower load and operate at a relatively shorter distance. Thus, they can use shielded twisted pair or unshielded twisted pair, for these are relatively less costly and they are more useful in shorter distance.

However, taking the Federal and Addis Ababa Police Criminal Records Centers, they are loaded with higher flow of data and the Local Area Distance is relatively longer in them than in the woredas. Therefore, considering the cost factor and the

greater load apparent in these areas, it is advisable that they should use a mix of fiber optic cable and STP/UTP. This is because in using the mix, fiber optic cable has an advantage of covering a longer distance than others and operating at a faster speed, whereas using STP/UTP in the mix alleviates the cost.

Network Adapters

In this regard, there are different alternatives:-

- LAN tastic adapters
- Ethernet
- Token Ring
- ARC net

In selecting adapters for police criminal record networks, the most important factor is speed. The speed in the flow of information is a key factor. Thus, the faster adapters can push data faster through the cable, which means, that the file server will get a request more quickly and send back a response more quickly.

Apart from speed consideration, Ethernet adapter is the most recommended because:-

- It helps to interconnect a wide variety of equipment
- One can buy Ethernet cards from dozens of competing manufactures
- Ethernet operates at a rate of 10/100 megabits per second
- It has collision detector

LAN Software

In this regard, operating and application softwares are considered.

For LANs the most applicable and recommended one is Windows NT. This is popular for several reasons.

- More applications will work on Windows NT than on any other single brand of network.
- Windows NT supports workstations using DOS, DOS and Windows, 0s/2, UNIX; Novell's Netware, Macintosh System 7 and other operating systems.

The network operating system (NOS) components on each workstation, and on the file server, communicate with each other through a computer language called a protocol. Thus, the protocol used in the LAN of the Police Criminal Record Management System should be carefully selected and it should communicate also with the Wide Area Network (WAN). For this there are different alternatives:-

- Net BIOS
- Novell, IPX/SPX
- TCP/IP

The most widely used protocol is TCP/IP, because it also supports communication within the Wide Area Network.

Application softwares can be developed in house or can be customized from those available in the market. The application softwares needed are:-

- Automatic Fingerprint Identification System (AFIS) Software,
- Criminal Record Management Software
- Softwares Used For Crime Statistics Purposes

Automatic Fingerprint Identification System Software can be purchased from the market. The remaining softwares can be developed in house or off-the-shelf product can be purchased and customized.

5.4.2.3 Wide Area Network (WAN) Considerations

As we have seen earlier, the Wide Area Network (WAN) is essential to the police criminal record management system. WAN requires special attention. In determining WAN component requirements, two factors should be considered.

1. The components should be decided based on the study of police criminal records data traffic. The growth of data traffic should be predicted once a relatively longer period of time.

2. Internet connectivity should also be considered. What type of access do the police need using WAN? E - mail Access, full access to the world Wide Web, etc need to be assessed.

WAN Hard wares

In designing WAN one of the components considered, is the hard wares used. WAN hardware consists of routers, bridges, and gateways.

Basically the WAN Hardware provides a path between LANs over which two or more LANs can share frames and packets. The WAN hardware decides which frames need to travel to another LAN; and the type and configurations of the WAN hard ware determine which WAN protocol is used.

In the case of the Ethiopian Police, both the LAN and WAN are new. There is no LAN nor WAN connectivity so far. So, the configuration of the LAN and WAN can be decided from the beginning by taking the one which helps the use of appropriate protocols.

WAN communication highly depends on telecommunication lines. Although there is a possibility of using cables, it may be costly to use cables to interconnect LANs which are dispersed in the whole city. Thus, the Ethiopian Telecommunication Corporation (ETC) has several data communication service plans such as ISDN and separate data communication capable cable lines. Therefore, the Police system can make use of anyone of these cost-effective solutions.

Protocol Requirements

The protocol used is also highly related with those hardwares used. However, there are different alternatives. Dial up modems, X.25, TI circuits, synchronous optical networks (SONET), Asynchronous Transfer Mode etc. can be used.

From these alternatives the most commonly used and the least expensive one at present are dial up modems. These modems are used over telephone lines. And

using these dial up modems, it is possible to use TCP/IP protocol in order to exchange information between the LANs. Hence, the most required protocol is TCP/IP using dial up modems.

5.4.2.4 Requirements of Management of the Network System

In this regard, there are different alternatives of management of the network system. The main alternatives are centralized and distributed system. Here, the processing of data is distributed except the common ones and hence the recommended management of network system is centralized control. This is because all the Local Networks are located in Addis Ababa. Besides, the centralized control maximizes the skills and knowledge of the scarce and expensive resources and staff members.

5.5 SECURITY AND CONTROL CONSIDERATIONS

Security is essential for business critical systems handling sensitive transactions and confidential data. Security is essential for two reasons, i.e., data access and data protection.

At this level, it is difficult to define all the details of security and control requirements. But it is possible to define to a certain extent the policies and the means to employed with regard to security and control.

5.5.1 Purpose of Security and Control

In defining security and control, one purpose should be to identify the sensitive information and its value to the criminal record management system. Moreover, the

potential risks and their probabilities should be predicted. So, we can say that all the databases of Federal Police, Addis Ababa Police and Woreda Polices are sensitive. Particularly, the ten fingerprint record, the criminal history record and the case files are very sensitive. If they are accessed illegally, they can create some problems of privacy and confidentiality and even can jeopardize the justice process. Moreover, if these files are destroyed, one can not recover them.

In the case of security and control, no matter how many controls and safeguards are in place, it is understandable that total security is impossible. However, risks can be minimized to an acceptable level. Therefore, in the police criminal record management system, security measures should be taken for the following purposes.

1. Limiting damage - As we have seen earlier, there are records which cannot be recovered again if they are destroyed once. So, the system designed should help prevent accidental damages.
2. It should also protect the confidentiality of the records - Almost all the records of the criminal record management system are confidential. Therefore, there should be procedures and means in order to keep the confidentiality of the records.
3. The system should also prevent fraud. Records should not be accessed or not used by unauthorized person.
4. The system should also prevent malicious damage of records. Records shouldn't be corrupted or modified or destroyed illegally.

5.5.2 Measures that should be Taken

To implement the above security measures the following procedures are recommended:-

1) Limiting unauthorized access to the records

1.1 The first key means is using passwords.

Each LAN user in the police criminal record management system should have a password, and the passwords should be changed regularly.

1.2 Limiting access

Another key to security is to limit access within the LAN on a directory by directory or server by server basis.

This means that not every user should be able to access all the police criminal files maintained in the databases. There should be limited access and full access. The police stations and other law enforcement agencies should have full access to read and print records related with case files, criminal history records. Others such as the INTERPOL should have limited access. Access rights to write and update records maintained in the Federal, Addis Ababa and Woreda Polices should only be authorized by the responsible bodies in the criminal record centers.

2) Protecting Data

File servers, like other computers, sometimes fail due to different reasons. To prevent these problems the following procedures are recommended.

2.1 File Backup

File backup can be done using floppy disks; magnetic tape, disks etc. In this regard, the system should make frequent and regular copies of the records and the copies should be placed in different safe areas.

2.2 Additional Servers

In the Federal Police and Addis Ababa Police criminal record management centers, it is recommended to use cold standby server because the cold standby server could takeover within a short period of time without the user's knowledge. Other automatic takeover facilities such as, hot standby, Mirrored server, etc. could be used as an alternative but they are not cost-effective when compared to cold standby server. If a file server suddenly breaks down, one can establish temporary connection with the other server using one of these servers. Of course the second server should remain part of the backup.

3) Power Protection

Loss of data can occur due to power failure. Therefore, servers particularly those at the Federal and Addis Ababa Police Department should be supported with uninterruptable power system (UPS). For this purpose, standby generators and UPS are required. In the Woreda police stations, however, batteries which will keep the server running for another 10 minutes may be used, for this time enables one to shut down the server without losing the files.

5.6 DEVELOPMENT AND OPERATION OF THE PROTOTYPE SYSTEM

The application software used for developing the physical database design and user interface is Microsoft Access 7 (Microsoft office 97's Access). Microsoft Access is relational database management system software suitable for low-end applications. It has Rapid Application Development tools and allows building relationships between tables that will make the database.

Based on the logical design of the Criminal Record Management System database in the previous section, the corresponding tables and relations were created using Microsoft table builder. The Microsoft Access database-builder tool allows user to create tables and set relationships among the required tables on primary key fields. The Form builder based on the defined tables and their corresponding relationships builds single, multi page and linked type forms. In general, the prototype application was developed using development tools of MS Access.

Sample records have been created for all alphanumeric type data. The fingerprint and photograph images were not created for lack of digital camera and fingerprint scanner devices. Since no analytical processing is going to take place on these data items, it will not affect the over all performance of the prototype. To simulate the actual system, fingerprints and photographs were scanned and stored in the database.

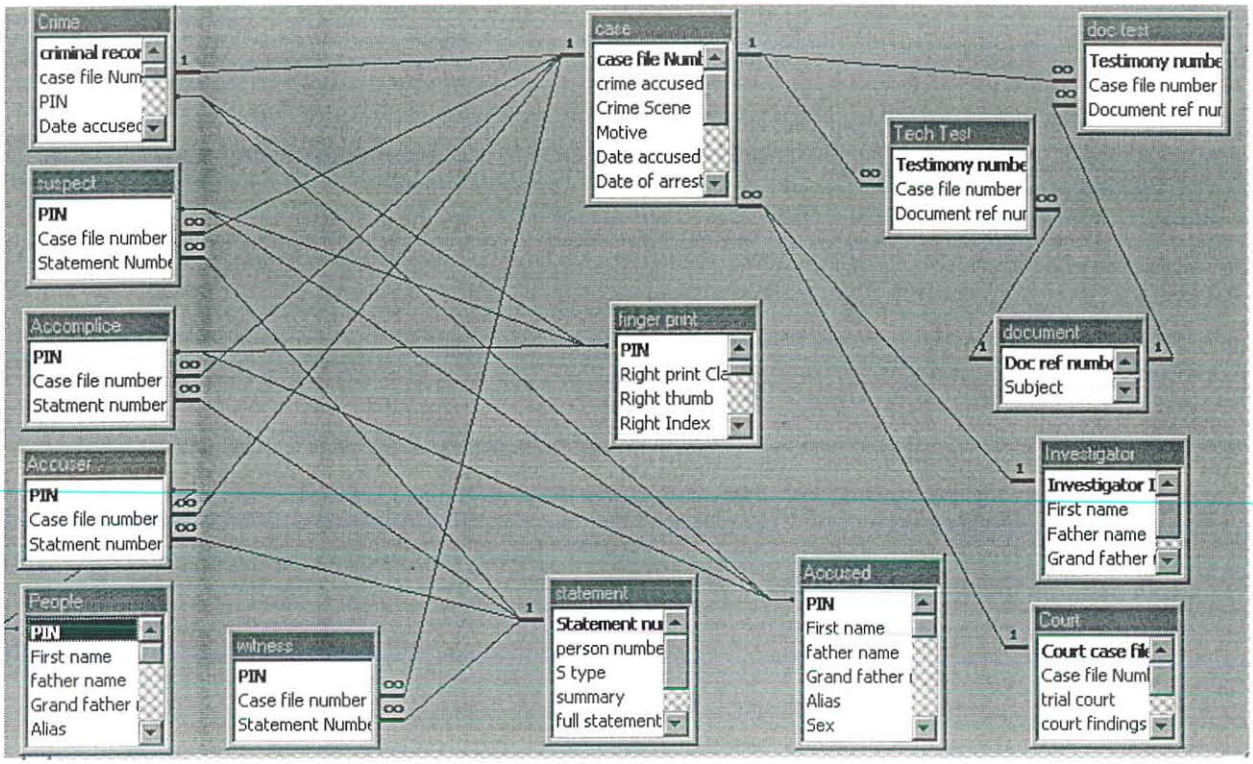


Fig. 1 Table Relationship

PROTOTYPE SYSTEM DESCRIPTION

Before a case file is opened the following data should be organized and filled..

- Suspect's data
- Accomplice's data
- Fingerprint data
- Accuser data
- Witness Data
- Statement of the Suspect, Accomplice, Accuser, and Witness will be recorded.

Data Input forms:

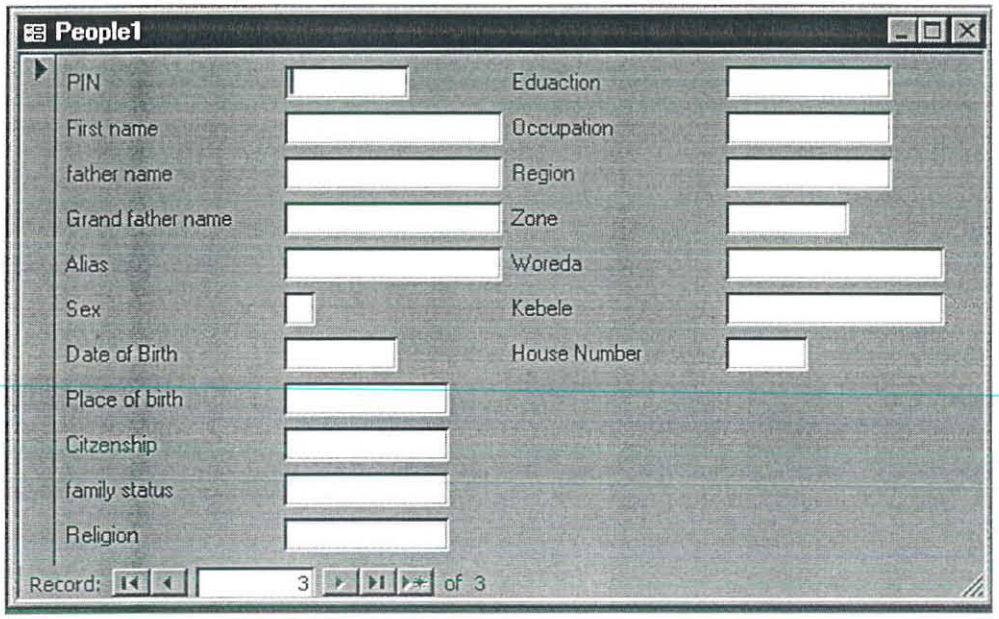


Fig. 2 Accuser and witness data entry form

The personal details of Accuser and witness will be similar and details will be filled/ recorded using this form.

The difference between a witness and an accuser data in the filled form will be the Person Identification number, PIN, coding. An accuser will have an "A" in front of the identifying number while witness will have "W". For example

A0000001 – could represent Accuser number 0000001 and

W0000001 – would represent Witness number 0000001.

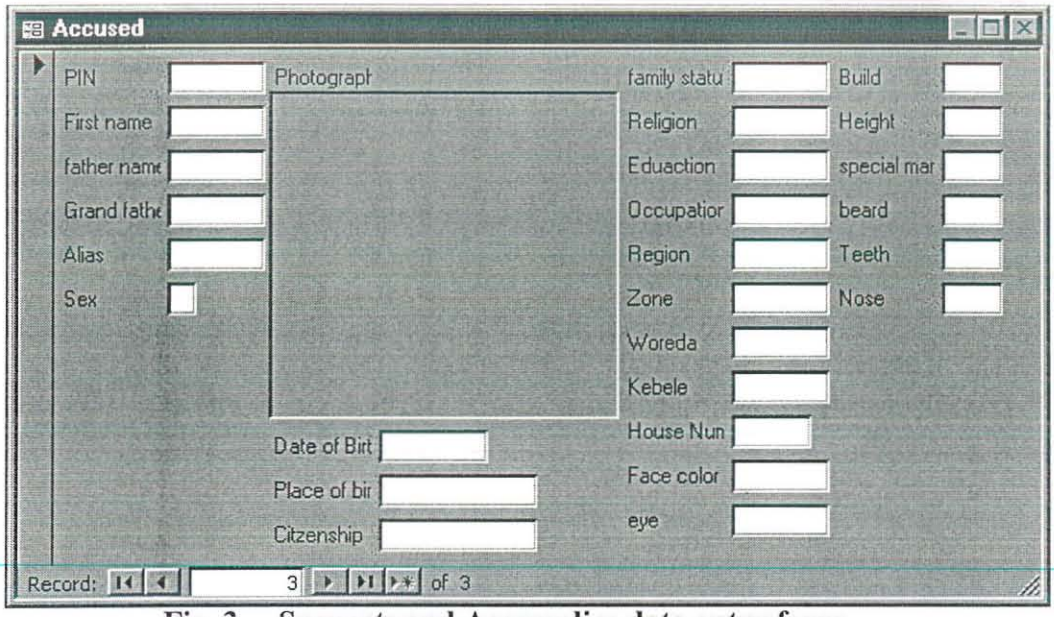


Fig. 3 Suspects and Accomplice data entry form.

Suspects and accomplice will be registered using this form. With the same analogy from the witness accuser relationship and data commonality, the same could be applied here to suspect and accomplice. That is Suspects PIN will start with "S" and Accomplice will start with letter "C".

Suspect and Accomplice will have their photograph captured. For the prototype scanned photos will be recorded but in the real system the photograph of the suspect and accomplice will be captured using CCD (Charge Coupled Digital) camera with frame grabber card inserted into the capture workstation expansion slots.

The following form will be used to capture Fingerprint of suspects and accomplice

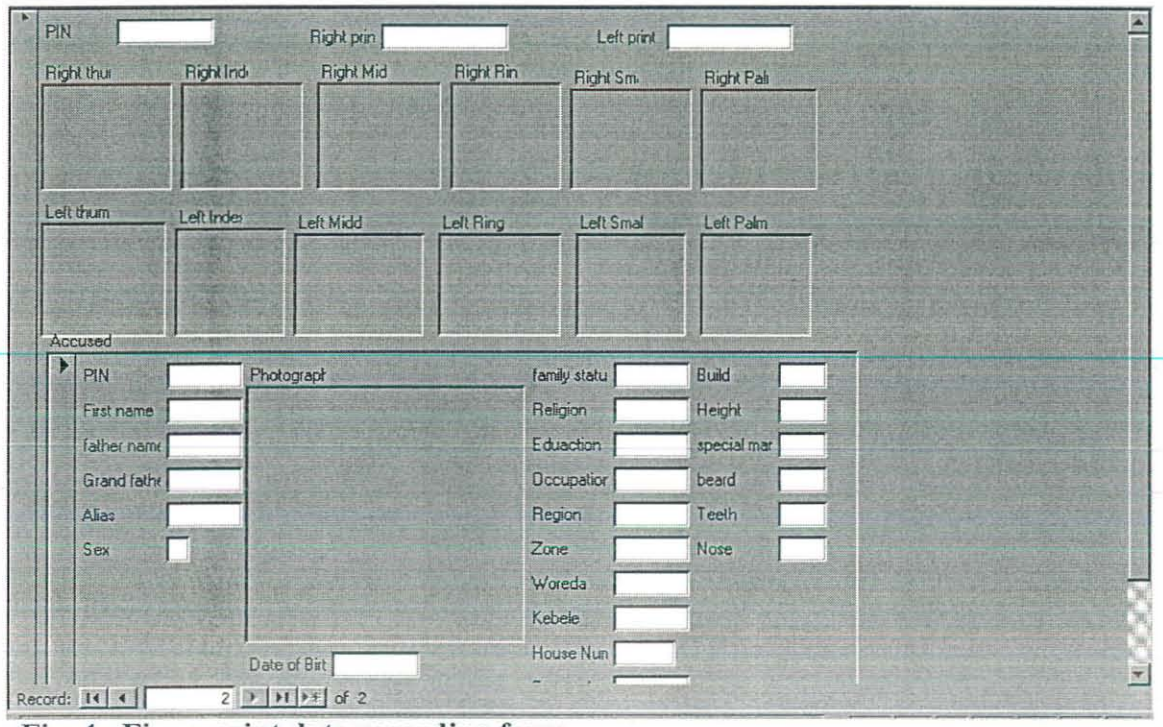


Fig. 4 Fingerprint data recording form

The fingerprint of each hand will be classified manually and recorded into the fingerprint database. The classified code of each hand is unique and enables to identify a person. Therefore, the PIN is directly related to fingerprint classification code and will be unique and it will be utilized throughout the system.

Even though, the prototype did not incorporate the AFIS software for automatic identification due to lack of software availability, the system could easily search in the manually classified and recorded code and verify or identify the suspect or accomplice against previous record.

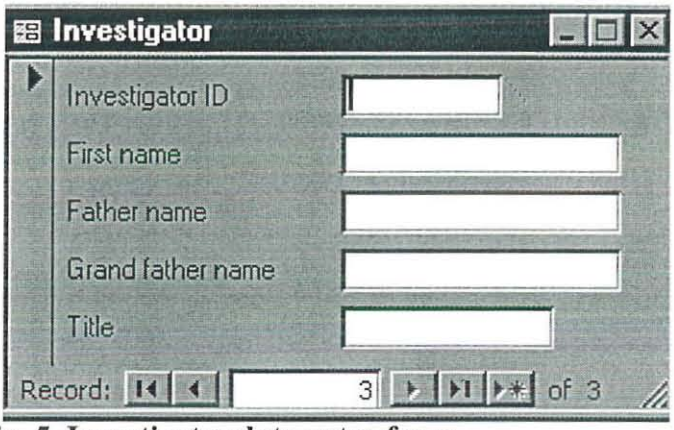


Fig. 5 Investigator data entry form

Moreover the system should also maintain investigator's profile. This data will be recorded using the above shown figure 5.

Statement from accuser, witness, suspect, and accomplice will be recorded using the following form.

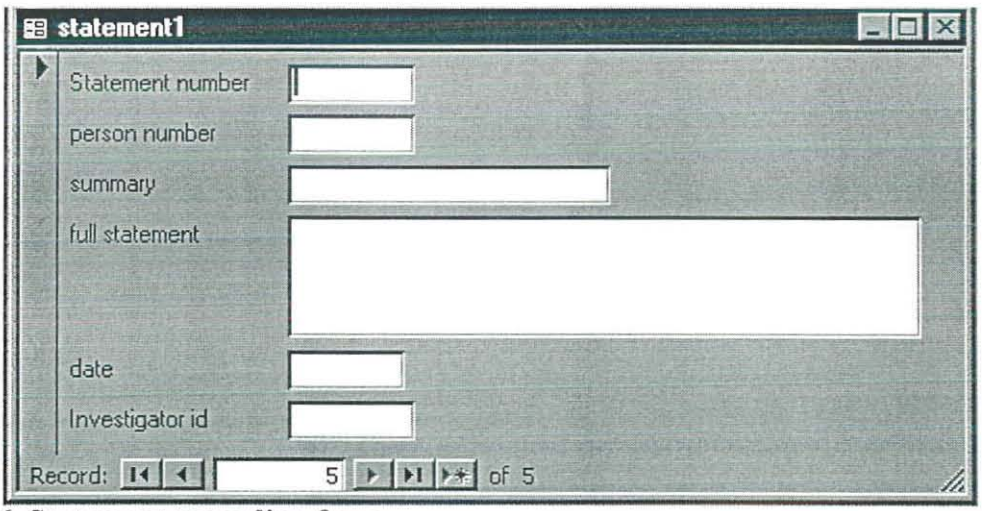


Fig. 6 Statement recording form

TESTIMONY

There are two types of testimonies developed in the prototype namely, the documentary testimony and technical testimony. The document coming from laboratory, hospitals etc. will be first registered by the archivist using the following document tracking form. (Fig. 7)

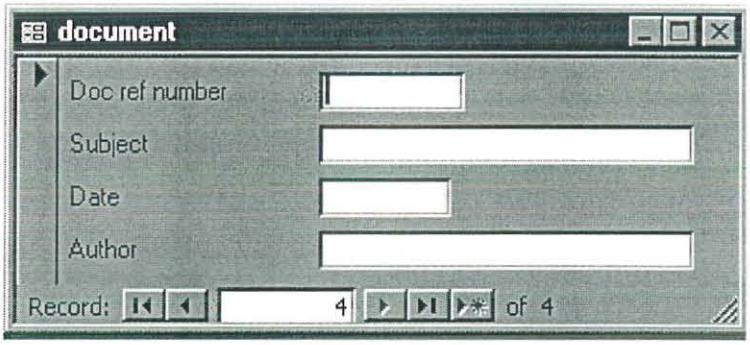


Fig. 7 Document registration form

Registered documents (testimonies) will be routed to the investigator handing the related case. After receiving the testimony the investigator will classify it as technical or documentary testimony and give it number using the following forms

Fig. 8.a Fig 8.b

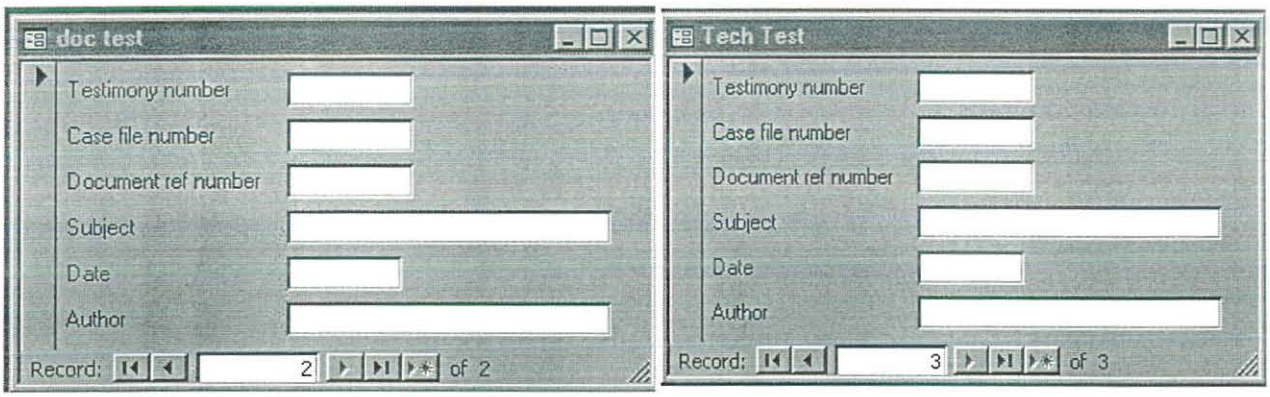


Fig. 8 Testimony registration forms

Finally after organizing all the required persons detail, statement, and testimonies, the investigator finally builds his case using several forms. Among them, the core one is the case data entry form.

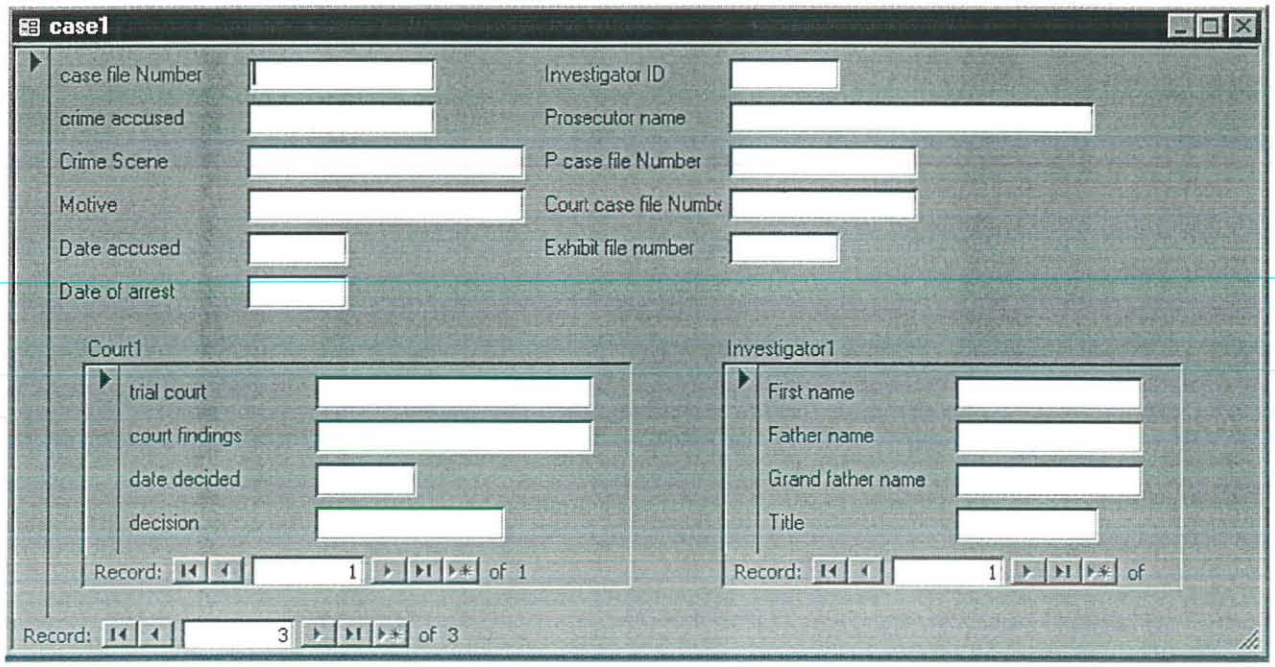


Fig.9 Case record data entry form

After recording the case fully, the investigator will then associate each suspect, accomplice, accuser and witness to newly recorded case file number using their respective data entry form. Accuser case data entry form (fig. 12), Suspects case data entry form (fig. 11), accomplice case data entry form (fig. 10), and witness case data entry form (fig. 13).

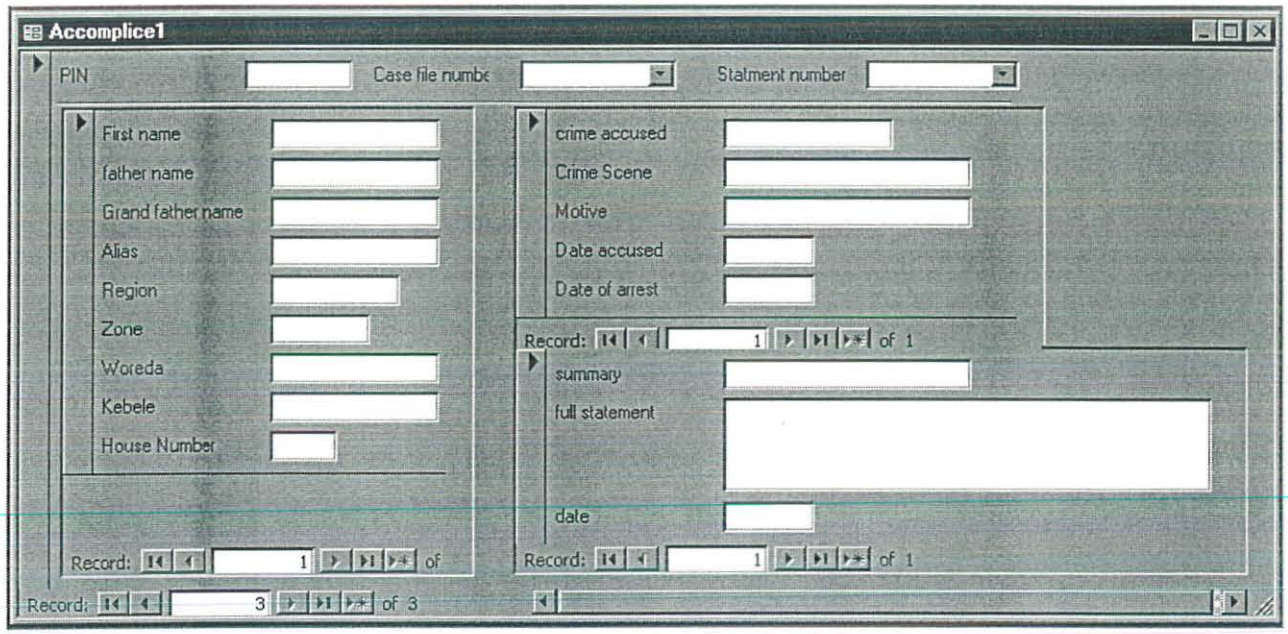


Fig. 10 Accomplice case data entry form

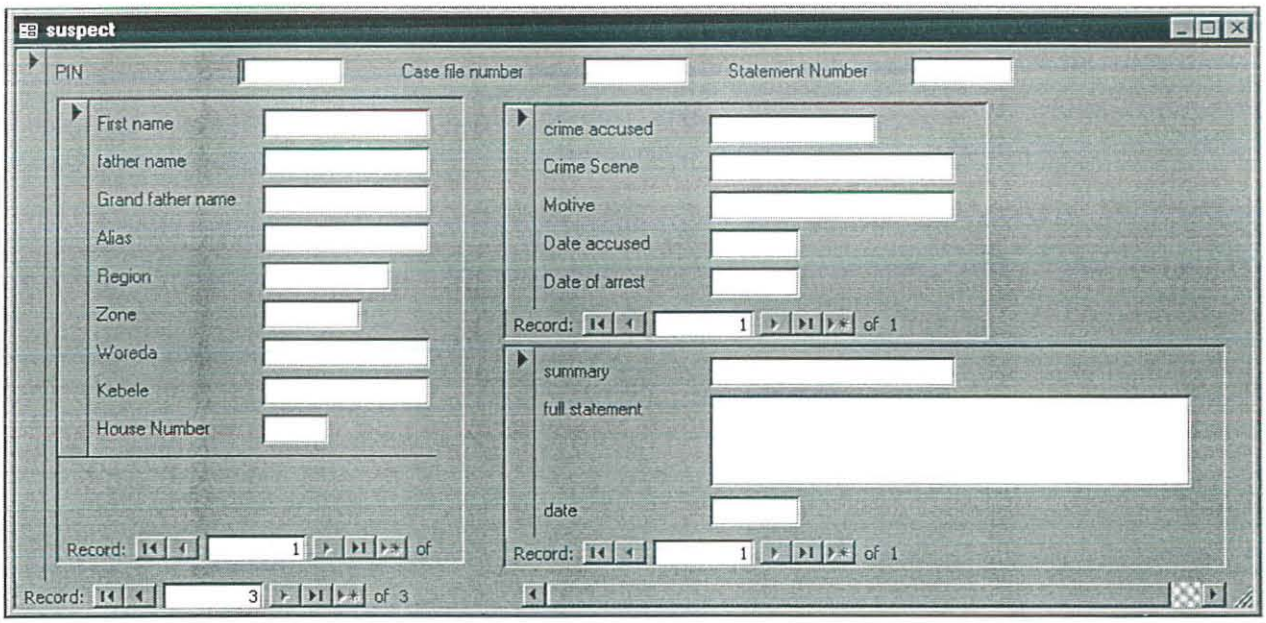


Fig.11 Suspects case data entry form

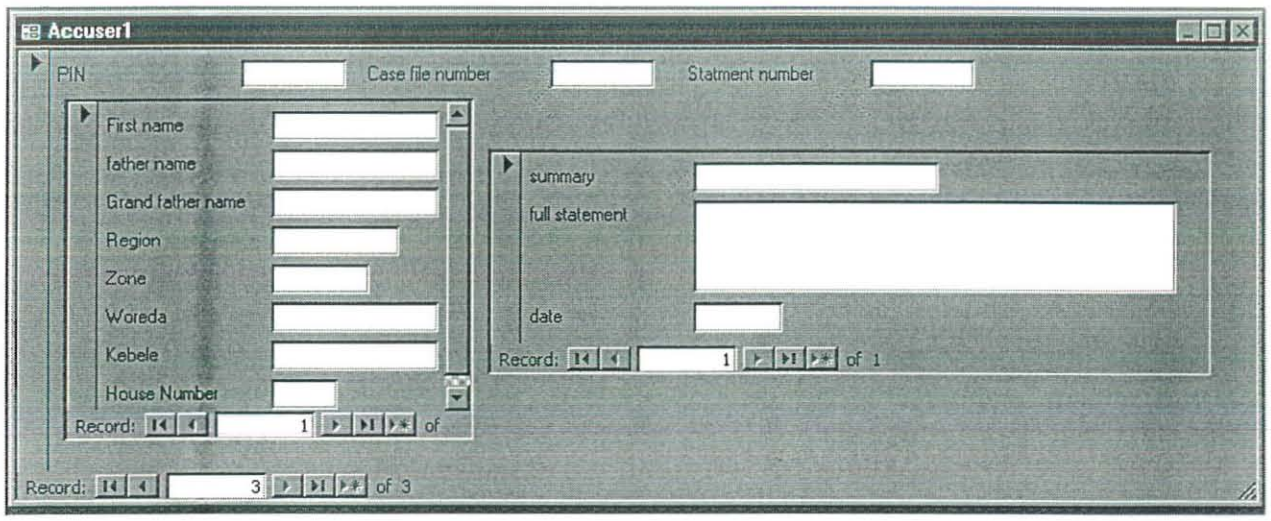


Fig. 12 Accusers case data entry form

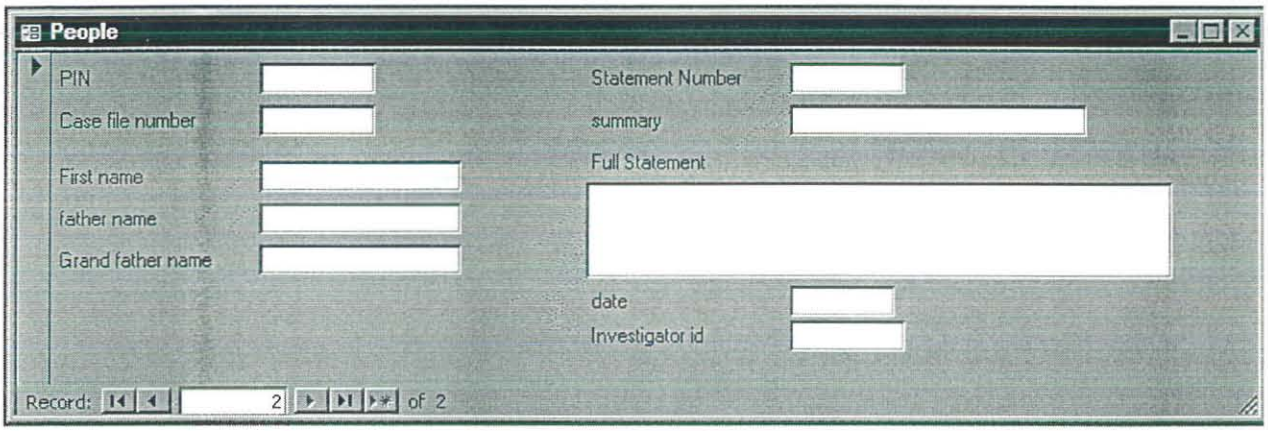


Fig.13 Witness case data entry form

After court proceeding the decision and relevant data will be registered using the court data entry form. Suspect or accomplice who are found guilty will be recorded in the crime record database.

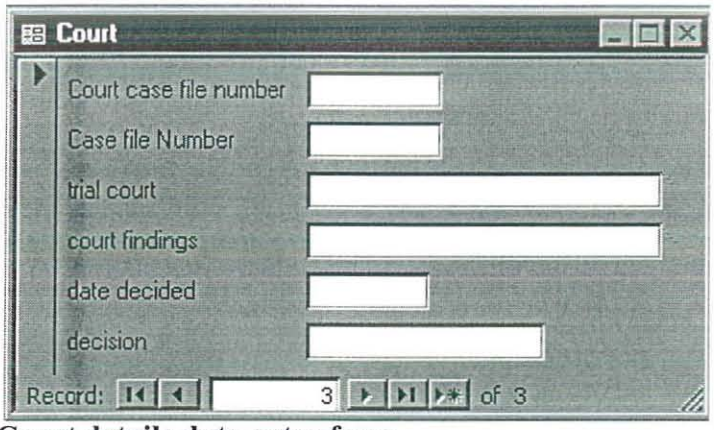


Fig. 14 Court details data entry form

Based on the data collected and filled in using the above forms, it will enable the police officers/investigators to get users specific type reports by preparing different type of queries.

User interfaces:

All the above form if used as they are might be some how cumbersome to use. Therefore, it will be necessary to provide the user with an integrated menu driven application.

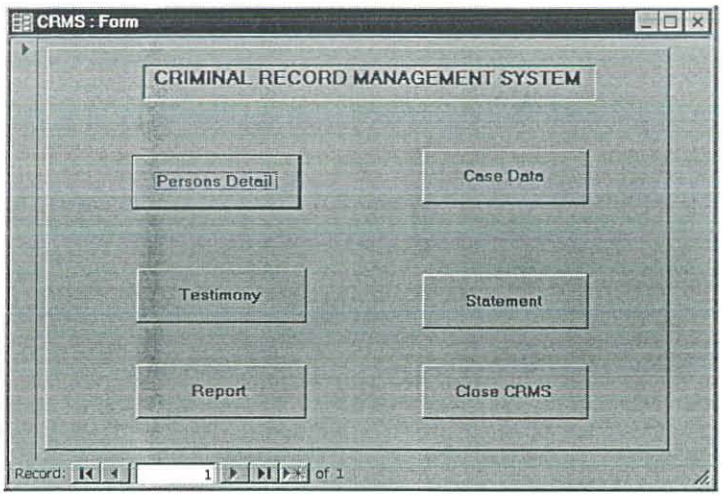


Fig. 15 Criminal record management system main menu

The Criminal Record Management System (CRMS) is menu driven application. The main menu is shown in figure 15.

Each menu item shown on the main menu will have further sub menus.

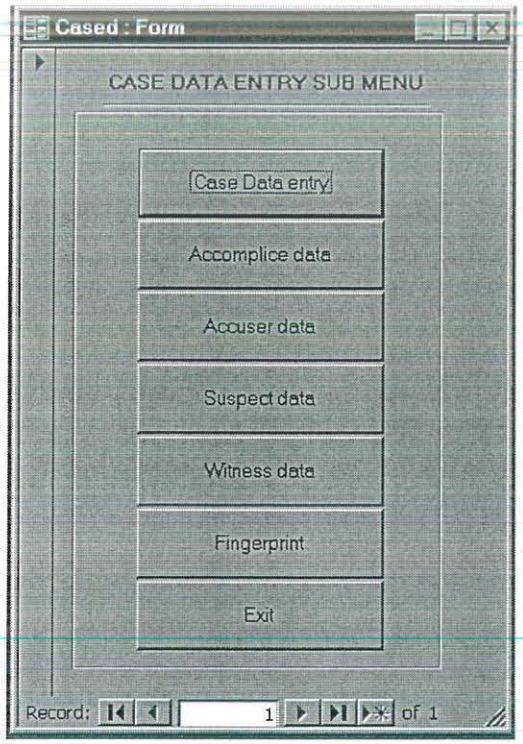


Fig. 16 Case Data Entry sub menu

This sub menu will launch application forms listed in the submenu. This sub menu (fig. 16)assists the investigator to build and follow up his cases.

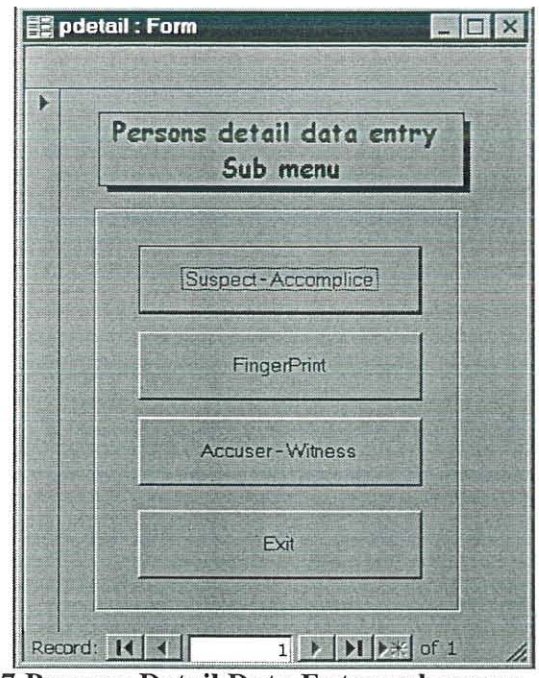


Fig. 17 Persons Detail Data Entry sub menu

The persons detail data entry sub menu (fig. 17) helps the investigator to start from that will allow them to record personal detail of suspect, accomplice, accuser and witness. Suspect and accomplice will have their fingerprint captured and recorded.

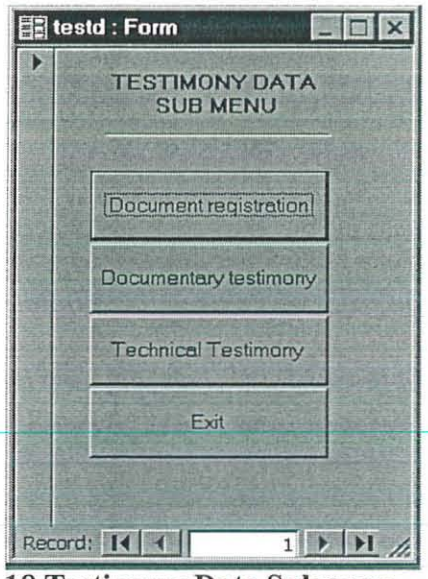


Fig. 18 Testimony Data Submenu

The Testimony data sub menu (fig. 18) enables users to select and launch forms to record document as they come in to the department, build cases by recording references to the case file number.

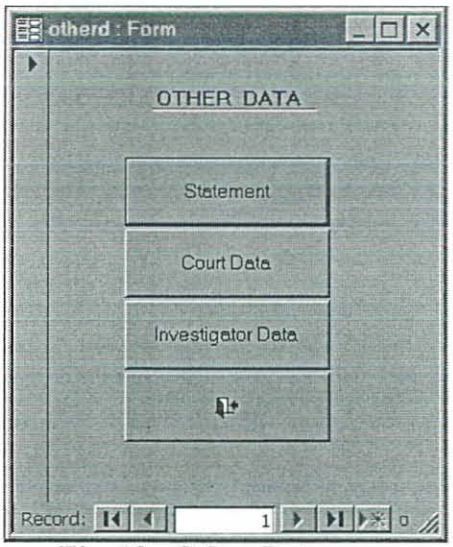


Fig. 19 Other Data

Other Data Sub menu (fig. 19) will be launched when the user selects "Statement" from the main menu. It enables to start forms into which users can fill in suspects, accomplices, accusers, and witness statements. It also starts the form, which enables users to fill in court proceedings.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The analyst started this work by analyzing the existing criminal record management system in order to identify the current problems and come up with some solutions. In this regard, the analyst has identified four major categories of problems.

The first discovered was that most of the problems described emanate from the traditional and manual nature of the police criminal record management system. As was observed in the analysis part of the thesis, all the activities are manual, and the system used in processing and producing crime data is still traditional. There are no improved methods of doing things even within the limits of the manual system. These problems have, therefore, created delay in the production of past crime data. Moreover, due to the manual nature of the task, it is becoming an increasingly tiresome job and is creating serious health problems on the employees, particularly, those working in the fingerprint record section. Therefore, changing the manual system into an automated criminal record management system is essential and helps to improve the overall management of criminal records and the working conditions of the employees.

The second problem is that the existing records maintained by record centers lack basic classes of crimes. Case files are held as a whole, without crime classification and there is no specialization of management and officers based on the types of crime classes. This is

a very crucial factor for the effective management of crime cases and its absence is seriously affecting the overall police operations and control of crimes.

The third problem is that name indexes are not appropriately used for criminal record management. They are only used to facilitate the searching process of fingerprint records. But in reality, they are not even facilitating the searching process, because whether a suspect is found in the name catalogue or not, the search has to be carried out using the classification codes in the ten finger print record. Practically the name catalogue does not provide any useful service at present. Else where, alphabetical name index is used for general information. If users need to know something about a person whose name is known, they can get general information about that particular person from the name index. In the Ethiopian case, it is impossible to know anything about a suspect known only by his/her name from the alphabetical name index. One has to go through the fingerprint record to get useful information about a suspect.

The fourth major problem discovered during the analysis, is that there is no clear relationship among the different agencies of the criminal justice system. This is highly affecting the management of criminal record system. The decision of courts on any particular criminal case does not reach the police criminal record center in anyway, nor are the courts obliged to send the information to the center. Due to this, records maintained by the police crime record management center suffer from obsolescence thereby eroding the credibility of the records maintained by the center.

To solve these and other problems investigated during the analysis, the researcher tried to exhaustively define user requirements. In specifying user requirements, the analyst has also considered critical assumptions related to communication policy among the criminal

justice agencies. The analyst has, therefore, found out that in order to solve the problems existing in the police criminal record management system, there should be clear policy of updating, purging etc. of records and in order to do this, there should be clear communication procedures between the different police departments within the police system itself, and with other criminal justice agencies.

Based on user requirements, it has been attempted to design alternatives of automation for the proposed system. Two design alternatives are selected that would best satisfy user requirements. The first design alternative focuses, on automating all the processes that can be automated within the police system and the interface units with the other law enforcement agencies are also defined.

The second alternative focuses only on the automation of processes that would facilitate the management of fingerprints only within the police system that would basically alter the operations of the police and the other justice agencies. Therefore, by comparing the advantages and disadvantages of these alternatives, the analyst has chosen the first alternative for further detail design.

At the detail design level, the recommended design alternative is further defined. The proposed system is defined in terms of output, input and process specification. In the logical database design part, entities about which the system collects data, are identified and their relationship, both within the system and with other entities outside the system, are established. Furthermore, in the logical design part of the database design, the analyst has found out that the entity case file should be taken as the focal point for the collection of criminal records, since case file is related with almost all internal and

external entities. In addition, the fingerprint and criminal history are also essential entities in the data collection, storage and retrieval process.

The main data items required by the proposed system are also investigated and normalized. Data items related with fingerprint record, case file record and criminal history records are normalized to eliminate update, delete, insert and remove anomalies in the database. Based on the normalized data items, the user interfaces through which users can access the record of fingerprint, case files records and criminal history records are also set. However, the analyst does not claim that the normalization attempt that has been done is exhaustive and enough. Data items of other data stores need to be normalized and the menu of the user interface should also expand in order to allow real time access to the records maintained in the police criminal record management system by the authorized users.

The analyst has also attempted to discuss the network considerations at policy level. It has been found, that Local Area Network (LAN) and Wide Area Network (WAN) are essential to have effective communication within the police system, and with the other law enforcement agencies. Based on this, LAN/WAN hardwares, protocols, and softwares required by the proposed systems are recommended. However, the analyst has found that the types of hardwares required should also be determined, based on a detailed survey of market condition of the relevant hardwares and softwares.

Finally, security and control design considerations are raised. In this regard two major points are considered. Limited access and data prevention. The LAN and WAN networks should have procedures for data access and should help protect the data of the organization from intentional and unintentional damages.

The analyst believes that the work done in this paper is preliminary, and therefore, should remain open for further development.

6.2 RECOMMENDATIONS

Before proposing something on the implementation of the proposed system it is important to mention some points which need to be incorporated in the analysis part of the proposed system.

As mentioned in the conclusion part of this chapter, police criminal record management system is highly interrelated and affected by the activities of the whole criminal justice system. Hence, in order to implement the proposed system, there is a need for detail analysis on the activities of the other law enforcement agencies specially the offices of prosecutors and courts. In this paper, it has only been attempted to discuss the problems related with police criminal records and the requirements of prosecutors and courts.

The second point is that the analyst has found out that experience in the police criminal record management system is essential to investigate problems and to design an effective and efficient system. However, the analyst only used the experiences which were available in the literature. Even in the available literature, it has been observed that the types of criminal files maintained in the different countries are based on the specific crime situation of the respective country and the level of automation looks very sophisticated. In this regard, it is essential to draw the experiences of federal systems like Ethiopia. The experiences drawn should be based on the negative, positive, advantage and disadvantages of each crime record management system of the countries under consideration.

Based on the experiences reviewed, it is very important to design the database and the types of files they contain taking into account the specific types of crimes committed in Ethiopia. This requires a thorough investigation and study on the types of crimes committed both in the capital (Addis Ababa) and the country as a whole.

Finally, the analyst's investigation was based only in the management of police criminal records in the Federal and Addis Ababa Polices. Although it is believed that the data collected more or less represent the entire police record management system in the country, it is also important to carryout research in the remaining regional states in relation with the Federal Police Record Management. This will enrich the implementation phase of the proposed system.

Having incorporated the above points in the analysis of the existing system, the proposed system should be implemented based on the following points.

Before implementing the proposed system, technical and economic feasibility study should be conducted. In the technical and economic feasibility study, the following points should be considered. We have seen that there would be three types of databases. Federal Criminal Record Database, Addis Ababa and Woreda Police station databases. These data bases will also have other sub databases. Some of the databases that exist at Federal level will also exist in Addis Ababa Police Criminal Record Center, for example, the fingerprint database. Thus, to avoid redundancy and duplication, the data to be contained in each of these databases should be clearly defined. The same is true also with case file databases.

The files maintained in the databases, specifically the classes of case files, are not specified. And it was not possible to determine without conducting detail investigation of crime classes' their frequency of occurrence, and distribution throughout the country. This study is therefore a prerequisite for the design and development of crime class based case file database.

To implement the proposed system, a thorough cost benefit analysis of the hardware and software required should be conducted. The types of softwares to be developed in house and those that will be purchased from the market should be identified and determined.

The user requirements specified in this work, should also be modified and revised in terms of the implementation requirements of the proposed system.

Having completed the technical and economic feasibility study, next comes the implementation phase. Although there should be a detailed reference plan for the implementation phase, consideration of the following points is essential:-

As we have seen in the general design part of this work the proposed design alternative is relatively costly. So, to avoid a huge burden of capital budget at a time, the implementation should be done phase by phase. This type of implementation method familiarizes the system to users over a longer period of time. It would also help to correct some design errors without incurring huge damage.

If the management is willing to implement the proposed system phase by phase, the sequence of the implementation process can be prioritized. The first priority should be

given to the critical areas of process ten fingerprint and process crime statistical data. Then, the processes related to the communication with prosecutors and courts can be addressed since automating the communication interface presupposes automation of the activities of prosecutors and courts with regard to the overall crime record management system.

Data conversion has already been started in the Federal Police Criminal Record Center and statistical data in the Addis Ababa Police. It is important to check if the data being converted into the computer system is consistent with the data required and to be contained by the proposed system to avoid unnecessary wastage of time, effort and resource later on.

Policy problems related with the responsibility of reporting court decisions on a particular case and generally the relationship that should also exist among the different agencies of the law enforcement system should have to be clearly sorted out. Further more, clear laws and procedures pertaining to the removal of records, which remained inactive over a number of years or over a certain period of time, should also be introduced.

Finally, creating and reinforcing awareness on the part of the public through different mass media in exercising the right of removing crime record from police files, as per the penal code of Ethiopia, is very important to simplify the burden of the criminal record management system.

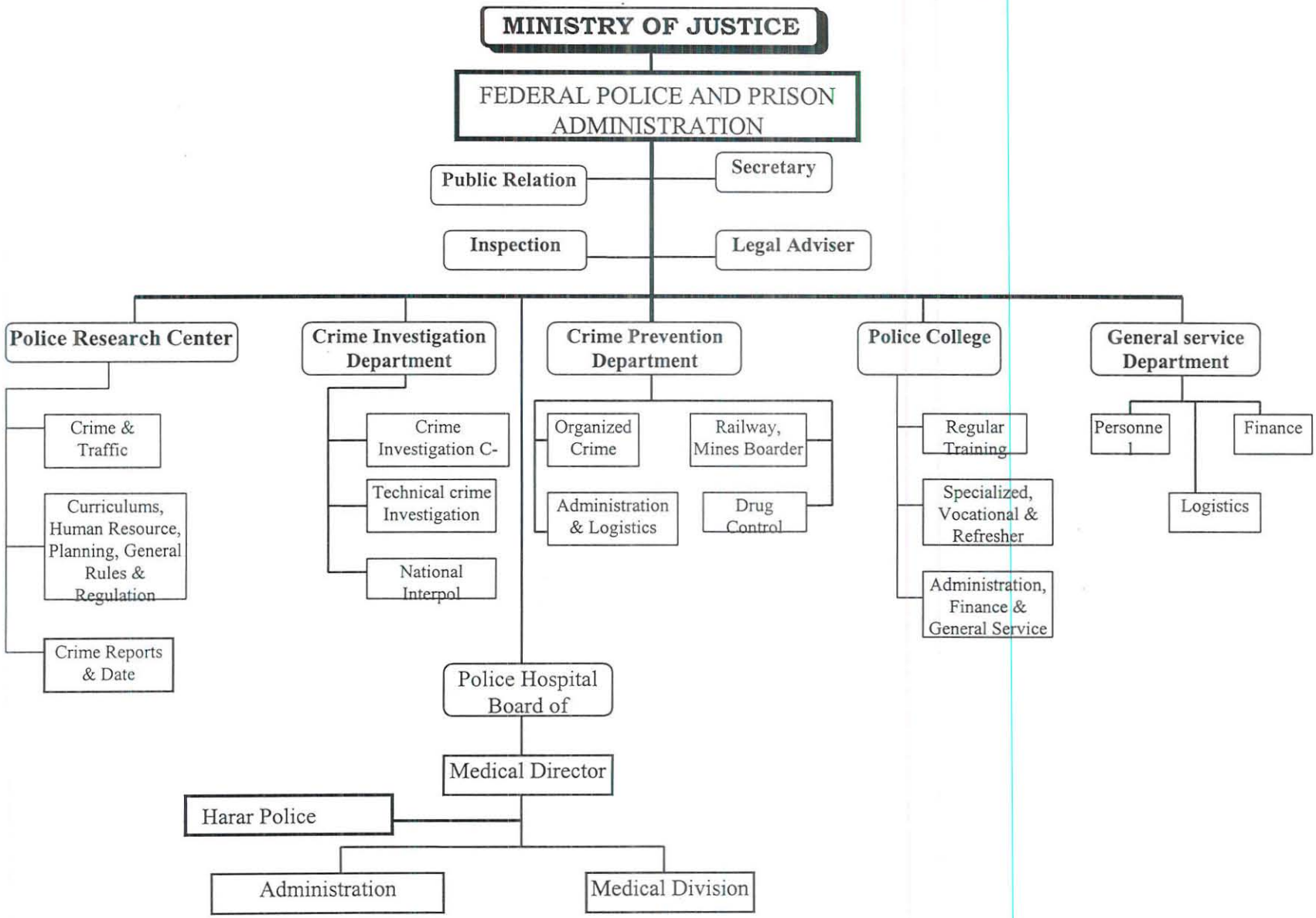
BIBLOGRAPHY

1. Adler, O.W. Mueller, S.Laufr, Criminal Justice, USA, Mc Grawi Hill Company, 1994.
2. Aktas, A. ZIYA. Structured Analysis and Design of Information Systems, USA, Prentce – Hall International, 1987.
3. Ashworth, Caroline and Good land, Mike. SSADM:A Practical Approach, London, Mc Graw – Hill, 1990.
4. Atkins, John. Mark Novvis, Total Area Networking, UK John Wiley and Sons Ltd., 1995.
5. Carroll, John M, Confidential Information Sources, USA, Butterworth – Heinemann, 1991.
6. Charles E. O'Hara, Gregory L,O'Hara, Fundamentals of Criminal Investigation, USA, Charles C Jhones, Publisher, 1988.
7. Daniels, Allan and Don Yeates, Basic Systems Analysis, Newdelhi, Galgota Publications Pvt., 1996.
8. Davis, Williams S. Systems Analysis and Design, A Structured Approach, USA, Addison – Wesl Publishing Company, Inc., 1983.
9. Fitzgerald, Jerry F.Fitzgernald, Fundamentals of Systems Analysis using structured Analysis and Design Techniques, USA, John Wiley and Sons, 1987.
10. Gill, Suzannel, File Management and Information Retrieval Systems, USA, Libraries Unlimited, Inc, 1993.
11. Gocke, B.W., Police Sergeants Manual, USA Legal Book Store, 122 South Broad Way, 1955.
12. Hadera Abera, Computerized Information Support System for the Immigration and Consular Department of Ethiopia, Msc. Thesis, Addis Ababa University, Addis Ababa, 1995.
13. Hawryszkiewycz, I.T., Introduction to Systems Analysis and Design, Newdelhi, Prince Hall of India Private Limited, 1997.
14. http://www/clere/andpoliceUK/Authority/infor.html
15. Huschinson, Sapahe, and Sawyer, Stacey C., Computers The user Perspective USA, Richard D. Irvin, Inc., 1992.
16. Hussain and Hussain, Information Systems Analysis Design and Implementation, Newdelhi, Tat Mc Graw – Hill Publishing Company Limited, 1995.

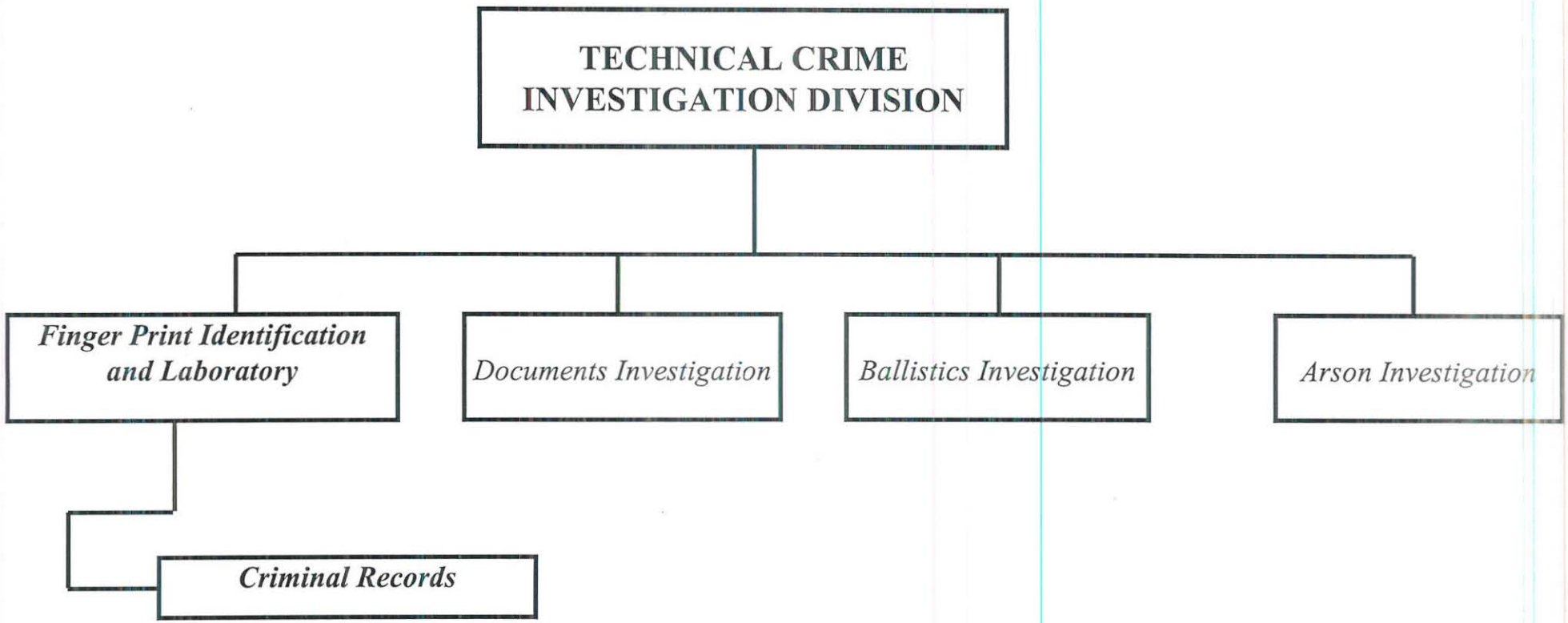
17. International City Managers Association, Municipal Police Administration, USA, CUSHing MALLOY,INC, and ANN ARBOR, MICHIGAN, 1961.
18. INTERPOL, International Police Magazine, Issue of Nov.-Dec., 1992.
19. INTERSEC, The Journal of International Security, Vol. 5. No. 9, 1995.
20. Kendall, Kenneth E, Julie E.Kendall, Systems Analysis and Design, Prince Hall International, 1995.
21. Kern, Johnson, Hawkins, Lyke, Networking the New Enterprise, USA, Sun Micro-systems, 1997
22. Lee, Introducing System Analysis and Design, Part I and II, UK, Galgota Book source, 1995.
23. LEONARD, Police Organization and Management, USA, The foundation Press Inc, 1951.
24. Majumdar, K. Bhattacharyya. Database Management Systems, Newdelhi, Tata Mc Graw Hill Publishing Company Limited, 1997.
25. Ministry of the Pen, Penal Code of the Empire of Ethiopia, Negarit Gazeta, Eritrea Ordinary Iss Nol, 1, Addis Ababa, July 1957.
26. Modell, E. Marlin, A Professional Guide to systems Analysis, USA, Mc. Graw Hill Company, 1988.
27. Nance, Bary. Introduction to Networking, Newdelhi, Prentce Hall of India Private Limited, 1994
28. Nunemacher, Greg, LAN Primer, An Introduction to Local Area Networks, USA, M & T Publishing INC, 1990.
29. Smith, JC and Brain Hogan, Criminal Law, UK, Butterworth and Co. Ltd., 1992
30. Taddesse Dadi, Office Records Management, Addis Ababa, Addis Ababa Commercial College, 1995.
31. UN, Crime Prevention and Criminal Justices ,News letter, 1987.
32. Welch, Frank, Integrated Computer Network Systems, USA, Marcel Dekken, Inc., 1992.
33. Wilson, O.W., Police Administration, USA, Mc Graw Hill Company, 1963.
34. WILSON, O.W., Police Records, Their Installation and Use, USA, Public Administration Servic 1951.

Appendix I-A

ORGANIZATIONAL CHART OF THE ETHIOPIAN FEDERAL POLICE AND PRISON ADMIN.

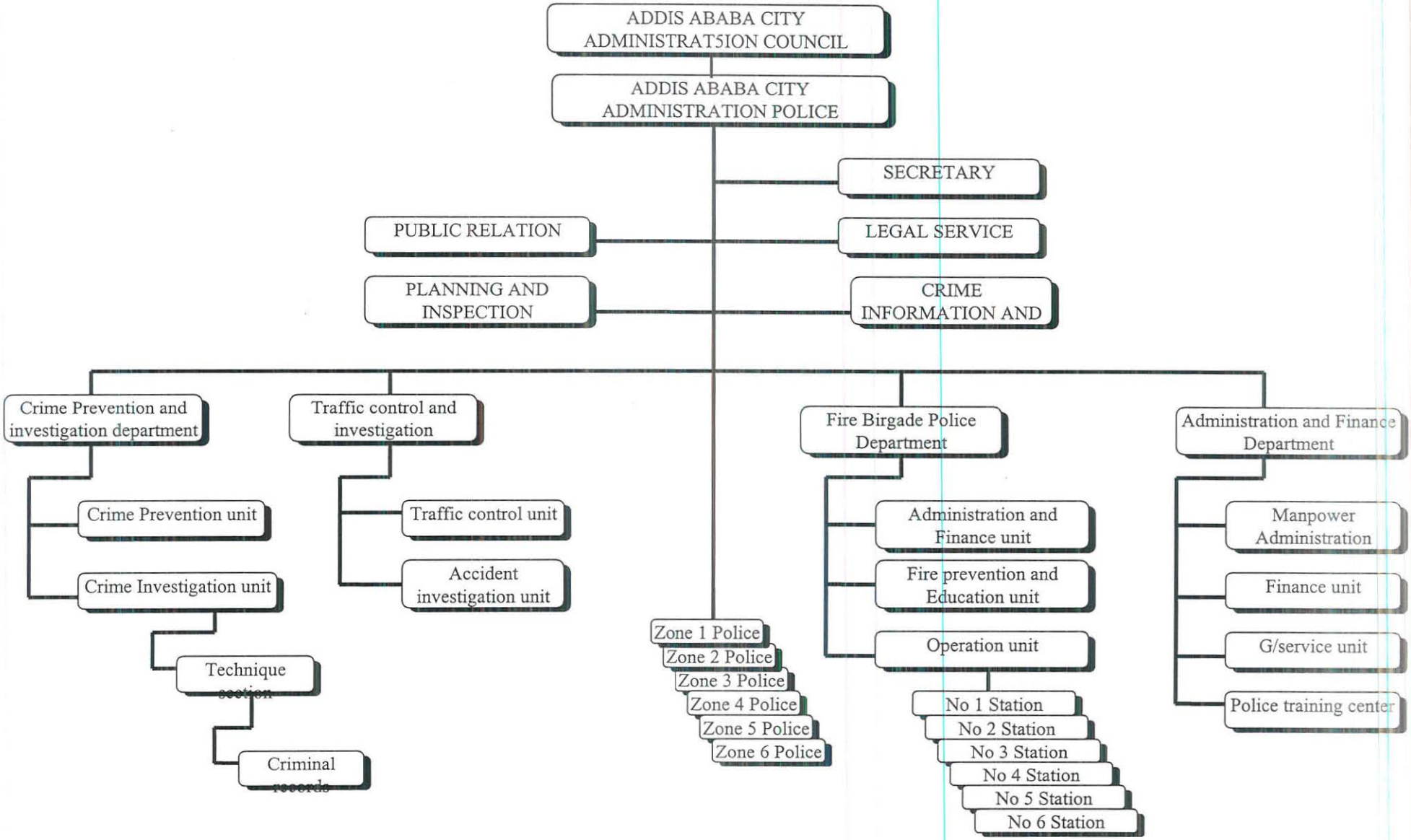


Appendix I-B


TECHNICAL CRIME INVESTIGATION DIVISION
Finger Print Identification and Laboratory
Documents Investigation
Ballistics Investigation
Arson Investigation
Criminal Records

Appendix I-C

ORGANIZATIONAL CHART OF ADDIS ABABA POLICE



Appendix II-A

Forms Used in the Analysis of the Existing System

Investigator's Initial

Head of Investigation's Initial

Investigation Progress Summary

No.	D/M/ Year	Hour	Investigation Progress Summary

Appendix II-B

ACCUSED'S/WITNESS'S STATEMENT FORM

Page _____
Total Page _____

Accused's/Witness's Name _____

Detail Statement _____

I sign that the above statement is mine and it is true.

Signature _____
Page _____
C.R. No _____
Crime Registration No.
_____

Appendix II-C

Date _____

CRIME SCENES TECHNICAL EVIDENCE COLLECTING FORM

1. Name of Technical Evidence Organization _____
2. Name of Investigators' group leader _____
3. Type of Crime _____
4. Date of Crime Committed and Time _____
5. Place of Crime Committed ____
6. Name of the accuser _____
7. What has happened to the accuser? _____
8. Evidence Collected Date _____
9. Collected Evidence type _____
   A. Finger Print _____
   B. Foot Print _____
   C. Blood _____
   D. Others _____
10. Brief Description from where the evidence collected?
    A. _____
    B. _____
    C. _____
    D. _____
11. Commitment of Crime briefly (Modus operandi)

_____

12. Collecting for checking

_____

13. If there is damage on collected evidence, state

_____

14. Name of suspect, age, home address

_____

15. Other attachment, (sample)

_____

16. Name or address of organization to which the evidence sent

_____

Name of Evidence collector

_____

Rank ___

_____

Signature

_____

Appendix II-D

ETHIPIAN POLICE FORCE
FINGERPRINT FORM

First Name _____ Family Name _____ Father's Name _____ First Name _____ Nick Name _____ Nick Name _____ Place of Birth _____ Date of Bith _____ Address _____ Crime _____	Fingerprint CLA _____ Province _____ Provincial C.R.O.No _____ Indent No. _____ Fingerprint No. _____

RIGHT HAND				
R.THUMB 1	R. INDEX FIN.2	R. MIDDLE FIN.3	R.RING FIN. 4	R. SMALL FIN.5
FOLD HERE		**LEFT HAND**		
L.THUMB 1	L. INDEX FIN.2	L. MIDDLE FIN.3	L.RING FIN. 4	L. SMALL FIN.5

FOLD HERE		
THE LEFT FOUR FINGERS	THE RIHT FOUR FINGERS	
FOLD HERE	**L. THUMB**	**R. THUMB**
Fingerprint Taken by _____ Rank _____ Date _____ Classified by _____ Rank _____ Date _____ Tested by _____ Rank _____ Date _____		

Appendix II-E

ACCUSED PERSONAL DESCRIPTION

A) Personal Description of Accused (filled by the inevstigator)

Region _____ Zone ___
_____ District _____
P. Station _____ C.R.N. _
_____
Name _____
_____ Father's Name _____
_____
Nick Name _____
_____
Birth Place _____
_____ Date of Birth _____
_____
Occupation _____
_____
Address _____
_____
Nationality _____
_____
Crime _____
_____
Date _____
Time _____ Place __
_____
Crime's Description _____
Reason _____ Cause __
_____

Put "x" in the circle for the correct work that you have seen on the accused (if there is no suitable word in the list write the necessary word)

Height in Cm

1. Build

Stout	Sportsman 0
Obese	Strong 0
Bend	Slim 0
Oblique	To the R 0
	To the L 0

3. Face

Circle	Triangular 0
Square	Narrow 0
Long	Wide Cheek 0

4. Colour

Red 0	Black 0
Brown 0	White 0
Chocolate 0	

5. Hair

Thick 0	Light bald 0
Thin 0	Bald 0
Fully bald 0	Curly 0

6. Hair Colour

Black 0	Fully Gray Haired 0
Red 0	Gray Haired 0
Brown 0	

7. Forehead

Long 0	Narrow 0
Short 0	Receding 0
Wide 0	Convene 0
Wrinkle 0	Horizontal 0
	Vertical 0

8. Eye

Small 0	Grcore 0
Medium 0	Crossed Eye 0
Large 0	

9. Eye Colour

Black 0	Gray 0
Brown 0	Blue 0
Green 0	Blood-shot 0

10. Eye Brows

Long 0	Arched 0
Short 0	Straight 0
Bushy 0	United 0
Hairy 0	

11. Ears

Wider 0	Hairy 0
Smaller 0	Away from Head 0
Thick lobe 0	Closed to Head 0

12. Nose

Large 0	Flat 0
Small 0	Short 0
Thin 0	Straight 0
Roman 0	Conved 0
Concave 0	

13. Moustache

Long 0	Bushy 0
Short 0	Shaved 0
Hairy 0	Square 0

14. Mouth

Big 0	Medium 0
Wide 0	Narrow 0
Crooked 0	To the R.Q 0
	To the L.Q 0

15. Lips

Thin 0	Thick 0
Protruding	The lower 0
	The upper 0

16. Teeth

Shade 0	White 0
Missed 0	Loose 0
Defects 0	Strong 0
Yellowish 0	Protrude 0
Golden 0	
Silver 0	

Notice:

For these artificial indicate the upper or law which they include there No.

17. Chin

Square 0	Protrude 0
Flat 0	Short 0
Pointed 0	

18. Beard

Large 0	Wide 0
Short 0	Circle 0
Square 0	Share 0

19. Any other particle

Continued Appendix II-E

Tattoos, Scars, Spot, Pimple, Blemish, Eye Glasses, Stammer, Dumb, Deaf, Lame, Bad Habit

Accused Right Index

20. The Way How He Dresses _____
21. The Name Adress of his/her friends _____

Investigator No. _____Rank _____Name _____

Day_____C.Y. Signature _____

B. Filled by the investigator

Region _____ Regional Police Station _____C. R. No. _____

Charged/Sentence	Release Freely	Closed by Police Station

Signature of the Commander _____

No. _____Rank _____Name _____

Fingerprint Classification _____

Central Criminal Record No. _____

Prison House Record No. _____

Modus Operand Briefly _____

To: _____

Name index	Found Not found
Finger print	Found Not Found

Cancel the word not used

Appendix II-F

FEDERAL POLICE TECHNICAL EVIDENCES
COLLECTION & INVESTIGATION DEPARTMENT

TABLE OF PREVIOUS CRIME RECORD

To ______________________________

Name ______________________________

Address Region _______________ Zone _______ Woreda ________ House No. __________

Nationality __________________ Ethnic _____________________ Age ________________

F/P/T/Book/No. ________________________

Date of Decision	Court Name F/no	Court Decision	Type of Offence & P/C/No.	Region	Zone	Woreda	Poi/St/C/R/No.	Recorder Initial

Appendix II-G

F/T/3
3

Date ___/ ___/ 1999

FEDERAL POLICE TECHNICAL EVIDENCES

COLLECTION AND INVESTIGATION DEPARTMENT

TABLE OF PRIMARY CRIME RECORD

To _____

Name _____

Fingerprint Identification _____

F/P/T/B.f.No. _____

The above Person is recorded for the first time in the F/P/Technical Evidence collection & Investigation Department.

Thank you,

Appendix III

Interview Checklists Used to Top and Line Management of the Federal and Addis Ababa Police and Operational Staff Members of the Criminal Record Centers

Checklist I

Checklist used in interviewing the tope management levels of the Federal and Addis Ababa Police.

1. What is the background of your organization (historical background)?
2. How is the current structure of your organization?
3. How do you view the objectives of having criminal records in your organization?
4. What are the policies and strategies regarding the management of criminal records in you organization?
5. What are some of the problems you experience in the management of criminal records in you organization?
6. What are your future directions in which your criminal records division may move?
7. What re the main constraints you face in your commitment to improve the management of your criminal records division?

Checklist II

Checklists used in interviewing the line management of criminal record centers

1. What are the objectives of your department?
2. How is the current organization (structure) of your department?
3. What are the procedures used in the management of criminal records in your organization?
4. What outputs are required from the processing of criminal records?
5. What types of inputs are required to deliver those outputs?
6. What types of operations do you perform in the processing of the criminal records?
7. What are some of the problems encountered in your activity?
8. What do you suggest for improving the effectiveness and efficiency of the operations for which you are responsible?

Checklist III

Checklists used in interviewing the operational staff of criminal record centers

1. What are the functions actually performed in your section?
2. What types of forms do you use for each function?
3. How do the forms you use relate to the works you do?
4. What are some of the common errors made in data entry in you work?
5. What are the lines of communication in your work?
6. How much is the volume of your work in each day, week, month and year?
7. Describe the most frustrating functions you have worked so far.
8. What do you suggest for improved procedures and forms in your section?

Appendix IV

LIST OF INTERVIEWEES

1.	Private Abonesh Tesfaye	Searcher of Fingerprint in the Fingerprint Records of the Technical Division of Federal Police of Ethiopia
2.	Lieutenant Aklilu Shume	Head of Information and Crime Research Division of Addis Ababa Police
3.	Lieutenant Alias Fekybelu	Head of Office of the Technical Division of the Federal Police of Ethiopia
4.	Ato Belete Golentaw	Commissioner of the Addis Ababa Police
5.	Private Bisrat Atrif	Expert of Fingerprint in Addis Ababa Police
6.	Soldier Daniel Tamirat	Head of Case File Records Section, in Woreda five Police Station of Addis Ababa Police
7.	Soldier Dawit Mekbeb	Head of Case File Records Section in Woreda two Police Station of Addis Ababa Police
8.	Private Demisse Bekele	Head of Statistical Section of Addis Ababa Police
9.	Lieutenant Desalay Antuchu	Head of Crime Investigation Section in Woreda five Police Station of Addis Ababa
10.	Colonel Emiru Tesema	Head of Crime Investigation Department of the Federal Police Force of Ethiopia
11.	Captain Eshetu Abebe	Head of Fingerprints Records Section of Addis Ababa Police
12.	Captain Gette G/Medhin	Head of the Fingerprint Classification Section, in the Technical Division of the Federal Police of Ethiopia
13.	Soldier Girma Kassa	Head of Crime Investigation Section, in Woreda Two Police Station of Addis Ababa Police
14.	Lieutenant Girma Moges	Head of the Reception Section, in the Technical Division of the Federal Police of Ethiopia
15.	Ato Jemal Ahmed	Deputy Commissioner of the Addis Ababa Police
16.	Corporal Lulle Zeleke	Coordinator of Shifts in the Information and Crime Research Center of Addis Ababa Police
17.	Private Mahmmed Amin	Head of Case File Section of Addis Ababa Police
18.	Corporal Mersha Wude	Head of Photograph Section of Addis Ababa Police
19.	Ato Mesfin Girma	Vice Minister of the Ministry of Justice of the Federal Government of Ethiopia
20.	Ato Sahlu Gebreyes	Head of the Prosecutors Office of the Federal Police of Ethiopia
21.	Major Shiferaw Ageid	Head of the Technical Division of the Federal Police of Ethiopia
22.	Lieutenant Teka Wolde	Head of the Criminal History Records, in the Technical Division of Federal Police of Ethiopia
23.	Ato Teklay Arega	Member in the Fingerprint Records Section, of the Technical Division of Federal Police of Ethiopia
24.	Lieutenant Temesgen Gebre	Head of Crime Investigation Division of Addis Ababa Police
25.	Ato Tesfaye Abraha	Acting Commissioner of the Federal Police Force of Ethiopia
26.	Ato Toumay Aregawi	Head of the Special office of the Federal Police of Ethiopia
27.	Lieutenant Yared Mellese	Head of the Special Office of the Addis Ababa Police
28.	Lieutenant Yohanes Worku	Head of Technical Division of Addis Ababa Police
29.	Lieutenant Zelalem W/Mariam	Head of Homicides Crime Investigation in the Addis Ababa Police

Appendix V

List of Documents Reviewed

1. Ethiopia Police Project, Information systems Strategy, 1997

2. Crime Investigation in Addis Ababa Police, Research Paper

3. Report on Management of Criminal Records and Finger Print Taking, 1999

4. Police Force Organizing Police and Central Bureau Structure and Job Description, 1994, Addis Ababa

Appendix VI-A

DATA DICTIONARY

DATA ITEM IDENIFFIER	DATA ITEM NAME	DATA ITEM DEFINITION OR DESCRIPTION	TYPE	RANGE OF VALUE	SIZE
SU-CFNO	Case File Number	An identification number given to crime case file of a suspect	AN		10
SU-CRNM	▪ Suspect's Name	A person suspected of committing a crime	A		10
SU-FTNM	▪ Suspect's Father's Name	Name of the father of a suspect	A		20
SU-GFNM	▪ Suspect's Grand Father's Name	Name of the suspect's grand father	A		20
SU-ALAS	▪ Aliases	Assumed name or another name of the suspect	A		20
SU-PHTO	▪ Photograph	The photograph of the suspect	G		10
SU-SEX	▪ Sex	Gender of the suspect	A		02
SU-DTBR	▪ Date of Birth	Date of birth of the suspect	D	DDMMYYYY	8
SU-PLBR	▪ Place of Birth	The place of birth of the suspect	A		10
SU-CZSP	▪ Citizenship	Citizenship of the suspect	A		15
SU-FMST	▪ Family Status	Marital status of the suspect	A		10
SU-RLFN	▪ Religion	The suspect's religion	A		10
SU-EDCN	▪ Education	Literacy level of the suspect	AN		10
SU-OCPN	▪ Occupation	Employment or profession of the suspect	A		10
SU-REGN	▪ Region	Name of the region where the suspect lives in Ethiopia	AN		10
SU-ZONE	▪ Zone	Name of the zone where the suspect lives in the region	AN		10
SU-WRDA	▪ Woreda	Name of the Woreda where the suspect lives in the town/zone	N		10
SU-KBLE	▪ Kebele	Name of the Kebele where the suspect lives in the Woreda	N		06
SU-HS/FTNO	▪ House/Flat Number	Identification number of the house/flat number where the suspect lives in the kebele	N		06
SU-STNO	▪ Suspect's Statement number	An identification number given to the suspect's statement	AN		10
SU-SMST	▪ Summary Statement	The Summary statement of the suspect	A		50
SU-FLST	▪ Full statement	Full text of the statement of the suspect	M		10
SU-DATE	▪ Date	The date, the suspect gives his/her statement	D	DDMMYYYY	8
SU-CMAC	▪ Crime Accused	The crime suspected of having been committed by the suspect	A		10
SU-CMSN	▪ Crime Scene	Specific place where the suspect is believed to have committed a crime	N		10

Appendix VI-B

DATA ITEM IDENIFFIER	DATA ITEM NAME	DATA ITEM DEFINITION OR DESCRIPTION	TYPE	RANGE OF VALUE	SIZE
SU-DTAC	Date Accused	The date the suspect is accused in the police station	D	DD MM YYYY	8
SU-DTAR	Date of Arrest	The date the suspect was arrested	D	DD MM YYYY	8
AC-PSNM	Accomplice's name	The name of the person who is accused as being an accomplice	A		20
AC-FTNM	▪ Father's Name	The name of the accomplice's father	A		20
AC-GFFNM	▪ Grand Father's Name	The name of the accomplice's grandfather	A		
AC-ALAS	▪ Aliases	Assumed name or another name of the accomplice	A		20
AC-SEX	▪ Sex	Gender of the accomplice	A		20
AC-PHOTO	▪ Photograph	The photograph of the accomplice	G		10
AC-DTBR	▪ Date of Birth	Date of birth of the accomplice	D	DD MM YYYY	8
AC-PLBR	▪ Place of Birth	The place of birth of the accomplice	A		10
AC-CZSP	▪ Ctizenship	Citizenship of the accomplice	A		10
AC-FMST	▪ Family Status	Marital status of the accomplice	A		10
AC-RLGN	▪ Religion	The accomplice's religion	A		10
AC-EDCN	▪ Education	Literacy level of the accomplice	AN		10
AC-OCPN	▪ Occupation	Employment or profession of the accomplice	A		10
AC-REGN	▪ Region	Name of the region where the accomplice lives in Ethiopia	AN		10
AC-ZONE	▪ Zone	Name of the zone where the accomplice lives in the region	AN		10
AC-WRDA	▪ Woreda	Name of the Woreda where the accomplice lives in the town/zone	AN		10
AC-KBLE	▪ Kebele	Name of the kebele where the accomplice lives in the Woreda/town	N		06
AC-HS/FLNO.	▪ House/Flat Number	Identification number of house/flat where the accomplice lives within the kebele	N		06
AC-STNO	▪ Statement Number	An identification number given to the accomplice's statement	AN		10
AC-SMST	▪ Summary Statement	The Summary statement of the accomplice	A		50
AC-FLST	▪ Full statement	Full text of the statement of the accomplice	M		10
AC-DATE	▪ Date	The date, the accomplice gives his/her statement	AN	DD MM YYYY	8

Appendix VI-C

DATA ITEM IDENIFFIER	DATA ITEM NAME	DATA ITEM DEFINITION OR DESCRIPTION	TYPE	RANGE OF VALUE	SIZE
AR-NM	Accuser's name	The name of the person who accuses the suspect	A		20
AR-FTNM	Father's Name	The name of the accuser's father	A		20
AR-GRNM	Grand Father's Name	The name of the accuser's grandfather	A		20
AR.SEX	Sex	Gender of the accuser	A		02
AT-DTBR	Date of Birth	Date of birth of the accuser	N	DD MM YY	10
AR-PLBR	Place of Birth	The place of birth of the accuser			10
AR-CZSP	Citizenship	Citizenship of the accuser	N		10
AR-FMST	Family Status	Social position of the accuser	A		10
AR-RLGN	Religion	The accuser's religion	A		10
AR-EDCN	Education	Literacy level of the accuser	AN		10
AR-OCPN	Occupation	Employment or profession of the accuser	A		10
AR-REGN	Region	Name of the region where the accuser lives in Ethiopia	AN		10
AR-ZONE	Zone	Name of the zone where the accuser lives in the region	AN		10
AR-WRDA	Woreda	Name of the Woreda where the accuser lives in the town/zone	AN		10
AR-KBLE	Kebele	Name of the kebele where the accuser lives in the Woreda/zone	N		06
AR-HS/FTNO.	House/Flat Number	Identification number of house/flat where the accuser lives within the kebele	N		20
AR-STNO	Accuser's Statement number	An identification number given to the accuser's statement	A		10
AR-SMST	Summary Statement	The Summary statement of the accuser	A		50
AR-FLST	Full statement	Full text of the statement of the accuser	M		10
AR-DATE	Date	The date, the accuser gives his/her statement	D	MM DD YYYY	8
WT-NM	Witness's Name	The name of the person who gives his testimony as a witness	A		20
WT-FTNM	Witness's Father's name	The name of the witness's father	A		20
WT-GFNM	Witness's Grand Father's name	The name of the witness's grandfather			
WT-ALAS	Aliases	Assumed name or another name of the witness	A		20
WT-SEX	Sex	Gender of the witness	A		02

Appendix VI-D

DATA ITEM IDENIFFIER	DATA ITEM NAME	DATA ITEM DEFINITION OR DESCRIPTION	TYPE	RANGE OF VALUE	SIZE
WT-DTBR	Date of Birth	Date of birth of the witness	D	MM DD YY	8
WT-PLBR	Place of Birth	The place of birth of the witness	A		10
WT-CZSP	Citizenship	Citizenship of the witness	A		10
WT-FMST	Family Status	Marital Status of the witness	A		10
WT-RLGN	Religion	Witness's religion	A		10
WT-EDCN	Education	Literacy level of the witness	AN		10
WT-OCPN	Occupation	Employment or profession of the witness	A		10
WT-REGN	Region	Name of the region where the witness lives in the Ethiopia	AN		10
WT-ZONE	Zone	Name of the zone where the witness lives in the region	AN		10
WT-WRDA	Woreda	Name of the Woreda where the witness lives in the town/zone	AN		10
WT-KBLE	Kebele	Name of the kebele where the witness lives in the Woreda/zone	N		06
WT-HS/FLNO	House/Flat Number	Identification number of house/flat where the witness lives within the kebele	N		06
WT-STNO	Witness's Statement Number	An identification number given to the witness's statement	AN		10
WT-SMST	Summary statement	The Summary statement of the witness	A		50
WT-FLST	Full statement	Full text of the statement of the witness	M	MM DD YYYY	10
WT-DATE	Date	The date, the witness gives his/her statement	D		10
DT-TSNO	Documentary testimony number	Identification number given for the documentary evidence	AN		06
DT-RFNO	Documentary Reference Number	The reference number of the document	N		06
DT-DT	Date	The date of issuance	D	MM DD YYYY	8
DT-SBJT	subject	The details of the testimony	A		10
DT-AUTR	Author	Responsible body for the issuance of the testimony	A		20
TT- NO	Technical Testimony Number	Identification number given for the technical evidence	AN		06
TT-DRNO	Document Reference Number	The reference number of the document	AN		06
TT-DT	Date	The date of issuace	D	MM DD YYYY	8
TC-SBJT	Subject	The details of the testimony	A		10

Appendix VII

GLOSSARY

The following terms and concepts are used throughout the study.

Case Application:- is the complaint of an accuser to the Woreda Police Station Crime Investigation Section or Addis Ababa Police Crime Investigation Division.

Case Record:- is a record held on by the statistical section of the Crime Investigation Division of Addis Ababa Police Stations when an accuser complains or when there is a report of crimes by police officers. This is the initial record for crime statistical works.

Case Report:- is a report the police investigator prepares after he finishes his investigation of the suspect, witnesses, accomplices and an accuser.

Case File:- is a file which is prepared to be sent to prosecutors or courts. Case file includes case report and past crime records of the suspect.

Region:- one of the administrative constituencies to which the Ethiopian Federal State is currently divided.

Zone:- One of the administrative organs that constitute a region.

Woreda:- One of the administrative organs into which a zone is divided.

Kebele:- One of the lowest administrative units into which a woreda is divided. This is the grassroots level administrative unit.

Accuser:- a person who appears before the woreda police stations submitting a written complaint (litigation) against some one who has supposedly committed some offence against him.

Accused:- A person against whom the accuser lodged litigation in the police stations. Sometimes, the litigation can be established by the police.

Accomplice:- A person who is accused of participating in the stated crime together with the accused, but his degree of involvement in the supposed crime is not as strong as that of the accused. He may have let him a hand or assisted him in someway when the accused committed the crime.

Witness:- A person who is supposed to have seen or heard about the circumstances in which the crime was committed and made to give his statement about it to the woreda police station and later to the courts.

Crime clearance certificate:- A certificate given to an applicant who appeals for such a document from the police in his woreda or any other organization.

Fingerprint:- Fingerprint taken by an authorized police section from a suspect, an accomplice or a crime clearance certificate applicant in which the print of the individual's palms and each of his fingerprint is separately taken.