

**South African  
Computer  
Journal  
Number 11  
May 1994**

**Suid-Afrikaanse  
Rekenaar-  
tydskrif  
Nommer 11  
Mei 1994**

**Computer Science  
and  
Information Systems**

**Rekenaarwetenskap  
en  
Inligtingstelsels**

**The South African  
Computer Journal**

*An official publication of the Computer Society  
of South Africa and the South African Institute of  
Computer Scientists*

**Die Suid-Afrikaanse  
Rekenaartydskrif**

*'n Amptelike publikasie van die Rekenaarvereniging  
van Suid-Afrika en die Suid-Afrikaanse Instituut  
vir Rekenaarwetenskaplikes*

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### Ensuring Successful IT Utilisation in Developing Countries

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#### Abstract

*It is generally accepted that Information Technology (IT) has the potential to promote development and alleviate some of the common problems in the developing countries. However, it would appear that few developing countries have been able to exploit this technology fully. In fact, it would rather appear that there is extensive under-utilisation of equipment, and failure of computer-based information systems projects in developing countries. In this paper, the author argues that this under-utilisation or failure could be as the result of not being aware of, or of not carefully considering, the implications of having certain foundations laid before the acquisition of IT. The paper will also explore the need for further research in this area.*

**Keywords:** *Developing Countries, Foundations for Information Technology*

**Computing Review Categories:** *H.4.m, J.0, K.4.3, K.6.0, K.6.1, K.6.2*

Received: August 1993

#### 1 Introduction

Goodman states, in a recent article, that "it may be argued that deficiencies in the use of IT are the least of the problems of a continent plagued by a history of exploitation, postcolonial political difficulties, bloody civil conflicts, and extensive health, educational, demographic and economic problems. Nevertheless, attention should be given to the fact that more than 500 million people have largely been left out of the 'global information society'" [4]. Although Goodman is focusing in particular on sub-saharan Africa, the above could hold true for most countries in the developing world. However, the author would assert that not only is it important for countries to be part of the "global information society", but that many of the problems listed by Goodman could be better addressed and possibly even alleviated through ensuring the successful utilisation of IT in these countries.

There is overwhelming awareness that there is great potential in the utilisation of Information Technology (IT) to promote development and alleviate some of the common problems in the developing countries. As such, it is also generally accepted that IT has the potential to "narrow the gap" between the developed and developing countries by addressing many of these development problems. However, it would appear that few developing countries have been able to exploit this technology fully. In fact, it would rather appear that there is extensive under-utilisation of equipment, and failure of computer-based information systems projects in developing countries [4].

In this paper, the author argues that this under-utilisation or failure of IT could be as the direct result of not being aware of, or of not carefully considering, the implications of having certain important foundations, laid before the acquisition of IT. In the same way that any secure fully utilised building requires a well laid foundation. No attempt is made to suggest solutions to the problem of a missing or 'suspect' foundation. It also needs to be stated that the author's assertions are not based on empirical direct research conducted by the author, but are largely based on extensive reading, personal experience, interviews and discussions with various people. The assertions are, in effect, an attempt to translate some of the traditional 'wisdom' of Information Systems theory into the context of developing countries. The paper will also explore the need for further research in this area.

#### 2 Definitions

For the purposes of this paper, the following working definitions are held to be valid:

- Information Technology (IT): Encompasses a wide range of technologies such as computers, telecommunications, office automation and microelectronics, which allow us to record, process, store, retrieve, transmit and receive data [2];
- Developing countries: Low-income and middle-income economies as defined by the World Bank [6].

### 3 Important Foundations

The investigation into the state of these important foundations, should be conducted before the acquisition of any IT, while investigating the feasibility, or otherwise, of an IT project. As the awareness of the state of the foundations grows, and attempts are made to address the problems, so the potential for the subsequent successful utilisation of that IT is enhanced. Obviously, some foundations may be considered more important in certain projects than others, but the assertion is made that the consideration of all the foundations, whether deemed relevant or not, will enhance the overall understanding of the project and the environment in which it will operate. Many of these foundations are particular to the needs of developing countries, but others are obviously applicable to all countries, whether developed or developing. While it is argued that these foundations are important, even essential in some cases, it is also not suggested that should the foundations be discovered to be 'suspect' that IT should not be acquired. It is, however, argued that having certain 'suspect' foundations could result in the subsequent under-utilisation of the IT.

The important foundations are discussed individually in the following sections.

#### Telecommunications

Telecommunications in developed countries is often taken for granted. However, the situation in the developing countries can be very different. Building a system (with telecommunication ability) on a foundation of a telecommunications infrastructure which is either non-existent or of poor quality, will obviously result in subsequent poor utilisation of the IT. However, developers with experience of these problems, are usually innovative in their solutions, and this is often cited as a particular area in which the developing countries could 'leapfrog' many developed countries by utilising the latest technology such as satellite or cellular communication, while developed countries are constrained by aging, inflexible infrastructure.

Regardless of whether the proposed project will require telecommunication facilities or not, there will still be the need to communicate verbally via telephone or fax, and the lack of a reliable service could be a further hindering factor. As such, the presence of a reliable, sophisticated public (or private) telecommunications network will greatly enhance the possibility of subsequent successful IT utilisation.

#### Roads and Electricity

Similarly, as per the telecommunications foundation discussed above, there is the need to investigate the state of the roads network and the electricity supply network. Should the project require the need for delivery of large equipment, then the condition of the roads is important. Fluctuations in the electricity supply, or even long breaks in power supply can also create havoc with any system involving IT. The area of reliable and consistent electrical supply is one which has received much attention in the utilisation of IT in developing countries, and there are many relatively inexpensive solutions to the problem.

However, failing to consider the state of the roads and electrical network beforehand, could lead later to IT utilisation problems.

#### Public Sector

The consideration of this foundation is multi-faceted, and open to wide interpretation. Consideration firstly needs to be made of the presence (or absence) of a national plan/strategy for IT utilisation and development within the country. The absence of such a document can be a warning sign for one to conduct further investigation into any future plans regarding IT utilisation in the country. Unclear priorities and objectives at a national level can obviously influence the success, or otherwise, of any project. One example could be the varying response to the importation of expensive equipment, upon which the success of the project may rest. National policies are usually directly or indirectly related to the social, economic and political conditions in a country, and the public sector can influence the use of IT by either approving of the technology and then investing in the necessary infrastructure, or disapprove and enforce restrictions on its importation and use [2].

Obviously, an investigation into the stability of the country is also vital, together with an understanding of the political environment, supporting social and political hierarchies, and the level of bureaucracy. An attempt should be made to consider scenarios over the foreseeable future with respect to future governments and the public sector, and the possible impact upon IT utilisation, in order to be prepared for any eventuality (change of government, policy, etc.). Consideration also needs to be made of the openness of the public sector to entrepreneurs, as it is often the entrepreneurs within a country that are responsible for creating wealth and realising some of the potential of IT. The public sector can facilitate the growth and establishment of this entrepreneurial culture by its policies and openness. A secure, stable government with an efficient public service may sound utopian, but may be an essential foundation required to ensure successful IT utilisation.

#### Organisation

An in-depth study needs to be made of the organisation within which the IT will be utilised. The understanding of the culture of the company is discussed under **Culture** below, but this study should exceed a general study of the culture, and include those factors within the organisation that will be vital in ensuring the successful utilisation of IT. There needs to be clear indication as to the ability of the organisation to absorb change, as well as indications as to how IT is perceived within the organisation. The financial, logistical and planning skills within the organisation need to be efficient and experienced [1], and the support and commitment of senior management is vital. Another important prerequisite for the successful utilisation of IT is that, in many cases, the business operations will need to be standardised: introducing any IT into the organisation before this standardisation may result in problems which will cause little or no utilisation of the IT. Similarly, a mechanism for the ongoing evaluation and follow-up of

the project needs to be in place to ensure that the IT is fully utilised. Misunderstanding the importance of this organisational foundation can lead to little or no IT utilisation.

### **Human Resources**

The availability and quality of human resources is a very important (if not the most important) foundation that needs to be considered if there is likely to be any possibility of successful IT utilisation. Too many projects fail to meet expectations as a result of the shortage of qualified staff, the inadequate compensation given and the high turnover (particularly of competent technical and managerial staff). The involvement of the user community (the group of people who will be using the final product) in all aspects of the project is also vital to the subsequent successful utilisation of the IT, and consideration should also be given to the availability, quality and commitment of the user.

As a result of unskilled and untrained staff, many organisations are forced to hire expatriate staff (such as outside consultants) who often lack knowledge about local conditions and culture, and design poor or inappropriate systems. Therefore the successful implementation and utilisation of IT projects in developing countries often depends upon the performance of outside consultants. Many projects have come to a sudden halt when the consultant leaves the project, especially when there has been no attempt to ensure continuity through the transfer of skills to a local, in-house team. It is essential to assign an in-house counterpart to the consultant who will assume joint responsibility with, and ultimately replace the consultants [1, 3, 5].

The importance of this foundation cannot be over-emphasised, especially in the light of the need for project sustainability.

### **Vendors and Maintenance**

The consideration of these two foundations are also of vital importance to the ongoing successful utilisation of IT. The suppliers of IT, via their vendors, have played a significant role in introducing and enforcing IT usage in developing countries, often inappropriately, and without adequate support and training. Many of the suppliers and vendors are known for their ability to manipulate management and decision makers into buying their equipment. Their main concern often appears to be selling obsolete technology at inflated prices, and not in the appropriate transfer of technology [3].

The absence of vendors, or even the presence of a few vendors can limit your choice, sometimes to inappropriate equipment. This dependence on individual suppliers can also lead to incompatible technology, and the inability to 'mix and match' technical equipment. Many manufacturers are also represented by vendors who are not committed to a long-term relationship resulting in poor or no technical support or backup, with few or poorly trained technical staff. As such, very little maintenance and technical assistance is often available, even though equipment may be sold with an after-sales agreement or guarantee. There is also the problem of the shortage or lack of back-up equipment, spares, paper and other essentials, without which the

system can grind to a halt. Consideration is also often not paid to these ongoing costs and this can be a crippling expense in countries short of valuable foreign exchange. The need for an indigenous technology industry that produces and maintains equipment locally is obvious.

A secure foundation of reputable, reliable vendors with skilful technicians and ample, affordably priced IT and supplies, will greatly enhance the success of any project and the subsequent utilisation of the IT.

### **Culture**

Experience with IT projects shows that it is vital to undertake a thorough assessment of the organisation and country within which the information system will be implemented with reference to a clear understanding of the culture.

Odedra [3] asserts that: *"Technology is received differently in various cultural settings. It is affected by such factors as the lack of awareness or education, diversity of cultures and hierarchies, or departmental barriers in an organisation. For any technology transfer to be successful, the local ways of thinking and behaving must be taken into account."*

An understanding of the organisational culture ensures an understanding of the norms, practices and values of the organisation, and an understanding of the hierarchy. Systems designed and implemented by expatriate consultants have often failed due to the fact that the consultant did not understand the culture of the organisation. Utilisation of IT in an organisation is also likely to bring about profound changes in the way the organisation conducts its business, and with these changes come often unforeseen problems that are not always technical in nature, but which can hinder the successful utilisation of the IT. These problems include the resistance to change and perceived IT-induced unemployment, and should be clearly identified during the study of the culture.

Similarly, developing countries usually have different social and cultural behaviour to those of developed countries, and IT is often considered a threat to these countries' systems of behaviour. To ensure the successful utilisation of IT, the local culture must be taken into account, and the design of the system should not be divorced from the social environment. IT can be inappropriately introduced and used if the concepts and methodologies used are not adapted to the local environment [1].

The presence or absence of a culture which understands and appreciates the value of information (an information culture) is also crucial to the subsequent usage of IT. An attempt needs to be made to establish this information culture in an organisation, and the country as a whole. This will result in quicker, easier absorption of new technology, and a desire to utilise IT effectively. The presence of an entrepreneurial culture (briefly discussed under Public Sector) can also contribute to the absorption of new technology and the generation of wealth. A thorough understanding of the organisation and the national culture will enhance the utilisation of the IT through ensuring appropriate, culturally relevant information systems.

## Need

The availability of information is one of the major determinants of economic and social progress, and most developing countries either lack data or use inappropriately [4]. As such, the need for more relevant and accurate information is obvious. However, it is important to clearly identify the need. What is required, and at what level? How pervasive is this need, and will it meet development priorities? As Soupizet writes: "*Computers don't clothe, don't cure, don't feed. Their power begins and ends with information. Their usefulness is therefore strictly linked to the effectiveness of the information...*" [3]. One must ensure that the need is met, and not make the need meet the technology.

The need must be well-defined and clearly identified. Clearly identifying the need for any IT, and then ensuring that it is driven by the owner of that need, will cause the responsibility for the subsequent successful utilisation of the IT to rest where it should - with the final user of the IT. There are also numerous cases of development, and other agencies donating equipment to organisations only for the equipment to be stored away and never used, due partly to the fact that there was no perceived need for the equipment in the first place, at least by the organisation. One must also be aware of the social status attached to having IT in the organisation, and ensure that this is not a primary motivation for the initiation of an IT project [5].

As such, a foundation of clearly defined, well-defined and understood needs will enhance the probability of subsequent successful IT utilisation.

## Funding

Again, this is a critical foundation to consider. The acquisition of most IT is expensive, and, at times complicated, and consideration must be given not only to the current availability of funding, but also to the ongoing nature of that funding. Mention has already been made of the ongoing costs such as maintenance, supplies, environmental requirements and provision should also be given to salaries, training and other important costs. With the acute shortage of funds available through international development agencies, and the lack of foreign exchange available within developing countries, the costs of the proposed system is a very important consideration.

The underestimation of project costs is another area of concern. Many projects have been justified on the basis of deliberately low estimations of cost, in order to force the initiation of the project, for varying reasons. It is a truism that any computer project will take longer to implement and cost more than originally anticipated. The potential for failure or subsequent low utilisation of the IT in this situation is obvious [1].

## Management and Sponsor

The active commitment of management has been shown consistently to be critical to the success of any project, let alone an IT project. This is especially true of projects involving large investments, which may end up taking longer and costing more than originally anticipated. Successful implementation and subsequent utilisation of the IT

can usually be ascribed to a strong commitment by management, and/or to the dedication of one/few individuals with the necessary knowledge, seniority, enthusiasm, persistence and the ability to plan effectively. Odedra believes that management attitudes, commitment, cooperation, support towards computerisation and their computer literacy and awareness played a major role in the success with which computers were introduced and used by organisations in her case studies [5].

Inevitably, the idea for a particular IT project flows from a group or more usually one person, who has the status and influence to ensure that the project becomes a reality. It is vitally important for the success of any IT project that this 'sponsor' be encouraged to continue to fully support the project to its successful conclusion and utilisation.

A foundation of committed management and sponsor with the necessary knowledge, seniority, enthusiasm and persistence is likely to enhance the possibility of successful IT utilisation.

## Technology Access

This foundation considers more than simply the ability to obtain technology and supplies (as discussed under Vendors and Maintenance above), but also the access to international knowledge flows regarding technology. This access is vital in ensuring that the IT to be used is not obsolete, and that there is the flexibility to change and upgrade depending on the requirements. This access will not only lead to an awareness of the latest trends, but will assist in increasing an awareness of information and IT.

## Education and Training

Consideration needs to be made of the availability of educational or training facilities that will equip people to design, build, operate and maintain the IT. The scarcity of technical and managerial skills has already been discussed (see Human Resources), and an attempt needs to be made to ensure a sufficient level of education and training. The availability of education and training facilities for end users is also vital and can have a direct relation to the subsequent successful utilisation. Training for the managerial, technical and end user staff should include experience with modern technology, and not only exposure to the theoretical concepts and principles.

## 4 Contribution and Further Research

It is suggested that the above foundations be used as a checklist to determine pre-conditions to the start-up of any IT project. As such, any organisation or individual considering such a project, may use of the checklist in order to ensure that there is an increased possibility of subsequent successful IT utilisation. Alternatively, the checklist could be used to raise awareness of areas of special need or attention.

There has been very little research conducted either in Africa, or the rest of the developing world, as to the exact

reasons why IT projects fail, or why IT is not fully utilised in a developing country environment[5]. Research that can identify the key factors, would be valuable in ensuring the future successful utilisation of IT. Further research is also required in order to test the inclusion of these particular foundations in the checklist, and to expand the list. Further research could be conducted into possible or suggested solutions, should a particular foundation be found to be of concern. Research into the *symptoms* indicating the lack of a foundation is also suggested with the possible *consequences* which may result.

## 5 Conclusion

The paper has suggested a number of foundations that need to be considered before the acquisition of IT, in order to increase the possibility of subsequent successful utilisation of the IT in developing countries. In many ways, the foundations suggested are *industry wisdom*, and are therefore often taken for granted. However, due to the lack of experience in using IT in developing countries, these factors are often overlooked in the rush to provide IT solutions, which can compound the problem. As such, the subsequent utilisation of the IT is either not optimal or even non-existent. While it is argued that these foundations are important, it is also not suggested that should a problem be discovered with a foundations that IT should not be acquired. It is,

however, argued that this could result in the subsequent under-utilisation of the IT. It is hoped that this attempt to identify some of these foundations will increase the utilisation of IT in developing countries, foster awareness of the issues, and perhaps eventually provide a valuable guide to all potential users of IT.

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