

1993

Impediments to information technology utilization in a developing nation in Africa

Ravinder Nath
Memphis State University

Follow this and additional works at: <http://scholarworks.lib.csusb.edu/jiim>

 Part of the [Management Information Systems Commons](#)

Recommended Citation

Nath, Ravinder (1993) "Impediments to information technology utilization in a developing nation in Africa," *Journal of International Information Management*: Vol. 2: Iss. 2, Article 1.

Available at: <http://scholarworks.lib.csusb.edu/jiim/vol2/iss2/1>

This Article is brought to you for free and open access by CSUSB ScholarWorks. It has been accepted for inclusion in Journal of International Information Management by an authorized administrator of CSUSB ScholarWorks. For more information, please contact scholarworks@csusb.edu.

Impediments to information technology utilization in a developing nation in Africa

Ravinder Nath
Memphis State University

ABSTRACT

With an increasing awareness of the role of information technology (IT) in improving internal efficiency and conducting business in the emerging global economy, organizations in the developing nations, like their counterparts in the developed countries, are taking a keen interest in IT-based solutions to their problems. Yet they face unique problems that impede their ability to adopt IT. This research identifies these problems in Zimbabwe - a developing nation in Southern Africa. The results are based on a two-stage study consisting of interviews with 12 MIS managers, and responses to a questionnaire instrument by 88 middle- and upper-level managers in Zimbabwe. While some of the problems mentioned are similar to those faced by the U. S. firms - lack of knowledge about the potential of IT on the part of top management and resistance to change by users - others are somewhat unique to Zimbabwe (or most developing countries). These include: the firm's inability to acquire modern IT (because of the high cost of hardware/software and/or the lack of foreign currency to import this equipment), and the lack of expertise in the areas of systems analysis, system design, information management, and computer training.

INTRODUCTION

Over the last two decades, computer technology, unlike any other innovation, has been responsible for changing the way an organization operates, and an individual approaches a task (Drucker, 1988). It is well documented that computers add to the economic growth and development of developed nations (O'Brien, 1983). Further, it is argued that computer technology holds the potential to spawn and accelerate development in the developing countries, as well (Alvarez, Smiley & Rohrman, 1985; Bogod, 1979; Pipe & Veenhuis, 1976; Taylor & Obudho, 1977; United Nations, 1971).

However, several obstacles to the successful computer technology adoption in these nations have been noted (Chandler & Holzer, 1985; Hossain, Brar & Budden, 1989; Ibrahim, 1985; Matta & Boutros, 1989; Yavas, Lugmani & Quraeshi, 1992). In the context of introducing computer-based accounting systems in less developed countries, Chandler and Holzer (1985) mention three major barriers. First, the lack of programmers, systems analysts and qualified

technicians impedes the ability of the country to effectively use the existing computer systems and to acquire and implement newer technologies. This results from the lack of educational and training facilities and lack of funds to pay for salaries. Second, the appropriate and up-to-date hardware, software and communications equipment may not be available. Finally, many developing countries simply do not have the financial resources to import or buy or transfer these technologies. Furthermore, they are short on the indigenous prerequisite expertise to adopt these computer-based systems.

In an investigation of the usage of computers in Saudi Arabia, Yavas, Luqmani and Quraeshi (1992) report that social factors such as the resistance of users to accepting computers and the high-context culture are the key barriers. The lack of financial resources is not an impediment in Saudi Arabia as it has vast oil revenues. Similar conclusions have been reached in the case of Kuwait (Ibrahim, 1985).

Alvarez, Smiley and Rohrman (1985) note that the lack of dealer support, scarcity of trained personnel, unreliable power supply, weak communications infrastructure, adverse environment conditions (high humidity, heat, dust and insects), and the lack of commercial software packages in local languages, impede the usage of computers in Latin America.

These mentioned problem areas in the developing countries are not based on the results of empirical research but rather reflect the individual opinions and experiences. The purpose of this paper is to identify and examine those areas that are barriers to the adoption of information technology in Zimbabwe - a developing African nation. Unlike other studies, this is accomplished by collecting data from a cross-section of middle-to-upper-level managers in Zimbabwe.

RESEARCH METHODOLOGY

Because of the paucity of prior empirical research in this area to build on, data for this research was collected in two phases. In phase one, 12 MIS managers in Zimbabwe were personally interviewed by the researcher using an open-ended question format. The purpose of these interviews was to bring out issues that are perceived to impede the adoption of IT in Zimbabwe. A synthesis of the interview contents resulted in identifying ten such issues.

In the second phase, these ten issues were made part of a questionnaire so that the respondents could state the degree of their agreement or disagreement with the statement on a 5-point Likert scale. The Likert scale used was: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree. In addition to the ten items, the questionnaire contained items designed to gather demographic information about the respondent and the firm. The questionnaire was administered to 95 middle to upper level managers who were enrolled in the executive MBA program at the University of Zimbabwe. These respondents came from across the country and represented a variety of firms. Of the 95 returned questionnaires only 88 were useable. This sample does not include any of the 12 MIS managers interviewed. Panel I of Table 1 reports the firm type and size, and Panel II has information regarding the respondents' job titles and other characteristics.

Table 1. Respondent and Organization Profiles

PANEL I

Organization Type	Percent
Manufacturing	30%
Financial	32%
Government	25%
Retail	8%
Other	5%
Total	100%

Organization Size (No. of Employees)	Percent
Under 100	18%
100 or under 500	22%
500 or under 1000	17%
1000 or more	43%
Total	100%

PANEL II

Respondent's Title	Percent
Directors	47%
Senior Managers	22%
Managers	25%
Other	6%
Total	100%

Org. has a MIS/DP department?	62% Yes; 38% No.
Work in MIS/DP department?	8% Yes; 92% No.
Use personal computer on the job?	57% Yes; 43% No.
Received any formal on-the-job training in using computers?	56% Yes; 44% No.
Average number of years with the organization:	4 years.
Average age:	34 years.

IMPEDIMENTS TO INFORMATION TECHNOLOGY UTILIZATION

What impedes the ability of firms in Zimbabwe from adopting IT? Table 2 lists the ten impediments to information technology adoption. They are ranked from one to ten as evidenced by the mean score for each item. The table also gives the mean, standard deviation, and the percent of managers agreeing with each statement.

Table 2. Impediments to IT Adoption (n = 88)

Rank	Item	Mean	SD	% Agreeing
1	Lack of knowledge on the part of top management about the potential of IT	4.06	1.08	82%
2	Lack of foreign currency to acquire equipment	3.94	0.98	76%
3	High cost of computer and communication technologies	3.82	0.97	73%
4	Shortage of hardware and software experts	3.78	0.94	74%
5	Lack of expertise in MIS (systems analysis, information management, etc.)	3.72	1.04	69%
6	Resistance to change	3.64	1.18	64%
7	Lack of locally-designed software	3.59	1.10	60%
8	Poor telecommunication infrastructure	3.57	1.21	57%
9	Unavailability of facilities for advanced training in computing and MIS	3.53	1.12	61%
10	Fear that computerization will cause unemployment	2.87	1.10	32%

Items are measured using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Item Analysis

In the following, each item from Table 2 and its implications are discussed:

Issue No. 1—Lack of knowledge on the part of top management about the potential of IT. To gain support for IT-based solutions, it is well recognized that the support of upper management is critical (Hogue and Watson, 1983). And this support can occur by educating upper management about what IT can do and deliver. Lederer and Mendelow (1988) discuss how to convince senior management of the strategic potential of information systems. Therefore, it is not surprising to see this being mentioned as the top rated issues by managers even in Zimbabwe.

Issue No. 2—Lack of foreign currency. Most developing countries lack the required technical infrastructure and the expertise to make their own computer equipment and therefore, must rely on the transfer of technology from overseas. This requires making the payments in foreign exchange - which they do not have enough of. Further, the organizations in these countries depend upon their governments for allocation of foreign exchange in order to acquire and import technology. Consequently, the lack of foreign currency is a significant barrier to the adoption of IT. The comments of a DP manager in a large insurance company in Zimbabwe point to the difficulty faced by many firms: "We have been submitting an application for foreign exchange (to the government) each of the last four years to buy a newer minicomputer but with no success. I will keep trying."

Issue No. 3—High cost of computer and communications technologies. Like most developing countries, the economy of Zimbabwe is labor intensive with low labor costs. Therefore, relative to the cost of local products and services, the cost of computers and communications equipment is considerably high. So, purely on the economic basis it is difficult to justify computerization over manual processes. This in conjunction with Issue No. 2 (scarcity of foreign exchange) severely impedes the ability of many firms to adopt information technology based solutions to their business problems.

Issue No. 4—Shortage of hardware and software experts. Shortages of qualified personnel in the computer field is another barrier faced by companies in Zimbabwe. It became clear during the interviews with MIS managers that often they lure senior programmers, hardware and telecommunications experts from other firms by offering them better pay, benefits, promotion opportunities and unique perks. Further, the country lacks the facilities for training in the computer field (item no. 9). Consequently, the shortage of manpower, lack of training facilities, and the pressure to computerize (as a result of trade liberalization policy by the government) places the MIS managers in a difficult situation in terms of acquiring human resources to manage computing facilities.

Steps can be taken to address this problem. For one, new degree programs in computer science and electronics engineering need to be developed to meet the demand. Second, to keep employees up to date in advances in computer and software technologies and tools, workshops and professional development seminars need to be offered. Such measures are likely to alleviate this problem in the long run.

Issue No. 5—Lack of expertise in MIS. On the surface it appears that this issue is the same as Issue No. 4. However, it deals with the scarcity of skills in areas such as systems analysis and information management. The previous issue (no. 4) involved technical expertise. Once again, this shortage can be dealt with by providing facilities for training and learning from the experiences of more developed countries.

Issues No. 6 and No. 10—Resistance to change; fear that computerization will cause unemployment. Successful adoption of IT requires the creation of an environment conducive to the change. Powerful employee unions often resist computerization because of the fear of loss of jobs (see item no. 10). Therefore, unless the computer-users (employees) or their representatives are involved in the computerization process from the onset of the project, they are likely to resent and resist the changes. It is the responsibility of the organizational management to assure that the culture change process is set in place at the onset. Also, a significant amount of human and financial resources need to be allocated in training users to prepare them for the computerization process.

Issue No. 7—Lack of locally designed software. Facilities and expertise to design and produce software to fit Zimbabwean requirements are virtually nonexistent. This is primarily due to the shortage of qualified personnel (as discussed above). Several managers mentioned that this hinders their ability to fully exploit the potential of information systems as they have to buy software overseas and force it to fit their environment.

Issue No. 8—Poor telecommunications infrastructure. A modern telecommunications infrastructure is the backbone of an information society in which computers play an important role. Most countries around the world with the exception of a few advanced nations have poor quality telephone systems and hardly any reliable data communications networks. While

studying the difficulties faced by American firms in establishing global communications networks, Steinbart and Nath (1992) found that "the poor quality of foreign telephone networks" was mentioned as the most significant impediment to the establishment of international networks. The managers of our study also mentioned this to be a problem even though the scope of most information systems in Zimbabwe is national and not international.

Issue No. 9—Unavailability of facilities for training in computing and MIS. Zimbabwe only has one comprehensive university, the University of Zimbabwe, offering degree programs in computer science and information systems at the undergraduate level (there are some polytechnic institutes offering 2-year degree programs in computer-related areas and there are a few professional colleges who, supposedly, offer short-term courses in computing). This lack of educational infrastructure in the dynamic field of computer and information systems imposes severe limitations on the MIS adoption plans of organizations in Zimbabwe.

Factor Analysis

In order to identify the underlying dimensions (constructs) that impede IT utilization, the ten items were factor analyzed. To determine the number of factors to extract, a commonly used rule-of-thumb, named eigenvalue criterion, was used that says that all factors with corresponding eigenvalues greater than one should be retained (Kaiser, 1963). This resulted in a 3-factor model. A varimax orthogonal rotation and .50 as the minimum loading value to bind an item with a factor, yielded a final solution but Item No. 10 (fear that computerization will cause unemployment) loaded on two factors. Therefore, to improve the interpretability of the factors, it was decided to drop this item from the analysis. The final 3-factor model consisting of 9 items explained 62% of the variability and it was statistically significant at the .01 level. Table 3 lists the three factors, the associated items, and the percent of variation explained by each factor.

Table 3. Factors and Associated Items

Factor	Item	Factor Loading
IT Expertise/Training (28.1%) ¹	• Shortage of hardware and software experts	.86
	• Lack of expertise in MIS (systems analysis, information management, etc.)	.90
	• Unavailability of facilities for advanced training in computing and MIS	.67
Hardware/ Software and Financial Resources (19.7%)	• Lack of foreign currency to acquire equipment	.72
	• Lack of locally-designed software	.73
	• High cost of computer and communication technologies	.60
	• Poor telecommunication infrastructure	.67
Organizational and Manage- ment Issues (14.2%)	• Lack of knowledge on the part of top management about the potential of MIS	.75
	• Resistance to change	.87

¹The number in parentheses is the amount of variation explained by the factor. The total variation explained by the 3-factor model is 62% (28.1 + 19.7 + 14.2).

Factor one is named "IT expertise/training" as it involves items dealing with the lack of computer training facilities, systems analysts, and hardware/software experts. Obviously, the lack of human resources in the information technology area is a significant hurdle to countries like Zimbabwe if they are to exploit the full benefits of IT.

The second factor deals with items relating to the lack of financial resources to acquire IT, and the high cost of these technologies. Therefore, this factor is termed "equipment and financial resources." The effective transfer of technology relies heavily on the economic conditions of the recipient nation (Contractor & Sagafi-Nejad, 1981; Marton, 1986). With the exception of a few nations among the developing countries (e.g., Saudi Arabia, Kuwait and other oil-rich countries), the rapid adoption of computers and related technologies is hampered by the lack of financial resources (Chandler & Holzer, 1985; Hossain, Brar & Budden, 1989) and thus, serves as an impediment.

The third construct "Organizational and management issues" deals with factors that are traditionally thought to be critical to the successful introduction and implementation of an MIS. These include: user and management commitment, user willingness to change (Ginzberg, 1981). These issues transcend national boundaries and apply equally well in every country. However, the cultural idiosyncrasies in some nations may prompt the employees to resist the introduction of computers more than in other nations.

IMPLICATIONS AND SUMMARY

The results of this study have implications both for managers of firms and government policy makers in Zimbabwe, and vendors attempting to do business in Zimbabwe. Also, these findings are generalizable to other developing countries which are similar to Zimbabwe in terms of government and public policies. Of the ten issues which have been identified as barriers to implementing information technology, some are such that the management of an organization has little influence over them. For example, the lack of foreign currency to buy equipment can only be remedied by a change of government policies by making available a generous amount of foreign exchange to purchase such equipment. But on the remaining issues, the management of organizations and government officials should cooperate and take steps to lessen the perceived negative effects of IT on the part of the employees. Specifically, the following steps can be taken:

1. Educate top management about the potential of information systems as the support of senior management is crucial to the successful completion and implementation of IT-based solutions. Having the person in charge of IS on the senior management team should solve this problem. If this is not viable, then the IS management must assure that a communication channel is created between the top management and them.
2. To cope with the shortage of computer and MIS experts, firms and government entities should pool their resources and establish programs with the help of local educational institutions to offer special skills and degree programs. This should go a long way in training employees and updating the computer skills of others.
3. Prepare employees for the computerization. This can be achieved by education and involvement. The involvement of the key personnel in the IS planning, design and implementation phases will lessen the resistance to computerization.

For vendors attempting to do business, they need to provide companies constant help and support in tailoring off-the-shelf software to their specific needs, as this was mentioned to be a problem area. Also, because of the lack of expertise in computers on the part of the firms in Zimbabwe, the vendor support in terms of initial setup, help with business analysis, and training have to be provided at a higher level than in the U. S.

REFERENCES

- Alvarez, J., Smiley, S. M. & Rohrmann, F. (1985). Informatics and small computers in Latin America. *Journal of the American Society for Information Science*, 36(4), 259-267.
- Bogod, J. (1979). *The role of computing in developing countries*. British Computing Society, London.
- Chandler, J. S. & Holzer, H. P. (1985). Preconditions for the introduction of computer-based accounting systems in less developed countries. *Management International Review*, 25(2), 53-66.
- Contractor, F. J. & Sagafi-Nejad, T. (1981). International technology transfer: Major issues and policy responses. *Journal of International Business Studies*, 12(2), 113-135.
- Drucker, P. (1988). The coming of the new organization. *Harvard Business Review*, 45-53.
- Ginzberg, M. A. (1981). Key recurrent issues in the MIS implementation process. *MIS Quarterly*, 5, 47-60.
- Hogue, J. T. & Watson, H. J. (1983). Management's role in the approval and administration of decision support systems. *MIS Quarterly*, 7(2), 15-23.
- Hossain, N., Brar, J. W. & Budden, M. C. (1989). Microcomputer usage in the developing world. *Proceedings Southeast Decision Sciences Institute*, 59-62.
- Ibrahim, R. L. R. (1985). Computer usage in developing countries: Case study Kuwait. *Information & Management*, 8, 103-112.
- Kaiser, H. F. (1963). Image analysis. In Chester W. Harris (Ed.), *Problems in measuring change*. Madison: The University of Wisconsin Press, 156-166.
- Lederer, A. L. & Mendelow, A. L. (1988). Convincing top management of the strategic potential of information systems. *Management Information Systems Quarterly*, 11, 525-534.
- Marton, K. (1986). *Multinationals, technology, and industrialization*, Lexington, MA: Heath.
- Matta, K. R. & Boutros, N. E. (1989). Barriers to computer-based message systems in developing countries. *Computers and Society*, 1-6.
- O'Brien, R. C. (1983). Ed. *Information, economics and power - The north-south dimension*. Boulder, CO: Westview Press.
- Pipe, G.R. & Veenhuis, A. A. M. (1976). *National planning for informatics in developing countries*, North-Holland, Amsterdam.

- Steinbart, P. J. & Nath, R. (1992). Problems and issues in the management of international data communications networks: The experiences of American companies. *MIS Quarterly*, 16(1), 55-76.
- Taylor, D. R. F. & Obudho, R. A. (1977). *The computer and Africa: Applications, problems, and potential*. New York: Praeger.
- United Nations, Department of Economics and Social Affairs. (1971). *The application of computer technology for development*. New York.
- Yavas, U., Luqmani, M. & Quraeshi, Z. A. (1992). Facilitating the adoption of information technology in a developing country. *Information & Management*, 23, 75-82.

