

DETERMINING USER REQUIREMENTS FOR A PERSONNEL INFORMATION SYSTEM
USING PROTOTYPING METHODOLOGY : THE CASE OF THE AGRICULTURAL
DEVELOPMENT CORPORATION (A.D.C.)

This Management Project is my original work and has not
been presented for a degree in any other University.

Signed: *Rosemary R. Nduku Kioko* Date: 17/10/91

Rosemary R. Nduku Kioko

BY

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This Management Project has been submitted for examination
with my approval as University Supervisor.

Signed: *Danny Fernandes* Date: 19/10/91

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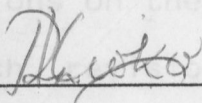
A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS AND ADMINISTRATION
FACULTY OF COMMERCE, UNIVERSITY OF NAIROBI.

JULY, 1991

ABSTRACT

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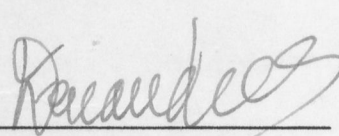
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ABSTRACT

This study was undertaken to determine user requirements for a personnel information system using the prototyping methodology. The research framework was a case study and the organisation studied was the Agricultural Development Corporation (ADC). ADC is a parastatal body with plans to computerise all its operations within the next three years.

Software prototyping was done using the dBase programming language. Three versions on the prototype were made, incorporating comments made at each revision by the ADC Personnel Department personnel.

The experiences in using the software prototyping methodology were documented.

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ACKNOWLEDGEMENT

I wish to express my sincere gratitude to all those who contributed directly or indirectly to facilitating this study particularly, my MBA classmates.

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Finally, I would not forget Mr. Ndritu Muriithi, whose constant help and encouragement made this study a reality. Thanks to each one of them.

INTRODUCTION

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SECTION 1

INTRODUCTION

Societies have always experienced the need to generate, process and store information. In the work setting, the beginning of a system for providing management with information for planning and control of the total business was the historical accounting system. Three threads of historical development have intertwined to bring about the modern management information system. These are the development of accounting theory, the development of management theory and the introduction of the electronic computer (Murdick and Munson:1986).

The impact of computer based information technology has been most pervasive on organisations, affecting the way companies do business and the way they grow and compete. This has led to proliferation of computer based information systems. Managers are besieged by seemingly endless opportunities to buy new software and faster computers all being touted as the answer to improved productivity and a better competitive position. Dantzig (1990), in a survey of managers frustrated with their information systems came up with three major complaints:-

- Escalating information systems cost without proportional gains in the level of user satisfaction.
- Development projects plagued with design inaccuracies
- "Maintenance mode" programming environments with growing backlogs.

In an earlier survey, Howard and Weinroth (1987) identified eight key problems, from polling seventy nine management level users, that were experienced by using their Information Systems. These were

incompatibility, poor competitive data, low information credibility, hardware shortages, poor computer centre support, data overload, poor top management and computer naivete.

The above findings imply that most computer information systems are not tailored for the company's particular needs. The systems do not ensure that company's needs are met both efficiently and effectively. This has been attributed mainly to the computer information system not being considered an organisational resource, together with labour, capital and raw material. Many organisations have not accepted that information fuels business and is not just a by-product of conducting business for, it can determine success or failure.

The first step in adequately coming up with effective user needs is to identify and understand specific user needs at each information level in the organisation. There are different levels of information needs within an organisational hierarchy. The crudest level of distinction is between :-

- a) the operational level, which actually does things, and
- b) management level, which supervises and plans.

A more sophisticated viewpoint is that shown in Figure 1.1 below, which has three levels of management function. The first level, the operational control supervises day-to-day operations. Management control or tactical planning, is concerned with short term planning while strategic planning, the third level, involves setting these goals, deciding on policies and planning future actions.

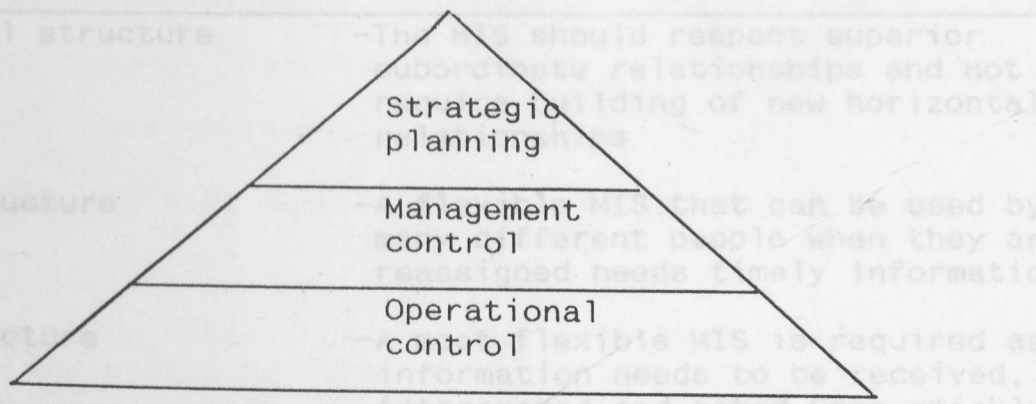


Fig. 1.1 Levels of information requirements

The types of information needed for the different levels of decision vary. Information required at an operational level needs to be very detailed and up-to-the-minute, while management information is usually summarized and ordered. The time scale for getting the information is also different and accuracy of the information may vary.

There are implications of the above for information system development. System analysts need to be aware of organisational structures and what they may mean for any proposed information system. Figure 1.2 below summarizes the key implications that hierarchical, project, matrix and information processing structures hold for information system development.

User requirements for the information system should be consistent with what is considered the status quo for the organisational structure. The system must be more flexible and should not be designed to support only one project.

Organisational Structure	Implications for MIS
Hierarchical structure	-The MIS should respect superior subordinate relationships and not require building of new horizontal relationships
Project structure	-A flexible MIS that can be used by many different people when they are reassigned needs timely information
Matrix structure	-A most flexible MIS is required as information needs to be received, interpreted and acted upon quickly
Information processing models	-The MIS must be adaptable to the amount of information that must be processed as the greater the uncertainty in the organisation, the more processing is necessary

Fig.1.2 Implication of organisational structures for designing information systems.
 Source: Kendall,K.E; Kendall,J.E. Systems Analysis and Design (Prentice-Hall International, Inc., 1988 p 40)

Organisational structure is but one factor among many that hold implications for information system analysis and design. Other factors include leadership style, technological considerations, organisational culture and human relationships in organisations.

Today's computing problems are not associated with harnessing electronics but rather with understanding user needs for information, and how information interrelates with the process of managing. One alternative would be to distribute information specialists to user departments in addition to computing machinery so as to further utilisation of computer system. The other, which is the main thrust of this management project, is to develop an information system based solely on the users' requirements.

1.1 The Personnel Department at ADC

The Agricultural Development Corporation (ADC) was created through an Act of Parliament, Cap. 346 of 1965. (This has since been superseded by Cap. 444 of 1986).

The act gave ADC wide ranging powers, a summary of which states that:-

"The Corporation shall be charged with the responsibility of promoting and executing schemes for agricultural development and reconstruction in Kenya by initiating assistance or expansion of agricultural undertakings or enterprises".

The Corporation is the only public organisation entrusted with maintaining selected farms in the national interest. The farms are selected on the basis of their on-going enterprises, their potential and relevance to current and future role in agricultural development. The Corporation is responsible for managing thirty-five farming units, most of which are located in the Rift Valley, notably in Trans Nzoia and Molo Highlands. The broad ADC structure is shown in Figure 1.3 below.

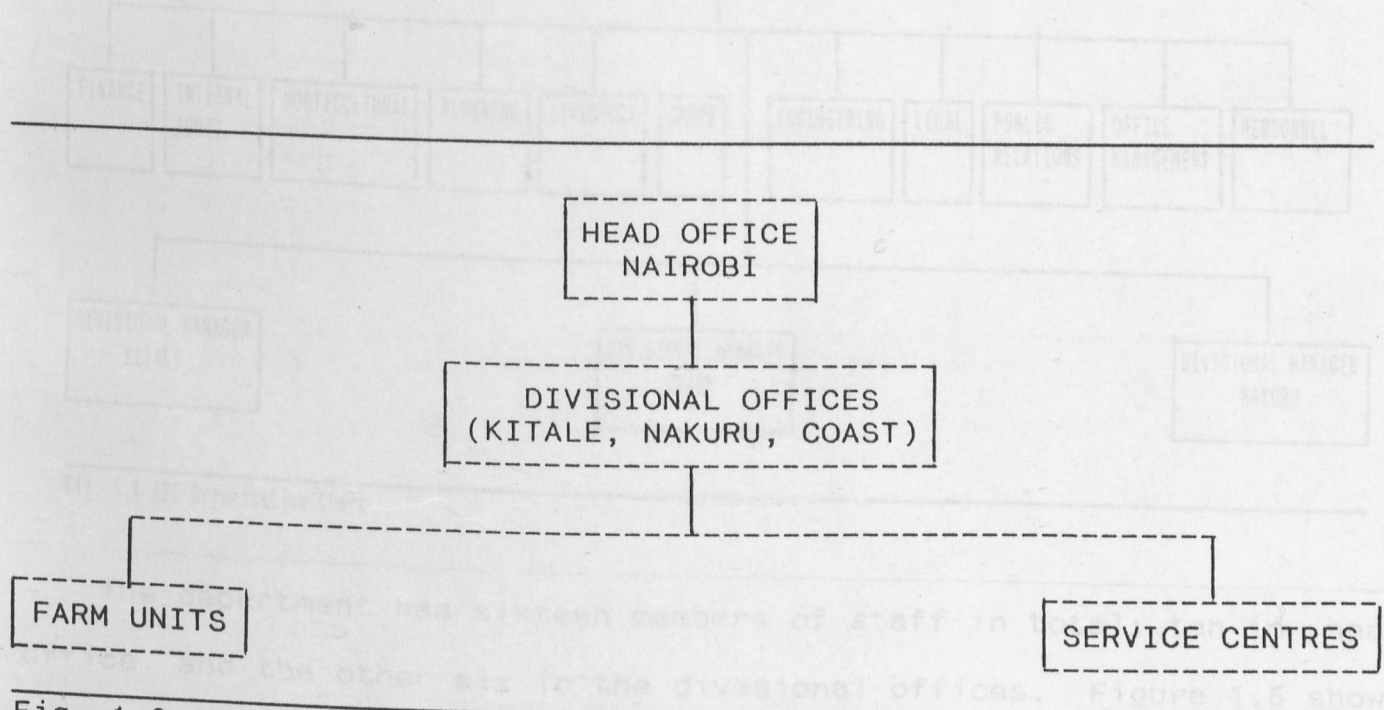


Fig. 1.3 ADC structure

ADC employs about six hundred people in Head Office payroll who

include professional, technical and managerial personnel. About eight thousand farm workers and junior supervisors are employed on farm muster roll by the individual farms.

The personnel department, which is the focus of this study is one of the eleven departments the corporation has. (see Figure 1.4 for the organisation chart)

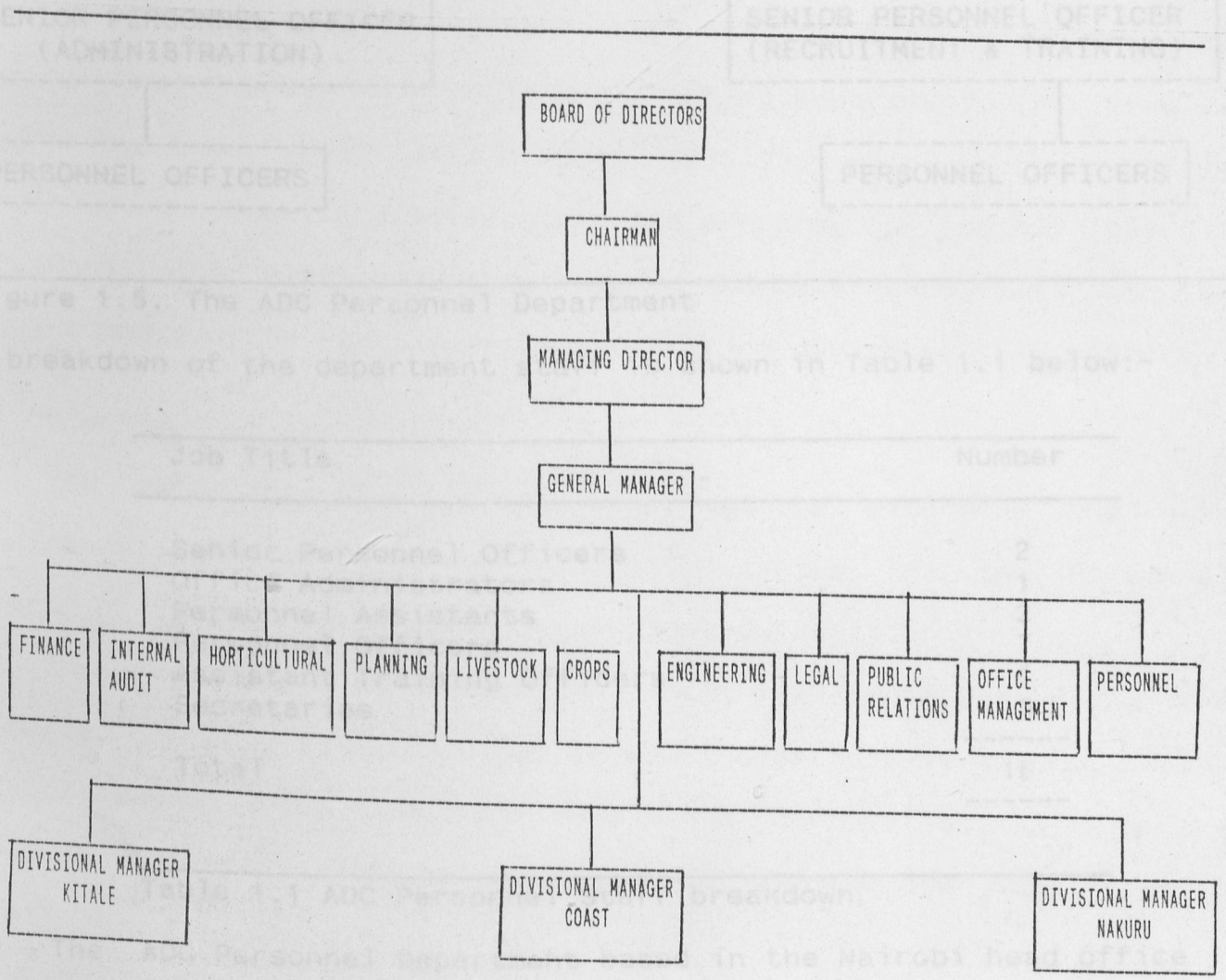


Fig. 1.4 ADC Organisation Chart

The department has sixteen members of staff in total; ten in head office and the other six in the divisional offices. Figure 1.5 shows the department's structure.

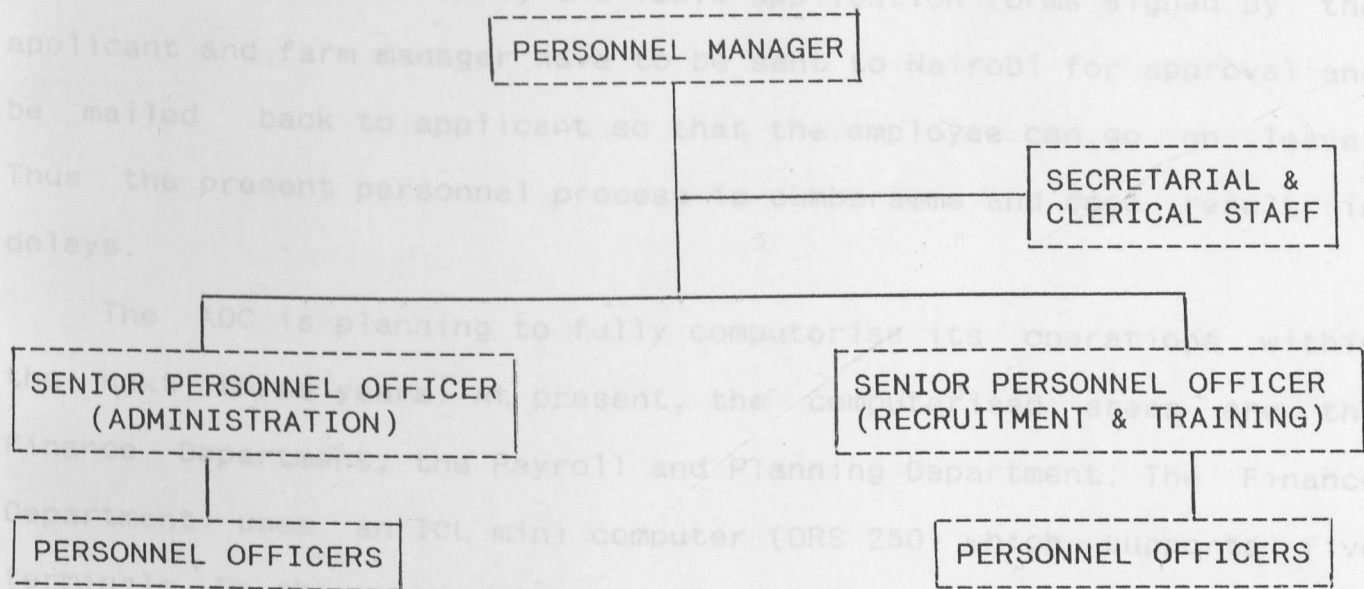


Figure 1.5. The ADC Personnel Department

A breakdown of the department staff is shown in Table 1.1 below:-

Job Title	Number
Senior Personnel Officers	2
Office Administrators	1
Personnel Assistants	2
Personnel Officers	7
Assistant Training Officers	1
Secretaries	3
Total	16

Table 1.1 ADC Personnel Staff breakdown

The ADC Personnel Department based in the Nairobi head office is manned by ten people, three of whom are secretaries. They handle over six hundred each of open and confidential files.

Although the bulk of the workers in the thirty five units outside Nairobi are temporary or casual, the rest of the staff have their files kept in Nairobi and processed there for any requests. This means that if a secretary in Kimwani Farm in Songhor, Western Kenya

wants to proceed on leave, the leave application forms signed by the applicant and farm manager have to be sent to Nairobi for approval and be mailed back to applicant so that the employee can go on leave. Thus the present personnel process is cumbersome and does result in delays.

The ADC is planning to fully computerise its operations within the next three years. At present, the computerised areas are the Finance Department, the Payroll and Planning Department. The Finance Department uses an ICL mini computer (DRS 250) which supports five terminals. On these, annual accounts are prepared and monthly payroll documents. The Planning Department, on the other hand, uses an IBM micro computer (IBM PS/2) for the preparation of its monthly reports.

1.2 Objectives of the Study

The main objective of the study was to determine the user requirements for a personnel information system for the Personnel Department in the Agricultural Development Corporation.

This was done by developing a software prototype using the software prototyping methodology (SPM). The refined version of tasks and processes which the department wants computerised within the eventual integrated information system for ADC was then specified in detail.

1.3. Importance and Benefits of the Study

This research documents the experiences in using the SPM in the Kenyan environment. The author is not aware of published work in this area. It will hopefully also generate academic interest in this relatively recent systems development methodology.

Major benefits will accrue to the ADC from the study. These will

include :-

- a) Clarification of the Personnel Department's requirements, allowing for redefinition and expansion of needs as various prototype versions are tested with the department.
- b) Provide a basis for creating the final system. This study will reveal to the organisation the 'real' system even before completion of the computerisation plans. It will also reveal how best personnel records can be computerised and problems to be expected, in doing so.
- c) The new system will not be a mere automation of the manual system but will also make an improvement to the management system to provide periodic reports to the management currently not being prepared.
- d) Additionally, the experiences gained from this prototyping exercise in the Personnel Department will benefit the computerisation process in the other departments of the organisation.

(1977) as follows :-

LITERATURE REVIEW

2.1 Personnel Information Systems.

With the decentralisation of the database management function, computer users are taking an increasingly active role in the design, development and especially in the administrative and managerial aspects of information processing. This increased user activity has had profound implications for information support in the data - intensive personnel function.

Such decentralisation provides opportunities for flexible information access that have previously been difficult to achieve (Kustoff Marc:1986). The reason for this opportunity has been two-fold :-

- (1) Direct managerial control allows the user to "fine tune" the system to the specific operational requirements of the Human Resource function; and
- (2) More powerful software tools make data manipulation much easier for the non - technical personnel user.

These advantages provide the potential for a heightened focus of information system. However, they also create responsibilities for the user who manages the data. Because of the atypical nature of informational requirements in personnel, it has been found increasingly necessary to establish a human resources information function, and to provide a prominent place for that function in the personnel structure.

Personnel Management has been defined by Michael Armstrong (1977) as follows :-

“Personnel Management is concerned with obtaining, organising and motivating the human resources required by the enterprise; with developing an organisation’s climate and management style which will promote effective effort and co-operation and trust between all the people working in it; and with helping the enterprise to meet it’s legal obligations and social responsibilities towards it’s employees with regard to the conditions of work and quality of life provided for them”.

The personnel function plays three major roles as depicted by the Figure 2.1 below :

ROLE	DESCRIPTION
Overall role	To make an effective contribution to the achievements of the objectives of the organisation and to the fulfillment of it’s social and legal responsibilities
Advisory role	Where the department advises on policies, strategies, procedures and systems
Functional guidance	To interpret and help to communicate personnel policies and procedures provided by top management, and, on behalf of top management, to provide guidance to managers which will ensure that the policies and procedures are implemented and maintained

Fig. 2.1 The roles of the personnel function

Personnel management is concerned with organisation, motivation, manpower, employee relations, employee and personnel services. These five activities are shown in Figure 2.2.

ACTIVITY	DESCRIPTION
Organisation	Involves organisation design and development
Manpower	Involves manpower planning, recruitment, selection, employment, training, management development and appraisals
Motivation	Involves job design, wage payment schemes, salary administration and job evaluation
Employee relations	Involves industrial relations, participation and joint consultation and communications
Employee and personnel services	Involves health and safety, welfare, personnel records and information systems.

Fig. 2.2 Personnel Management Activities

The increasing costs of personnel selection, training and turnover have made statistics related to the personnel function more important than ever to effective management. However, the recent emergence of on-line database systems from the batch processing environment of the seventies allows the personnel department to take control of and responsibility for its own data.

There are also strong arguments for establishing a 'stand-alone' personnel system that is separate from the payroll system. Payroll systems are transaction oriented while personnel systems must be more strategically oriented. A Human resource Information System (HRIS) requires significantly larger amounts of data, as well as more flexible access to the data. As such, it is far more comprehensive and sophisticated than a payroll system. Pre-defined, cyclical reports are more suited to the payroll function than they are to personnel. Consequently, conditions that are

suitable for the maintenance and management of a payroll system are not suitable for the more volatile and sophisticated HRIS.

Most public agencies have or are considering automating portions of their personnel programs. Such automation is sometimes viewed as a magic genie which will, seemingly miraculously, solve many long-standing personnel problems (Darany:1989).

The automation of personnel functions ought to accomplish one or more of these objectives:

- .save money
- .save staff time
- .reduce tedium
- .reduce the duration of an activity
- .gain information and control over key processes.

Theodore Darany (1989) performed tests to determine areas in which automation has proven track record of offering savings to the personnel manager, and came up with the four areas shown in Figure 2.3.

Fig. 2.3 Personnel areas with reported successful savings

Despite these recognized advantages of computerizing personnel records, many agencies have come to view the personnel automation as a dragon, burning out staff and chewing up resources while providing little in the way of improvement (Darany:1989). The reasons for these failures include those listed in Figure 2.4.

REASONS FOR FAILURE

1. Word-Processing

Significant savings were found to be achieved throughout a typing process when an effective Word-Processing system rather than a traditional, yet high quality electric typewriter was used. First, a 25% increase due to typing directly into an easily corrected screen-based system was achieved. Second, very significant increases in productivity were achieved by permitting the typist to retype just the material that had been changed from draft, rather than retyping the entire document for each draft.

2. Applicant tracking

A computer - based test applicant testing was found to allow for productivity gains in the range of 25 to 100 percent. It also produced a more dependable time frame within which the testing activities took place. It also developed information useful to assess the quality of one's tests and adequacy of current tests.

3. Test item banking

The computer was found to provide a welcome assistance in offering training which for the human trainer was tedious. The limited amount of evidence of automation for training purposes suggested that well designed computer - assisted instruction may be very effective in the areas of skill development, orientation and skill refreshing.

4. Personnel information management

Automation was found to provide the personnel manager access to tools which otherwise were hard to come by and costly. One area with a well developed track record of success was budget development and forecast.

Fig. 2.3 Personnel areas with reported successful savings

Despite these recognised advantages of computerising personnel records, many agencies have come to view the personnel automation as a dragon, burning out staff and chewing up resources while providing little in the way of improvement (Darany:1989). The reasons for these failures include those listed in Figure 2.4.

REASONS FOR FAILURE

1. Disagreement between HRIS designers and human resources professionals as to what the system should do.
2. Systems designed from a machine processing perspective only without consideration of the people who will use the system
3. Lack of management support, resulting in poor maintenance and reports to users, lack of system credibility, as well as poor training and unclear understanding of the system's capabilities
4. Corporate design of the system without the involvement of divisions or subsidiaries that will also use the system
5. Lack of continuing training on the operation and use of the system, lack of adequate user, processor or technical documentation and assignment of one key employee to maintain the system with no backup in case the person leaves the company
6. A project plan that is too ambitious (calls for installation of the entire system immediately instead of in phases) or no project plan at all
7. Multiple systems (and multiple inputs), resulting in systems that are incompatible with each other, data discrepancies, non-standardised definition, duplication of effort.

Fig. 2.4 Personnel Information Systems failure

The one common element for failure is the lack of adequate communication (Battisti:1986). This shortcoming can affect the successful development and implementation of a human resources information system in four key areas:

- i) project management
- ii) relations between human resources professionals and data processing professionals
- iii) training/education and
- iv) documentation.

These findings underline that human resources professionals must make a concerted effort to clearly articulate their active involvement in each step of an HRIS project and establish an effective dialogue with the data processing professionals, the senior management, divisions / subsidiaries, users and employees.

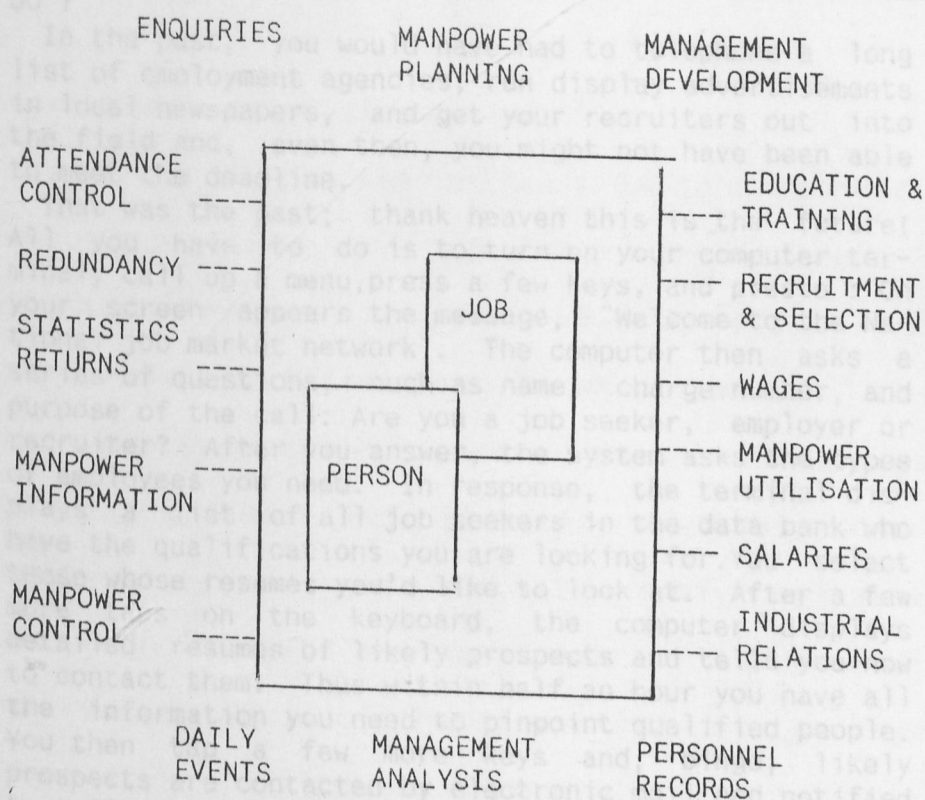


Fig 2.5. Personnel Management Information Systems: A Total Concept.
 Source: Bramham, J. Practical Manpower Planning (Institute of Personnel Management, GB, 1988) pp 189.

When developing a personnel information system, care should be taken to separate job and person files. Job files include information about grade, qualification, experience required e.t.c.

Figure 2.5 above shows this separation. Such separation makes it possible to undertake a matching of jobs and people to identify areas of imbalance.

Computers are coming into greater use in personnel departments. Rapid development in computer equipment and software have led to many professionals envisaging what the future will hold

for all. Consider the following National On-line Personnel System scenario by Barry Armandi (1986) :-

"It is the future. Your boss has just given you, the Human Resources manager, an impossible task : hire a hundred qualified technicians by next week. What do you do ?

In the past, you would have had to telephone a long list of employment agencies, run display advertisements in local newspapers, and get your recruiters out into the field and, even then, you might not have been able to meet the deadline.

That was the past; thank heaven this is the future! All you have to do is to turn on your computer terminal, call up a menu, press a few keys, and presto : On your screen appears the message, "Welcome to the National job market network". The computer then asks a series of questions, such as name, charge number, and purpose of the call: Are you a job seeker, employer or recruiter? After you answer, the system asks the types of employees you need. In response, the terminal displays a list of all job seekers in the data bank who have the qualifications you are looking for. You select those whose resumes you'd like to look at. After a few more taps on the keyboard, the computer displays detailed resumes of likely prospects and tells you how to contact them. Thus within half an hour you have all the information you need to pinpoint qualified people. You then tap a few more keys and, bingo, likely prospects are contacted by electronic mail and notified to call you to set up interviews".

Fig. 2.6 The National On-Line Personnel System
Source: Armandi, B.R. "A National On-Line Personnel System". Personnel, May, 1986, p7.

Armandi defends this view as hardly being far-fetched, too much like science fiction, too complex and expensive. He notes that attempts at creating such a system have already been made and gives examples: CLEO (La Salle, California), Direct connection on CompuServe (Honolulu, Hawaii), Career Network (Baltimore, Maryland), Career system (West Palm Beach, Florida) and CARI (Shaumburg, Illinois) that are self-serving and limited.

Perhaps one may say that present Kenya is not ready to ac-

comodate such a nationwide on-line job market place through which employers, recruiters and applicants can exchange information. But it is worth noting that individual organisations such as A.D.C. are now ready and willing to invest in computer-assisted personnel systems.

2.2. Database Management Systems

Generally, any organisation has a large number of information systems. These range from the large institutional systems servicing the organisation as a whole (e.g the payroll, the airline booking system and the club membership system), through to institutional systems serving specific parts of the organisation (e.g the purchasing, sales and inventory systems), down to personal systems developed and used by individual managers and professionals (e.g budgets and estimates for a section).

The information needs of these systems at an operational level may be distinct, although commonly, there is some overlap, at least between some of the systems which will require transfer of information between systems. Decisions at higher management levels may require information from most, if not all, of these systems, either in combination or at separate times. Hence, there is a need, at an organisational level, to make use of more information between systems, and to bring information from different systems together. This has led to attempts to integrate these isolated systems into larger systems, covering a section of an organisation or the whole organisation by concentrating all the data required by these systems into a single, centrally controlled database, which is accessed by all users. In this way,

any given item of data needs to appear only once (and so can readily be kept up to date) , and since all data is in one place, it is possible to process it in any way required to obtain management reports.

The main problem with a database is that a user who wants to perform a particular job potentially has to wade through vast amounts of irrelevant information while other users can potentially access that user's data. In order to get round this problem, a means has to be provided so that each user sees only that part of the database that is relevant to him. This is done by use of specialised software (database management systems) through which any request to access the database must go.

The database management systems (DBMS) has been defined by Murdick and Munson (1986) as :-

"Any computer-based system that will define, create, retrieve, update, revise and maintain the integrity of the system".

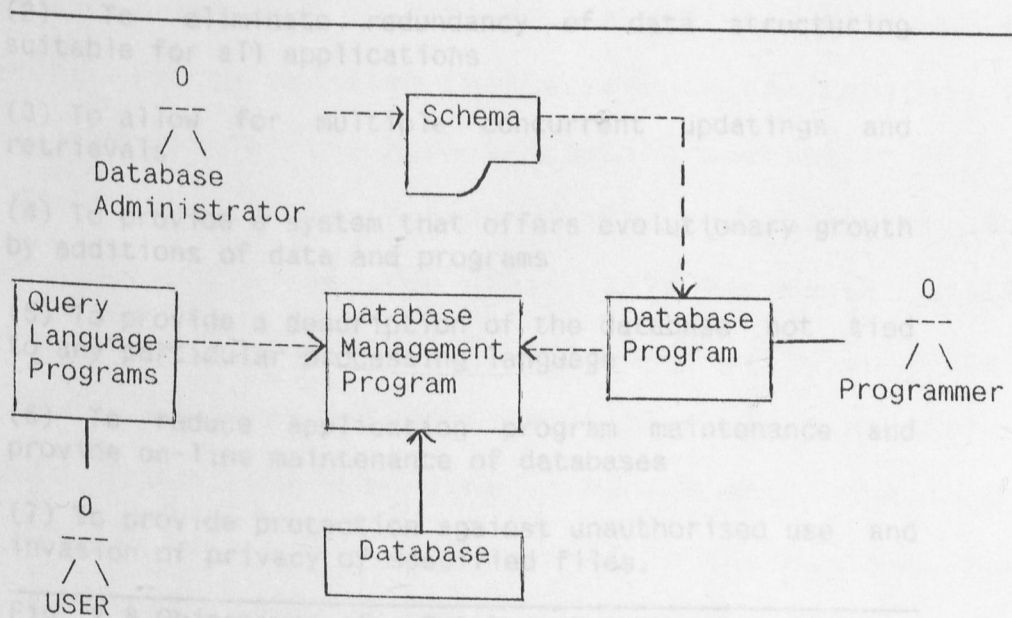


Fig 2.7. DBMS Components.

Source: Murdick, R.G; Munson, J.C. MIS Concepts and Design (Prentice-Hall International Editions, 1986) p226

Figure 2.7 above shows the DBMS components. The *database administrator* is responsible for the database schema. The *schema* describes the nature of logical and physical relationships among records in the database. The *data management program* creates all subsequent record input and output activities of the database. *Query language programs* permit managers to ask questions and receive answers by querying the database in ordinary language. The *database* contains the physical records and the *programmer* serves as a user interface to the database system. *Database programs* are used by the programmer to derive information from the data in the database. The essential objectives of a DBMS are given in Figure 2.8 below :-

DESCRIPTION OF OBJECTIVES

- (1) To provide instant system access to latest transactions related to an information system
- (2) To eliminate redundancy of data structuring suitable for all applications
- (3) To allow for multiple concurrent updatings and retrievals
- (4) To provide a system that offers evolutionary growth by additions of data and programs
- (5) To provide a description of the database not tied to any particular processing language
- (6) To reduce application program maintenance and provide on-line maintenance of databases
- (7) To provide protection against unauthorised use and invasion of privacy of specified files.

Fig. 2.8 Objectives of a Database Management System

To establish whether these objectives are achieved in practice, a study (Gabriel and Wiorkowski:1978) of twenty seven sites

was carried out to measure the perceived degree of change subsequent to installation of a DBMS. Table 2.1 below shows the results.

ADVANTAGE REALISED	GAIN OR REDUCTION ()
Data Independence	3.2
Data Integrity	2.5
Centralised control	2.3
Ease, flexibility, restructuring & maintaining data	2.8
Data redundancy	(1.5)
Integrated vs independent applications	2.3
Quick handling of unanticipated requests	2.0
Programmers not having to know physical structure	2.0
Security and privacy	1.2
Other changes:	
Maintenance costs	(0.7)
Costs of adding applications	(1.7)
Ability to backup and recover	2.2
Number of characters stored	0.8
Timeliness of information	2.6
Usefulness of information	2.5

Table 2.1 Degree of change after installing DBMS for 27 sites (on a scale of 1 to 5).

Source: Murdick, R.G; Munson, J.C. MIS Concepts & Design (Prentice-Hall International Editions, 1986) p228

It was concluded that objectives are achieved to a moderate degree. Thus, it can be noted that databases are designed first to suit the viewpoint of the data-processing specialist.

Data administration has broadened the perspective of managing data as a corporate resource. This calls for managing all information - including documents, unstructured text, voice messages, diagrams, pictures, statistical tables; as a valuable corporate asset. The higher one rises in management, the more and more use is made of external information in the decision making. Executives have been noted (Sprague Jr and McNurlin:1986) to seem to want five types of information:-

TYPE AND DESCRIPTION OF INFORMATION

- a) **Comfort information:**
A few daily figures that tell something about the state of the business for example number of absentees for the personnel manager
- b) **Problem information:**
Information about a major crises or about the progress of a significant project
- c) **Information for outside dissemination:**
To be disseminated to outsiders for instance job specifications for recruitment purposes
- d) **External Intelligence:**
Information about the business environment and what competitors are doing for example salary scales
- e) **Internal Operations:**
Information to indicate how things are going for instance performance appraisals

Fig. 2.9 Types of Management Information

2.3 System Development Methodologies

An information system is analogous to the human life form. It is born, grows, matures and eventually dies (Figure 2.10). In the *birth stage* of the system life cycle, someone has an idea as to how the computer can assist in providing better and more timely information. The idea becomes a reality during the *development stage* when system analysts, programmers and users work together to analyse a company's information processing needs and design an information system. The design specifications are then translated in to programs, and the system is implemented. Upon implementation, the information system enters the *production stage* and becomes operational, continuously being modified or "maintained", to keep up with the changing informa-

tion needs of the company. The *death stage* arrives when an information system becomes so cumbersome to maintain that it is no longer economically or operationally effective. At this time the system is discarded and the system life cycle is repeated.

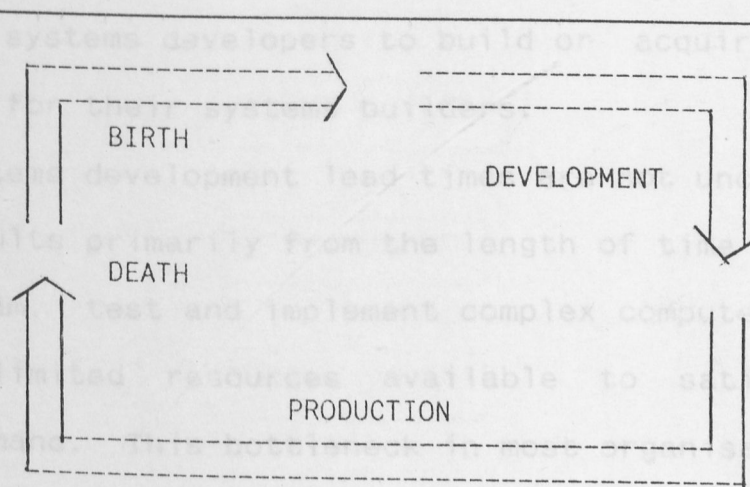


Fig. 2.10 The System Life Cycle

Analysts disagree on exactly how many phases there are in the system development life cycle, although its systematic approach is generally lauded.

Despite the complexity of systems development or perhaps because of it - the information systems field has made significant progress in improving the process of building systems. The need to improve the efficiency and effectiveness of system development has produced a spate of "new" tools and methodologies such as fourth generation languages (4GL) and prototyping.

Goals of the traditional systems development have been to provide a more disciplined approach, reliability and error correction and more efficient use of resources. Currently, there are two trends in traditional application development methods (Kendall and Kendall:1988). One is the assimilation of some of the newer approaches into the traditional framework. Three such

approaches are prototyping, iterative development and phased implementation. The other trend is towards creating "application development environments" (ADE). An ADE is a set of integrated electronic tools and systems for use by systems professionals. Emphasis on these tools has heralded the beginning of a movement by information systems developers to build or acquire more integrated tools for their systems builders.

Long systems development lead times are not uncommon. This bottleneck results primarily from the length of time required to design, program, test and implement complex computer-based systems and from limited resources available to satisfy systems development demand. This bottleneck in most organisations leaves demand unsatisfied for three years or more (Gremillion, Pyburn : 1983). In response to this problem, many companies have been turning to innovative methods for systems development and one of these is the software prototyping methodology.

Software prototyping is an iterative process that begins with developing the system prototype, a live working system, which may become the actual system and whose purpose is to test out assumptions about user's requirements and/or a system design architecture. The application development cycle using prototyping differs from the conventional process in three ways: in the tools used, in the skills needed, and in the procedures followed. Prototyping requires software tools that allow designers or programmers to create a working system in a very short time and to revise it easily. The prototyping environment also requires different skills for both users and data processing professionals. Interviewing skills are not as important for system analysts because user specifications are based on the

demonstrated working prototype, not how well the system analyst interprets the user's spoken requirements. Further, the analyst does not need to uncover all requirements at the beginning. Each

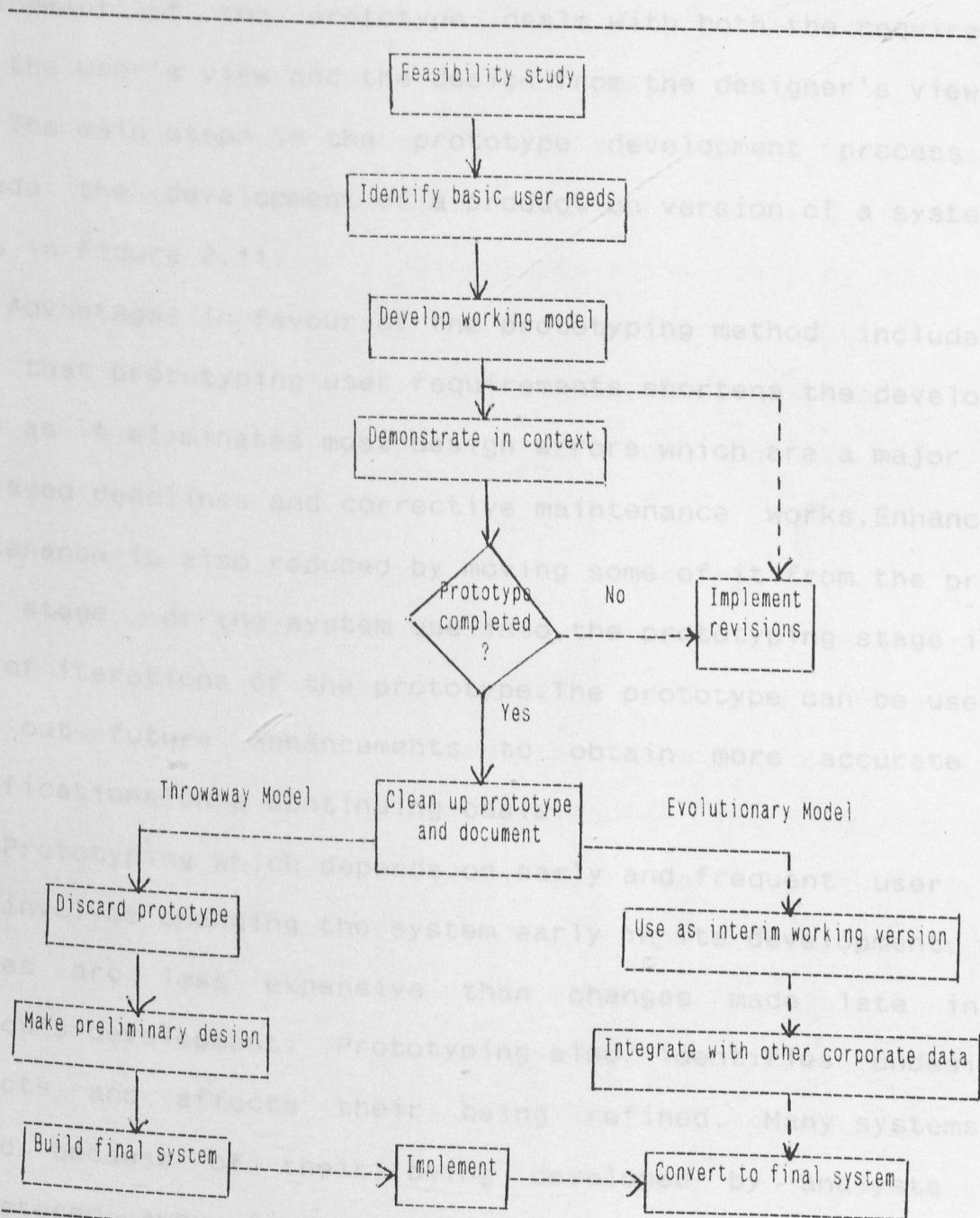


Fig. 2.11 The SPM Process

Source: Thierauf, R.J. "User-Oriented Decision Support Systems" (Prentice-Hall, 1988), 218

version of the prototype helps the user to refine requirements successively and to identify missing ones. In the conventional cycle, user requirements are defined in a specification document,

which is approved and signed by the user. Only after that phase is completed does the design of the system begin. In prototyping, the requirements definition and design evolve together. The development of the prototype deals with both the requirements from the user's view and the design from the designer's view.

The main steps in the prototype development process that precede the development of a production version of a system are shown in Figure 2.11.

Advantages in favour of the prototyping method include the fact that prototyping user requirements shortens the development cycle as it eliminates most design errors which are a major cause of missed deadlines and corrective maintenance works. Enhancement maintenance is also reduced by moving some of it from the production stage of the system use into the prototyping stage in the form of iterations of the prototype. The prototype can be used to test out future enhancements to obtain more accurate user specifications on a continuing basis.

Prototyping which depends on early and frequent user feedback involves changing the system early in its development. Early changes are less expensive than changes made late in the project's development. Prototyping also identifies undesirable projects and affects their being refined. Many systems have failed because of their being developed by analysts while sequestered away from the users (Gremillion and Pyburn:1983). This is avoided in SPM where the major emphasis is designing a system for users' needs and expectations.

The prototype approach to systems development exploits the advance in computer technology which allows information systems professionals to build "quick and dirty" systems in response to

users' needs (Kendall, Kendall:1988). The systems are then refined and modified as they are used, in a continuous process, until the fit between user and system is acceptable. The conventional system development projects have a common cost pattern (Gremillion and Pyburn:1983): about a quarter of the cost is incurred during the definition phase, at least one half goes into the design phase, and the remainder incurred during implementation. The approach largely ignores operating costs by concentrating on staff productivity hence a number of companies in the United States have reported that costs by SPM are usually less than 25% of the costs with the traditional approach (Gremillion and Pyburn:1983).

These companies found out that prototype systems provide useful results faster than those developed using the traditional system development life cycle (Kendall and Kendall:1988). The systems are also better received than those that derive from extensive, though one-time, design procedures. The forgiving nature of the SPM (that is, build it quickly and easily; fix it quickly and easily) allows users to identify their needs at less cost through experimentation (Gremillion and Pyburn:1983).

SPM does have its disadvantages. It can be difficult to manage prototyping as a project within the larger systems effort (Sprague and McNurlin:1986). Users may adopt a prototype as a completed system when it is in fact inadequate and was never intended to serve as a finished system. It was in this context that various researchers (Davis:1982, McFarlan:1981, Schmitt and Kozar:1978) point out that SPM is most appropriate in circumstances where the problem is uncommon, where the system will have a broad impact on the organisation and where the structure

of the proposed system is low (that is, less certainty as to what the system should do).

In this study these conditions do generally hold and the SPM experiences will be fully documented.

3.1 Research Methodology

This research study was carried out as a case study. A case study consists of intensively investigating a single or small number of cases - people, organisations or structures - from a holistic or clinical perspective (Paterson, 1982).

A case study framework suited the study as the researcher was attempting to become familiar with a particular problem, that of determining user requirements using the prototyping methodology instead of the conventional system development life cycle. User requirements differ from one organisation to another as well as from one department to another within the same organisation. The case study framework was able to give the researcher a good understanding of the relevant user requirements that were operating in the given decision situation (the Personnel Department of the ADC).

3.2 Data Specification

The type of data that was required for the study was both causal and non-causal. The medical benefits allowed for each employee, for example, was determined by the job group he was in, thus causal. Causal data is that which permits strong cause-and-effect inferences while the non-causal type permits inferences about relationships among variables.

There were two sources of data required for the study, primary and secondary data. Since user requirements are specific as seen in the preceding sub-section, these formed the bulk of the primary data. The organisational background, policies, structure and charts were

SECTION 3

RESEARCH DESIGN

3.1 Research Framework

This research study was carried out as a case study. A case study consists of intensively investigating a single or small number of cases - people, organisations or structures - from a holistic or clinical perspective (Peterson: 1982).

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There were two sources of data required for the study, primary and secondary data. Since user requirements are specific as seen in the preceding sub-section, these formed the bulk of the primary data. The organisational background, policies, structure and chart were

derived from secondary sources.

The nature of the data required for the study was data over time. This means that it was necessary to collect data at several points in time from the same users, known as time series. This time allowed for alterations to be made in between the prototype versions.

The form of data required was obtained by both verbal and non-verbal means. This ranged from asking specific questions (overt data) through related and indirect questions (non-overt data) to the actual observation of tasks and processes (non-verbal data).

Throughout the study, the word "user" was used to refer to any employee of ADC, who was a member of the Personnel Department and was involved in the operations of the said department.

3.3 Data Collection

Data was collected in three ways, through informal interviews, an interview guideline and through written responses.

The interview guideline used is shown in Appendix I and was personally administered by the researcher. The interview guideline was divided into three sub-sections:-

- a) Background information on ADC
- b) Information on the Personnel Department
- c) Information on the existing computer system

The guideline had twenty five questions six on section A), nine on section B) and ten on section C). The questions were open-ended type and some had many parts to a question.

Informal interviews were conducted by the researcher to establish the basic user requirements. Other user requirements were collected in specially designed Prototype Comments Form. The design of this form is

shown below (Figure 3.1) and was filled in by the researcher herself during the demonstrations.

P R O T O T Y P E C O M M E N T S		
Prototype Version:- _____		Date :- _____
Comments By Users on Prototype		
Number		Source (Initials)
1.		
2.		

Fig. 3.1 Prototype Comments Form

Some data was also collected from ADC's newsletter and forms designed by the corporation for record purposes. Such forms included leave application forms, sick sheet, subsistence allowance claim forms, e.t.c

There was no sampling plan used to select the users and the whole population of Personnel Department members was considered during the demonstration exercises and the interviews. This was because the department's had only ten employees.

3.4 Data Analysis and Presentation

The data collected was analysed by use of a form specially designed for the purpose by the researcher. This form, known as the Prototype Alteration Specification form, is illustrated below in Figure 3.2.

PROTOTYPE ALTERATION SPECIFICATION FORM

Prototype Version :- _____

Date :- _____

Comment Number	Action Required		
	Database File	Program File	Details
1.			
2.			

Fig. 3.2 Prototype Alterations Specification Form

The form was designed as shown above so as to be able to keep track of the comments made by the users and to remind the researcher, at a later date if the need arose, of what program and database files were affected by each processed comment.

The user requirements were presented in the form of tables, information flowcharts, HIPO charts and programs. In addition, the information system was documented in the form of a document program.

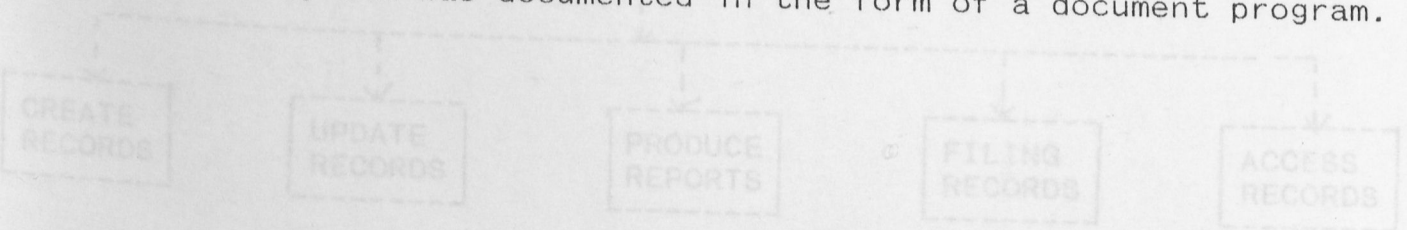


Fig. 4.1 Personnel Department Information Flow Chart.

The Personnel Department keeps all information on its employees in two files: the 'C' file (confidential) and the 'O' file (open). There is no clear-cut way of deciding what is confidential and what is not at times. The 'C' files are kept in the Managing Director's offices in a registry that is manned by the Confidential Registry clerk. The 'O' files are kept within the Personnel Department offices

SECTION 4

RESULTS AND ANALYSIS

4.1 ADC Personnel Department Basic Requirements

The ADC Personnel Information system (ADC_PIS) is a computer-assisted system of personnel administration tasks and processes. This means that most of the personnel administration work formally carried out manually can now be carried out using the computer.

To be able to transfer the users basic requirements to a computerisable form, the information flow of the department had to be discerned . This information flow is shown below in Figure 4.1

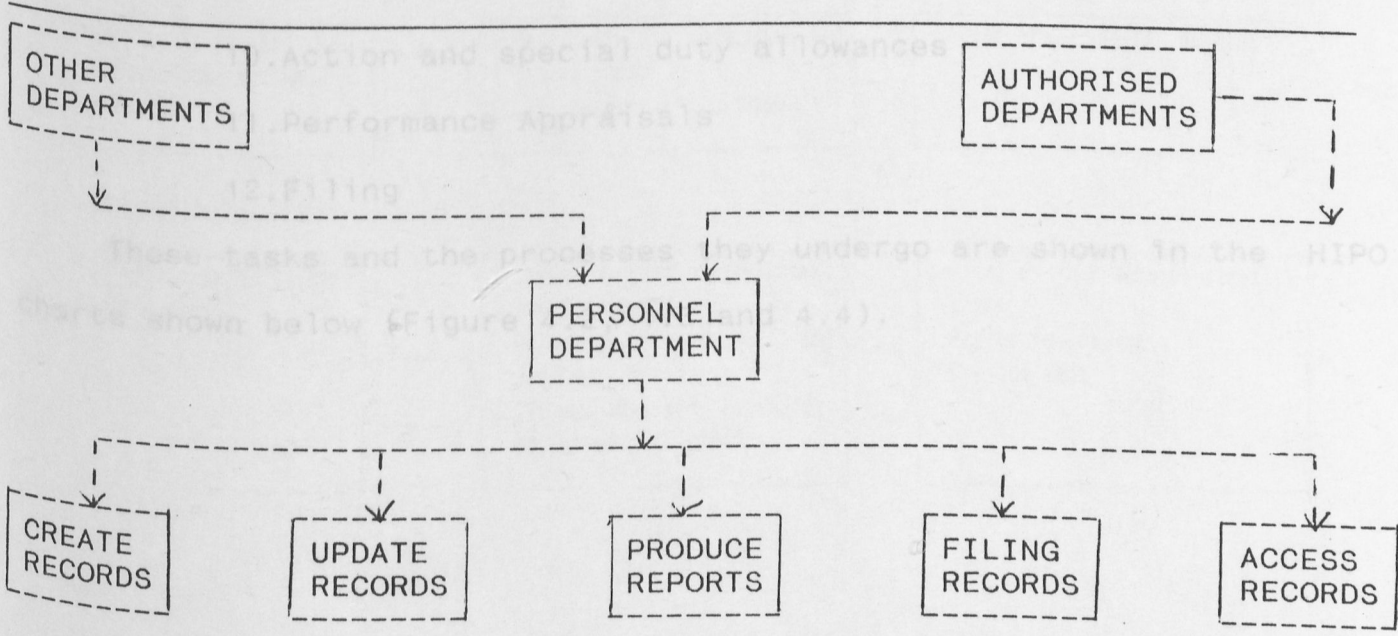


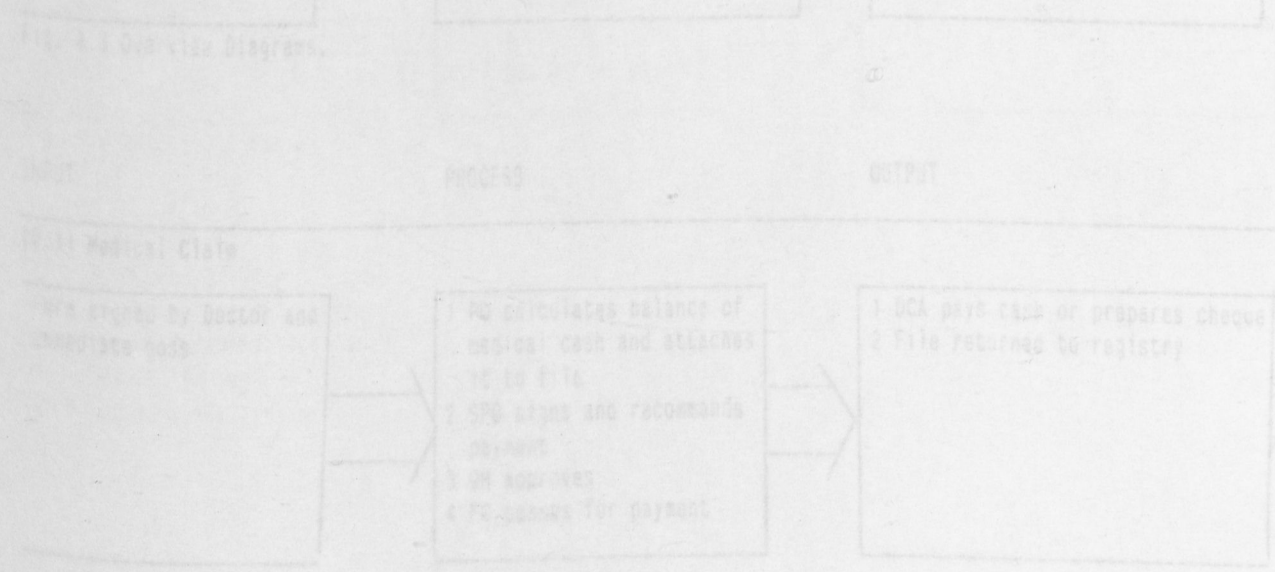
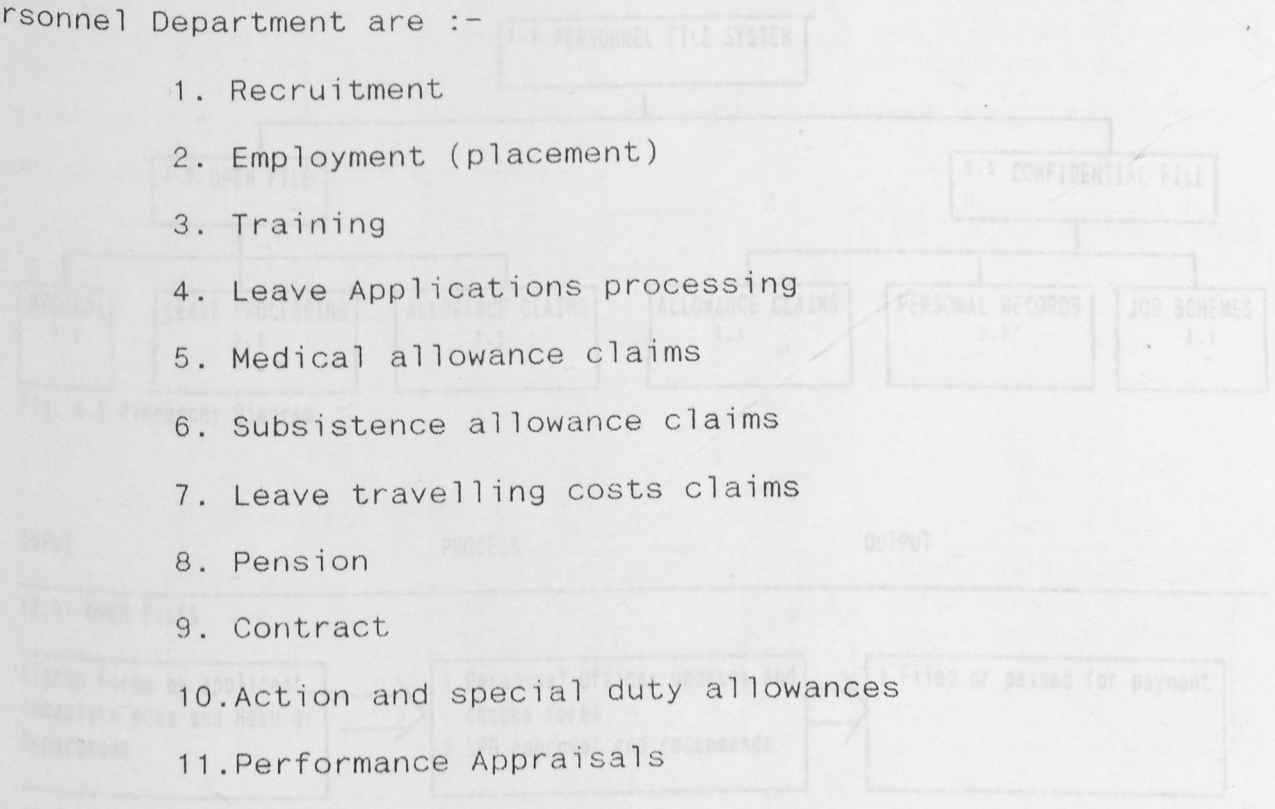
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and manned by a personnel clerk. The main tasks/jobs done in the Personnel Department are :-

1. Recruitment
2. Employment (placement)
3. Training
4. Leave Applications processing
5. Medical allowance claims
6. Subsistence allowance claims
7. Leave travelling costs claims
8. Pension
9. Contract
10. Action and special duty allowances
11. Performance Appraisals
12. Filing

These tasks and the processes they undergo are shown in the HIPO charts shown below (Figure 4.2, 4.3 and 4.4).



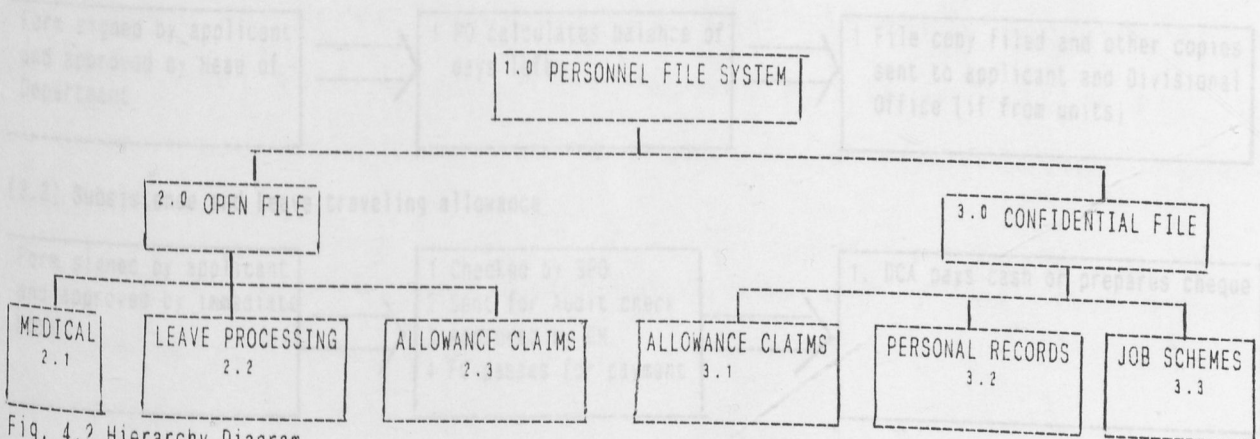


Fig. 4.2 Hierarchy Diagram.

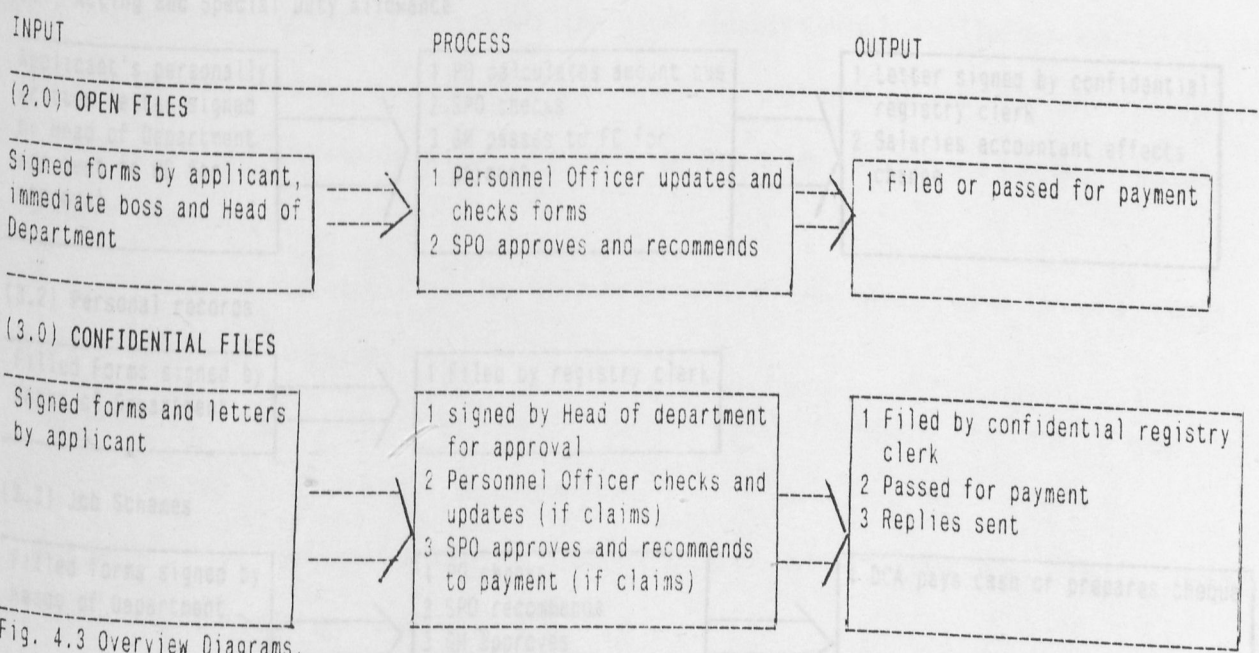
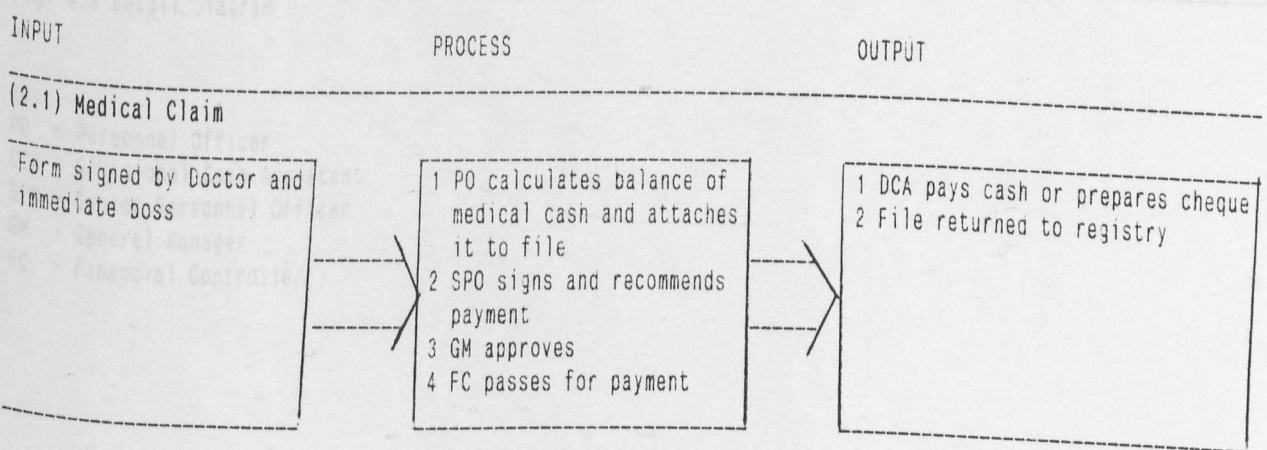
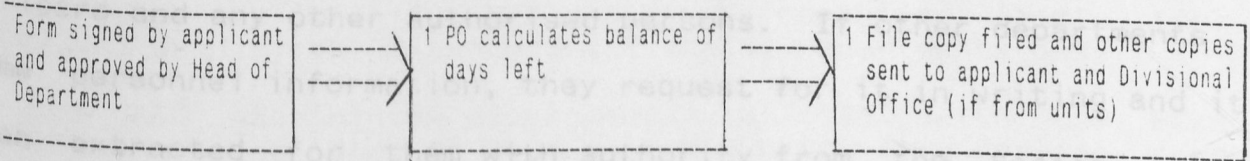


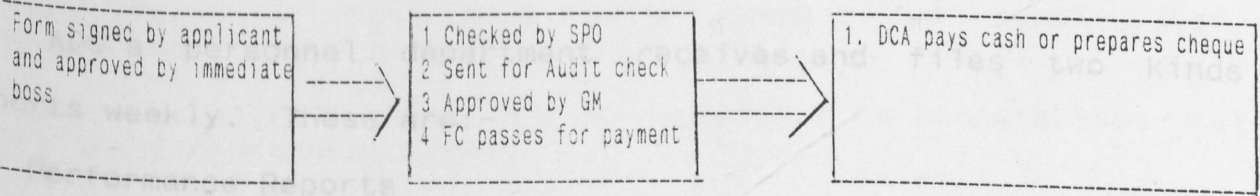
Fig. 4.3 Overview Diagrams.



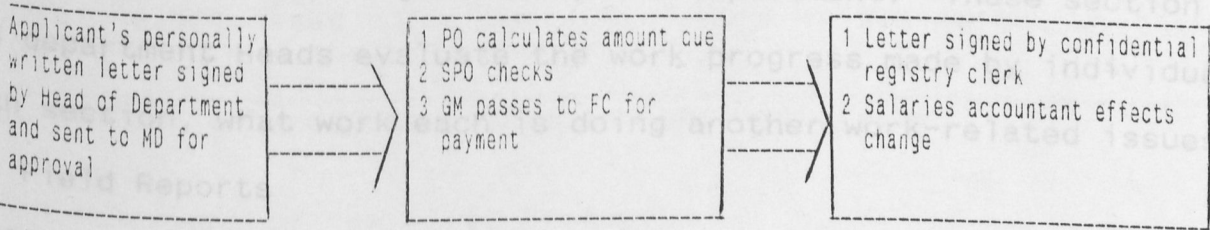
(2.2) Leave Processing



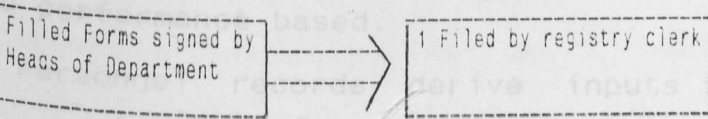
(2.3) Subsistence and Leave traveling allowance



(3.1) Acting and Special Duty Allowance



(3.2) Personal records



(3.3) Job Schemes

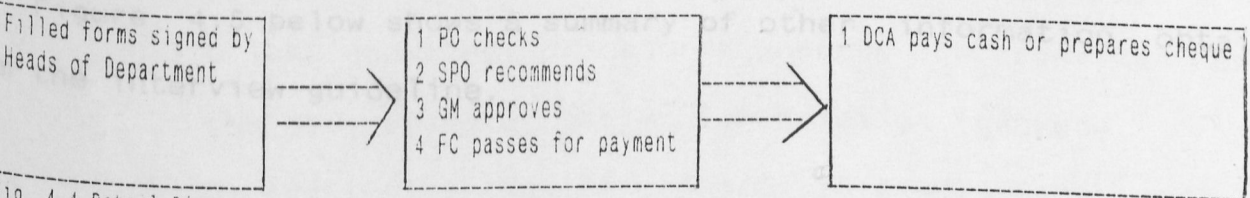


Fig. 4.4 Detail Diagram

- Key
- PO - Personnel Officer
 - DCA - Divisional Cash Assistant
 - SPO - Senior Personnel Officer
 - GM - General Manager
 - FC - Financial Controller

Information from the personnel files is accessed by personnel officers and any other authorised persons. If other departments want some personnel information, they request for it in writing and it is then extracted for them with authority from the Senior Personnel Officer.

The Personnel Department has ten members who handle over one ADC's personnel department receives and files two kinds of reports weekly. These are:-

a) Performance Reports

These are reports prepared from weekly meetings of Heads of Departments/Sections organised by the department. These section Heads and department Heads evaluate the work progress made by individuals in each section, what work each is doing another work-related issues.

b) Field Reports

These are reports sent to the department from the farm units, and are also performance based.

Personnel records derive inputs from filled forms, copies of correspondence and other documents.

Figure 4.5 below shows a summary of other information obtained from the interview guideline.

- 1) Access to data without looking for the individual's file.
- 2) Quick updating procedures whereby records can be changed, added or marked for deletion (packed).
- 3) Generation of required reports in good time.
- 4) Backup of all data stored.

The database files were modelled around the person. The files information was as shown below in Figure 4.6

The software requirements for the prototype were incorporated through the use of dBase IV. dBase IV is a fourth generation language which has powerful abilities in the generation of program code and program using the Applications Generator and in the querying of databases using the Structured Query Language (SQL) facility.

1. The ADC has a five year old computer system which comprises of a mini- computer (DRS 150) and two micro- computers (Apple Iie, IBM Model 30) used by the Finance and Planning Departments only.
2. The ADC has eleven departments in total with the Personnel Department being one of the busiest due to its service rendering nature.
3. The Personnel Department has ten members who handle over one thousand two hundred files.
4. Only the payroll aspect of the department is computerised but is under the finance department.
5. The Personnel Department is to be computerised along with the other departments of the organisation within the next three years.
6. Due to the large size of files to be handled, some files get lost during the processes and a backlog of work exists as no two tasks can be carried on any one file concurrently.

Fig. 4.5 Salient responses from personal interview

4.2 Development of the First Prototype

The objective of the study was to develop a system which would effectively satisfy the user requirements. In particular, the prototype would endeavour to achieve:-

- 1) Access to data without looking for the individual's file,
- 2) Quick updating procedures whereby records can be changed, added or marked for deletion (packed).
- 3) Generation of required reports in good time.
- 4) Backup of all data stored.

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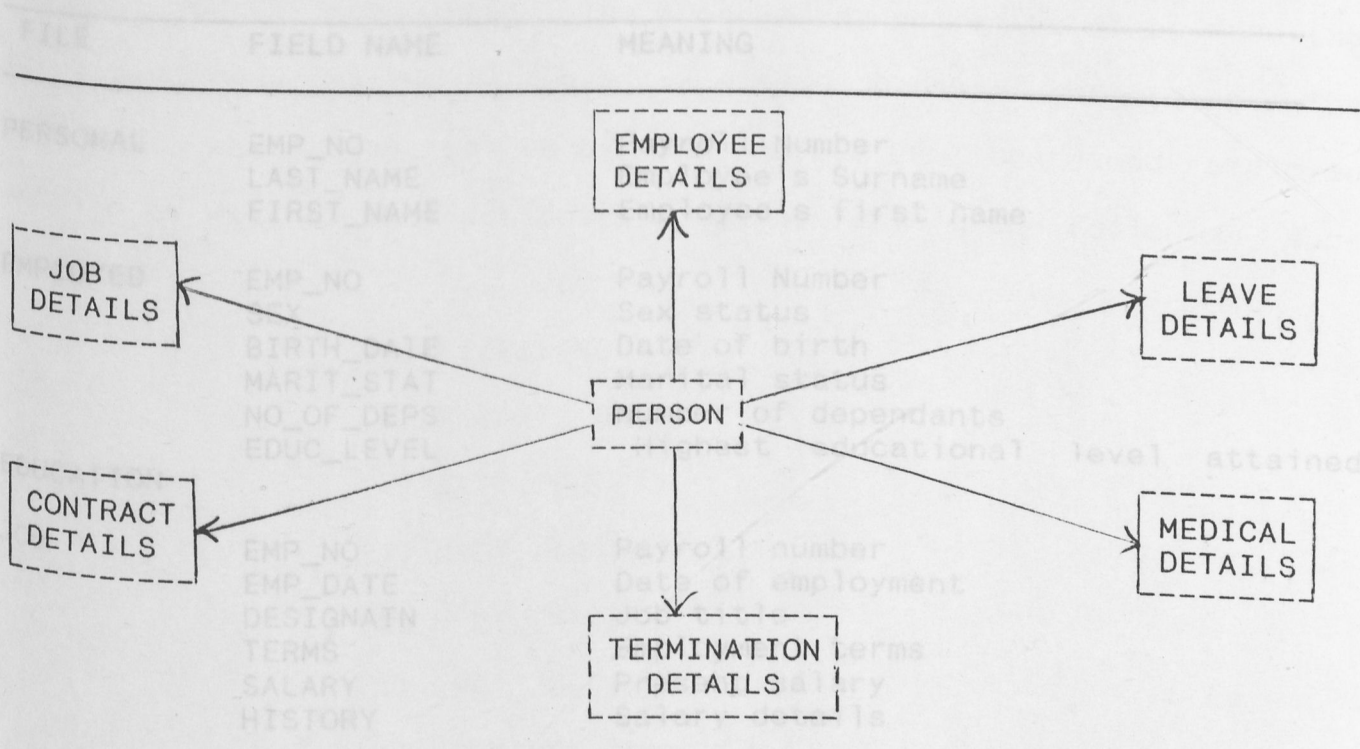


Fig. 4.6 Data model for the proposed prototype

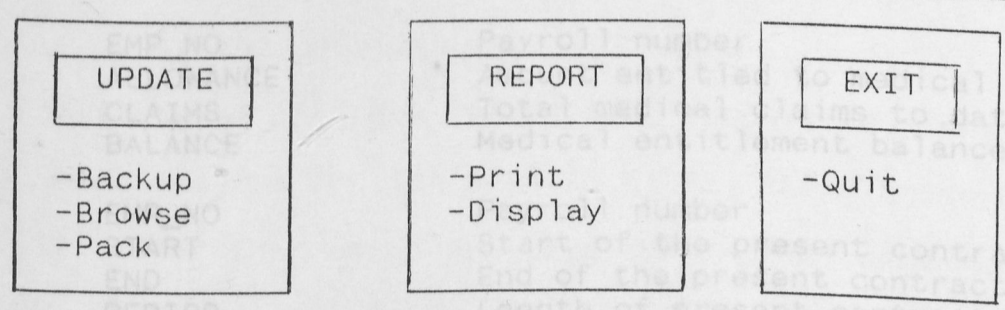


Fig. 4.7. The ADC_PIS Horizontal Menu Bar

A menu-bar with the option of "UPDATES", which had a pull down of each database file available was created (Figure 4.7). Outputs from the prototype were to be achieved through the menu-bar option of "REPORTS" where queries, reports, forms and labels would be generated. Details of the database files in this prototype were as shown in Table 4.1 below. The key field in all the database files was the payroll number (EMP_NO) field. The payroll number is specific for each employee.

FILE	FIELD NAME	MEANING
PERSONAL	EMP_NO	Payroll Number
	LAST_NAME	Employee's Surname
	FIRST_NAME	Employee's first name
EMPLOYED	EMP_NO	Payroll Number
	SEX	Sex status
	BIRTH_DATE	Date of birth
	MARIT_STAT	Marital status
	NO_OF_DEPS	Number of dependants
EDUCATION	EDUC_LEVEL	Highest educational level attained
JOB	EMP_NO	Payroll number
	EMP_DATE	Date of employment
	DESIGNATN	Job title
	TERMS	Employment terms
	SALARY	Present salary
	HISTORY	Salary details
LEAVE	EMP_NO	Payroll number
	DAYS ALL	Leave days entitled to annually
	DAYSTKN	Leave days taken to date
	LEAVEBAL	Balance of leave days
MEDICAL	EMP_NO	Payroll number
	ALLOWANCE	Amount entitled to medical annually
	CLAIMS	Total medical claims to date
	BALANCE	Medical entitlement balance
CONTRACT	EMP_NO	Payroll number
	START	Start of the present contract
	END	End of the present contract
	PERIOD	Length of present contract
	GRATUITY	Amount of gratuity to be paid
	HISTORY	Details of previous contracts
TERMINAL	EMP_NO	Payroll number
	DATE	Date of termination
	REASON	Reason for leaving
	BENEFITS	Terminal dues

Table 4.1 Database Structures

This first version of ADC_PIS information system comprised of two main programs:-

- 1). ADCPIS.PRG
- 2). MAIN.PRG

The ADCPIS.PRG called the main program (MAIN.PRG) and was the main

routine for the menu system. The program had procedure files for the generated menu system, as well as a menu process definition. The MAIN.PRG, which was called by the ADCPIS.PRG contained employee details as well as menu actions. It called from it the following sub-programs :-

- (1) FILES.PRG
- (2) REPORTS.PRG
- (3) EXIT.PRG
- (4) UPDT_PER.PRG
- (5) UPDT_EMP.PRG
- (6) UPDT_JOB.PRG
- (7) UPDT_MED.PRG
- (8) UPDT_LVE.PRG
- (9) UPDT_CON.PRG
- (10) UPDT_TER.PRG

The first three programs (FILES.PRG, REPORTS.PRG and EXIT.PRG) contained menu actions for the UPDATES FILES, REPORTS and EXIT items respectively. The other seven programs (UPDT*.PRG) were menu actions for BACKUP, BROWSE and PACK of the Personal.dbf, Employed.dbf, Job.dbf, Medical.dbf, Leave.dbf, Contract.dbf and Terminal.dbf for the personal, employees, job, medical, leave, contract, terminations and general remarks items respectively. Figure 4.8 illustrates this relationship.

PROGRAM FILE	RELATED DATABASE FILE
UPDT_PER	Personal
UPDT_EMP	Employed
UPDT_JOB	Job
UPDT_LVE	Leave
UPDT_CON	Contract
UPDT_MED	Medical
UPDT_TER	Terminal

Fig. 4.8 Relationship between program and database files

4.3 Revisions on the First Prototype

Three prototype versions were developed in the study, the first being the one described in the preceding sub-section. When the SPM (software prototyping methodology) process was described in section 2, the literature review, it was noted that as the process is an iterative one, it calls for refinements on each version. This was carried out after demonstration to the users.

A Prototype Comments Form (see Figure 3.1) was used for the purpose of collecting user comments on each demonstration. This form was administered by the researcher herself during the demonstration. An Prototype Alteration Specification Form (see Figure 3.2) was used by the researcher to effect the comments brought up during the demonstration. This form was filled after the demonstration during the refinement of the prototype. Table 4.2 below gives a summary of the revisions made after the first prototype version.

Table 4.2 Revisions made on first prototype version

The duration for refinements was varied between each prototype. The length of revision period was about two weeks on the first version to get the second version and a little over three weeks on the second version so as to come up with the third version. Table 4.3 below

DESCRIPTION OF REVISIONS

1. Middle name of the employee added
2. Addresses of each employee included
3. Provision for details of the dependants of the employee: names, ages, relationships, school and addresses.
4. Working experience of the employee before joining A.D.C.
5. Personal database file incorporated into the employed database file
6. The station of the employee by way of code (unit number)
7. The job group of each employee specified
8. Details of days on which employee went on leave and his address the was provided
9. Details about when and the amount of medical claims made
10. A general remarks file opened for each employee for disciplinary, commendation and correspondence purposes
11. Maintenance of details for any other type of leave apart from annual leave e.g maternity, compassionate, e.t.c
12. The following reports created:
 - a) monthly leave report
 - b) employee summary details
 - c) Years of service report
 - d) Monthly medical report
 - e) Employee addresses list
 - f) Report of employees currently on leave
13. Comments on mode of job group assignment, contracts duration, calculation of monthly leave days' balance, conditions for warning letters and recording of leave days taken

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compares the three versions made. SECTION 5

VERSION 1	VERSION 2 AND CONCLUSIONS	VERSION 3
Database Files		
Employed	Employed	Employed
Personal	Job	Job
Job	Leave	Leave
Leave	Medical	Medical
Medical	Contract	Contract
Contract	Terminal	Terminal
Terminal		Remarks
Report Files		
	Emp_Summ	Emp_Summ
	Job_Grp	Job_Grp
	Emp_Add	Emp_Add
		Lve_Summ
		On_Leave
		Med_Summ
Query Files		
	1.0 ADC_PIS	Job_Grp Lve_Summ On_Leave Med_Summ
Batch Files		
Updt_Emp	2.0 UPDATE Updt_Emp	3.0 RECORDS Updt_Emp
Updt_Per	Updt_Job	Updt_Job
Updt_Job	Updt_Lve	Updt_Lve
Updt_Lve	Updt_Med	Updt_Med
Updt_Med	2.2 BR Updt_Con	Updt_Con
Updt_Con	3 PACK Updt_Ter	Updt_Ter
Updt_Ter		Updt_Rem
		3.2 PRINT
Total Application Files		
74	81	98

Table 4.3 Comparison of the three Prototype versions

The diskette included in this research report contains the application that has been developed. The application can be run in a dBase IV environment by typing 'Do ADCPIS.PRG'.

- 1) Personal
- 2) Job
- 3) Leave

SUMMARY AND CONCLUSIONS

5.1 Refined User Requirements

The objective of the study was to determine user requirements for a personnel information system for the Personnel Department of ADC. Thus the refined requirements are those underlying the last prototype version, version three. This version's abilities can be expressed in a HIPO chart form (Figure 5.1).

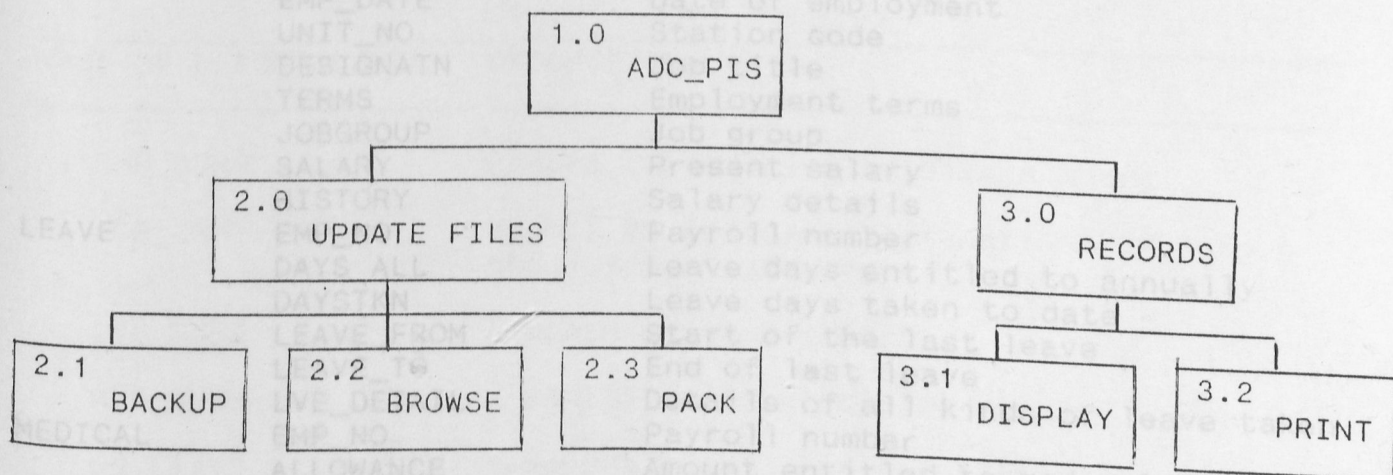


Fig. 5.1 HIPO Chart for ADC_PIS

The detail diagram from the HIPO chart would show the database files at the centre of all activity : in backup, browsing, packing, displaying and printing reports. The Database files used in ADC_PIS were:-

1) Employed

which contains all employees' personal details

2) Job

which contains all employees' job details

3) Leave

which contains all employees' leave details

which contains all employees' medical details

5) Contract

6) Term

which contains details of terms of employees who've left ADC

7) Remarks

which is general remarks each employee

The field name shown in Figure 5.2. In addition there were labels generation

program. The labels shown in the figure are:

FILE	FIELD NAME	MEANING
EMPLOYED	EMP_NO	Payroll Number
	LAST_NAME	Employee's Surname
	FIRST_NAME	Employee's first name
	MID_NAME	Other names of employee
	SEX	Sex status
	BIRTH_DATE	Date of birth
	MARIT_STAT	Marital status
	BOX_NUMBER	Address
	TOWN	Address
	NO_OF_DEPS	Number of dependants
EMPLOYED	DEPENDANTS	Details of dependants
	EDUC_LEVEL	Highest educational level attained
	EDUCATION	Education Background
	WORKINGEXP	Details of work experience
JOB	EMP_NO	Payroll number
	EMP_DATE	Date of employment
	UNIT_NO	Station code
	DESIGNATN	Job title
EMPLOYED	TERMS	Employment terms
	JOBGROUP	Job group
	SALARY	Present salary
LEAVE	HISTORY	Salary details
	EMP_NO	Payroll number
	DAYS ALL	Leave days entitled to annually
	DAYSTKN	Leave days taken to date
LEAVE	LEAVE_FROM	Start of the last leave
	LEAVE_TO	End of last leave
	LVE_DETAIL	Details of all kinds of leave taken
	EMP_NO	Payroll number
MEDICAL	ALLOWANCE	Amount entitled to medical annually
	CLAIMS	Total medical claims to date
	BALANCE	Medical entitlement balance
	DATES_PAID	Details of medical claims
CONTRACT	EMP_NO	Payroll number
	START	Start of the present contract
	END	End of the present contract
	PERIOD	Length of present contract
	GRATUITY	Amount of gratuity to be paid
	HISTORY	Details of previous contracts
TERMINAL	EMP_NO	Payroll Number
	DATE	Date of termination
	REASON	Reasons for leaving
	DETAILS	Further details on termination
REMARKS	BENEFITS	Terminal dues
	EMP_NO	Payroll number
	RECOMMEND	Recommendations made
	DISCIPLINE	Disciplinary actions taken

Fig. 5.2 Final Database Structures

4) Medical

which contains all employees' medical details

5) Contract

which contains all employees employed on contract terms

6) Terminal

which contains details of those employees who've left ADC

7) Remarks

which is a general remarks file on each employee

The field names for each file and their contents are shown in Figure 5.2. In addition, there were five report and one label generation program. These are shown in the following Table 5.1 :-

NAME OF REPORT/LABEL	DESCRIPTION
EMP_SUMM	Report on employee details summary
JOB_GRP	Report on employee designation, job group and years of service
LVE_SUMM	A monthly leave report
MED_SUMM	A monthly medical claims report
ON_LEAVE	A report of all employees currently on leave
EMP_ADD	Labels of ADC employees' addresses

Table 5.1 Designed Reports and Labels

The documentation of the information system is shown in Appendix II.

5.2 Observed Effects of SPM on the Systems Development Cycle

Several benefits of using the SPM process over the conventional systems development life cycle were experienced. During the determination of the requirements the researcher noted that the users' imaginations were stimulated by the exercise. This was more evident

during the demonstrations of the earlier prototype versions. The users made many comments on the prototype versions. Often they requested incorporation of capabilities into the system which go beyond what the current manual system does. The iterative nature of the SPM made the task of establishing and incorporating required modifications to the original design relatively easy.

System development period between the feasibility stage to the implementation stage using conventional means can be lengthy. Although the researcher did not go up to the implementation stage (as this was not the objective of the study), she was able to accomplish the task up to one step before implementation in a period of about ten weeks. Time saving can be regarded as a major advantage of the SPM process.

The involvement of the users in the development cannot be over emphasised in this study. The researcher believes that this involvement will considerably reduce the user training time on adoption of the eventual system. It will also greatly assist in producing satisfied users by providing them with a physical model to examine, test, evaluate and comment on rather than providing them with an intangible stack of specifications.

In conventional systems development detailed program documentation is necessary at each stage of program development. In this case the need for detailed intermediate program documenting was vastly reduced due to the iterative nature of SPM, including prototype demonstrations to users.

The researcher, in applying the SPM methodology, was able to envisage certain pitfalls. SPM can not be a cure for bad design habits. If the developer, as an individual or an organisation, had

poor development practices when using the conventional means, installing a 4GL (fourth generation language) system using SPM would not help much.

The researcher noted that because of the excitement of the users, it is possible that they may request capabilities for the prototype which are unnecessary. This would result not only in increased development time but would add to costs. Thus the system analyst must be aware of this.

5.3 Limitations of the Study

The main limitation of the study lay within its case study nature. A case study, having been described as an intense investigation of a single or small number of people, organisations or situations from a holistic perspective, its results can not be generalised. Thus the conclusions reached from this study can only be restricted to organisations similar to the ADC in terms of structure, policies, organisation loci and other undetermined factors. The other limiting factor in the study was time constraint.

There were about ten weeks available for this project. This largely determined the number of revisions on the original prototype that could be carried out. Ideally the prototype revisions should be carried out until the users are largely satisfied.

5.4 Recommendations for future Research

The study was based on the determination of user requirements for the creation of a personnel information system for the A.D.C. Personnel Department using the software prototyping methodology. The study yielded positive results for the methodology. However, the success cannot be generalised as it was based on a single organisation. Therefore future researchers in this area should take

up and make replicative studies covering a cross-section of industries.

A. SPM process was carried out in this study by a third party to the specific organisation (ADC). The possibility of the same study being carried out within the organisation by the users themselves, should be considered. Thus future research work is recommended to find out whether prototyping can be undertaken by users without the aid of professional programmers.

4. What are ADC's major policies?

5. What relationship exists between ADC and other firms in the agriculture sector?

6. To what extent have the government policies influenced ADC?

B. INFORMATION ON PERSONNEL DEPARTMENT

7. How many people are in the personnel department?

8. What is the department structure?

9. What tasks are done in personnel department?

10. For each task (in 9 above) identify

(a) The nature (clerical, technical, professional)

(b) The staff employed

(c) The equipment used (technical, office, communication)

(d) The input for the work and its source.

(e) The output from the work and its destination.

(f) The files or records used or the set-up.

(g) Existing or potential quantities

(h) Peak points

(i) Whether it is an essential or secondary activity

(j) What would happen if it were omitted completely

(k) Whether it is time-consuming and if there are short term delays and their cause

(l) problems with availability of resources such as labour

(m) whether it is boring and fatiguing for the person doing it

(n) whether it is expensive to perform.

11. What information is found in the

a) Confidential file

b) Open file

12. What are the particularly valuable features of the present system

INTERVIEW QUESTIONS

A. BACKGROUND INFORMATION ON A.D.C.

1. When was ADC formed?
2. What does ADC do?
3. What is the organisation structure of the firm in terms of
 - (a) How many people does it employ?
 - (b) How many branches does it have and where are they?
 - (c) How is the organisation chart?
 - (d) How many department does it have?
4. What are ADC's major policies?
5. What relationship exists between ADC and other firms in the agriculture sector?
6. To what extent have the government policies influenced ADC?

B. INFORMATION ON PERSONNEL DEPARTMENT

7. How many people are in the personnel department?
8. What is the department structure?
9. What tasks are done in personnel department?
10. For each task (in 9 above) identify
 - (a) The nature (clerical, technical, professional)
 - (b) The staff employed
 - (c) The equipment used (technical, office, communication)
 - (d) The input for the work and its source.
 - (e) The output from the work and its destination.
 - (f) The files or records used or the set-up
 - (g) Existing or potential quantities
 - (h) Peak points
 - (i) Whether it is an essential or secondary activity
 - (j) What would happen if it were omitted completely
 - (k) Whether it is time consuming and if there are short term delays and their cause
 - (l) problems with availability of resources such as labour
 - (m) Whether it is boring and fatiguing for the person doing it
 - (n) Whether it is expensive to perform.
11. What information is found in the
 - a) Confidential file
 - b) Open file
12. What are the particularly valuable features of the present system

13. What are the problems experienced
14. What solutions can you offer to the problems identified in the preceding question
15. What additional work do you think would be valuable but is not possible at present

C INFORMATION ON THE EXISTING COMPUTER SYSTEM

16. How old is the computer system at ADC
17. What does the computer comprise of in terms of
 - a) Hardware
 - b) Software
18. Does the system serve any other department apart from the Finance department
19. What tasks are done on the system and what reports are produced
20. Are there any links between the computer system in Nairobi and that in Kitale
21. Who maintains the system during
 - a) normal servicing
 - b) repair and breakdowns
22. How many members of staff work on the computer system
23. Is there room for expansion for the computer system in terms of
 - a) workload
 - b) space (physical)
 - c) personnel
24. What are the management's reasons for a new system
25. How will the proposed system affect
 - a) the type and number of machines used
 - b) the number and training of staff in the computer room
 - c) the present departmentalisation

Sets for Application:

Bell ON
Carry OFF
Centry OFF
Confirm OFF
Delimiters OFF
Display Size 25 lines
Drive
Escape ON
Path MAIN follows:
Safety OFF

Starting Colors for Application:

Color Settings:
Text : W+/B
Heading : W/B
Highlight : GR+/BG
Box : GR+/BG
Messages : W+/N
Information : B/W
Fields : N/BG

Database/View: EMPLOYED

=====
Menu/Picklist definitions follow:

Layout Report for Horizontal Bar Menu: MAIN

Screen Image:

```

  0          10          20          30          40          50          60
70
>.....+.....|.....+.....|.....+.....|.....+.....|.....+.....|.....+.....|.....+.....|.....+.....
00:#=====
01:"UPDATE FILES          REPORTS          EXIT
02:#=====
03:
04:
05:
06:
07:
08:
09:
10:
11:
12:
13:
14:
15:
```


Bar: 2
Prompt: Job
Action: Call Batch Named: UPDT_JOB
Message Line Prompt for Item: THIS FILE CONTAINS JOB DETAILS OF EACH
EMPLOYEE
New Database/View: JOB

Bar: 3
Prompt: Medical
Action: Call Batch Named: UPDT_MED
Message Line Prompt for Item: THIS FILE CONTAINS ALL MEDICAL ISSUES
OF EACH EMPLOYEE
New Database/View: MEDICAL

Bar: 4
Prompt: Leave
Action: Call Batch Named: UPDT_LVE
Message Line Prompt for Item: THIS FILE CONTAINS ALL LEAVE DETAILS ON
EACH EMPLOYEE
New Database/View: LEAVE

Bar: 5
Prompt: Contract
Action: Call Batch Named: UPDT_CON
Message Line Prompt for Item: THIS FILE CONTAINS DETAILS OF EMPLOYEES
ON CONTRACT
New Database/View: CONTRACT

Bar: 6
Prompt: Terminations
Action: Call Batch Named: UPDT_TER
Message Line Prompt for Item: THIS FILE CONTAINS INFORMATION ON PAST
EMPLOYEES
New Database/View: TERMINAL

Bar: 7
Prompt: General Remarks
Action: Call Batch Named: UPDT_REM
Message Line Prompt for Item: THIS IS A GENERAL REMARKS FILE FOR ALL
EMPLOYEES
New Database/View: REMARKS

Layout Report for Popup Menu: REPORTS

Action: Run Report Form JOB_GRP.FRM.frm
Command Options:
PLAIN
Print Mode: Ask User at Runtime
Message Line Prompt for Item: REPORT ON EMPLOYEE DESIGNATION, UNIT,
JOB GROUP AND YEARS OF SERVICE
New Database/View: JOB_GRP.QBE

Bar: 2
Prompt: Employees' Addresses Label
Action: Run Label Form EMP_ADD.lbl
Print Mode: Ask User at Runtime
Message Line Prompt for Item: A LIST OF EMPLOYEES' ADDRESSES

Bar: 3
Prompt: Employee Summary Report
Action: Run Report Form EMP_SUMM.frm
Command Options:
PLAIN
Print Mode: Ask User at Runtime
Message Line Prompt for Item: AN ON-THE-SPOT EMPLOYEE DETAILS REPORT

Bar: 4
Prompt: Leave Monthly Report
Action: Run Report Form LVE_SUMM.frm
Command Options:
PLAIN
Print Mode: Ask User at Runtime
Message Line Prompt for Item: A MONTHLY REPORT ON EACH EMPLOYEE'S
LEAVE BALANCE DAYS
New Database/View: LVE_SUMM.QBE

Bar: 5
Prompt: Employees on leave Report
Action: Run Report Form ON_LEAVE.frm
Command Options:
PLAIN
HEADING "EMPLOYEES ON LEAVE REPORT"
Print Mode: Ask User at Runtime
Message Line Prompt for Item: THIS REPORT DISPLAYS ALL THOSE
EMPLOYEES CURRENTLY ON LEAVE
New Database/View: ON_LEAVE.QBE

Bar: 6

Setup for UPDT_EMP follows:

Description: BACK UP, EDIT and PACK Employed.dbf for the Employee item

Colors for Menu/Picklist:

Color Settings:

Text : W+/B
Heading : W/B
Highlight : GR+/BG
Box : GR+/BG
Messages : W+/N
Information : B/W
Fields : N/BG

Batch actions for Menu UPDT_EMP follow:

Batch Action: 1

Prompt: Copy Employed.dbf to Empibak.dbf

Action: Copy Records to File emplbak

Batch Action: 2

Prompt: Browse

Action: Browse File

Batch Action: 3

Prompt: Pack

Action: Pack Current File

Multiple Action Summary for Batch Object: UPDT_JOB

Screen Image:

```
0      10      20      30      40      50      60
70  >.....+.....|.....+.....|.....+.....|.....+.....|.....+.....|.....+.....|.....+.....|.....+.....
00:
01:
02:
03:
04:
05:
06:          #=====#
07:          "Copy Job.dbf to JobBak.dbf"
08:          "Browse"
09:          "Pack"
10:          #=====#
11:
```


Heading : W/B
Highlight : GR+/BG
Box : GR+/BG
Messages : W+/N
Information : B/W
Fields : N/BG

Batch actions for Menu UPDT_REM follow:

Batch Action: 1

Prompt: Copy remarks.dbf to Rembak.dbf

Action: Copy Records to File rembak

New Database/View: REMARKS.DBF

Batch Action: 2

Prompt: Browse

Action: Browse File

New Database/View: REMARKS.DBF

Batch Action: 3

Prompt: Pack

Action: Pack Current File

New Database/View: REMARKS.DBF

End of Application Documentation

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