MANAGEMENT SATISFACTION WITH THE PERFORMANCE OF COMPUTER-MEDIATED INFORMATION SYSTEMS: THE CASE OF CLIENTS OF SELECTED COMPUTER VENDORS

BY

JULIUS K. KIPNGETICH

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

JUNE, 1991

This project is my original work and has not been submitted for a degree in any other university.

Signed:_____ Date: 8th Nov. 1991

Julius K. Kipngetich

This project has been submitted for examination with my approval as university supervisor

Signed:_____ Date 8/11/91

Danny Fernandes

Lecturer

Department of Management Science

DEDICATION

In memory of my late uncle Joseph Kipyego Chemursoi

ACKNOWLEDGMENTS

My special thanks go to my supervisor Mr. Danny Fernandes, Lecturer, Department of Management Science for the invaluable guidance and constant advice from the project conceptualisation through to writing up of the final project. His special interest in my studies has given me a lot of encouragement.

I wish to register my appreciation to all my classmates for the good company we had for the gruelling M.B.A. programme. To each of them I say thank you for your comradeship and may God bless you all in your endeavours.

Special thanks also go to all the respondents to the questionnaire for their patience in filling them. Despite the length and depth of the questionnaire the response rate was very high.

My most sincere gratitude go to my mother Pauline Letema, my late uncle Joseph Kipyego and wife Susan, my cousin Charles Limo for their support, encouragement and dedication to my well-being despite a myriad of frustrations, and some other times, utter hopelessness. I find no fitting words to thank them for their valuable support.

I appreciate also the efforts of my dad, John Nyangwaria and grand mother Soti Chemursoi and late grandfather Chemursoi Choge for their encouragement in my studies.

I would like also to take this opportunity to thank my special friend Chemutai for her moral support, valuable suggestions and stimulating discussions.

For those whose have made any other contribution to my life and their names are not here, I register my appreciation and thanks to all of you.

ABSTRACT

The primary objective of this study was to investigate which factors are considered important in gauging satisfaction with computer - mediated information systems in Kenya. The rationale of the study arose from the fact that little is known in Kenya about the computer technology and its effect on organizations. This is a new and increasingly ever changing technology and the "feelings" of the users is important to be known by the computer vendors.

To facilitate this study, a sample of 30 computer users was drawn from a list supplied by three computer vendors. The respondents gave information on aspects of timeliness, efficiency, purchasing policy and security of information systems. Data was collected using a questionnaire personally administered by the researcher.

The results show that the factors considered important by the users in assessing satisfaction with information systems are:

1. Cost versus benefit of computer system
2. Image of the company as a result of usage of the computer system
3. Compatibility of computer systems
4. Interrelationships between systems personnel and other company staff

These results should be interpreted in consideration of the limitations of the study, specifically with regard to the sample size. In this regard, the findings of the study should be viewed as a tool to aid computer vendors in their service to clients.

TABLE OF CONTENTS

LIST OF TABLES

SECTION ONE

INTRODUCTION

1.1 Background of the Study

During the last decade, computers have been introduced in organisations at a sustained rate (Bergeron:1990). Since this type of equipment requires large investment and is object of ever increasing demands by the end-users, managers in organisations have become concerned about the performance of the computer-based information systems. A great number of organisations have formulated policies on the purchase of equipment, the development of applications, user support and data security.

However, the information technology industry is suffering a mild case of jitters (Thomas:1990). This may surprise people outside the industry who stare incomprehendingly at the ever advancing, massed ranks of computers that line modern offices and at the tempting regular computer advertisements. The industry is having major difficulties in getting its act together for the benefit of corporate clients, leaving managers wondering still what to do. Managers remain, in worrying numbers, sceptical about the paybacks of information technology. A common complaint is the gap that exists between Information Systems (IS) departments from business managers.

The most neglected area of IS is training and education activities. Although most suppliers claim to offer training, most of it appears to concentrate upon the mechanics of a system,

while for managers, the important elements are training for management of change and interpretation of the reporting abilities of systems (Thomas:1990). Such a finding reflects widely held scepticism over whether the IS industry is addressing the real needs of its customers. For now, it is arguably over-focused on the product to the detriment of service or client orientation.

A recent survey (Black and Trippi:1990) reports that education and training of mid- and upper-level management in information technology is less than adequate. But a general interest in the IS function was found to be significant in the boardrooms. All managers surveyed felt that an effective IS department was vital to the future of their organisations. The survey concluded that the chief obstacles to the more effective use of information resources are human and organisational rather than technical.

Whilst the information industry and its academic apologists espouse the need for continued focus on business applications rather than "product" in isolation, many suppliers of information systems find this a difficult step to take in practice. Bridging the gap between the supplier and the client is essential so that information technology could be utilised well for their benefit and that of the economy and society as a whole. Equipping managers with facts of computer cost and benefits, required technical knowledge and self confidence to search, plan, test, evaluate, purchase, maintain and implement the appropriate information technology to meet business objectives is indispensable.

1.2 Extent of Computer Application in Kenya

As Kenyans aspire for higher economic standards set by the developed countries, it has become necessary to use modern technology not only to ease the workload on individual workers but also to speed up production and promote precision. The huge sums of money spent on importing capital equipment, computers and office communications equipment is testimony and evidence that the local business fraternity is becoming more and more sophisticated.

Most local small-scale businessmen are well versed in the advantages of using computers but the near prohibitive cost of installing computer equipment often places such essential business machines out of reach of many businessmen and make them seem unpopular. Many sources say that duty and sales tax charged on computers is too high. Currently the importation cost adds up to between 150 and 160 percent per unit. Added to service back-up charges and other operational costs, this totals up to a computer selling at about three times the price of that in the country of origin.

The trend in the industry now is a movement towards smaller but more powerful computers. Thus there is mushrooming of an industry dominated by microcomputers which are ideal for personal use.

A major weakness of the computer industry in Kenya is that buyers acquire equipment without first defining how it will affect employees, boost productivity, create unique profit offerings, expand market channels or improve decision-making.

Computer companies operating on the local scene are either subsidiaries of foreign computer firms or their agents,as Kenya has not acquired the capability to manufacture computers and related equipment. The global computer scene is dominated by Siemens, Ricoh, Epson, Philips, Wang, IBM, Apple Mac, Havard Professional, Hyundai, Acer, ALR among others.

Dealers operating in Kenya include Computer Applications Limited (CAL), International Computers Limited (ICL), International Business Machines (IBM), National Cash Registers (NCR), Business Machines Limited (BML), Copy Cat, Amarco Ltd., Comprite Ltd., Data Equipment, Automated Systems Ltd (ASL), Microsolve Technology, Kenya Micro, Kenafro, and Insight among others.

CAL has joined the top bracket of computer vendors locally, since its establishment eleven years ago. One of CAL's strongest points is availability of spare parts, technical and sales back-up personnel. As of 1989, CAL had 134 mini- and main frame computers already installed or on order, 600 microcomputers and over 4500 terminals to be found in organizations all over the country. In the software division, all technical staff are graduates with bachelors or masters degrees in computer related fields. In the hardware section there are 15 engineers. The sales section is composed of former technical staff and this background makes them know the computer field very well. CAL has been selling Wang Vs system and some of its clients include Kenya Planters Cooperative Union (KPCU), United States Aid for International Development (USAID), and National Bank of Kenya.

ICL has been in Kenya for 60 years. In terms of value of installed equipment, ICL enjoys the lions share of the local com-

puter market. It is a wholly owned subsidiary of ICL (UK)Ltd. Its sales department has a staff of 12 people whose philosophy is not only to find solutions to client's needs but also initiate a business partnership between the client and the supplier that will last through many years. In maintenance there are 13 skilled engineers who provide technical support and consultancy to clients. A sufficient stock of spare parts is kept by ICL and in case of a shortage the company has a special arrangement with their UK organisation to deliver spares in Kenya within 48 hours. Also, ICL has the largest education and training centre in Kenya.

IBM computer dealers in Kenya are Modern Business Communications (MBC) which was appointed in 1983. It has a staff of about 30 and has experienced minimal staff turnover. The firm believes in total support for the customers with consultation and matching system to customer needs, training and software selection and a comprehensive service back-up as the only way to full satisfaction for IBM customers. The most extensive range is th PS/2 personal computers.

Copy Cat Ltd are the exclusive distributors and dealers of Armstrad microcomputers. The ones supplied by Copy Cat are IBM compatible. They are also dealers of NCR microcomputers.

ASL is a Kenyan owned company which started business six years ago initially providing computer systems for tour operators, but later diversified and now provides computers for hotels. It has supplied computers to the Serena Group of Hotels, Sadini Beach Hotel, Paradise Ocean and Diani Beach Hotel.

On the part of the users, almost all multinationals in Kenya use a computer facility. Such companies include Esso (K) Ltd,

Caltex Oil (K) Ltd, East Africa Industries, Price Waterhouse, Diners Club, Barclays Bank, Standard Chartered among others. Locally incorporated companies are also moving towards computer use and several have taken the initiative in this direction such as Trade Bank, Unga Group of Companies, Jubilee Insurance, East African Building Society, and Southern Credit Finance. In the public sector the Ministry of Finance, Ministry of Health and Ministry of Livestock have utilized computers together with a number of other parastatals, among them, Kenya Posts and Telecommunications Corporation, National Bank of Kenya, Industrial Development Bank, Kenya National Assurance, Kenya Commercial Bank, Industrial and Commercial Development Corporation, and Agricultural Development Corporation.

Educational institutions have also taken the challenges of this new technology and the leading institutions are the Aga Khan Foundation, University of Nairobi, Moi University, Jomo Kenyatta University College of Agriculture and Technology, Eldoret Polytechnic, Kenya Polytechnic, Starehe Boys, Kabarak High School, Alliance High School and recently Makini Nursery and Primary School.

1.3 Characteristics and Features in the Development of Information Systems

An information system is analogous to the human life form. It is born, grows, matures and eventually dies. In the birth stage, someone has an idea as to how the computer can assist in providing better and more timely information. In the development stage, the idea becomes a reality through the analysis of a company's information processing needs. The specifications are then translated into programs and the system is implemented.

During the maturity stage, the system is operational and may undergo various modifications to keep up with the changing needs of the company. The accumulation of system modifications to a dynamic information system eventually takes its toll on the system efficiency. At this time the system is discarded and a new one takes its place.

The full installation of a system follows several processes . It includes; problem definition, system analysis and design, programming, conversion and implementation, and post-implementation evaluation (Long:1987, Sanders:1988).

1.4 Proliferation of Computer-based Information Systems

Frequently, managers are besieged by seemingly endless opportunities to buy new software, faster computers and still more powerful data processors. All are marketed as being the answer to improved productivity and ultimately a better competitive position. Dantzig(1990:32) surveyed many managers who expressed frustration with their information systems. Their most frequently voiced complaints are:

. Escalating IS cost without proportional gains in the level of user satisfaction.

. Development projects plagued with design inaccuracies and cost overruns.

. "Maintenance Mode" programming environments with growing backlogs.

Computer-based information suppliers are many and varied around the globe. A manager must evolve a policy of distinguishing characteristics of these suppliers on software and hardware options and features desired to avoid disastrous results.

Software options across and within companies are many. Word processing, spreadsheet, data management, graphics and communications packages in the market currently are numerous. Managers must consider the functionality needed and effective use of hardware. This can be a difficult task because the differences between the various packages are often unclear and disguised,

Choosing the hardware can also be a difficult task. Several hardware alternatives, in all likelihood, are available to meet

the company objectives and this puts the computer manager in a dilemma as to which option meets the company's usage needs. A company can go with a "minimum" configuration or can add a few "bells and whistles". Single- versus two disk system, colour versus monochrome monitor, graphics output, quality print among other issues will dictate the kind of computer system desired.

Apart from the software and hardware options a company must also consider its future computing needs, service back-up and risk of obsolescence in investing in a computer system.

It can thus be an ordeal to successfully acquire a computer system. In recent years, the computer proliferation problem has captured the attention of many organisations. Even an individual supplier can have several products at its disposal with varied capabilities and the task of choosing an appropriate system is not easy. Further, differences in the various needs of departments regarding their system requirements may tempt the computer manger to acquire different sets of computer systems. This may provide the technical support with problems of compatibility. By increasing the level of compatibility between equipment and software, the organisation increases the communication between workstations and decreases exchange problems. However Bergeron (1990) said that the more numerous the management policies regarding acquisition of computers are in force, the less satisfied the end-users are with computing.

To reconcile the varied needs of the company, it may require compromises among the various user departments. Invariably, some departments will not be satisfied with the performance of the system. In some cases, it may not be appropriate and suitable to

specific departments in the organisation but at corporate level it may be optimal.

1.5 Statement of the Problem

A basic strategy for developing a useful IS is that the system must be directed towards satisfying the perceived needs of its intended user. The user-oriented design strategy leads to the development of an optimality criterion for systems design. In most design efforts, analysts establish the criterion to be used for judging which system design is best. Whether that criterion involves the ability of a model to produce accurate predictions, the speed and accuracy of data processing, or the degree to which the system is able to replicate actual operating history, the criterion is almost invariably technical in nature. It does not generally involve a measure of, or even the objective consideration of, the acceptability and usefulness of the system to its prospective users. The validity of this claim concerning systems design criteria is made evident by most descriptions of systems design. Implementation considerations is treated as one of the latter stages of the design process, and generally less objective and rigorous than is the treatment of the earlier design phases. This relegation of implementation questions to the latter phases of the design process suggests that the optimal system, in the technical sense, is developed first. Then the designer considers what must be done in order to get this design accepted and used.

Further, differences between the manager's needs and available system designs may make a computer system non-optimal. This

coupled with costs can cause a variation between the performance of the system and management expectation.

It is with the aforesaid in mind that the researcher undertook to explore the area of management satisfaction with the performance of their computer-mediated information systems of some clients of selected computer vendors in Kenya.

The following hypotheses have been advanced by the literature:

H_1: Management satisfaction with the performance of the system will be greater when the requirements of the system have been studied prior to the system implementation

H_2: Management satisfaction with the performance of the system will be greater when the application package has been modified to meet user needs.

H_3: Management satisfaction with the performance of the system will be greater if the supplier provides professional support.

H_4: Management satisfaction with the performance of the system is greater if the attitude towards it is positive.

This study aimed at establishing whether such relationships exist in Kenya.

1.6 Objectives and Importance of the Study

The study was aimed at establishing which factors are considered significant for measuring user satisfaction with information systems.

The user in this case was the computer manager or the equiv-

alent in the organisation hierarchy. The end-users would have been the most appropriate in the study, but given the time limitation and potential obstacles to access, the computer manager was chosen since in all likelihood, the performance of the computer system will eventually be noted in that capacity.

The study will be of value to academicians to serve as a stimulus to carry out research in this area of information systems and increase the body of knowledge existing.

To suppliers of computer systems, it will help identify the major factors that users look for in a computer system. This will help them focus on the consumer needs and strive to satisfy them in the most effective way.

It will also be of value to potential users who might want to acquire computer based information systems and want to know the general performance of such systems in the market.

SECTION TWO

LITERATURE REVIEW

2.1 Consumer Satisfaction in General

Consumers generally purchase products with incomplete information about the alternatives. Information may be imperfect because of the proliferation of competing brands, the difficulties of exhaustive search or sampling, biases in product evaluation, constant product innovation, or consumer mobility (Newman 1977: Thorelli and Thorelli 1977). Though price and quality are the most general attributes on which brands are chosen, information about quality[1] is more problematic because quality is more difficult to assess before and even after purchase. Moreover, the impact of quality persists as inferior quality can be a source of long-lasting irritation and inconvenience. Tellis (1990) asserts three strategies may be used by a consumer under uncertainty of product quality: best value, price seeking, and price aversion. Best value is choosing the brand with the least overall cost in terms of price and expected quality; price seeking is choosing the highest priced brand to maximise expected quality; price aversion is choosing the lowest priced brand to minimise im-

---

1. Quality is defined as a product's outcome or performance according to specifications and "information" as the consumer's knowledge of the product's outcome (Tellis and Gaeth:1990).

mediate costs.

Though objective information strongly promotes rational choice, under uncertainty, objective information does not eliminate sub-optimal choices. Product quality in real markets is probabilistic and thus sub-optimal decisions are not rare, therefore inferior brands could continue to be present in the market. In the past, typical response of economists to such inefficiencies caused by uncertainty

2.2 The Disconfirmation Paradigm

In the product/service satisfaction/dissatisfaction literature, a lot of what has been written centres around the confirmation/ disconfirmation paradigm. This paradigm which is a plausible basis of explaining and predicting satisfaction or dissatisfaction for commodities (Masinde:1987).

The key elements of the satisfaction/dissatisfaction process can be said to be; some apriori basis of evaluation such as expectations[2] of the product performance, comparison of perceived performance with expectations and a post-purchase judgement that

---

2. An expectation is a perceived likelihood that a product possesses a certain characteristic or attribute, or will lead to a particular event or outcome (Olson and Dover:1979). It is first an expected level of performance and satisfaction and secondly, it is a user's estimate of how likely it is that the expected level of performance would, in fact, be realised when the product is used.

the experience was noticeably better than expected, as expected or worse than expected, leading to feelings of satisfaction, neutrality or dissatisfaction respectively.

It is important to note that performance is the central focus point of satisfaction. The primary importance of performance in the satisfaction literature has been as a standard of comparison by which to assess disconfirmation. Though it is reasonable to assume that increasing performance should increase satisfaction, the magnitude of performance effect vis-a-vis expectations and disconfirmation effects has not been indicated in the literature.

An individual's expectations about a commodity are positively disconfirmed when the performance exceeds expectations; negatively disconfirmed when performance is below expectations and confirmed when performance equals expectations, although it is assumed that this is a state of indifference or neutrality. Disconfirmation arises from discrepancies between prior expectations and actual performance. It is the magnitude of the discrepancy or disconfirmation effect that generates satisfaction[3] and dissatisfaction.

---

3. Satisfaction is, therefore, an outcome of purchase and use resulting from the buyer's comparison of the rewards and costs of the purchase in relation to the anticipated consequences. Operationally, satisfaction can be assessed by looking at the various attributes of the product. If it is up to the expectations or higher then the customer can be classified as satisfied.

2.3 Satisfaction with Information Systems

One of the challenges facing the Information Systems Manager is the performance of the system. In recent years, a great deal of attention has been drawn to processes through which useful management systems might be developed. This attention is due to the widespread view that many computer based information systems were failing to fulfill the purpose for which they were intended or failing to live up to the expectations of potential users. Taking into account the prohibitive costs of acquiring a computer-based information system, management's major concern is how the system is performing. The primary concern is whether the system is meeting its objectives or not.

In a survey of 79 management level users, Howard and Weinroth (1987:30), eight key factors emerged as dissatisfiers with computer systems; incompatibility, poor competitive data, low information credibility, hardware shortages, poor computer centre support, data overload, poor top management support and general computer naivete.

It is imperative that the performance of the computer system may not match the initial specifications. "Acceptance" or "success" of interactive computer systems have to be cited as satisfiers although in broad terms.

2.4 Details of Selected Studies

The development and implementation of computer based management information systems in organisations have encouraged many researchers to investigate factors which might be related to system use. A number of researchers have focused upon the attitudes of users towards their information system. Guthrie (1974:221) explored the determinants of attitudes and concluded that previous experience of information systems, recent manager training, and the organisation environment are factors which shape management attitudes towards information systems. Adams (1975:337) studied the attitudes of managers towards information systems and computers, and found user attitudes to be quite favourable, in that managers were, on the whole, satisfied with their information systems and did not indicate a strong need for change.

Wu (1990:28) did a research on steps on selecting the right software application package. Ives et al (1983) measure of user satisfaction was adopted for measuring the fit of the software application package to user needs. The aspects that related to the proper fit were: system performance, the satisfaction with the output produced, the suitability of output requirements, the response time, the lack of features that are desired and the general ease of use. The following results were obtained;

-user satisfaction with the fit of the package to the application will be greater when the requirements of the existing system are thoroughly studied.

-no other method employed to select application packages is significantly related to user satisfaction with the fit of the

package.

-the satisfaction of the user with the fit of the package will not be significantly greater when the software application package has been modified for the user.

Hiltz and Johnson (1990:739) did a study of user satisfaction with computer mediated communication systems. The objective of their study was to identify the factors which comprise subjective satisfaction with information systems. The study used a questionnaire and a sample of 150 end-users. Factor analysis identified two primarily instrumental dimensions, that is; satisfaction with the *interface* (understandable, courteous, and easy to use)and with system *performance* (productive and time saving), and two primarily social-emotional dimensions, that is; *Inexpressive* (perceived inadequacy of the system for expressive, emotional or personal communication) and *mode problems* (distraction by mechanics, constrained and overloaded) with computer-mediated communication. The strongest correlates of interface satisfaction are differences in system software and documentation, interacting with baseline attitudes and characteristics of the individual users. The strongest correlates of the inexpressive factor include such group-level variables as frequency of previous communication with the group, and attitudes towards the group task. This study concluded that to ensure a successful implementation, managers must consider the "fit" between a computer-mediated communication system and a particular work group.

Jobber and Watts (1986:69) did a study of behavioural aspects of marketing information systems aimed at determining the relationship between usage systems and attitude factors, per-

ceived organisational factors and personality dimensions. A survey of 84 marketing information users in 33 companies was conducted. Principal component analysis was used to derive underlying attitude and organisational factors. A series of multiple regressions were used to relate the criterion variable (usage dimensions) to each of the predictable variables (attitude factors, perceived organisational factors and personality). The results indicated that there was a significant relationship between the proportion of relevant information from reports which was used and attitudes, and was found to be largely attributable to the influence of two attitude factors, system sophistication and prestige. Further, a significant relationship was found between the proportion of relevant information from reports which was used and organisational factors and was attributed to the significant association between that usage variable and two perceived organisational factors; company sophistication and scepticism of others.

Guimaraes and Gupta (1988) argued that;

"Measuring of IS performance has long been a problem for executives. Whilst measurement of performance is crucial for sound management, few concrete measures exist for assessing the health of the IS organisation. While costs are relatively straight forward to establish, benefits continue to be difficult to quantify. Underlying the problem is the IS profession's inability to establish and quantify the value of information. Meanwhile, measurement continues to be a critical problem as organisations invest more and more in information systems."

Guimaraes and Gupta concluded in their study that:

- since the introduction of end-user computing, business managers in general have raised their computer literacy

level considerably.

- with the growing competitiveness in the business environment, companies are using computers as strategic tools. As such, computing resources and IS function are attracting more and more direct attention from top management.

- with the advent of personal computing and mainframe based end-user computing, many top managers have joined the ranks of hands-on (or 'chauffeured') computer users.

They assert that IS budget is dependent on top management opinion of the IS department, the level of top management support of IS department policies and proposals is dependent on its overall perception of the IS department. Further, the willingness of top management to share information on company strategy, future plans and so on is affected by its opinion about the IS managers and his/her department as a whole and a thorough performance evaluation of IS department requires a major commitment in company time and resources.

Another major study on information systems usage is by Kagan, Lau and Nusgart (1990). They did a project to investigate the use of information systems by small firms. Among the research objectives was the relationship between software satisfaction and software sophistication. The study's sample consisted of 884 randomly selected small business firms in the upper Midwest, U.S.A. The response rate was 38%. Software satisfaction in this study was measured by three dummy variables. The T-test and F-test results indicate that the software sophistication index is not dependent on the small firm's satisfaction with software ($P > 0.05$). This means that software satisfaction or dissatisfaction

does not alter the software sophistication level. Further results of this study showed that the wholesaling sector had the more sophisticated software compared to retailing, manufacturing and professional sectors and that as firm size increases the level of software sophistication also increases.

A study of relevant literature, indicates that there is a gap separating information systems suppliers and information systems users. The potential causes attributed to information system suppliers are shown in Tables 2.1 and 2.2 below:

Table 2.1
FACTORS SEPARATING IS SUPPLIERS AND USERS (SUPPLIERS' SIDE)

- Product not client focused
- Product not service focused
- Instability of the IS industry itself
- Delay in finding "industry standards"
- Product incompatibility
- Over-Competitiveness (at client expense)
- Myths, for example, "ease of use"/"PC's are easy and the like.
- Poor documentation
- Printers
- In-built obsolescence

Managers as users of information systems, this gap is because of the factors listed below:

Table 2.2
FACTORS SEPARATING IS SUPPLIERS AND USERS (USERS' SIDE)

- Lack of key board skills
- Neglect of strategic/change opportunities
- Low status of technical/analytical skills
- Undeveloped specification/purchasing skills
- Defensive/threat of appearing ignorant/naive
- Data processing departments in conflict with end-users
- Lack of numerical/statistical skills
- Under-investment in training
- Accelerating expectations

These factors that contribute to the gap between IS suppliers and users are considered relevant to user

satisfaction/dissatisfaction with IS. They have thus been incorporated into the questionnaire used by this study to gather information on issues related to IS user satisfaction.

SECTION THREE

STUDY DESIGN

3.1 Research Framework

This is a cross-sectional framework since the data are collected at only one point in time. This one-shot framework diagrammed as:

R X O

where R represents a random sample and O the observation

The objects being studied are randomly selected and observations or measurements taken.

3.2 Data Specification

The type of data is non-causal. They describe relationships among variables and as such, cause and effect inferences cannot be inferred or would be relatively weak.

The source of data is primary, since the researcher administered a questionnaire to the respondents directly. The form of the data is overt.

3.3 Data collection

The tool for collecting the data is as detailed in Appendix I. Section A contains 17 general questions about the company in relation to the system in operation. This gives a review of the

companies surveyed. This part was mainly for classification purposes.

Section B contains 32 detailed questions about the performance of the system. The scale used is a 5-scale Likert-type ranging from strongly agree to strongly disagree. The questions are asked to solicit responses about the timeliness, efficiency, security, purchasing policy, employee appreciation of the system among other factors.

The sequence of the questions are random so that the respondent may not guess the underlying factor being sought. A review of the literature on information systems satisfaction led to the compilation of the various attributes. The questions were simplified as much as possible so that all respondents have a clear meaning of each question.

Data was collected via a personally administered questionnaire. The respondents were given the questionnaires to fill and the researcher collected them later. All refusals and non-responses were removed from the analysis.

The population of interest was all the clients of International Computers Limited (ICL) Kenya and Kenya Micro-Computers Limited and Kenafro Computers Limited. These firms are the major suppliers of computers in Kenya. All clients of these firms were considered. The questionnaire was filled by the Computer Managers or equivalent of these organisations. These vendors agreed to participate in the study and gave lists of their clients who have a fully fledged information system department which has existed for more than two years. A sample of thirty users was selected through the use of random numbers.

3.4 Data Analysis and Presentation

Section A of the questionnaire was analysed through the use of percentages and proportions. Section B was analysed by the use of principal component analysis[4] to uncover the underlying dimensions measured by these elements. To ensure that the dimensions are uncorrelated, and thus distinct, the principal component solutions will be orthogonally rotated using varimax rotational method. This procedure has the added advantage of improving interpretability of the resulting factors.[5] The results were presented using tables.

---

4. The general objective of factor analysis is to summarise a (large) set of the variables by creating a smaller number of variates or *factors* that are defined in terms of the original variables. This smaller number of variates is derived such that the maximum amount of information available in the original variables is retained in the smaller number of factors.

5. All previous studies on user satisfaction with IS have used factor analysis to reduce the data. Jobber and Watts say that the scale approximates interval scale and principal component analysis is the most appropriate (Peterson:1982).

SECTION FOUR

DATA ANALYSIS AND FINDINGS

4.1 Survey of Firms Selected

Data in this study is summarised and presented in terms of proportions and mean scores for the first part of the questionnaire and factor analysis for the the second part of the questionnaire.

Table 4.1

INDUSTRY DISTRIBUTION

	Frequency	(%)
Manufacturing	1	(3.3%)
Finances, Insurance & Business Services	12	(40%)
Transport, Storage & Communication	3	(10%)
Community, Social & Personal Services	5	(16.7%)
Agriculture	2	(6.7%)
Construction	1	(3.3%)
Electricity, Gas and Water	5	(16.7%)
Other	1	(3.3%)
TOTAL	30	

From the above table, it can be deduced that most computer user are in the Finances, Insurance & Business services, followed by the community, social & personal services and electricity, gas and water. The banking sector is very much computerised in the financial services sector. In the community sector, government organisations have also utilised computers in their services. The manufacturing and agricultural sector are however poor users of computerised systems.

Table 4.2

AGE OF BUSINESS IN OPERATION

	Frequency	(%)
Less than ten years ago	1	(3.3%)
Less than 20 years but more than 10	3	(10%)
More than 20 years	26	(86.7%)
TOTAL	30	

Most businesses have been in existence for more than 20 years. This means that it takes time to acquire a fully fledged computer system.

Table 4.3

CLASSIFICATION OF COMPUTER SYSTEMS

	Frequency	(%)
Own System	24	(80%)
Computer Bureau Owned	3	(10%)
Other	3	(10%)
TOTAL	30	

Most computer systems are owned by the organisations themselves. This indicates a desire in the industry for the users to acquire their own systems, as opposed to having them on hire.

Table 4.4

PERIOD OF UTILISATION OF COMPUTERS

	Frequency	(%)
Less than 5 years ago	5	(16.7%)
Less than 10 but more than 5 years	4	(13.3%)
More than 10 years	21	(70%)
TOTAL	30	

Of the sample, 70% have had their computer systems for more than 10 years. This is an indication that a computer system requires time to mature to a fully fledged department. This also means that information systems departments are among the last of departments to be established in an organisation.

Table 4.5

INVESTMENT IN COMPUTER SYSTEM

	Frequency	(%)
Less than 1 Million	1	(3.3%)
Less than 1 Million but less than 5 m	9	(30%)
More than 5 Million	20	(66.7%)
TOTAL	30	

Investment in computer systems is in the range of more than five million shillings. This represents a huge investment to most organisations, and this may contribute to the few number of organisations having a computer system department.

Table 4.6

PROCESSING METHOD

	Frequency	(%)
Batch	9	(30%)
On-line	3	(10%)
Combined Batch and On-line	18	(60%)
TOTAL	30	

The processing method used by most organisations with computer departments is a combination of both on-line and batch. In conversations with users, the researcher found out that most establishments start first with batch processing and later move to

on-line.

Table 4.7

INTEGRATION OF INFORMATION SYSTEMS

	Frequency (%)	
Yes	7	(23.3%)
No	22	(77.3%)
Partially	1	(3.3%)
TOTAL	30	

Table 4.5 indicates most users have a combination of both on-line and batch processing methods. According to the above table 77.33% of the computer systems are not integrated through a network. From trends in the industry there is a movement towards integration of systems. The banking sector in particular has moved in this direction.

Table 4.8

WRITTEN COMPUTER ACQUISITION POLICY

	Frequency (%)	
Yes	15	(50%)
No	15	(50%)
TOTAL	30	

Table 4.8 indicates an equal proportion of firms who have a computer acquisition policy and those who do not. A clearly defined computer acquisition policy assists an organisation prevent, for example, a proliferation of incompatible computers.

Table 4.9

TYPING SKILLS OF COMPUTER USERS

	Frequency (%)
None	1 (3.3%)
Hunt and Peck	3 (10%)
Casual	3 (10%)
Good	18 (60%)
Excellent	5 (16.7)
TOTAL	30

As indicated in Table 4.9, most organisations reported that the users have good typing skills. This is a strong point in the industry and as such suppliers need not emphasise it much in their marketing programs. This may be attributed to type-writer like keyboards and the fact that word processors have been introduced in large numbers in organisations and are mainly used by secretaries.

Table 4.10

MAINTENANCE OF COMPUTER SYSTEM

	Frequency (%)
Supplier	25 (83.3%)
Company Staff	0 (0%)
Combined	5 (16.7%)
TOTAL	30

A large majority of users reported that their systems are maintained by the suppliers (Table 4.10). In fact no user reported In-house maintenance of computer systems. The suppliers should take this into consideration because this means that tech-

nical support is not available to the organisations from within.

Table 4.11

EFFICIENCY OF SUPPLIER SUPPORT

	Frequency	(%)
Yes	19	(63.3%)
Sometimes	10	(33.3%)
No	1	(3.3%)
TOTAL	30	

Table 4.12

RATING OF SUPPORT OF SUPPLIER

	Frequency	(%)
Very good	3	(10%)
Good	16	(53.3%)
Average	9	(30%)
Poor	2	(6.7%)
Very poor	0	(0%)
TOTAL	30	

The rating of the computer suppliers on support was high as shown by the Table 4.11 and Table 4.12. This indicates satisfactory technical support is available from computer suppliers.

Table 4.13

USAGE OF COMPUTER WITHOUT APPROVAL

	Frequency	(%)
Yes	2	(6.7%)
Sometimes	9	(30%)
No	19	(63.3%)
TOTAL	30	

Table 4.13 indicates that computers are rarely used without approval. This means that security measures in this area are effective.

Table 4.14

PROJECT MASTER PLAN DEVELOPED

	Frequency	(%)
Yes	21	(70%)
No	9	(30%)
TOTAL	30	

Table 4.14 indicates 70% of users reported project master plans were developed. This means that a majority of users systematically consider the various implications of acquiring a computer system.

Table 4.15

SYSTEM DESIGN DOCUMENTED

	Frequency	(%)
Yes	26	(86.7%)
No	4	(13.3%)
TOTAL	30	

Similarly, a large majority of users had their system designs documented as indicated in Table 4.15. This would imply that the users took a keen interest in knowing exactly how their designs are conceptualised and executed.

Table 4.16

MONITORING OF COSTS DURING SYSTEM DEVELOPMENT

	Frequency (%)
Yes	18 (60%)
No	12 (40%)
TOTAL	30

A relatively lower proportion monitored their costs during system development as shown in Table 4.16. This is an area normally overlooked by users. The system benefits have to justify the costs. Although in the short run this may not be feasible, in the long run, it should be able to determine the justification of the system.

Table 4.17

OUTPUT REQUIREMENTS DEFINED AND DOCUMENTED

	Frequency (%)
Yes	27 (90%)
No	3 (10%)
TOTAL	30

Ninety percent of the respondents (Table 4.17) reported that their output requirements were defined and documented. This facilitates efficient writing and testing of programs.

Table 4.18

APPLICATION SOFTWARE FULLY DEVELOPED

	Frequency (%)
Yes	27 (90%)
No	3 (10%)
TOTAL	30

A similar proportion (Table 4.18) reported that their application software were fully developed either as modified standard packages or specially prepared for them by the suppliers.

Table 4.19

POST IMPLEMENTATION EVALUATION

	Frequency (%)
Yes	23 (76.7%)
No	7 (23.3%)
TOTAL	30

Table 4.19 indicates that most computer systems had a post implementation evaluation. This is the stage where the computer system is assessed to ascertain whether it is working as specified. This is an indication that users are concerned about the performance of their computer systems.

Table 4.20

CROSS-TABULATION OF INDUSTRY WITH AGE OF ORGANISATION

	Less than 10		More than 20	
	No.	%	No.	%
Manufacturing	0	(0%)	1	(4%)
Finance and related orgs.	0	(0%)	10	(40%)
Transport and Comm.	0	(0%)	3	(12%)
Community, social etc	1	(100%)	2	(8%)
Agriculture	0	(0%)	2	(8%)
Construction	0	(0%)	1	(4%)
Electricity, Gas etc	0	(0%)	5	(20%)
Other	0	(0%)	1	(4%)
TOTAL	1		29	

A significant proportion of the respondents in the sectors listed in Table 4.20 have existed for more than 20 years except for one respondent in the community, social and personal services sector which began ten years ago.

Table 4.21

CROSS-TABULATION OF INDUSTRY WITH PROCESSING METHOD

	Batch		On-line		Combined	
	No.	%	No.	%	No.	%
Manufacturing	0	(0%)	0	(0%)	1	(5.6%)
Finance and related orgs.	4	(44.4%)	2	(66.7%)	6	(33.3%)
Transport and Comm.	1	(11.1%)	0	(0%)	2	(11.1%)
Community, social etc	1	(11.1%)	0	(0%)	4	(22.2%)
Agriculture	2	(22.2%)	0	(0%)	0	(0%)
Construction	0	(0%)	0	(0%)	1	(5.6%)
Electricity, Gas etc	2	(22.2%)	0	(0%)	4	(22.2%)
Other	0	(0%)	1	(33.3%)	0	(0%)
TOTAL	10		3		17	

In the sample, 44.4% in the Financial and related services, 11.1% in the Transport and Communication industry and 11.1% in

the community and social and personal services use batch processing (Table 4.21). About twenty two percent in the agricultural sector and 22.2% in the electricity and gas sector use batch processing.

Among those using on-line processing, 66.7% are from the Financial and related sector and the rest from other sectors (specifically, a United Nations body)

A larger proportion, however, use combined on-line and batch processing methods as shown in Table 4.21 above.

Table 4.22

CROSS-TABULATION OF INDUSTRY WITH INVESTMENT IN SYSTEM

	Greater than sh 1 Million but less than sh 5 Million		More than sh 5 Million	
	No.	%	No.	%
Manufacturing	0	(0%)	1	(5%)
Finance and related orgs.	5	(55.6%)	7	(35%)
Transport and Comm.	0	(0%)	3	(15%)
Community, social etc	1	(11.1%)	3	(15%)
Agriculture	1	(11.1%)	1	(5%)
Construction	1	(11.1%)	0	(0%)
Electricity, Gas etc	1	(11.1%)	4	(20%)
Other	0	(0%)	1	(5%)
TOTAL	9		21	

From the Table 4.22, it can be deduced that the investment in computer systems is high. A majority of the investments in computer systems are in the range of over five million shillings. The distribution of the firms is such that most users from each industry fall in the over five million shillings range.

Table 4.23

CROSS-TABULATION OF INDUSTRY WITH ACQUISITION POLICY

	Have an Acquisition Policy		Do not Have an Acquisition Policy	
	No.	%	No.	%
Manufacturing	0	(0%)	1	(6.7%)
Finance and related orgs.	7	(46.7%)	5	(33.3%)
Transport and Comm.	2	(13.3%)	1	(6.7%)
Community, social etc	1	(6.7%)	4	(26.7%)
Agriculture	1	(6.7%)	1	(6.7%)
Construction	0	(0%)	1	(6.7%)
Electricity, Gas etc	3	(20%)	2	(13.3%)
Other	1	(6.7%)	0	(0%)
TOTAL	15		15	

On computer acquisition policy, Table 4.23 indicates an equal proportion for those who have one and those who do not. Of the users who have an acquisition policy, 46.7% were from the Financial services sector and 20% of them were from the electricity,gas and water industry. For those who did not have security policies, firms in the community, social and personal services sector represented 26.7%.

4.2 Factor Analysis

Factor analysis was done on Section B of the questionnaire. The results are presented below.

Table 4.24

STATEMENTS IN THE QUESTIONNAIRE

1. The system has increased efficiency in the organisation
2. The use of the system has increased quality of work
3. The use of the system has improved the image of the company
4. The system has increased security and privacy of data
5. The system has increased the supply of useful information
6. Information obtained from the system normally up to date
7. The system conducts a comprehensive statistical analysis
8. Requested reports include irrelevant data
9. Requested reports arrive late
10. Disputes occur between end-users and systems personnel
11. Changes made to the system too frequent
12. Company encourages users to participate in system changes
13. Systems department has too much power and control over other departments
14. Employees in the company have received sufficient training by the supplier in operating computers
15. The system is too complex for the employees to appreciate
16. The system justified expenditures on a cost-benefit basis
17. The system has led to increase of support of information systems from top management
18. The system controls user access to corporate data
19. The system has increased information flow in organisation
20. The system was designed with end-user in mind
21. The system has reduced time pressures on staff
22. Reports received easy to understand
23. Managers of other departments skeptical of system
24. Employees in the systems department have the data processing knowledge to effectively and efficiently perform development
25. Management reports show evidence of goal achievement
26. Systems capabilities are grossly underutilised
27. All purchases of the system are approved by the management
28. End-users justify the possession or acquisition of computers
29. It is not possible for end users to update the data contained in the central data base unless authorised by IS department
30. All users are obliged to make security copies
31. Users respect copy rights
32. It is possible to transfer data from the central data base through the users computer

Table 4.25 below shows the summary statistics relating to the variables of the second part of the questionnaire. It gives the average, mode and standard deviation.

Table 4.25

THE SUMMARY STATISTICS OF SECTION B OF QUESTIONNAIRE

	AVERAGE	MODE	STANDARD DEVIATION	VARIABLE NUMBER
Q1	4.5	5	0.630	1
Q2	4.4	4	0.621	2
Q3	4.1	4	0.759	3
Q4	3.7	4	0.794	4
Q5	4.4	4	0.556	5
Q6	3.9	4	0.860	6
Q7	3.7	4	0.794	7
Q8	2.6	2	1.100	
Q9	2.3	2	0.837	8
Q10	2.3	2	0.837	9
Q11	2.4	2	1.105	
Q12	3.5	4	1.106	
Q13	1.9	2	0.669	10
Q14	3.6	4	0.964	
Q15	2.3	2	1.087	
Q16	3.9	4	0.691	11
Q17	4.0	4	0.694	12
Q18	3.5	4	0.974	
Q19	3.9	4	0.615	13
Q20	3.9	4	0.885	14
Q21	3.6	4	0.964	
Q22	4.0	4	0.643	15
Q23	2.7	2	1.112	
Q24	4.0	4	0.743	16
Q25	3.9	4	0.827	17
Q26	2.5	2	1.041	
Q27	4.2	4	0.817	18
Q28	3.8	4	1.100	
Q29	3.8	4	0.961	
Q30	3.3	4	1.272	
Q31	3.5	4	1.073	
Q32	2.9	4	1.155	

From the above, the following questions:- 1, 2, 3, 5, 17, 24, and 27- the users tend to agree or strongly agree with the

statements. Thus, on average, users tend to agree that their systems have increased efficiency, quality of work and improved images of their respective companies. Further, users tend to agree that the system has led to increased support of top management and that all purchases of computer systems have to be approved by top management.

Also, users agree that reports from the system are easy to understand, normally up to date and that the system conducts a comprehensive statistical analysis. Users also agree that the system was designed with the end user in mind and that it is not possible for end-users to update the data contained in the central data base unless authorised.

Users, however, have disagreed with the following questions:- 9, 10, 11, 13 and 15- This means that, on average, users disagree that requested reports arrive late, that disputes occur between system personnel and end-uses, that changes to the system are too frequent. They also disagree that the systems department has too much power and control over other departments and the system is too complicated for the employees to appreciate.

On average, they neither agreed nor disagreed that all users are obliged to make security copies, that users respect copy rights and that it is possible to transfer data from the central data base through to the users computer.

A study of the mode of each question, indicates that users strongly agree with the statement that computers have increased efficiency in the respective organisations. The mode of the response to 23 questions implies that users agreed with most of

the statements except questions 8, 9, 10, 11, 13, 15, 23 and 26, where the mode 2 means that they disagree with the statements in these questions. The statistical package used for analysis is limited to a 18 by 18 such matrix. To eliminate the other 12 variables (questions), the standard deviation was used. The lower the standard deviation, the better the variable in determining satisfaction. This means that the users were more consistent in their choice of response to that variable. These variables are in Table 4.26 below.

Table 4.26
STATEMENTS SELECTED

VARIABLE	STATEMENT
1	The system has increased efficiency
2	The use of the system has increased quality of work
3	The use of the system has improved the image of the company
4	The system has increased security and privacy of data
5	The system has increased supply of useful information
6	Information obtained from the system normally up to date
7	The system conducts a comprehensive statistical survey
8	Requested reports arrive late
9	Disputes occur between end-users and systems personnel
10	Systems department has too much power and control over other departments
11	The system is too complex for the employees to appreciate
12	The system has led to increase of support of information systems from top management
13	The system has increased information flow in the organisation
14	The system was designed with the end-user in mind
15	Reports received easy to understand
16	Employees in the systems department have the data processing knowledge
17	Management reports show evidence of goal achievement
18	All purchases of top management are approved by top management

Table 4.27
CORRELATION MATRIX

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1	.62	.40	.24	.44	.26	.38	-.30	-.10	.12	.55	.31	.22	-.10	.34	.17	.46	.23
2		1	.64	.46	.50	.43	.53	-.40	-.10	.03	.55	.48	.31	.07	.52	.37	.46	-.05
3			1	.14	.40	.50	.68	-.54	.01	.14	.61	.46	.38	.27	.49	.43	.51	.18
4				1	.34	.55	.67	-.59	-.33	.24	.46	.18	.47	.34	.47	.41	.44	.23
5					1	.47	.65	-.24	-.02	-.06	-.51	.45	.44	.00	.39	.25	.50	.03
6						1	.50	-.61	-.37	.05	.33	.23	.58	.16	.37	.32	.32	-.30
7							1	-.57	-.07	.18	.50	.44	.40	.15	.54	.41	.44	.11
8								1	.26	.02	-.38	-.42	-.52	-.33	-.58	-.67	-.32	.30
9									1	-.23	-.14	-.01	-.11	-.10	-.44	-.22	-.27	.10
10										1	.14	-.15	.00	-.12	.08	.07	.06	.99
11											1	.72	.48	.21	.62	.47	.65	.02
12												1	.40	.28	.77	.53	.66	-.18
13													1	.18	.26	.52	.40	-.05
14														1	.30	.21	.32	-.16
15															1	.51	.65	-.20
16																1	.57	-.06
17																	1	.13
18																		1

From the correlation matrix in Table 4.27, which is the basis of generating the factors[6], variables 11. 12, 15 and 17 were found to have a positively high correlation. The next variables to have a high correlation were 4, 5, and 7 were similarly found to be highly correlated positively. Variables 1, 2 and 3 are also correlated and variable 8 and 16 are correlated but negatively. Variables 9, 10, 14 and 18 were weakly correlated with the rest of the variables.

---

6. Factor analysis is a technique of the analysis of interdependence. In studies of interdependence, the variables have equal chance, and the analyst is concerned with the set of relationships among variables.

Table 4.28

FACTOR ANALYSIS OUTPUT OF VARIABLE AND COMMUNALITY

VARIABLE	COMMUNALITY
1	0.56
2	0.55
3	0.85
4	0.70
5	0.56
6	0.65
7	0.69
8	0.79
9	0.50
10	0.30
11	0.72
12	0.90
13	0.48
14	0.19
15	0.83
16	0.50
17	0.67
18	0.60

The communality is the proportion of the variable's variation to the total variation that is involved in the factors. For example, 85% of variable 3 is involved in the factors.It can be deduced that variable 10, 14 and 9 rank low in terms of their contribution to the factors. Thus it supports the correlation matrix results.

Table 4.29

EIGEN VALUES

FACTOR	EIGEN VALUE	%VARIABLE	CUMULATIVE%
1	7.06927	49.0	49.0
2	1.60915	11.1	60.1
3	1.36933	9.5	69.6
4	1.00010	6.9	76.5
5	0.89970	6.2	82.7
6	0.65325	4.5	87.3
7	0.55317	3.8	91.1
8	0.45570	3.2	94.2
9	0.39732	2.8	97.0
10	0.20598	1.4	98.4
11	0.12529	0.9	99.3
12	0.07850	0.5	99.8
13	0.02421	0.2	100
14	-0.04858	0.0	100
15	-0.08866	0.0	100
16	-0.11601	0.0	100
17	-0.11692	0.0	100
18	-0.14638	0.0	100

The measures in Table 4.28 indicate how well each of the identified factors fit the data from all the respondents on all statements. This output measure consists of the eigen values, which is the sum of the squares of its factor loadings. Because the responses to the statements are standardised, the variance associated with the responses to any statement equals 1.0. For example, Factor 1 explains 49.0% of the total variation, Factor 2 explains 11.1% of the total variation and so on.

Table 4.30
INITIAL FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
1	.54	-.51	-.12	.02
2	.70	-.20	-.7	-.11
3	.73	-.05	.54	.12
4	.78	-.22	.20	-.09
5	.62	-.26	-.12	-.32
6	.64	.27	.32	-.247
7	.76	-.78	-.22	-.18
8	-.73	-.43	-.21	.18
9	-.29	-.30	.22	-.54
10	.10	.15	.35	.38
11	.78	-.18	-.26	.11
12	.71	.10	-.62	.03
13	.61	.14	.10	-.27
14	.31	.30	-.02	.08
15	.78	.20	-.24	.35
16	.65	.25	-.04	.08
17	.73	-.13	-.25	.25
18	-.04	-.72	.21	.19

Table 4.30 shows the correlations between the factors and the variables. Variable 2 (Q2), variable 3 (Q3), variable 7 (Q7), variable 8 (Q9), variable 11 (Q16), variable 12 (Q17), variable 15 (Q22) and variable 17 (Q25) load heavily on principal factor 1, while the second factor is loaded heavily by variable 7 (Q7) and variable 18 (Q27).

Factor 3 is loaded heavily by variable 12 (Q17) and variable 3 (Q3) and Factor 4 by variable 9 (Q10).

Table 4.31
FINAL VARIMAX ROTATED FACTOR MATRIX

FACTOR	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
1	.59	.32	-.32	-.08
2	.61	.41	.05	-.09
3	.22	.86	.12	.22
4	.51	.66	.04	-.04
5	.58	.35	.04	-.31
6	.21	.50	.50	-.05
7	.47	.67	.10	-.11
8	-.32	-.52	-.64	-.09
9	-.03	-.23	-.18	-.65
10	-.09	.33	-.23	.36
11	.79	.28	.01	.12
12	.90	-.08	.28	.08
13	.36	.44	.38	-.14
14	.18	.10	.33	.19
15	.71	.20	.28	.50
16	.46	.30	.38	.22
17	.74	.24	.01	.26
18	.39	.27	-.73	.19

The rotated matrix gives the revised initial factor matrix after it had been orthogonally rotated using varimax. It attempts to simplify the columns of factor matrix by making all values close to either 0 or 1. This matrix represents the terminal solution of the factors. Since it is an orthogonal-factor matrix, it stands for both a pattern and a structure matrix. That is, the coefficients in the matrix represent both regression weights and correlation coefficients. The loadings in a given in a given row represent regression coefficients of factors that describe a given variable.

In the final varimax rotated matrix (Table 4.31), variable 11 (Q16), variable 12 (Q17), variable 15 (Q22) and variable 17

(Q25) load heavily on factor 1. Variable 3 (Q3), variable 7 (Q7) and variable 4 (Q4) load on factor 2; variable 18 (Q27) and variable 8 (Q9) load on factor 3 while factor 4 is loaded on variable 9 (Q10). The implications of this are shown in Table 4.32 below.

Table 4.32
THE FACTORS

This means that the following statements will make factor 1;

. The system justified expenditures on a cost-benefit basis.
. The system has led to increased support of information systems from top management.
. Reports received easy to understand.
. Management reports show evidence of goal achievement.

Factor 2 arises out of the following statements;

. The use of the system has improved company image
. The system conducts comprehensive statistical analysis.
. The system has increased security and privacy of data.

Factor 3 arises out of the following statements;

. All purchases of the system are approved by top manageent
. Requested reports include irrelevant data

The following statements makes factor 4;
. Disputes occur between systems personnel and end-users.

SECTION 5

SUMMARY AND CONCLUSIONS

The objective of this study was to explore the area of management satisfaction with computed mediated information systems. Among other things, this study was to come up with factors considered important or significant by the users in their satisfaction or dissatisfaction with information systems.

The literature covered in this study dwelled much about information systems in the western countries, specifically Britain and the U.S.A. Various attitude factors were discussed regarding user satisfaction based on previous related research studies. This study was not a replica of any of the previous studies but attempts to give a view of users attitude toward information systems in Kenya.

5.1 Conclusions

From the research findings as presented in Section 4 of this study, several conclusions may be drawn. These are discussed in light of the objectives of the study.

5.1.1 Conclusions on Survey of Firms Selected

From this section, it can be deduced that a greater proportion of computer users are in the Financial, Insurance and Business Services sector, followed by Community, Social and Personal

Services and Electricity Gas and Water Sectors. The rest of the sectors of the economy use computers at a minimal level. Further, That it takes a considerable length of time for a company to have a fully fledged computer department.

Most organisations own their computer systems and investment in the computer systems is considerably high (More than five million) and most systems are not integrated through a network.

Users seem indifferent on having a written computer acquisition policy and the typing skills of computer users is good. On the maintenance of computer systems, the users report that they rely to a very great extent on the services of the computer supplier. Users further report that suppliers are efficient in their service to them and the rating was, on average, good.

Computers in most organisations are rarely used without approval and most users reported that careful analysis from project master plan to post-implementation evaluation was performed.

5.2.2 Conclusions of the Factor Analysis

According to the summary statistics, on average, most organisations agree that the systems in operation have increased efficiency and quality of work in the organization. They disagree that there are frequent changes in the computer system and that Information Systems personnel have too much power and control over other personnel in other departments.

The correlation matrix, indicates a strong correlation between goal achievement and expenditure, systems security and supply of useful information, system efficiency and quality of

work, and effectiveness of systems department and relevance of data reports.

The correlation matrix formed the basis of the next stage of analysis, that is, the initial factor matrix. This is where the factors are generated. In the initial stage, quality, image, system capability, cost and support of top management heavily loaded on factor 1, system capability and purchasing policy loaded on factor 2. Factor 3 had support of top management and image of company as significant while factor 4 concerned the relationship between system personnel and end users.

After the final varimax rotation, the factors were finally generated. The most important factor is the cost-benefit aspect of the computer system. The goal of any computer system is to achieve certain objectives. If these objectives are met within specified constraints then it will always receive support from top management.

The next important factor is image of the company. Since most of the firms sampled were in the Financial, Insurance and Business Services sector, most customers would normally consider security and privacy of data, and better analysis of information as important. This would contribute to the image of the organisations.

The third factor is purchasing policy. End-users must justify the possession of computers for top management to approve. Once a purchasing policy is established all acquisitions will be done in an orderly manner and irrelevant data will not be obtained.

The fourth factor is inter-personal relationships in the or-

ganisations. There must be good relations between systems personnel and those from other departments.

Therefore, computer users in Kenya consider the following factors as important in gauging satisfaction with information systems:

Table 5.1

SUMMARY OF THE FACTORS

. Cost benefit of the system
. Prestige and image of the company as a result of the system acquisition
. Purchasing policy hence compatibility of computer systems
. Inter-personal relationships in the organisation as important factors in the acquisition of computer systems.

5.2 Limitations of the Study and Suggestions for Further Research

This section discusses the limitations of the study- both general and methodological- and suggestions for further research.

5.3.1 Limitations of the Study

A major limitation of this study was that not all computer vendors agreed to participate in the study. The study would have been made richer in content had the other computer vendors such as National Cash Register (NCR) and Computer Applications Limited (CAL) participated.

Resource constraints were also a limitation of the study. The study confined itself to firms that were easily accessible, that is those firms that were based in Nairobi. A larger sample would have been better suited for the study but it was not possible. A longer period of observation of the respondents would have given a better picture of the level of satisfaction over time, depending on the age of the system in operation.

5.3.2 Suggestions for Further Research

This was a study on the clients of selected computer vendors. A moe widely selected sample study of organisations having computer-based information systems would give results which are more generalisable.

This study can also be extended to include all managers in the organisations who are directly involved with the computer/information department, for example Finance and Accounting Departments, Administration and Planning Departments, Production, among others.

Further, this study can be extended to the actual end-users, such as computer operators, technicians, data entry clerks plus all other support staff in the organisation who in one way or another are directly involved in the computer department.

APPENDIX I

Department of Management Science,
University of Nairobi,
P.O. Box 30197,
Nairobi.

Dear Computer Manager,

I am a postgraduate student in the Faculty of Commerce, University of Nairobi. I am doing a research on "Management Satisfaction with the Performance Of Computer-Mediated Information Systems".

I am therefore appealing for your assistance in completing the attached questionnaire to the best of your knowledge and ability. It will only take a few minutes of your time to answer the questions and you might find it an enjoyable experience. The information you provide will be treated in strict confidence.

Any additional information you might feel is necessary for this study is most welcome and can be written on the back of this questionnaire.

Your cooperation in completing the questionnaire is greatly appreciated.

Yours Sincerely,

Kiphgetich, J.K.
M.B.A. II Student

Supervisor:
Danny Fernandes, Lecturer,
Department of Management Science, University of Nairobi

QUESTIONNAIRE

Please answer the following questions by placing a tick ( ) in the space provided.

1. What industry would you classify your institution to be in?

Manufacturing ( )
Finance, Insurance, Real Estate and Business Services ( )
Transport, Storage and Communication ( )
Mining ( )
Community, Social and Personal Services ( )
Agriculture ( )
Construction ( )
Wholesale, Retail trade, and Restaurant and Hotels ( )
Electricity, Gas and Water ( )
Other (Specify).....

2. How long has the organisation been in existence?

Less than 10 years ago ( )
Less than 20 but more than 10 years ( )
More than 20 years ago ( )

3. How would you classify your computer system in terms of ownership?

Own System ( )
Computer Bureau Owned ( )
Other (Specify).....

4. When did your institution first utilise computers?

Less than 5 years ago ( )
Less than 10 but more than 5 years ago ( )
More than 10 years ago ( )

5. Approximately how much have you invested in your computer system?

Less than sh 1 million ( )
More than sh 1 m but less than 5 m ( )
Over sh 5 million ( )

6. Which of the following processing methods describe your computer operations?

Batch ( )
On-line ( )
Combined batch and on-line ( )

7. How many departments in the organisation are computerised?.....out of.....
Which ones are they.....
.....

8. Is the information system integrated through a network?

Yes ( )
No ( )

9. Approximately how many people are employed in your organisation?
.....

10. How many of these employees are in the Systems and/or information Department?
.....

11. Was the following performed for the development of the system in operation?

	YES	NO
Project Master Plan developed	—	—
System Design documented	—	—
Monitoring of Costs during system development	—	—
Output Requirements defined and documented	—	—
The Application Software fully tested	—	—
Post-Implementation Evaluation	—	—

12. Does the company have a written computer acquisition policy?

Yes ( )
No ( )

13. How would you rate, on average, the typing skills of computer users in the organisation?

None ( )
Hunt and peck ( )
Casual(Rough draft with errors) ( )
Good(Can do 25 w.p.m. error free) ( )
Excellent(Can do 40 w.p.m. error free) ( )

14. Who maintains your computer equipment?

Supplier ( )
Company staff ( )
Both Company staff and Supplier ( )

15. If the supplier participates in the maintenance of computer system, is the support available as and when you need?

Yes ( )
Sometimes ( )
No ( )

16. How would you rate the support given by the supplier?

Very good ( )
Good ( )
Average ( )
Poor ( )
Very poor ( )

17. Are there instances that computers are used by employees without proper approval?

Yes ( )
Sometimes ( )
No ( )

SECTION B

Indicate the extent to which you agree or disagree with the following statements.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. The system has increased efficiency in the organisation	( )	( )	( )	( )	( )
2. The use of the system has increased quality of work	( )	( )	( )	( )	( )
3. The use of the system has improved the image of the company	( )	( )	( )	( )	( )
4. The system has increased security and privacy of data	( )	( )	( )	( )	( )
5. The system has increased the supply of useful information	( )	( )	( )	( )	( )
6. Information obtained from the system normally up to date	( )	( )	( )	( )	( )
7. The system conducts a comprehensive statistical analysis	( )	( )	( )	( )	( )
8. Requested reports include irrelevant data	( )	( )	( )	( )	( )
9. Requested reports arrive late	( )	( )	( )	( )	( )
10. Disputes occur between end-users and systems personnel	( )	( )	( )	( )	( )
11. Changes made to the system too frequent	( )	( )	( )	( )	( )
12. Company encourages users to participate in system changes	( )	( )	( )	( )	( )
13. Systems department has too much power and control over other departments	( )	( )	( )	( )	( )
14. Employees in the company have received sufficient training from the supplier in operating computers	( )	( )	( )	( )	( )

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
15. The system is too complex for the employees to appreciate	( )	( )	( )	( )	( )
16. The system justified expenditures on a cost-benefit basis	( )	( )	( )	( )	( )
17. The system has led to increase of support of information systems from top management	( )	( )	( )	( )	( )
18. The system controls user access to corporate data	( )	( )	( )	( )	( )
19. The system has increased information flow in organisation	( )	( )	( )	( )	( )
20. The system was designed with end-user in mind	( )	( )	( )	( )	( )
21. The system has reduced time pressures on staff	( )	( )	( )	( )	( )
22. Reports received easy to understand	( )	( )	( )	( )	( )
23. Managers of other departments skeptical of system	( )	( )	( )	( )	( )
24. Employees in the systems department have the data processing knowledge to effectively and efficiently perform development	( )	( )	( )	( )	( )
25. Management reports show evidence of goal achievement	( )	( )	( )	( )	( )
26. Systems capabilities are grossly underutilised	( )	( )	( )	( )	( )
27. All purchases of the system are approved by the management	( )	( )	( )	( )	( )
28. End-users justify the possession or acquisition of computers	( )	( )	( )	( )	( )
29. It is not possible for end users to update the data contained in the central data base unless authorised by IS department	( )	( )	( )	( )	( )

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
30. All users are obliged to make security copies	( )	( )	( )	( )	( )
31. Users respect copy rights	( )	( )	( )	( )	( )
32. It is possible to transfer data from the central data base through the users computer	( )	( )	( )	( )	( )
33.	( )	( )	( )	( )	( )
34.	( )	( )	( )	( )	( )

36. What further comments can be made with respect to your satisfaction with the information system?

.....

.....

THANK YOU VERY MUCH FOR YOUR COOPERATION

BIBLIOGRAPHY

ARTICLES

Adams C.; "How Management Users View Information Systems", Decision Sciences, Vol. 6 April 1975 p. 337-45

Aeh R.K.; "Technology's Impact on Organisations and their Structures", Journal of Systems Management, Dec. 1989 p.22

Anderson, R. E.; "Consumer dissatisfaction: The Effect of Disconfirmed Expectancy on Perceived Product Performance", Journal of Marketing Research, Vol. 10, Feb. 1973 p. 38

Archer N.P; " End-user Software Selection", Journal of Systems Management, July 1988 p. 32

Atkins M.C & Lucas K.C; "Microcomputer Audit Guide", Journal of Systems Management, Sept. 1986 p. 22

Bergeron F.; "End Users Talk Computer Policy", Journal of Systems Management, Dec. 1990, p. 14

Black W. and Trippi R.; Management Attitudes Toward IT in the UK", Journal of Systems Management, Dec. 1990 p.21-25

Bluestone I.; "The Human Factor: Source Effects of Computer Revolution on Labour", Computers and People, July-August 1983, p. 12

Burch, J.G.; "How to Select the Best Computer Vendor", Journal of Systems Management, June 1987 p.32

Dantzig D.F; " Untangling Information Systems", Journal of Systems Management, Feb. 1990

Doll W.J. and Torkzadeh G.; "The Measurement of End-user Software Involvement", Omega, Vol. 18, No. 4 p. 399

Espejo W; " Information Management, Organisation & Managerial Effectiveness", Journal of Operational Research Society, Vol. 39 No. 1, 1988 p. 7

Guimaraes, T. and Gupta Y.P.; "Measuring Top Management Satisfaction with MIS Department", Omega, Vol. 16 No.1, 1988 p. 17-24

Guthrie A.; "Attitudes of User-Manager Toward Management Information Systems", Management Information Vol.3, No. 5, p. 221-32

Heeler R.M., Whipple T.W. and Hustard T.P.; "Maximum Likelihood Factor Analysis of Attitude Data", Journal of Marketing Re-

search, Vol. XV, Feb 1977, p.42

Hiltz S.R. and Johnson K.; "User Satisfaction with Computer-mediated Communication Systems", Management Science, Vol.36 No.6, June 1990 p.739

Howard G.S. and Weinroth G.J.; "User's Complaints: Information System Problems from the User's Perspective", Journal of Systems Management, May 1987 p. 30

Ives, Blake, Margrethe H. and Baroudi J.; "The Management of User Information Satisfaction", Communications of the ACM, Vol.26, No.10 p.785-793

Jobber D.; "Behavioural Aspects of Marketing Information Systems", Omega, Vol.14 No.1, 1986 p. 69

Kagan, A., Lau, K. and Nusgart, K.R.; "Information System Usage Within Small Business Firms", Entrepreneurship Theory and Practice, Spring, 1990 p. 25-37

Khosropour M.; "Systems Investigation in Microcomputer Development", Journal of Systems Management, April 1989 p. 33

Krieg R.E. and Goslar M.D.; "Integrating Technology to Increase Application Development Productivity" Journal of Systems Management, August 1989 p.6

Liu J.P; "Utilising the Trend of End-user Development", Journal of Systems Management, Jan 1989, p. 38

Lederer A.C & Spencer V.L; "The Effective Informations Center: Targeting the Individual User for Success", Journal of Systems Management, Jan 1988 p. 23

Mcgraw Jr H.W; " The Information Industry: The Principles that Endure", Computers and People, May-June 1983 p. 7

Munro M. & Huff S.L; " Managing End-user Computing", Journal of Systems Management, p.13

Reitzfield M.; "On what should the Systems Department Concentrate", Journal of Systems Management, Dec. 1989 p.21

Santos B.L.D; "Information Systems: Similarities and Differences across Organisations", Omega, Vol.17 No.1, 1989 p.9

Tellis G.J. and Gaeth J. G.; "Best Value, Price-Seeking, and Price Aversion: The Impact of Information and Learning on Consumer Choices", Journal of Marketing, Vol.54, April 1990 p. 34-45

Thomas C.; "Management Development and IT: Bridging the gulf", Management and Data Systems, Vol. 3. 1990 p. 3

Westbrook R.A. and Newman J.W.; "An Analysis of Shopper Dissatisfaction for Major Household Appliances", Journal of Marketing Research, Vol. XV, August 1978, p. 456

Wu M.S; " Selecting the Right Software Package", Journal of Systems Management, Sept. 1990 p. 28

Yap C.S.; "Distinguishing Computer Users from Non-users", Omega, Vol.18 No.1, 1989, p. 103

BOOKS

Boyd, H.W., Westfall, R, and Stasch S.F.; Marketing Research: Text and Cases, 6th Edition, Irwin Inc., Homewood, 1986.

Churchill, G. A.; Marketing Research: Methodological Foundations, 3rd Edition, The Dryden Press, Holt-Saunders, 1983.

Green P.E.; Analysing Multivariate Data, Dryden Press, Hinsdale, 1978

Long L.; Computers in Business, Prentice Hall International, Engelwood Cliffs, 1987

Peterson R.A.; Marketing Research, Business Publications Inc. Texas 1982

Sanders D.; Computers Today, Prentice Hall International, Engelwood Cliffs, 1988

Weiers R.M.; Marketing Research, Prentice Hall International, 2nd Edition, Engelwood Cliffs, 1988

OTHER PUBLICATIONS

Masinde, C.K.; "Perceived Quality of Service: The case of Kenya Airways", University of Nairobi, Unpublished M.B.A. Project, June 1986

Statistical Graphics Corporation, Statgraphics Manual 1985