

## **MIS Sustainability in Sub-Saharan Africa: Three Case Studies from The Gambia**

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### **ABSTRACT**

Many national and international aid agencies, government and non-governmental organisations (NGO), see the introduction of Information and Communication Technology (ICT) as a rapid way of helping the economies and governance of less developed countries (LDC) through improved management and more effective dissemination of information. Attempts to achieve these aims by the introduction of several aid agency funded ICT schemes in The Gambia – a typical LDC – have failed. This paper suggests that such failures stem from two fundamental causes: the aid agencies do not understand the operational – human and physical – environment in which the ICT systems are to operate and, equally, the intended beneficiaries are unaware of how ICT systems can be usefully employed in their day-to-day tasks. Failure to correctly employ ICT systems has resulted in the wastage of scarce development funds and the diverting of scarce local skilled personnel away from other, productive tasks. To achieve real and sustainable benefits from ICT schemes in such LDCs a phased implementation project model is proposed which includes, in addition to the provision of hardware and software solutions, ICT awareness building and training of user personnel as well as ongoing monitoring of the system's impact. Before significant ICT project development starts management must understand and agree that the scheme's introduction will benefit their work. Moreover, they must fully commit to change and adapt their working procedures in ways that will enable them to benefit from the added functionality provided by the ICT system.

**Keywords:** *Developing countries, information management, development issues, management information systems.*

### **INTRODUCTION**

#### **Purpose of this Paper**

The benefit of introducing Information and Communication Technology (ICT) to developing countries as a means of boosting development has been widely discussed and is suggested as a way of assisting poverty reduction in less developed countries (LDC). Frequently ICT facilities are provided as an element of third-world aid packages by the World Bank, well-meaning non-governmental organisations (NGOs) and government overseas aid departments, such as the United Kingdom's Department for International Development (DfID) (DfID, 2003), Sweden's Stryrelsen för Internationellt Utvecklingssamarbete (SIDA) (SIDA, 2003) and, internationally, the United Nations Development Programme (UNDP) (UNDP, 2003). In reality however, attempts to introduce 'high tech' solutions to address perceived problems in LDCs often fail.

This paper identifies difficulties peculiar to LDCs that arise when introducing ICT and proposes a set of guidelines for project implementation targeted at achieving sustainability. These are based on the authors' observations and experiences during the period 2000 – 2004 with three systems installed in The Gambia<sup>1</sup>. Conditions for ICT in The Gambia may appear particularly severe but many similar criteria apply to other LDC environments. Indeed, an email discussion forum run jointly by the World Bank and International Record Management Trust (IRMT) during November

2003 through January 2004, participants from all corners of the world raised very similar concerns to those identified by the authors (WB/IRMT, 2003-4).

The authors contend that, based on their experiences, introducing sophisticated ICT schemes that might be suitable and indeed highly successful in developed countries can lead to costly failures in LDCs. This does not imply that such systems have no place there, but their introduction does require more detailed analysis and planning than might be necessary in developed countries. Assumptions about prospective users' appreciation of the benefits of ICT, appropriate to developed countries, need thorough review in LDCs.

### **Differences Between LDCs and Developed Countries' Environments**

#### *ICT Awareness*

ICT has had a long period of development and use in developed countries and has become accepted as a part of daily life for most people. A significant awareness has been built up over a lengthy period of the benefits of ICT in work and everyday life. This contrasts with LDCs where only very few people have any experience or understanding of the capabilities of such technology. When introducing ICT into LDCs the project plan must therefore include the building of appropriate ICT awareness amongst user management and staff.

#### *Costs of Failure*

Introducing systems that do not serve a useful purpose equates to money wasted. This is particularly serious for LDCs where development capital is generally in very short supply. It is, moreover, not only money which is squandered. To be sustainable, introducing ICT schemes inevitably requires involvement of highly trained and skilled local staff, usually a scarce commodity in LDCs. This diverts those staff from other tasks. If the introduction of a scheme fails this represents wasted useful productive effort by those scarce staff. The effect of scarcity means that the impact of failure is likely to be greater in LDCs than corresponding failures would have in developed countries.

#### *Underlying Factors*

Failures might be avoided by sound analysis of the problems facing the intended uses of ICT systems. Specifically, both the physical and cultural environments in which systems are to operate need to be evaluated and understood by system designers. Consideration must be given to issues such as:

- **Expectations and ability of available local staff** - In The Gambia the quality of both the primary and higher education systems are generally poor when compared to developed countries leaving individuals ill-equipped to deal with ICT systems.
- **Physical infrastructure problems such as inconsistency or perhaps even unavailability of water and electricity** - There are always exceptions to this such as the Gambia telephone system that is very reliable and utilises some of the latest technology. Infrastructure should not be taken for granted and realistically evaluated.

ICT must not be regarded as an end in itself but a tool for improving ways of achieving useful results by better use and management of information. Critical to the successful employment of any ICT system is that all parties concerned – donors, implementers and final users – must, from the outset, recognise that users will have to adjust their working-procedures if practical benefits

are to be achieved. The nature of the changes to working-procedures must be evaluated, understood and agreed by all stakeholders before the scheme is implemented.

Evaluation must therefore include not merely hard- and software requirements of the project but also staff capabilities, training needs and the willingness of staff to benefit from the introduction of technologically advanced schemes.

#### *Long-term Sustainability Needs*

Sustainability requires that realistic provision is made to ensure the scheme's long-term operating costs – consumable items, maintenance and spares, ongoing staff training, telephony costs, etc – are fully covered. This is a non-trivial matter in LDCs where budgets are frequently diverted and where even the cost of paper for printing is frequently regarded as a significant item. When planning the introduction of ICT schemes it is important to recognise that after the installation is complete there are on-going costs involved in the operation of the system. Plans must ensure provision is made to cover those continuing costs.

#### **Scope and Structure of this Paper**

The paper relates to three separate civil service Management Information Systems (MISs) in The Gambia, West Africa. The authors, who have many years of professional ICT experience gained in Europe and North America, were assigned for periods of 2 – 3 years to Gambian civil service departments as (volunteer) advisers under the aegis of the British NGO VSO<sup>2</sup>. In sections 2, 3, and 4 of this paper the authors each describe the respective system on which they worked, their experiences and the problems which arose. Section 5 identifies some common elements and section 6 proposes some guidelines for project implementation in similar environments.

The three civil service departments concerned, their respective ICT systems, and the responsible advisers (authors) are listed in table 1 below.

**Table 1: Details of the three Management Information Systems**

<b>DEPARTMENT</b>	<b>SYSTEM</b>	<b>AUTHOR</b>	<b>DATES</b>
<i>Personnel Management Organisation (PMO)</i> , a Department of State which had responsibility for recruitment and general human resources management within the civil service; the civil service included most education and medical staff	PMIS	J I Sander	September 2000 through April 2002
<i>Department of State for Education (DoSE)</i> , responsible for all stages of education from early childhood to tertiary including curriculum, educational standards, school management, teacher management including teacher posting, textbooks and financial management	EMIS	P J Bell	January 2002 through January 2004
<i>Department of State for Health and Social Welfare (DoSH&amp;SW)</i> , responsible for health care delivery throughout the country	HMIS	S D Rice	January 2002 through December 2004

## **CASE STUDY 1: THE PERSONNEL MANAGEMENT INFORMATION SYSTEM (PMIS)**

### **The Functions of Personnel Management Office (PMO) and Public Service Commission (PSC)**

PMO is the central human resource (HR) management and planning department for the Gambian civil service. As a department it was (in 2000 through 2002, the period to which this section of the paper refers) headed by a Permanent Secretary (PS). The PS reported to the Secretary General, who as head of the Gambian civil service, was answerable to the Office of the President. PMO had responsibility for maintaining information on the staff of approximately 11000 full time civil servants as well as a number of people employed on a daily wage basis. All Gambian teachers in state schools were civil servants as were most nurses and other medical staff. The PMO staff were themselves civil servants. A number of other state employees also existed though apparently outside PMO's immediate management orbit. These included groups such as the police, army and certain health workers.

PMO handled the administration of all civil servants career developments, ensuring that they followed the correct procedures and defined rules. Amongst PMO's other functions were the development of a civil service grading structure, the definition of different career cadres within the civil service, setting the rules governing qualifications needed for different cadres and the terms for promotion, etc. PMO also managed the training programmes for civil servants including the training budget. Payment of civil servants was not PMO's responsibility but PMO did liaise with the Accountant General's department on payroll issues.

Crucially, PMO's procedures and operations were in turn supervised and scrutinised by an independent body, the Public Service Commission (PSC), comprising a chairman, deputies, and a full time secretary. The PSC functioned as an appointed board, separate from the civil service procedures. All civil service applicants had to be approved by the PSC; any decision relating to a civil servant made by PMO had to be referred to, and ratified by, the PSC.

### **Objectives**

The PMIS was designed and installed sometime around 1998 -1999 but it was in fact never seriously used by PMO's staff who viewed the data it held with suspicion. By September 2000, on arrival of the author, all documentation relating to its design and implementation, if in fact any had been produced, was missing.

The objectives assigned to the author were:

1. To organise formal operating procedures for the system;
2. To bring the data it held up to 95% accuracy.

Developing a set of simple operating procedures was not *per se* a difficult task though explaining the need and persuading the PMIS operations staff to adopt them was less straight-forward. However, the occasion of a fire in an adjacent department with the loss of a very large amount of paper-based information, did serve to demonstrate the value of disaster recovery planning and management procedures!

It rapidly became evident that there were other, more difficult problems, to solve:

1. Ensuring that the PMIS data already entered was accurate.

2. Devising an effective, accurate and timely procedure for the capture of new and changed information.
3. Getting the system recognised as a potentially useful tool for PMO's operations.
4. Explaining to PMO's staff how to use PMIS.

These problems were closely linked.

### **Information Management within PMO**

In the year 2000 PMO held information on all full time appointed civil servants within its jurisdiction in two separate formats:

1. Data held in a conventional paper based filing system.
2. PMIS, digital, records in the database (probably implemented 1998-99).

**Paper-Based Filing System** - For each civil servant PMO maintained a file containing the accumulated information relating to his or her career progression, the so-called P-file. The P-file should, according to agreed rules, contain all PMO and PSC official papers relating to the individual. As a minimum they include: birth certificate (to verify age), original application form, documentation covering educational achievement and qualifications, copy of letter of appointment, 'confirmation in appointment' (when applicable), copies of all correspondence between PMO and the civil servant e.g. relating to promotions, career changes, disciplinary matters, etc.

**Digital Records in Database** - The database was apparently designed to hold information similar to that in the P-file system though it made no provision either for storing or referencing any of the correspondence. The main personnel records were modelled on the civil service 'Application for Employment' form though the database also made provision for some additional records covering career progression, time spent on secondment, and other significant events and episodes. Some areas of the data structures employed were poorly designed (indeed reflecting the employment application form!). In particular, the education and training sections were quite inadequate either for recording meaningful data or identifying individuals with specific characteristics and competencies.

DfID had paid for hardware and software in the form of an aid/grant to PMO. The ostensible reason for introducing a database was to improve 'good governance' by improved record keeping procedures. PMO staff stated that a European Consultancy Group had implemented the database. However PMO had neither records identifying the "Consultancy Group" nor how they had been selected and appointed.

No background information was available within PMO explaining how the system had been conceived or by whom. No written details or specifications relating either to the planning and design of the database, or to its testing and hand-over, existed within PMO. There was, crucially, no information suggesting that any ideas relating to its intended usage had ever been discussed with PMO's management or staff. Apparently no thought was given to the purpose and role of the database system within the PMO organisation, nor on its impact on PMO's method of working. This is a major cause for the system remaining virtually unused by PMO, effectively becoming a complete 'white elephant'.

### **System Configuration & Operation**

The system was based on four or five Personal Computers (PCs) linked using a peer-to-peer network and housed in a special air-conditioned office. The database was implemented as a conventional relational database scheme using Microsoft™ Access™.

The system was run by a relatively senior civil servant as manager, a deputy who handled the technical aspects, and two data entry clerks. The system, including staff, was initially known as the Human Resources Information System (HRIS) but later renamed the PMO Management Information System (PMIS) to align it with the EMIS, HMIS and other planned Gambian government MIS schemes.

### **Data Collection and Input**

After development of the system a major exercise was undertaken by PMO, primarily HRIS staff, to acquire and enter the personnel data. To gather the data HRIS produced a questionnaire requesting civil servants to supply the information required. PMO staff then travelled around the country, visiting every civil servant at their place of work, explaining the issue, and getting them to complete the questionnaires. The data entry clerks then entered the resulting data into the HRIS database.

Several problems arose from this procedure resulting in numerous, serious discrepancies between the PMIS and P-file data:

1. It was difficult to verify the information provided by civil servants on some topics as many did not have copies of relevant correspondence, forms, etc and relied on memory.
2. When the information from the forms was input by the data entry clerks no attempt was made to check the accuracy of the data entry operations.
3. Most significantly, no crosschecks were made comparing the information gathered on the forms with that on the corresponding P-files.

### **Failure to Incorporate PMIS in Working Procedures**

The operational procedures within PMO were never changed to make use of the PMIS database; paper files continued to be used for all PMO's work. When occasionally the PMIS was interrogated differences frequently existed between PMIS and P-file information. PMO's staff were familiar with the P-files with their information in written form. They regarded the P-file information as accurate and thus the PMIS data as unreliable. This became one of the nails in the PMIS coffin: Why use suspect data when (apparently) accurate information is at hand?

Later, when PMO were persuaded to carry out a verification exercise checking both the P-files and the PMIS database against reality, it was discovered that there were serious discrepancies in the paper system's information too. In fact the database information was, in general, much more accurate than the P-files! (A lot of bad filing and bad records practice, e.g. letters with wrong or quite commonly, completely missing references, had resulted in an accumulation of errors in the P-files over many years; errors of which the PMO staff had been quite unaware!)

### **Data Changes and Update Procedures**

The personnel data was, of course, not static. Civil servants change their roles quite frequently. Those changes had to be reflected in the PMIS to maintain its accuracy. However the PMIS was not used in any meaningful operational way for making decisions on individual civil servants and the changes in their careers. Instead, decisions were based on information laboriously dredged from the individuals P-files. The decisions were then communicated to the person and a letter sent as confirmation with a copy placed in the P-file as a record.

The procedure for updating the PMIS database was separate. A copy of every letter written in PMO was included in the so-called 'running-file' and circulated to all managers within PMO including HRIS. Each week the HRIS data entry clerks sifted through the current running-files and used the relevant letters to update the PMIS. As a result the PMIS was always at best one or two weeks out of synchronisation with reality. There were no checks on the update procedure. It was not difficult to miss one or more letters in the running-file or to transcribe the information incorrectly. Moreover there was no certainty that the running-file was itself complete, thus increasing the risk of inaccuracy of the PMIS.

### **The Data Access Problems**

There were two very serious problems concerned with PMO's general staff accessing the PMIS data and these taken with the ones already discussed almost certainly rendered the overall system as originally conceived effectively useless:

1. No training or explanation had been provided to the PMO staff outside HRIS on what a database might be used for nor what information the PMIS contained.
2. If, in spite of this, a member of PMO staff did want information from the PMIS they had to come to HRIS office and ask the PMIS staff to obtain it for them; they did not have terminals on their desks or indeed anywhere in the offices where they worked – where indeed the information was needed.

PMO staff were very busy, indeed generally overworked, and the idea that they might take time out to visit HRIS to learn how to use the PMIS (which, as previously explained, most staff believed held flawed data) was totally unrealistic. It did not happen. Some senior staff who had come across databases while studying abroad did occasionally make requests, particularly relating to statistical information, but the overall use was extremely low. It appeared that, generally, staff had no understanding or interest in the capabilities of the PMIS system.

### **Planned System Upgrades**

Three major changes were proposed for the PMIS which, taken as a whole, formed a realistic attempt to demonstrate that the database could in fact be a very useful asset to PMO, speed up the work done, and improve the quality and accuracy of PMO's output:

1. Acquisition of additional PCs / terminals to be placed on selected staff desks and linked to the PMIS providing easy access to the information
2. Train PMO staff to use the PMIS, show what information it held, how to extract it and how use it in their work
3. The PMIS would be integrated into simple, day-to-day, PMO operations. It would be set to trigger certain date-driven actions on a proactive basis; used to generate text of standard

letters, e.g. confirmation of promotions, whilst drawing information from the database and automatically updating the database on a real-time basis.

The upgrade scheme was designed to show how the PMIS might benefit PMO's operations without seriously disrupting PMO's way of working. The long-term objectives were for the PMIS to gradually take over increasing amounts of PMO's workload. It would be quite feasible to develop the PMIS to handle many of the routine tasks. Every decision made by PMO (and the PSC) currently involves numerous movements of files amongst members of staff and management, and each movement has to be recorded. PMO's arcane procedures could be greatly simplified and the time to make decisions greatly reduced. It would also permit the redeploying of many of PMO's staff to other tasks where their abilities might be better used. The first essential step, however, was to build confidence in the PMIS's capability amongst PMO's management and staff. Only then might it be practical to introduce more sophisticated human resource management objectives.

The proposed upgrade plan needed additional investment. No money was available from PMO resources but a small grant was provided by DfID enabling a pilot project to demonstrate the PMIS's ability to create standard format letters while simultaneously updating the database. This did however not resolve the real problems of PMO staff access to the PMIS, nor did it provide the training in database use or explain its capabilities. The PMIS thus inevitably remained unused, a wasted asset.

## **CASE STUDY 2: THE EDUCATIONAL MANAGEMENT INFORMATION SYSTEM (EMIS)**

### **Introduction to DoSE**

The Department of State for Education (DoSE) is responsible for all facets of education within The Gambia. It includes over 700 schools with over 6,000 teachers providing education from primary up to university level.

Major issues facing the Department in 2000 included:

- Inefficient and poorly resourced management
- Lack of accurate statistical data for the sector
- Use of significant proportion of unqualified teachers
- Primary Net Enrolment Rate (NER) of around 75% in some areas
- Gender inequality in pupil enrolment and teacher recruitment and deployment
- Unsatisfactory curriculum

### **Project Outline**

DfID has a history of supporting the development of the education sector in The Gambia. As part of this development an Education Management Project (EMP) was inaugurated in early 2000. This project was extensively researched and discussed with DoSE senior management when it was being designed. It had a planned duration of two years and specifically targeted the management of the sector through:

1. Provision of new systems including EMIS, staff appraisal system and training needs system.



## 2. Strengthening of human resources and IT capacity

This paper is primarily concerned with the EMIS component of this project and does not consider the staff appraisal aspect although this encountered very similar difficulties.

The project team comprised:

- Team Leader
- EMIS System Designer
- Human Resource Specialist - Principally concerned with the staff appraisal system

The team was supplemented by a Systems Analyst from VSO and by local staff who received more training under the project.

The DoSE Information Technology and Human Resource Department (ITHRD) had previously commenced work on an EMIS. The EMP Team Leader's report of this aspect in April 2002 stated:

*"ITHRD had conducted a survey of teachers in 1998 and data was still being entered under difficult conditions. Data control systems were non-existent.... The data entry system was similarly unsystematic, with three separate databases maintained and no system to prevent duplicate entry, and no permanent identification system for records.' There were also severe resource constraints in terms of the number of computers, network facilities and general administrative arrangements." (DoSE, 2002)*

A work-plan was produced for the System Designer and Systems Analyst and this was, in general, executed as planned:

- User needs assessment;
- Review of current information flows;
- Design of EMIS on the basis of the user needs;
- Develop EMIS;
- Review IT training needs of ITHRD staff;
- Review EMIS training needs of DoSE users.

The resulting EMIS product was distributed on a CD that included the necessary procedures for installation on user PCs. It was intended to provide a comprehensive, accumulating statistical view of the education system in the country. It did not provide for end-user feedback of amendments and corrections.

### **System Components**

The system was composed of the major data elements shown in Table 2:

**Table 2: Major data elements**

<b>Data Source</b>	<b>Contents</b>
School	Description, Location, Enrolment, Physical facilities, Special Needs pupils and facilities
Centre	Description, Location, Enrolment, Physical facilities
Financial	Actual expenditure, Budgets
Staff	Individual details including qualifications and working history of both teachers and administrative staff
GIS	Location data for all educational establishments

### Reporting

Extensive reports at establishment, regional and national levels including analyses by age, gender, grade and school type. Statistics included Gross and Net Enrolment Rates, Pupil/Teacher ratios, promotion and drop out rates in accordance with international definitions.

### Technical Overview

EMIS was developed in Microsoft™ Access™ (version '97 and 2000) being used so as to provide compatibility with the versions of this software currently in use within DoSE. The GIS component was produced with MapInfo.

There are a number of different functional components involved in the production process:

- Data entry system for establishment descriptive and enrolment data
- Data entry system for staff data
- Regional databases for use in the Postings process
- Form tracking systems for the management of data collection and entry
- Ad-hoc data manipulation for the other data sources
- Operations Database for automated combining of new elements of data into the master version, other items of system administration and the final 'publication' in CD format.

The two data entry systems were operated separately from the master version of the data. Once data entry was complete the Operations Database managed the loading of the new data into the master version.

The final product, the two data entry systems and the operations database all had a similar structure in terms of a front-end database and a core database that are joined by the "Linked Table Manager" in a way that is transparent to the users.

### Project Implementation

Under the direction of the System Designer most of the work was carried out by the VSO System Analyst who in turn directed a Peace Corps volunteer (who developed the GIS component) and two Gambian Systems Analysts who had been trained in Microsoft™ Access™ under the project.

### *Development Period*

During the active life of the project (i.e. until March 2002) the system was developed broadly in accordance with the work-plan and the system design as modified in the light of user feedback.

- Appropriate systems (PCs, network servers, network components, printers & UPS) were purchased and installed.
- The software development moved forward steadily and there were a number of releases during this period as data was captured and more functionality was provided. The VSO System Analyst was the principal driving force in this period.
- Capacity building of relevant staff was initiated. Technical staff receiving more advanced training were tied to government employment by a bonding scheme that imposed financial penalties if they left government service before the end of a contracted period.
- A recommended annual operational schedule was defined and progressively introduced.

In March 2002 a formal ceremony marked the end of the development project and the departure of the team members. At that point the status of EMIS was:

- **Software Development** - Most major components completed, some minor elements outstanding. Formal quality assurance and testing not performed.
- **Documentation** - User Manual and Operations Manual – complete in line with software.
- **Technical Training** - Complete except for one Network Administrator in UK on MS Certification course and one System Analyst continuing a distance-learning course.
- **User Training** - User workshops had been provided for all appropriate education management staff. Further workshops had been carried out when subsequent versions were released.

### *Post Project Period*

The closing ceremony proved to be a high water mark for the system. Over the next two years there was a progressive decline in the staff situation within DoSE and especially with the EMIS team. Generally the management staff levels across DoSE were well below the establishment figures with the more competent individuals being moved around according to changing priorities.

In the EMIS team individuals trained under the project were either moved away or left as soon as they could at the end of the bonding period associated with their training<sup>3</sup>.

The remaining development team were heavily occupied in the routine operation of the system and operational problem solving which left inadequate time for new development. Software problems were encountered with various statistical production modules within the system and these proved too complex for the existing staff to correct.

Recruitment of suitable replacement staff proved impossible because of management reluctance and, even more significantly, because of the lack of suitable candidates. The Gambian education system, like many other countries in Sub Saharan Africa, is heavily based on rote learning and positively militates against constructive thinking:

*“The school curriculum has little relevance to the needs of the community. Often, its goals are too ambitious and its content too encyclopedic [sic] given the realities of the situation. This explains, in large part, the high rate of student failure. The teachers usually have*

*only a modest level of education themselves and little systematic training. They tend to emphasize rote learning rather than using active methods and have little experience in how to organize a programme that can cater to students of different ages and achievement levels. Very few countries have effective programmes of continuing education and training for teachers to help them overcome these weaknesses.” (WB, 1997)*

Management of the EMIS during this time was provided by another VSO volunteer (the author of this section) who was supposed to act as an Advisor in support of a Gambian departmental manager. However the person eventually appointed for the latter role was fully occupied with other ICT activities and took no part in EMIS. When the author departed in January 2004, in the week of his departure a Gambian with minimal experience was appointed to take on those responsibilities. Therefore no proper hand-over or training was possible.

The power supply throughout the country worsened progressively with particularly significant impact in the regional offices with negative consequences especially on the postings process (see section 3.63 below). Funding had been allocated for fuel for a generator for the DoSE building in which EMIS is based but these funds were often not made available for that purpose.

The equipment maintenance situation deteriorated progressively. The local maintenance organisations are of limited ability and capacity. Minimal funding was identified for maintenance in annual budgets.

#### *Data Collection*

The annual data collection exercise was a critical part of EMIS since it was the source of the majority of data loaded into the system. The key element was the completion of a 14-page form by the principal of each educational establishment covering detailed enrolment figures and the establishment facilities. Training was provided each year for school heads in each region to equip them for this exercise.

Each year different methodologies have been used for the issuing, collection and validation of these forms. No satisfactory and cost-effective approach has yet proved successful in terms of the speed, completeness and accuracy of form completion.

Although head teachers had the importance of this process explained to them each year, they saw little if any direct benefit coming to them or their schools and consequently they often lacked motivation and delegated the task to less appropriate individuals. The resulting forms required extensive validation before data entry.

#### *Postings*

The annual process of allocating teachers to schools was identified as one of the principal ways in which EMIS could provide benefits to DoSE management. To date this has not proved to be the case mainly because of operational difficulties that have made the relevant information available to the Postings Committee either too late or in incomplete form. The failure of EMIS to provide real benefits in this respect handicaps the reputation of the system within DoSE management.

## Observations

- The project design and development was carried out with comprehensive investigation and consultation phases. The development phase followed the agreed work-plan including significant user review elements. However the available development team were not able to complete and test the system as designed in the time available.
- The outstanding items would not have prevented proper operation of the system had adequate technical and operational staff been available once the team departed.
- Most of the Gambian staff who had received training under the project were either moved away by DoSE management, lacked the aptitude or ability for the role or left government employment as soon as they could on completion of the bond period. The assumption had been made that adequate technical staff would be available to operate, manage and further develop the system as a result of the training that would be included in the project. In hindsight this appears to have been a false assumption.
- This severe lack of suitable local individuals for identification and training as technical staff to operate and further develop the system implies that it will be dependent upon non-Gambian resource for the foreseeable future. This lack is principally due to the poor quality of education and rigid methodology employed in Gambian schools.
- Elements of the local infrastructure (power supply, computer maintenance companies, availability of software development personnel) were a serious obstacle to the ongoing development of this system and to ICT developments in the country as a whole.
- DoSE management were not prepared to devote resources to the EMIS once the project team had departed and did not appear to have any grasp of the management or technical demands of IT systems.

## CASE STUDY 3: THE HEALTH MANAGEMENT INFORMATION SYSTEM (HMIS)

### Introduction

The Department of State for Health and Social Welfare (DoSH&SW) is responsible for providing health care to the people of The Gambia. Delivery of health care has been focused at the primary level, that is, within the community itself with village health workers and community health nurses providing key health services to the public. Secondary and tertiary services were provided by 4 hospitals and approximately 40 health facilities with more than 500 health posts at the primary level though there were also facilities provided by private and Non-Governmental Organization (NGO) clinics. The "Mission Statement" of DoSH&SW is:

*"Provision of quality health care services within an enabling environment, delivered by appropriately and adequately trained, skilled and motivated personnel at all levels of care with the involvement of all stakeholders to ensure a healthy population." (DoSH&SW, 2001)*

DoSH&SW was aided in the provision of these services by ICT equipment scattered in offices and health facilities throughout the country. Most of this equipment was donated to the department or acquired by funding agencies such as the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF). Some equipment was also purchased using credit from organisations such as the World Bank. In the past most of this equipment was used for

basic word processing and spreadsheet purposes with little consideration of their use for more advanced analytical and planning purposes.

In recent years there has been an increasing demand for accurate health information on which to base sound decisions. Previous decisions were made based upon surveys with limited applicability or by "generally accepted" situational analysis. The information necessary to make effective decisions was simply not available. It was accepted that ICT could potentially play a significant role in this effort and it was further hoped an effective Health Management Information System (HMIS) would be able to provide this information.

### **Project History and Overview**

The need for a HMIS was initially recognised by a survey undertaken by the Management Sciences for Health organisation in 1994 (MSH, 1994). The African Development Bank funded this initial survey but specific HMIS funding was not secured until 1998. At this point the World Bank funded Participatory Health Population and Nutrition Project (PHPNP), a five year project (subsequently extended), identified the HMIS as part of its efforts towards "...improving the quality of, and access to, family health services, including reproductive, infant and children health services, nutrition services, and the management of such services in The Gambia" (PHPNP, 1998). PHPNP included HMIS as part of its "Capacity Building and Policy Development" (Component IV, "Management and Implementation of a Family Health Project", sub-component 1). PHPNP identified the following as components of the HMIS:

- **Health Indicator System** - Containing information specific to the generation and management of key health indicators currently entered at the divisional level through the use of spreadsheets. The idea behind this system was to create a database system that would allow central analysis of data both at the divisional and central levels.
- **Finance and Accounting Information System** - Containing information regarding the day-to-day financial activities of DoSH&SW
- **Maintenance Information System** - Containing information regarding the management and repair of various medical equipment, vehicles and facilities throughout DoSH&SW

Since the initial PHPNP proposal various events occurred that caused adjustment to the scope of the HMIS including:

- Establishment of the World Bank sponsored Integrated Financial Management Information System (IFMIS) in the Department of State for Finance and Economic Affairs (DoSFEA). This promised to provide much of the functionality originally identified as the "Finance and Accounting Information System" so this component has been removed from the scope of the HMIS implementation. In recent years the viability of the IFMIS has been called into question with continuing delays and seemingly over-optimistic goals.
- The Human Resources Information System financed by the African Development Bank identified in the initial HMIS proposal never materialised so this critical piece needed to be added back into the implementation of the HMIS.
- Updating the National Pharmaceutical Service Inventory and Drugs Information System required higher priority in order to improve service delivery, resource management and cost-efficiency.

## Project Implementation

### *Project Focus*

The HMIS had the advantage of being implemented after the initial attempts at establishing MISs by PMO (PMIS) and DoSE (EMIS). In conversations with key individuals involved in the development of these systems a number of critical issues linked to their perceived failures were identified.

These conversations and other influences caused the HMIS implementers to re-consider their activities with regards to the following:

- **Limit the Scope** - One of the shortcomings in both the PMIS and EMIS was that of trying to do too much. On review it was seen that the original scope of the HMIS was also too wide therefore the PHPNP decided to focus on the establishment of a solid foundation for the HMIS rather than the actual implementation of such a large system. This focus narrowed the original requirements such that out of eight core components identified in the HMIS policy (DoSH&SW, 2002) only three were to be implemented as part of the PHPNP.
- **Sustainability** - Every effort was made to ensure that HMIS activities were looked at from the perspective of how these activities would be continued in the future (if required) and how the DoSH&SW infrastructure could maintain the results. One of the reasons for this focus included the fact that both of the key HMIS staff involved had worked for organisations that have this as a stated mandate. The concern was also based upon the observation that many of the activities that have failed in The Gambia have not taken sustainability into consideration. This concern also drove the decision to focus on the development of a solid, core foundation on which the system was to be built in order to attempt to ensure its long-term sustainability.
- **De-Centralisation** - With the government passing into law the "Local Government Act" it was vital that the HMIS took into account the power that would eventually be transferred into the divisional offices. HMIS tried to build divisional capacity by providing the divisional staff ICT training and installing essential ICT infrastructure including computers and network equipment.
- **Inter-Departmental Communication/Co-Operation** - The team implementing the HMIS saw the communication with other government departments regarding common needs in the development of IT systems as critical to its success. It was perceived that previous project failures were due to a lack of this communication. These types of discussions are crucial in light of the interdependencies HMIS has with IT systems in other departments such as PMO and DoSFEA. The team encouraged the development of an "Inter-Departmental MIS" group as well as the active participation of DoSH&SW in any and all inter-departmental ICT forums such as the recent e-Government program of UNECA.

### *Establishing the Core Infrastructure for HMIS*

To identify the state of ICT within the department an initial assessment of all ICT resources (both computer equipment and personnel) was performed. This assessment was used to determine what specific activities needed to be carried out to establish the fundamentals for the HMIS. The activities identified included:

1. **Training** - The level of ICT understanding in the department was quite low so it was identified very early in the process that some level of ICT training would be required. This training was carried out by local institutions for personnel at all levels within DoSH&SW. It was critical that

training also be held for staff stationed in the six divisional health team (DHT) offices who are often neglected due to the lack of professional training resources outside of the capital area. This has meant that HMIS has sponsored very successful training sessions held up-country. This training was also intended to help build the capacity of the divisions in support of future DoSH&SW decentralisation. Additional training was carried out for key personnel in Data Analysis since there was a requirement that competent staff be available to analyse the data the HMIS would generate. It has been widely accepted that the educational system in The Gambia does not produce many analytical thinkers so training in this area was critical to the goal of implementing a HMIS.

2. **ICT Acquisition and Installation** – PHPNP purchased computers and networking equipment for use throughout the country. For sustainability reasons the necessary protective equipment (including UPSs, Voltage Regulators and fused Power Strips) was also purchased. Due to the erratic power supply in the country this additional equipment was absolutely necessary. Both the establishment of a long-term maintenance strategy and the acquisition of a Department-wide anti-virus solution provided additional support of this infrastructure. Prior to this investment loss of critical health data and information was common due to out of date anti-virus software or, in most cases, lack of any anti-virus software at all. There were yearly subscription costs associated with providing anti-virus software so efforts were also been made to include these costs in the departmental budget. Computer networks installed throughout the country also facilitated communication and co-operation between the various units as well as providing communications with the rest of the world using a high-speed Internet connection. Later in the project it was realised that with a little extra effort networking would be possible at the six Divisional Health Team (DHT) offices located throughout the country so an integrated wired and wireless solution was identified, procured and installed in these offices. Professional communication was also facilitated with the establishment of a departmental web site (<http://www.dosh.gm>) as well as another web site specifically targeted for the public (<http://www.healthgambia.gm>, though this site has not been fully developed).
3. **Policy and Standards Development** - HMIS has largely been responsible for the implementation of a "Computer Use Policy" to govern the acceptable and responsible use of ICT in the department including how an Internet connection should be used and how computer equipment should be cared for. Monthly training sessions are held to inform employees of what the "Computer Use Policy" is and what it means to them. All employees are required to sign the "Computer Use Policy" to indicate their understanding and acceptance of its restrictions. ICT and HMIS staff were always watching for violation of this policy and taking the necessary actions to address them. Standards providing minimum acceptable specifications of ICT equipment (both for new purchase and donation) have also been established which has been critical in avoiding the acquisition of inappropriate or insufficient equipment. Largely the role of HMIS in this area is the sensitisation of employees to the policies, guidelines and standards including continual reminders of their existence. It should be noted that all of these policy initiatives were of the non-Gambian HMIS personnel, as it seemed local DoSH&SW staff were unable to grasp their importance. Over the years since the policy has been implemented the local employees have begun to see that these policies are designed to protect and further the ICT interests of DoSH&SW and are for their benefit so the enthusiasm for them has increased.

#### *Establishing the HMIS*

Early in the planning process it was seen that a central repository for all HMIS data would be required. This repository would allow any system requiring DoSH&SW data to easily access it. It was determined that this database would have to be capable of handling multiple concurrent



access but with budgetary considerations commercial products such as Sybase SQL Server and Oracle were not seen as viable solutions. After long discussions the Open Source database server software MySQL was chosen and implemented. This database was eventually populated such that it contained the core set of information for future (and existing) HMIS components.

After the core database was implemented, basic versions of the following components were implemented and were largely operational at the end of the author's services:

1. **Health Indicators** – Essentially the same as the “Health Indicators System” envisaged by the initial PHPNP proposal, this component would contain statistical data regarding the delivery of health care in the country intended to support the Epidemiology and Statistics Unit (ESU) of the Directorate of Planning and Information (DPI). Generally this involved the extraction of data entered at the divisional level in spreadsheet form into a central database. It is with this extracted data that key indicators for the country could be determined such as those related to maternal mortality rates and immunisation coverage. A preliminary system was developed in 2002 using local contractors but the solution developed was not adequate for the needs of the department. There was a new system developed by the VSO volunteer hired to assist with HMIS implementation before he left the country. There was also a severe back-log in the entry of divisional information by the local data entry clerks with some personnel reassigned or resigned from the service.
2. **Drugs, Vaccines and Other Medical Supplies** – This component would contain inventory and ordering information for medical supplies throughout the country and was implemented by a consultancy firm from Ghana. Initial indicators after implementation were that the system was not being used correctly (if at all). It was suggested that this failure has been due to the fact that the personnel could not see the benefit of the system and that full accountability was not something they truly wanted.
3. **Human Resources** – Before HMIS there was little accurate information about DoSH&SW employees available within the department and even within the department supposedly responsible for it: PMO. To address these concerns a Human Resources component was identified to store information about all DoSH&SW employees. A rough data-entry system was created to store the information gathered from a questionnaire sent to all employees to establish a core set of data about all staff. All data received was entered into the system and the information was being validated with information that was received from PMO at the time the author left the country. It was hoped that this system would eventually be regularly synchronised with the human resource information of PMO.

A number of components of HMIS were yet to be implemented including:

- **Vital Registration** – This component would be used to store key information regarding the registration of births and deaths. The Births and Deaths Registration Unit were managing this process and, while they had computer equipment, it was largely unused as all information gathered by the unit was being entered manually into large registration books. This system led to widespread abuse and inconsistencies in the data. Due to political issues this component was not developed but was awaiting direction from senior management. Recently a proposal was put forward to fund the creation of a Vital Registration system as part of the United Nations Economic Commission for Africa (UNECA) African Information Society Initiative (AISII) framework (adopted by African Countries in 1996) however the outcome of this has not been revealed.
- **Logistics** – This component was envisaged as containing a complete inventory of all medical equipment as well as maintenance scheduling facilities. This component was only partially implemented by the end of the authors time with all ICT equipment existing in an inventory

database along with management of any problems related to that equipment. This information was used to derive key statistics for future ICT resource planning. The aspects of this component related to medical equipment were not yet implemented with no future plans for their development in place. This was partially due to the fact that the key local staff member involved with and driving the implementation had left the service before the system could be completely specified and implemented.

#### *Current Status of Project Personnel*

The current HMIS Consultant and the VSO systems analyst assisting her have now both left the country. There was hope that the time allotted would be sufficient for this role of establishing the firm foundation for future development however it seems that this is not the case.

It should be noted that since their departure both consultants have continued to support the HMIS by providing support via the telephone and electronic mail. It is hoped that these continuing efforts will in some small way sustain the foundation that they have helped establish.

#### **Difficulties**

A number of critical issues were identified throughout the development of the HMIS including:

- **Lack of High Level Support for ICT Activities** - A large number of the difficulties experienced in the implementation of the HMIS could have been addressed with the support of high-level managers. There seemed to have been little appreciation of the utility of ICT resources nor a consensus as to how to use the information that is generated. Frequent changes in top-level management have made long-term plans difficult to implement thus the planning process was considered wasted effort. Senior managers much prefer to retain the short-term control afforded by *ad hoc* decision-making to more demanding information-based decisions. *Although a MIS can make information more available it cannot compel its use.*
- **Inability of Donors to Assess Need** - A number of donor agencies seemed to be willing to implement systems or donate ICT equipment to vertical programmes without first assessing needs of the programme itself, or of the health system in general. Inappropriate computer equipment was often purchased to the extent that there are units in the department that had more computers than people. Often systems were installed as part of a worldwide effort even though they had little relevance to the country and caused serious disruption to the running of the health care system. Largely, it seemed, the attitude of the donors was one of "we know what is best for you" and "do what we say" rather than "what do you want?" or, more importantly, "what do you need?" Admittedly, it is difficult to assess need in a country such as The Gambia when every response is geared towards saying what the donor wants to hear. The donors are to be kept happy since they are the source of current and future funding. DoSH&SW was only too willing to accept advice unquestioned rather than thinking about its own requirements. Recipients were adept at using all the correct words while not fully believing in them or understanding their implications. Donors have more responsibility to assess the actual level of commitment to the use of ICT and MIS than was often made.
- **Sustainability** – Long-term plans for maintaining and using any MIS must exist and be realistic. While maintenance of resources was rightly the responsibility of recipients of major donations, specific planning for the ongoing upkeep and use of complex systems must be part of the initial donor process. It is not adequate for the donor to assume that it is out of their hands, nor for the recipient to assume "someone" will take care of it in the future.

- **Inadequate Basic Education of Personnel** - Basic analytical skills were missing in most personnel within the department. This was largely seen as the fault of the education system in the country. With education mainly focused on teaching young people by rote they were not encouraged to develop the analytical or planning skills necessary to survive in the global world of today. University level education began in The Gambia less than ten years ago focusing on liberal arts and economics with science, engineering and technology poorly represented. Although more and more graduates of secondary schools and university were computer-literate at a basic level, the thinking and analytical skills needed to maintain, use and develop a useful MIS were yet to become widely available.
- **Inadequate Basic Technical Infrastructure** - Power and water were not reliable throughout the country (though most pronounced outside of the capital area) which caused problems when making use of ICT requiring the use of alternate power sources such as solar power and (more often) petrol generators. It should be noted that The Gambia was fortunate, however, to have a very reliable telephone system with fibre throughout.
- **Lack of In-Country ICT Development Expertise** - There was a serious lack of qualified ICT system analysts and development personnel throughout the country leading to systems being written outside the country or systems being implemented poorly. Part of this was likely due to the quality of the education system (see above) but also due to the fact that any local qualified personnel are very valuable and they find better opportunities elsewhere. Such personnel were highly sought after by the private sector that regularly draws such staff away from DoSH&SW and other government departments. Ironically, it was often multi-national NGOs that recruit staff away from the countries they are supposed to be assisting.
- **Expense of Acquiring Legal Software** - There was little understanding or support for developing countries in the acquisition of legal copies of computer software. While £300 may mean nothing to a large company in England, to a developing country such as The Gambia this represents much more than a year's salary for most people. While companies such as Microsoft™ have made it less expensive for educational institutions they have not yet seen the difficulties of public institutions in the developing world where the resources are much more constrained.

## OBSERVATIONS AND DISCUSSIONS

Several issues can be identified as being common to the design and implementation of these three systems as described above:

- **Technology was not a factor in the success or failure of project implementation** - It is clear from the three cases cited in this paper that technology was not an issue when it came to the success or failure of the given systems. In all of these cases it can be seen that the effectiveness of management was critical to the success or failure of the project.
- **Infrastructure problems severely impacted project implementation** - It should not be underestimated the impact of the lack of an appropriate infrastructure will have on project implementation. In The Gambia the lack of power and telephone services<sup>4</sup> for extended periods of time severely impacted the implementation of each of these systems. These factors should be understood and allowances made during project design.

There are a number of factors that can be seen as critical for project success:

### Understanding Cultural and Contextual Differences is Key

In The Gambia the poor quality of the educational system was often ignored which led to a "developed world" solution being implemented in an immature management context.

The three authors have come from cultures in which ICT has been introduced slowly over time and integrated into the society as a whole. In developing countries to implement advanced technological solutions without this cultural context is irresponsible and most likely to lead to failure. *It must not be assumed that the recipients understand or appreciate the impact of the system being implemented.* This "technological cultural gap" cannot be addressed by simply training individuals in the use of technology but there must also be a gradual sensitisation process whereby an appreciation for the cultural impact of technology is made clear. Technology is not simply a matter of computers it is also a state of mind -- an entirely new way of thinking.

It should also be understood that in many ways managerial staff in developing countries are likely to agree to anything proposed by ICT implementers for numerous reasons relating to aid dependency and perceived expertise on the part of the ICT professional. There should be concerted effort to ensure that the recipients understand the full ramifications of the project.

### **Long Term Project Sustainability**

In many cases a project is implemented by a funding organisation over a fixed duration after which the project is considered complete. Before embarking on an ICT project serious thought must be given to the long-term sustainability of the project once it has been completed.

Development projects funded by donor agencies normally specifically exclude running costs such as:

- Hardware and software maintenance costs
- Telephone and Internet charges
- Consumables such as paper, printer cartridges, and backup media
- Higher salaries required for the retention of technical staff

Therefore the project should address these matters by ensuring that senior management recognise this issue and that adequate provision is made in the budgetary process for the new system. This is an area in which senior management will often say that provision will be made at the start of the project but financial constraints are often imposed during the budgetary process. These recurrent costs are not perceived as being 'mission critical' and are often therefore dropped. There is a common belief that 'some other donor' can be found to fill the resulting gap when something breaks down.

### **PROJECT IMPLEMENTATION GUIDELINES**

Based upon their experiences, the authors would like to propose the following guidelines for successful MIS implementation in developing countries such as The Gambia. It should be noted that this section is not intended as a comprehensive project management manual but identifies aspects that require particular attention in such environments.

#### **Project Planning**

During the planning process for the project there are a number of factors that should be considered:

*Ensure Project Applicability*

It may appear obvious but there needs to be a true understanding of the needs of the recipient and any proposed system must address those needs. It is possible to implement a system in a country with little regard to whether or not the country such a system serves any useful purpose. While it is true that the donor may have its own reasons for wanting the system, this should be weighed in light of the real and practical needs of the recipient. Where the donor has a particular set of requirements for the system these should take into account the needs of the recipient as well adjusting to the local requirements.

*Realistic Scope*

A realistic scope and time-scale for the project should be identified and communicated to all key players. There is always a pressure when funded by large agencies that the project achieves (or is perceived as achieving) the most within the budgetary constraints. This temptation should be weighed in light of the likelihood of the long-term success or failure as well as the value of the project to the recipients. The needs of the recipient should be balanced with the needs of the funding agency. It should be seen that it is in the best interests of the donor to see to it that the project is a success and, therefore, take necessary steps including the narrowing of scope to ensure that this is so.

*Management Commitment to Project Success*

Ensure that there is genuine management commitment to the successful implementation of the project. There should be no assumptions made of their knowledge of ICT issues. It is essential to ensure the necessary understanding exists before soliciting key decisions. It may be necessary to consider the training of key individuals in management issues so they are more capable of making appropriate business decisions.

*Clear Project Goals and Success Indicators*

All parties should understand what the goals are of the project and clear indicators for project success should be developed. Such understanding by the recipient agency middle management should be to the level of being able to explain to others what these are in their own words instead of repeating simply the terminology and phrasing laid out in the project documentation. There should be a focus on the real understanding and appreciation of the impacts the project will bring to the recipient.

*Long-term Financial Planning*

The financial planning of the project will naturally include all identifiable items during implementation. The project costs should reflect the additional sensitisation and consequent longer project duration than would be appropriate in western circumstances. However from the very beginning attention should also be given to the long-term financial sustainability of the project with efforts focused on obtaining long-term funding for the recurrent expenditures required after successful project implementation. The inclusion of such expenses into the budget may include lobbying and negotiating for necessary budget funding or talking to other long-term donors. This process can, potentially, take a considerable amount of time (perhaps even the duration of the entire project) so efforts should be made to start this as early as possible. The financial management of the project should be paramount. The adoption of separate bank accounts, not under the control of the recipient, should be used to fund the project<sup>5</sup>. Similarly, the

provision of ring-fenced funding<sup>6</sup> to cover the various ongoing costs of running the finished system and its further development should be given serious consideration.

## **Project Implementation**

### *Phased Implementation*

Ensure that projects are implemented in a step-by-step manner with clear and achievable goals in each phase. These goals should be associated with the identification of easily quantifiable indicators. All parties should have a clear understanding of these goals and be continually striving towards their achievement. Each phase of the project should thus result in a system that demonstrates functional benefit to the recipient's management and staff. Implementing a project using the "big bang" is a recipe for disaster particularly when the lack of cultural understanding identified in the previous section.

If possible the decision as to whether or not to proceed to the next step of project implementation should be based upon the confirmation that the previous step has been successfully implemented. Continual checks and balances should be made throughout the implementation of each phase with adjustments made as necessary to ensure successful implementation. It may be possible to link the achievement of the goals of each particular phase to financial incentives to stimulate this process.

### *On-Going Training and Sensitisation*

Before and throughout the implementation, training should take place for all relevant recipient agency staff in the *use of the MIS as an adjunct to their working procedures*. This includes technical personnel, management and system users. This training should be accompanied by project sensitisation sessions to ensure widespread understanding of the system and the benefits it will bring. Often such sessions are left until after the project has been implemented but this may cause resentment in that the system is implemented seemingly "out of nowhere" with little consideration given to the potential users. Appropriate sensitisation should also be provided for other staff members (e.g. secretaries, filing clerks) who have no direct contact with the system but whose working practices will be affected.

### *Organisational Change Management Unit*

A dedicated Change Management Unit should be created within the organisation to control the impact of the new system on working practices. This would be used for attempting to ensure the successful implementation of the project but could also be useful for the development of management skills within the recipient agency and subsequently for other, non-project related activities that could be more effectively implemented. The perception may be that such a unit would slow project implementation down. While this may be true such a unit could ensure the long-term sustainability of the project and, therefore, the associated goals.

This unit could serve as a training unit for people in change management techniques beginning with one individual trained in such techniques passing these skills onto others in the unit. Were such a unit to be proposed it is essential it is mandated and facilitated by the recipient agency itself. Without this involvement it is unlikely that such a unit would survive past project implementation.

### **Project Implementation Checklist**

In summary, the following is a checklist of the attributes that must be a part of any successful project implementation:

- Clear definitions of the project rationale and anticipated impact
- Achievable project scope
- Demonstration of management commitment
- Communication of project goals and success indicators
- Project financial planning to cover implementation
- Long-term financial support provided by recipient agency
- Incremental implementation linked to identifiable deliverables with demonstrable benefits
- Training and sensitisation of all appropriate staff in the recipient agency
- Use of a dedicated Change Management Unit

### **CONCLUSIONS**

It can be seen in this paper that there are two fundamental issues:

- ***Failure of aid agencies to understand the environment in which their ICT is to operate*** – In the PMIS DfID supplied equipment but seemed to have no understanding of where or how that equipment would be used. Would DfID have even contemplated EMIS if they had known DoSE would just let all the project staff leave without replacing them?
- ***Failure of aid recipients to understand the benefits of ICT for their jobs*** – If this understanding had been in place, would the management of DoSE allowed the EMIS to stagnate? Would PMIS have continued for year after year to contain patently inaccurate information? Would the HMIS have taken so long to implement?

Notwithstanding these difficulties however, the authors are satisfied that ICT projects, correctly implemented, with due regard for sustainability and staff training, can yield very significant

benefits in in LDCs. Much of the development needed in LDCs would greatly benefit from access to, and effective analysis of, information. Each of the three schemes discussed, if correctly implemented and applied, had the potential to yield clear benefits in terms of improving the efficiency of the departments concerned whilst reducing reliance on scarce, trained and skilled, staff resources. The "phased" approach suggested in the "Project Implementation Guidelines" goes a long way towards anticipating these requirements and addressing the related issues.

Much of the information access and analysis can only realistically be achieved by ICT. The shortage of educated and skilled staff has been flagged as a specific problem for development of ICT schemes but it is equally a serious factor in virtually all areas of administration, business and industry in The Gambia. The introduction of soundly planned ICT systems does therefore provide a possible means of employing scarce resources more efficiently and benefiting the country's economy.

Finally it should be noted that, although many difficulties arise with the introduction of ICT in The Gambia this does not reflect hostility towards technology in general. As in so many Sub-Saharan LDCs, the wide acceptance of cars and motorised transport, and, even more recently, the extensive adoption of mobile telephones in The Gambia is clear evidence of this. This demonstrates that, when people in The Gambia perceive a benefit that is readily available, they are quick to take advantage of new ideas and, very importantly, develop the infrastructure necessary to support that technology. For ICT to become accepted in The Gambia, its benefits too must be adequately explained and it must be made available in a usable and sustainable form.

## ENDNOTES

- <sup>1</sup> The country's official name is 'The Republic of The Gambia'; the colloquial name 'The Gambia' is generally accepted and will be used in this paper.
- <sup>2</sup> Formerly Voluntary Service Overseas (VSO). Cf. <http://www.vso.org.uk>
- <sup>3</sup> "Bonding" is the process of contractually obligating civil servants so that they must continue employment within the government (or even, more specifically, their department) for a specified duration.
- <sup>4</sup> It should be noted that although the telephone system was generally well-developed government departments were frequently cut off because of non-payment of bills.
- <sup>5</sup> It is acknowledged that the setting up of such bank accounts may be difficult as demonstrated by the "Drug Revolving Fund" within DoSH&SW which required an act of the National Assembly before it could be implemented.
- <sup>6</sup> Funding that is allocated for a specific set of activities.

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