



GAPS IN MODELS/METHODS USED IN THE ASSESSMENT OF
INFORMATION SYSTEMS INVESTMENTS: THE CASE OF COFFEE
MARKETING CO-OPERATIVES IN TANZANIA

BY

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This document is a dissertation submitted to the St.Clements University of the British West Indies as a requirement for the award of the degree of Doctor of Philosophy (Ph.D).

DECLARATION

I hereby declare that this dissertation is an original product of my own personal research work.

All the materials, like data or figures or statements, which have been quoted from other writers and used in the course of writing this document have been duly acknowledged and included as reference material.

Benedict L.K.Mwaibasa

CERTIFICATION

This is to certify that this dissertation titled “***Gaps in models/methods used in the assessment of information systems investments: The case of coffee marketing co-operatives in Tanzania***” is an original product and result of a research project undertaken by Benedict L.K.Mwaibasa under my supervision and guidance and has been approved for the award of the degree of Doctor of Philosophy (Ph.D.).

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SUPERVISOR

ADMINISTRATOR
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Dated:_____

DEDICATION

I dedicate this piece of work to my late father *Isaya Kabotola* and mum *Rose Bukuku* who first saw me start class one. I also dedicate this piece of work to my beloved, the late wife, *Nabwike Kipesile* the mother of my beloved children *Edward* and *Atupakisye* who perceive my livelihood as a necessity for their livelihood and advancement.

Benedict L.K. Mwaibasa

Preface

This document is a research report on a study done on “Gaps in models/methods used in the assessment of Information Systems (ISs) investments the case of coffee marketing co-operatives in Tanzania.”

The study considers ISs as socio-technical systems as they are established to solve information related problems for organizations such as co-operative organizations. This implies that the assessment of an IS cannot be completed without consideration of the human element with its accompanying attributes. Also, the study considers information systems as important enablers with both tangible and intangible benefits to organizations.

This document is divided into five chapters and ends up with a section on references and appendixes as follows:

Chapter one has the following sections: 1.1, Background information to the Research Problem; 1.2, Statement of the Research Problem; 1.3, Objectives; 1.4, Research Questions; 1.5, Hypotheses; 1.6, Rationale, Significance and Contribution of the Study; 1.7, Expected Beneficiaries; 1.8, Assumptions; 1.9, Limitations and scope; 1.10, Conclusion for the Chapter; 1.11, Definition of key concepts.

Chapter two has sections which include: 2.1, The concept of information systems (ISs); 2.2, The need for the assessment of proposed IS/IT investments; 2.3, Related literature on methods/models used in the assessment of proposed IS/IT investments and 2.4, Conclusion for the chapter.

Chapter three is divided into seven (7) sections; namely: 3.1., Research Design; 3.2., Definition of the study population, types of data required and data sources; 3.3., Sampling methods and procedures; 3.4., Data Collection; 3.5., Data processing, analysis and interpretation; 3.6., Discussion of limitations of the methods and procedures used and 3.7., Conclusion for the chapter.

Chapter four is divided into three (3) sections; namely: 4.1, Introduction; 4.2., Analysis and Interpretation of Research Findings; 4.3, Summary and Conclusions.

Chapter five is divided into six sections, which include: 5.1: Summary of major research findings; 5.2: Recommendations; 5.3: suggestions for further research; 5.4: Dissertation tie-up.

The dissertation ends up with references and appendices.

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Lastly but not least, I take this opportunity to thank my wife, Justina, for taking care of our family while I was away struggling to collect data and putting it in a meaning form so as to come up with this document. Of course I have not forgotten my children who prayed that I completed the assignment successfully so that they could rejoice with me.

Above all, I appreciate that without the **GRACE OF THE ALMIGHTY GOD** I would not have managed to complete this research project.

However, I am to blame for whatever mistakes that may appear in this document.

ABSTRACT

This research project attempted to identify gaps in IS/IT investment assessment models/methods/frameworks used in coffee marketing co-operative organizations in Tanzania. The purpose was to improve on existing IS/IT assessment models/methods or propose new models/methods so as to come up with appropriately assessed/appraised IS/IT investments in the organizations.

The study used questionnaires, interview schedules and observations to collect data from a random sample of coffee marketing co-operative organizations in Tanzania. The collected data was analysed with the help of a statistical computer package for social scientists (SPSS version 10).

The major findings from the study are that, in addition to not having documented plans for information systems, no co-operative organization had pre-prepared and documented IS/IT investment assessment models/frameworks. Also, a significant proportion of co-operators did not perceive the existing information systems as effectively supporting their organizations in business communication in the present liberalized trade environment.

From the research findings it is concluded that lack of planning for IS/IT investments and hence not having appropriate IS/IT investments for business use was due to lack of entrepreneurship orientation among co-operators. This situation culminated into co-operative organizations not being able to compete in the introduced liberalized trade environment. This *problem is educational* and its solution lies in, first, ***running tailor-made programmes (TMPs)*** as recommended in chapter five item 5.2.1 page 107. This will give an entrepreneurship orientation to co-operators and introduce them to strategic planning for business information systems. Second, co-operators be introduced to a ***general framework*** for assessing IS/IT investment proposals in their organizations. This ***general framework*** has been ***proposed*** in chapter five item 5.2.2 page 108 and illustrated in appendix G page 165. The aim of the above recommendations is to ***have adequately assessed/appraised IS/IT investments*** which can ***effectively support the co-operative organizations*** in coffee marketing and to let co-operators appreciate the importance of having ***appropriate*** information systems in their business organizations.

Since the identified problem is ***educational***, further researches on information systems in co-operative organizations are recommended and these should use an ***action research approach*** so as to be able to make continuous improvements on the acquisition and use of ISs with time.

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CHAPTER ONE: INTRODUCTION

1.1.0: Background information to the research problem:

1.1.1: Preamble:

The need for objectively designed and managed information systems (ISs) among co-operative organizations in Tanzania cannot be overemphasized, especially now that co-operatives are working in a liberalized trade environment where the need for information and the management of information resources is crucial.

Studies on the failures of ISs and other information based systems show that the failures start at their point of inception, that is when they are first conceived. An inadequate model/method for assessing a proposed information system investment may approve the implementation of a less feasible IS investment and disapprove a feasible IS investment. It is behind this thinking that a proposal on the study of gaps/shortfalls in Models/Methods used to assess information systems (IS) investments in Coffee Marketing Co-operatives in Tanzania was put forward. The significance and rationale of this study is based on the fact that no practical models/methods for the assessment of IS investments have been documented for practical use among agricultural marketing co-operatives in the Tanzanian environment.

Tanzania is one of the 33 poorest countries in Africa with a per capita income of US\$ 246.94 (National Economic Growth:1999), a population growth rate of 2.8% and an economic growth rate of 4% (Business Times: May 17, 2001).

The country's economy pre-dominantly depends on agriculture which employs about 80% of the country's population which was 34,569,232 people (2003. Tanzania National Website: <http://www.tanzania.go.tz/census/>)

Major cash crops which contribute to the national economy include: coffee, cotton, tobacco and cashew nuts. Of the four cash crops, coffee is the major foreign currency earner for the country. It contributes between 23-30% of the Gross Domestic Product (GDP) and employs about 2.5 million people most of whom are small-holder farmers who constitute 80% of all coffee growers (Kaaya's committee: 2000). Most of these small-holder farmers market their coffee through primary co-operative societies (L.C.Komba:2000); hence their importance to the national economy and the need to be researched on in order to see if their performance could be improved.

There are 48 co-operative unions among these, 45 are agricultural co-operatives. There are 2,590 agricultural co-operative societies among these, 500 are affiliated to 16 coffee marketing co-operative Unions (ibid). The above discussion shows the importance of coffee marketing co-operatives to the country's national economy in general and poverty alleviation among co-operators in particular.

Many national and international authorities, including Presidents of Tanzania, have emphasized on the importance of co-operative organizations as a means through which poverty among poor people can be eradicated as members could pool up and share resources for the benefit of all. This can be seen from quotations made by Banturaki (2000) as follows:

... From authoritative circles, public and private, there has been much discourse on the potential of co-operatives to service the needs of the poor and eradicate poverty in their communities. Following the unsuccessful attempts through costly programmes in the 1960s and 1970s by United Nations (UN) agencies to eradicate poverty in the third world, Grant (1977), Dams (1977) and Laidlaw(1977) commented that there were good reasons for the co-operative system to be an important part of a new development strategy. This is because it involves the poor and weak members...

(Banturaki 2000:12)

Other authorities, quoted by Banturaki, have expressed the significance of co-operatives in the improvement of socio-economic status among poor communities, especially in developing countries (including Tanzania):

The government will never let the co-operative movement collapse... it is indispensable for farmers' welfare, and ... economic development at regional and national levels will only be hastened through the promotion of the co-operative unions. –Tanzania's third president, Benjamin W. Mkapa. (Daily News, 14/2/1997).

Co-operatives are "most suitable" to rural development, both as a way of life and also as an instrument for accelerated development. – (Zambia's first President, Kenneth Kaunda – (An address to the United National, Independence Party's National Council, 1969).

... No future for agriculture in India except through Co-operatives.

It seems to be obvious that the co-operative approach is the right approach not only in agriculture, but in many other activities - India's first Prime Minister, Nehru (Message to all India Co-operative Week Celebration, 1959, - in C.G.E)

Co-operatives are the instruments for change in an effort to alleviate poverty. Co-operatives are to take part in the major means of production. (Tanzania's first President, J.K. Nyerere, 1967 speech).

In the molding of our people into a nation, the co-operative movement has had and will continue to have a most important role to play. Already it has paved the way for our peasant farmers, who form the majority of our population to take their rightful place in the nation's economy. It has been a school for democracy, a spearhead in the war against poverty, ignorance and disease, and I am sure it will be one of the principal pillars in the future

of our new nation. -Tanganyika's former Minister for Agriculture, Paul Bomani (The co-operative Movement in Tanganyika, 1962).

Rural workers feel a sense of solidarity one with another and should unite to form co-operatives, which are necessary if they are to benefit from scientific and technical progress. They need to organize to have a voice, for today almost nobody hears, much less pays attention to isolated voices. -Pope John XXIII. (Co-operative League of the USA).

The weavers of Rochdale who formed the modern co-operative enterprise balanced independence with interdependence, self-interest with good-will and action with foresight. The co-operative belongs to no one nation but has its roots in the traditions of all democratic peoples. I look forward with confidence to the contribution that co-operative organizations will make to the years of peace that lie ahead-USA's former President, Franklin D. Roosevelt (Co-operative League of the USA).

(Banturaki 2000:154-157)

However, the nice statements, as observed from the above quotations about the great potentials of co-operative organizations in poverty alleviation, are easily said but hard to practice, especially in developing countries where one would think of running instead of taking cautious steps and observing the basic principles which make co-operative organizations flourish. In particular reference is made to the internationally accepted co-operative principles; namely: open and voluntary membership, democratic management and control, limited interest on shares, equal share in the economic benefits for all members, education for all members, and co-operation with other co-operatives at local, national and international levels(ICA, 1995 et al). This statement, by the ICA et al. made in 1995, is still true today for Tanzania where efforts are being made to let co-operative organizations stand on their own feet while they do not have the means of doing so, including being prepared to compete in business. Competition in business presupposes that one has the necessary information about his own internal business operations, about his competitors, his customers, suppliers and about his business environment in general. The requirement for information which may facilitate making effective plans, decisions and control would in turn call for the existence of effective, efficient and appropriate information systems for the co-operative organizations.

However, co-operative organizations in Tanzania have been having sustainability problems due to a number of weaknesses and constraints as discussed below.

Various studies, though none of them has directly looked at the effect of information systems on the performance of co-operative organizations, have been made on the problems of the co-operatives. The studies indicated that the nature of problems faced by co-operative organizations were different as the tenure of the governments changed ever since the colonial era to-date. The

periods studied included: the colonial period (before 1961), the period after independence (i.e. after 1961) and the period after the introduction of liberalized trade (1984/95). On the introduction of liberalized trade co-operatives found themselves on an equal footing with private local and multi-national companies like the Dorman Ltd., a company which buys coffee from farmers and at the national level and sells it at the world market.

1.1.2.0: Problems faced by coffee based co-operative organizations in Tanzania.

1.1.2.1: Before independence (1932 to 1961):

From 1932 to independence (1961) a number of coffee marketing co-operative unions were formed. The main purpose of the co-operatives was to bypass middlemen in the coffee business and to create an opposing force to competition brought by European settlers then. However, among other problems, co-operative organizations had a problem of lack of business information. Kimario(1992: 2-3) points out that indigenous farmers were not conversant with the coffee business and thus found themselves depending on Asian and European middlemen who could contact coffee buyers in the international markets for information on coffee business. This points to weaknesses such as the lack of appropriate information systems needed by the indigenous farmers for tracking information on the coffee business at an international level. The acquaintance of appropriate information systems would have provided them with the necessary information about the coffee business at local and international levels. The information would support them with planning, deciding and controlling their day-to-day coffee business operations and not to depend on middlemen whom the co-operative organizations were meant to bypass for improved income among the farmers.

However, Kimario (ibid) observes that one among the established co-operative unions, the Bukoba Native Co-operative Union (BNCU-1950), managed to solve problems related to lack of transparency through the introduction of a newspaper called the Buhaya Co-operative News. The newspaper worked as a good source of information from the Union to its members. It explained to co-operative members what co-operation was all about and highlighted on operational problems which local co-operatives faced in their attempts to achieve their objectives. The newspaper demonstrated to members that it was possible to enhance transparency and honesty among the owners, members and stakeholders of the co-operative union provided that all the interested parties were adequately given appropriate information.

However, Kimarios' study did not point out whether there were any consciously developed and implemented information systems for the BNCU or other unions and whether the newspaper was still in use to-date.

The discussion in the preceding paragraph shows the importance of having appropriate information systems which can effectively link an organization to its

business environment. Appropriate ISs could take care of internal information flows within a co-operative organization and external information flows involving customers, suppliers (e.g. suppliers of farm inputs, finances, education and other organizations which supplied resources to a co-operative organization), competitors (e.g. other co-operative organizations, private companies, associations and individuals doing the same business as the co-operative organization under consideration), collaborators or institutions which facilitated the development of co-operative organizations in the country (e.g. the Ministry concerned with co-operative development, co-operative development consulting and training institutions and similar other institutions). Availability of useful information is an important aspect, especially for organizations like co-operative organizations which are jointly owned by many individuals whose part of their commitment is their individual collaborative and collective participation. Such a situation calls for a high level of transparency. Participation cannot be effected if one is not informed of what is going on in the shared business, leave alone, problems which the business is facing; as Banturaki 2000) argues

... Self-propelled growth of co-op self-help organizations is only possible, if the self-help mechanism is put to motion (Munkner 1984). Participation in co-op activities, which results in tangible advantages for the member motivates the member to continue and intensify his or her active participation. This attracts others to join in the co-op society...

(Banturaki ibid: 17-18)

Participation and transparency in a co-operative organization can only be put to motion only if there exists effective, appropriate and adequate information behind which there must be effective and appropriate information systems. Although this is an obvious fact that to have valuable information one needs effective and appropriate information systems many studies made on problems faced by co-operatives in Tanzania did not take the trouble of going into the depths of studying the models/methods used to assess and identify appropriate IS investments in the co-operative unions during the period under discussion.

After independence (1961) and before the introduction of liberalized coffee trade (1992/93) in the country, coffee marketing co-operatives had a different cluster of problems as compared to those faced before independence. As indicated by various studies, which were mostly done by special committees of enquiry formed by the government authorities, most problems faced by the co-operative organizations were more politically based rather than technical as can be seen from the discussion below.

1.1.2.2: After independence (1961 to 1994):

After independence and with the understanding of the potentials of rural co-operative organizations in the eradication of poverty, new independent governments of Tanzania looked to co-operatives as the major means through which their socio-economic and political strategies could be channelled to the poor masses in rural areas in the country. It has to be noted also that this was

the starting point when a co-operator was made to stop thinking as an entrepreneur but as a political counting-unit and to stop thinking that a co-operative organization was his/her business unit but that it belonged to the government. It was the government which designed and implemented information systems as directed by the ruling party, the Tanganyika National Union (TANU) then. A political channel may not be expected to have an information infrastructure of a competitive business unit other than which caters for political ends.

On independence (1961), the new government of the TANU party, the sole ruling political party, embarked on a crash programme to promote co-operatives. In areas where there were no co-operatives during the colonial epoch, new co-operative organizations were established. To speed up the process of establishing the co-operatives, the government made amendments to the co-operative law in 1963 so as to allow co-operatives to be formed on political grounds, even where they had no economic viability (Kimario op cit: 27). As a result of this crash programme the number of registered co-operatives increased rapidly.

The rapid increase in the number of registered co-operatives was calling for problems in the long run, as no preparations had been made to run them on business basis. Indigenous farmers had no prior experience in coffee husbandry nor did they have enough capital to start the business, leave alone attempts to have strategies for the introduction of business information structures for effective business in the co-operatives. As Kimario (ibid) points out

... The rapid increase in the number of co-operatives was not without problems. The co-operative movement found itself in serious financial and management problems caused by inefficiency, corruption, nepotism and widespread dishonesty at union and primary societies' levels. According to the farmers, the marketing co-operatives which had been established to accelerate agricultural development in rural areas had turned out to be highly exploitative. High overhead costs in the primary societies, unions and marketing boards, big losses of money through thefts and deterioration of produce, and the inability of employed staff and committee members to apply modern management principles and techniques, made it impossible for the farmers to get good prices for their produce. As a result, farmers saw no justification for continuing their membership in the marketing co-operatives.

(Kimario ibid: 28)

The above situation called for an appointment of a special committee of enquiry so as to investigate into the operations of co-operatives.

The Mhaviile Special Committee of Enquiry (1966):

Following the problems of co-operatives which cropped up after the crash programme of their establishment, the President appointed a Special Committee

of enquiry in January, 1996 (Kimario *ibid*). The committee was chaired by Mr. Mhaviile and because of this it was called the Mhaviile Special Committee of enquiry.

The Committee was given the task to review in the staffing and where necessary, the organizational structure of the Co-operative Movement and Marketing Boards in order to recommend steps to be taken for the purpose of strengthening them for the benefit of farmers and consumers.

The committee submitted its report in June, 1966. The report listed the basic weaknesses found in co-operative organizations then as:

- (i) Uninformed membership.
That is a number of co-operative societies members were not informed about the objectives of their societies, the duties and the responsibilities of their committee members and the role these members had to play to make their societies achieve the set goals. As a result of this situation members were less inclined to participate actively in the affairs of their societies.
- (ii) Shortage of appropriate manpower.
 - the majority of staff in the co-operative organizations were not well trained to manage their organizational functions well.
 - the staff did not demonstrate a strong sense of responsibility for their work.
- (iii) Lack of democracy at the union level.
 - Union committee members were not elected directly by farmers.
- (iv) Lack of skilled personnel.
 - There was lack of personnel to give advice on problems which were beyond the scope of the members and employees of primary societies and unions.
- (v) Susceptibility of the movement to political interference.
 - There was widespread political interference in the running of the primary societies and unions. Politicians used co-operatives as stepping stones through which to get their political ambitions to rural people.

Item (i) above shows that there were no adequate information systems which made sure that information reached individuals at different management levels in the co-operative organizations. Item (ii) shows that manpower was not trained, this is an indication that, as marketing organizations are usually information intensive, the untrained manpower could not adequately handle business information and also they could not manage information resources which might have been there. Item (iii) above points to possibilities of adulterating information, as where democracy is lacking any little information that might attempt to flow is filtered and manipulated to the benefit of the undemocratic leaders. In any case where democracy lacks no attempts are made to have clear

and standardized information systems at least at the operational level which is crucial for the handling of basic transactions of any worthwhile business. Once information at the operational level is tempered with then other information systems whose execution depend on information at the operational level will not show a true and fair business picture of the organization concerned. In this case the co-operative organizations faced the ever-present problems of theft and embezzlement. Deliberately designed, effective and appropriate information systems would have made members at all co-operative levels informed of what was going on in their co-operative organizations and hence would have enhanced democracy, transparency and trust among co-operative society members. However, one could not expect the existence of effective and appropriate information systems for co-operative business if the government and the ruling party wanted to use them (the co-operative organizations) for political ends. Item (v) was a clear violation of the second co-operative principle which requires that a co-operative organization should be “democratically managed and controlled” as the concept of democracy applies where there are two or more people of equal interest in a given affair. In its wider perspective, the principle presupposes that to institute democracy members are knowledgeable of what is taking place and of the outcome of whatever is taking place.

Although the ICA co-operative principles have been proved to be the foundations for progress and flourishing of co-operative business organizations elsewhere in the world regardless of whether the co-operative organization is in a developing or developed country in Tanzania things were different. With the drive of political ambitions, the need to abide to the second co-operative principle by Tanzanian co-operators was met with threats. For example, an individual who would tend to resist political interference into the affairs of his/her co-operative organization would be considered as an unfit citizen in the eyes of the ruling party and would be given various descriptions. For example, statements like “so and so is not one of us” would be heard being pronounced by some political leaders against individuals who appeared to resist political interference encroaching their co-operative affairs. In other situations co-operative members would be promised to be given soft loans or other incentives by politicians provided the co-operators were ready to be used for political ends.

Kimarion(ibid) observes that after having identified the above problems, in co-operative organizations, the Mhaviile Committee came up with the following general recommendations:

- (a) The creation of a strong education section in the Co-operative Union of Tanganyika (CUT) which would be concerned with the preparation and mounting of intensive member education and information campaigns throughout the country;
- (b) the creation of a Unified Co-operative Service Commission (UCSC) which would be responsible for the engagement, discipline, terms of service and dismissal of any employee of registered co-operatives;

- (c) the strengthening of the CUT through the expansion of its services to the co-operative movement;
- (d) the introduction of direct election of union committee personnel by the members and the establishment of an Electoral Commission at CUT to deal with complaints;
- (e) the strengthening of the unions and the CUT, especially their supervisory functions, in relation to societies – with the long term aim of making them take greater responsibility in all matters pertaining to the development of the co-operative movement.

The government accepted all but the criticisms and recommendations which were associated with political interference and the election of union committee members. This meant that the government was not ready to let co-operatives be run freely in the hands of its owners, the members who formed them. In any case this situation would not inculcate, among co-operative members, a sense of entrepreneurship which, among other things, would put forward the importance of the existence of effective and appropriate information systems which would produce information to enhance transparency, democracy, co-operative business decision making, co-operative business planning and control. Moreover, the said CUT was the ruling party's mass organization. Thus, it (the CUT) could not be in a position to represent co-operative organizations as business units other than as the ruling party's affiliates hence taking them away from being true business organizations.

Now, a year following the submission of the report by the Mhavi's Special Committee of Enquiry (June, 1966), the President (the late Julius K. Nyerere) then, declared the government's commitment to the principles of Socialism and Self-Reliance (Kimario *ibid*). The declaration came to be known as the Arusha Declaration as it was declared in a town known as Arusha.

During the ten years' period following the Arusha declaration (1967 to 1976) period co-operative development in the country was directed by guidelines provided in the Mhavi's Commission Report and the Arusha Declaration which was the Tanzania's blue print affirming its commitment to the principles of Socialism and Self-reliance (Kimario *ibid*).

Here, the way socialist ideals were implemented, including the violation of the ICA principle of free membership, presented another "tighter" bottleneck to the development of co-operative organizations in the country. In particular, co-operative organizations were meant to further socialist ideals and not co-operative principles as observed by Kimario

... Subsequent policy guidelines on co-operatives, which were outlined in the Government Paper Number 4 of 1967 and President Nyerere's book on Socialism and Rural Development, spelt out in more detail the new role which marketing co-operatives were expected to play in order to bring about socialism in the rural areas of the country...

(Kimario *ibid*: 35)

However, while Mhavi's Committee's recommendations were at the starting point of implementation and backed up by the 1968 Co-operatives' Act, the adoption of Socialist principles as outlined in the Arusha Declaration of 1967 required the development of co-operative organizations in the country to be carried out on political grounds (Kahama's Report, 2001:10). The declaration required primary co-operative societies to be used to support socialist ideals. Under this political environment villages were to be registered as multi-purpose co-operative societies and all villagers were automatically considered as co-operative society members; actually without their consent. While co-operative organizations were being politicized another committee was formed in order to see how the village-based co-operative societies would fair in the socialist environment. This committee was headed by Mr. Massomo and was named after his name, that is the Massomo committee as pointed out by the Kahama's Report (*ibid*) that

... In order to implement the changes on the roles to be played by villages (as multi-purpose co-operative societies) the Prime Minister and the Second Vice President appointed a commission in 1975, chaired by Mr. Massomo, to report on the plans and activities of various co-operative unions and to recommend on unions to be dissolved or strengthened. However, before any recommendations of the commission were implemented the Village and "Ujamaa" Villages Act of 1975 was ready for implementation and this repealed the 1968 Co-operatives' Act. The results of the 1975 Act was the dissolution of all the Traditional Marketing Co-operative Unions on 14th May, 1976 leaving their primary co-operative societies under the Villages and Ujamaa Villages system and serviced by government parastatals like the District Development Corporations (DDC's), the Regional Trading Corporations (RTC's) and Marketing Boards in terms of crop collection, marketing and distribution of farm inputs...

(Kahama Report (*ibid*) 2001:10)

However, the above parastatals selected to take care of the primary co-operative societies could not serve the small-holder-farmers-cum-primary co-operative society members to their satisfaction as co-operative unions did. As a result of being unsatisfied, the government formed another committee chaired by Mr. Ngwilulupi and named as the Ngwilulupi Commission (Kahama's Report (*ibid*)).

The Ngwilulupi Commission (1980):

Following complaints from farmers-cum-primary co-operative societies members on that: Marketing Boards' personnel were bureaucratic, inefficient, corrupt, and people who failed to pay farmers their dues. Thus, the Prime Minister appointed a committee of experts chaired by Mr. Ngwilulupi in September, 1980. The

committee was to research on the reported inefficiencies and the possibilities of re-instating the dissolved co-operative unions (Kahama's Report (ibid)).

The reasons for the reported inefficiencies as pointed out by the Ngwilulupi's committee were that:

- (i) the village leadership gave more emphasis on the efficient running of the ruling Party and village governments than to co-operative societies' business affairs;
- (ii) there were no guidelines on how to run business in villages on co-operative principles;
- (iii) some villages had no managerial expertise and enough business activities to be economic;
- (iv) co-operative education, as a means of incorporating villagers in planning and implementing economic ventures, was not given enough emphasis.

The above reasons, indicated by the Ngwilulupi's committee, signified that the co-operative organizations were not given an opportunity to be run as business units hence not given an opportunity to prepare co-operative business systems including information systems through which business information flows could be structured.

However good was the idea of organizing rural people into villages the snag behind the idea was that of mixing two new and different concepts; the concept of "socialism" and "co-operation" each of which has its own strong principles for its successful implementation. More importantly, each one needed significantly different information flows.

Following the identified inefficiencies, the Ngwilulupi's committee recommended that:

- (i) Co-operation in villages would be guided by the 1968 Co-operatives' Act where a village would be registered as a multi-purpose Co-operative society;
- (ii) the Party and Government offices in villages were to supervise the planning and implementation of co-operative activities in villages;
- (iii) introduce open membership at the primary co-operative society's level;
- (iv) let several primary co-operative societies run a joint venture;
- (v) let the Co-operative movement structure start with a Ruling Party, the ministry responsible for the development of co-operatives, the Co-operative Union of Tanganyika(CUT), District or Regional Co-operative Unions and end up with the production co-operative societies.
- (vi) the committee recommended implementation strategies to include:
 - the establishment of a ministry responsible for the development of co-operatives;
 - the establishment of a Rural Co-operatives Bank;
 - the introduction of courses on Socialism and Co-operation;

- the establishment of Regional and District Co-operative Unions which should be based on economic viability.

As can be observed from the above recommendations; recommendations (i), (ii) and (v) tied the co-operative organizations to the ruling party and its government, that is making the co-operative organizations as part of the governing structure on one hand and on the other as extensions of CUT which, after all, had not been registered as a co-operative business caretaker. This situation aggravated the already worsened business outlook of co-operatives in the country and hence denying them an opportunity to be run on business lines.

As expected, much of the period after 1981 was spent on the implementation of the Ngwilulupi Commission's recommendations. Hence, in 1982 the government came up with a new Co-operative Act to support the Ngwilulupi's committee recommendations. Under this Act the following were to be implemented:

- Regional Co-operative Unions were to be established on the basis of regional boundaries.
- Co-operative Union leaders were to be scrutinized by the ruling political party.
- CUT was to be an affiliate of the ruling political party.
- Loans and other expenditures in co-operative unions were to be authorized by the ruling party and government leaders and not co-operative leaders.

As a result of the implementation of the above recommendations, co-operative union leaders found themselves responsible to the government and the ruling political party leadership instead of the co-operative union or primary co-operative societies' members who were the true owners of the co-operative organizations. In fact as a result of the implementation of the 1982 Co-operative Act co-operative organizations did not have clear organizational structures which could facilitate their management. This situation made co-operative members be discouraged from continued co-operative membership and from participation in co-operative affairs for the further development of co-operative primary societies and unions as business entities which could enable them meet their social and economic ends. Co-operatives were no longer run on business basis to warrant them efficiency and competitiveness as they were now taken as political entities whose affairs could be taken care of by the ruling political party and its government.

1.1.2.3: After the introduction of liberalized trade (1984/85 to 2003)

However, the implementation of the 1982 Co-operative Act coincided with the government's move of introducing a market economy system into the country. In 1982/83 the government introduced liberalized trade in many of its economic sectors. These included, among others, the liberalization of financial institutions' functions. Now, in order to get ideas on how to reform the financial sector the government formed a committee, headed by Mr.Nyirabu, in 1990 (Kahama's Report (ibid)).

Nyirabu's committee identified several co-operative related bottlenecks which affected the performance of the financial sector. Among the bottlenecks were:

- (i) the ruling political party used co-operatives as a means through which it could propagate its propaganda instead of treating them as business entities through which its owners could get services like the distribution of farm inputs and marketing their crop produce;
- (ii) the implementation of the 1975 ruling party's directive, that every village be registered as a multi-purpose co-operative society, violated the ICA co-operative principle of free membership;
- (iii) the registration of primary co-operative societies did not take into account the economic viability of the proposed society.

Now, as a result of the above stated situation, where co-operative management was masked with a strong government influence, repayment of loans extended to co-operative unions by banks for the procurement of farm inputs distributed to farmers and whose produce was marketed through government Marketing Boards did not work. This affected bank operations and resulted into accumulated bank loans, which the government had to foot, but after long political discussions.

Other factors, identified by the Nyirabu commission, which made the development of co-operatives difficult, were that:

- (i) co-operatives were started with inadequate small capital which did not lead to business expansion;
- (ii) the supervision and inspection of co-operative operations could not be implemented successfully due to lack of competent personnel and other working facilities(e.g. transport facilities);
- (iii) the government's responsibility for the development of co-operatives was not clear;
- (iv) the government was setting crop prices(in several cases without considering production costs);
- (v) there were weaknesses within co-operatives on the management of assets and finances and hence a failure to appreciate the need to do profitable business as could be dictated by market forces;
- (vi) there was lack of expert accountants, lack of honesty among committee members, people who stole or misused co-operatives' property were not taken to task, there was not competent personnel in the office of the registrar of co-operatives and within the Co-operative Audit and Supervision Corporation (COASCO).

The Nyirabu committee came up with a number of recommendations which were meant to alleviate the above problems. Among the recommendations were:

- (i) registration of economically viable co-operatives only;
- (ii) streamlining of accounting procedures for all economically viable co-operatives;

- (iii) establishment of strong administrative systems in co-operatives;
- (iv) establishment of an easy book keeping and accounting system for co-operatives;
- (v) improvement on the capital base for the co-operative societies; and
- (vi) streamlining of Co-operative Unions' business for the purpose of improving them.

After the Nyirabu's commission recommendations the government came up with the 1991 Co-operative Act and the 1997 Co-operative Policy. The aims of the 1991 Co-operative Act were to: (i) let co-operatives be run on the basis of the ICA principles, (ii) build the capacity of being self running and (iii) encourage the government to let the co-operatives be managed by their members on democratic basis. However, the Act did not take into account the changes introduced by the liberalized trade environment introduced in 1986. In order to implement some of the recommendations presented by the Nyirabu committee, the government reviewed the 1991 Co-operative's Act and came up with the 1997 Co-operative Policy.

The 1997 Co-operative Policy was passed by parliament in order to emphasize on the items which appeared in the 1991 Co-operative Act and also to make some adjustments to the Act.

In addition to confirming that the government could respect the International Co-operative Alliance (ICA) principles it also earmarked that it would:

- (i) respect freedom of co-operatives;
- (ii) recognize that co-operative societies could be established on a number of business lines and not only on agricultural related activities;
- (iii) protect the interests of co-operatives;
- (iv) introduce Co-operative Education in schools and colleges;
- (v) support research projects related to co-operative activities in order to identify co-operative oriented problems and solve them where possible;
- (vi) see to it that there was employment security for co-operative employees;
- (vii) see to it that government and party leaders do not get leadership positions in co-operative organizations.

However, although the 1997 Co-operative Policy was in place, with strategies for the strengthening of co-operative organizations in the country, there was no implementation plan and hence co-operatives remained stuck. This situation "forced" the President to call for a symposium which discussed on the major causes of the persistent mismanagement of Tanzanian co-operatives. The symposium culminated into a Task Force.

The Task Force made another very important study on problems which retarded co-operative development in Tanzania. The Task Force was formed after the symposium convened by the president of the United Republic of Tanzania, His Excellency Honorable Benjamin William Mkapa(MP), which was held on 24th and 25th of March, 2000 in Mwanza. This Task Force was headed by the Honourable

George C.Kahama(MP) and now the Minister for the ministry of Co-operatives and Marketing. The task of the Task Force was to analyze the results of the symposium and recommend to the President on possible solutions and their implementation (Kahama's report (ibid)).

The Presidential Task Force which is also known as the Kahama Task Force presented its report (the Kahama Report) to the president on 22nd of January, 2001.

The Task Force identified a number of problems which faced co-operatives and came up with several recommendations on how to solve them.

The identified problems included:

- (i) the existence of co-operatives which did not serve the interests of members;
- (ii) co-operatives with inadequate/insufficient capital;
- (iii) poor leadership among co-operatives;
- (iv) poor organizational structure of the co-operative movement;
- (v) inefficiency and ineffectiveness of the institutions responsible for the development of co-operatives like the Co-operative Development Department in the ministry responsible for the development of co-operatives, the Tanzania Federation of Co-operatives(TFC), the Co-operative College of Moshi and other facilitating institutions;
- (vi) lack of co-operative education among co-operative members in unions and primary co-operative societies;
- (vii) deficiencies in the implementation of the introduced liberalized trade/market economy in the country and the inability of co-operatives to compete in a liberalized trade environment;
- (viii) co-operative practice was not extended to many different economic sectors in the country;
- (ix) the co-operative movement was not given enough attention in the government plans; and
- (x) the 1991 Co-operative Act and the 1997 Co-operative policy did not take into account the introduction of liberalized trade.

Some of the recommendations put forward for the purpose of alleviating the co-operative movement's problems included:

- (i) The strengthening of primary co-operative societies and let society members own their societies.

The purpose of this strategy was to make co-operatives in Tanzania look like true co-operative organizations blended with the ICA Co-operative Principles, where members have the last say on matters concerning the development of their co-operative organizations. This could be done through:

- letting the public discuss their economic and social development and to appreciate the importance of co-operative organizations in the eradication of poverty among them;
 - to establish strong primary co-operative societies as the strength of a co-operative movement depended on the strength of the underlying primary co-operative societies;
 - to improve on any existing primary co-operative societies.
- (ii) Improvement on capital required by co-operative organizations:
The aim of this strategy was to improve on capital required by co-operatives so as to meet their obligations adequately. To meet this requirement, a number of ideas needed to be realized:
- to increase capital within the co-operatives, possibly through increased share contributions by members and/or increased membership fees;
 - to enable co-operatives to get external capital, possibly through the establishment of Savings and Credit Co-operative Societies (SACCOS), the establishment of a National Co-operative Bank, establishment of Crops Procurement Funds, establishment of a "Seed Capital Fund", or to convince commercial banks to reduce their interest rates on bank loans or have a special window for serving co-operatives or to let the government reduce if not wave off tax on co-operative business.
- (iii) To strengthen the co-operative leadership and to eradicate theft and embezzlement within co-operatives. This would make co-operative leaders and management to be responsible to co-operative members who are the owners of the co-operatives. To achieve this, strategies to be used could include the:
- establishment of a code of conduct for co-operative leaders;
 - evaluate the value of asset which might happen to have been stolen;
 - reclaim all what was stolen from any involved individuals;
 - establish a legal section within the co-operative movement which would deal with co-operative legal matters.
- (iv) To restructure the co-operative movement organization structure so that it is not top-heavy. This would minimize bureaucracy, improve on democracy, and make co-operative members closer to their support institutions.
- (v) To improve on public institutions responsible for the development of co-operatives in the country.
- (vi) To improve on education and training for the co-operative members, managers and committee members.
- (vii) To improve on co-operatives' business competitiveness in a liberalized trade environment.
- (viii) To expand the co-operative business scope so as not only to cover agricultural activities but also to cover other economic sectors like: mining, energy, industries, communications, and fishing.
- (ix) To give co-operation its due weight in government economic plans.

In addition to the above recommendations the Kahama Task Force considered three issues as special issues requiring particular attention. These issues were:

(i) The preparation of programmes for issues which required special investigations:

Like those of preparing programmes or special research or consultancy for:

- A Co-operative Education programme;
- A programme to enable the public to appreciate the importance of co-operation in economic development;
- Research on the establishment of “Ward level banks”, National Co-operative Bank, Crop/Inputs Funds and “Seed Capital Fund”;
- A programme for the establishment of business information systems(including Management Information Systems).

(ii) Special Co-operative Union issues.

(iii) Issues on Co-operative union assets which were taken by the government in 1976 when the Traditional Marketing Co-operatives were dissolved.

From the above discussion it may be noted that all along co-operatives in Tanzania have not been subjected to any rigorous business practice other than political ups-and-downs, especially before the introduction of liberalized trade. In such a situation it is doubtful if there existed appropriate information systems to enable the co-operatives to compete in the introduced liberalized trade environment which has come with cut-throat competition.

The inability to compete in a liberalized trade environment by the co-operative organizations, especially the coffee marketing co-operatives, has been seen from the decline in their coffee market share over time. For example, the Kilimanjaro Native Co-operative Union (KNCU)'s coffee market share declined from 50% in 1994/95 to 11% in 1997/98 giving way to local and international companies (Ngailo et al. 1999). KNCU was one among the strongest co-operative unions in the country; the experienced drop in its market share over the period could mean that the coffee business must have been worse for weaker coffee marketing co-operatives in the country.

Other studies done on the weaknesses of agricultural marketing co-operatives in the country, like studies done by Komba,L.C(2000) and Chambo, S.A. and Cooksey et al. (1999) indicate that lack of access to business information on national and international market conditions was one among the major problems which led to the decline in the coffee market share experienced by some co-operatives. However, none of the studies addressed the question of information systems in the co-operatives and on how they were assessed for their suitability and capability in supporting co-operatives in a liberalized trade environment.

It is interesting to note that of all the studies made on the problems facing co-operatives only the Kahama Task Force clearly noted the importance and need for a study and the establishment of business information systems within and for co-operative organizations.

Many IS/IT professionals like Punset and Sweeney, Professor Itami, the Laudons and others have expressed concern over the importance of information in any worthwhile business. Punset and Sweeney, for example, point out that,

... Yet the empirical evidence strongly indicates that it is the quality of the information activities and of the information processed by a firm which makes its innovations commercially successful and give competitive edge.

In information, its acquisition and exploitation, lies the key to the creation of economic wealth and corporate growth...

(Punset, E. and Sweeney, G. 1989:1)

Professor Itami, H. of the Hitotsubashi University of Japan observes that,

... Observation over a considerable period of successes and failures of many Japanese firms has however convinced me that the real competitive edge does not come from the physical and visible resources. It comes from those things which we cluster together as intangible resources or invisible assets. They are information based assets, and this is why a small but growing number of managers are adding information to the economist's list of capital inputs to the productive process...

(Itami, H. in Punset, E. and Sweeney, G. 1989: 36)

Itami continues to argue that,

...all resources are necessary for a business, but one must distinguish two kinds of necessity. Some resources, for example the plant, must be physically present for business operations to take place. Others are necessary for competitive success. Most physical and monetary assets and some human resources are necessary in the first sense. Most invisible assets and some human resources are necessary in the second sense.

Business firms succeed not because they have buildings or money or labour, but because they have technological skill, brand names, information on the customers' needs, or a good corporate culture which entails being very responsive to the needs of customers.

(Itami ibid: 37)

On the other hand the Laudons emphasize that,

... In the current environment, managers of even small businesses who do not plan consciously for Information Technology run the clear risk of not surviving for more than a few years...

(Laudon, K.C. and Laudon, J.P. 1991: 841)

However, to produce and communicate appropriate information, an organization would need to consciously plan for it. This would call for planned information systems so that their introduction in the organization take into account the

existing environment and level of technology at which the organization is run. What is observed here is that information with good qualities alone is not enough if the recipient manager is not effective. This situation requires that assessment models/methods for the approval of new proposed IS investments be those which consider both tangible and intangible benefits and costs on the one hand and on the other hand should be those which take into account the technological level at which the organization can produce and manage information resources, in this case one would consider the human element.

On the basis of the discussion in the above paragraphs emphasize is on the importance of the phrase “plan consciously” as pointed out by the Laudons. This phrase implies that it requires great care in planning for a worthwhile information system before one can get returns from it. A system has to be carefully assessed before investing on it. It has to be aligned with the overall business strategic/corporate plan so as to enable the organization to gain from its investment. In other words the above statements call for ways of properly assessing and identifying beneficial IS investments in line with the organization's corporate plan. This in turn calls for appropriate models/methods for the assessment of IS investment proposals. Appropriate IS/IT assessment models/methods/frameworks would require a reflection of knowledge of actual and potential costs and benefits of prospective IS/IT investments. Knowledge of actual and potential costs and benefits, both tangible and intangible, of IS investments may help management to properly appraise proposed ISs.

Nevertheless, lack of knowledge of the foreseeable benefits of proposed and implemented IS investments may lead to approving non-beneficial IS investments and rejecting beneficial IS investment proposals. This calls for the formulation of IS Investment Assessment models/methods with least gaps/shortfalls.

Moreover, although there is some scattered literature on models/methods on how one may go about assessing IS investments there is no one best method/model for the task because of the socio-technical nature of ISs and the fast changes in IT on which the ISs are based. This problem becomes even more pronounced in least developed countries, like Tanzania, where IT knowledge is scant and relatively new to many people, even to those at the top levels of management.

Writers and researchers like Farbey et al., point out that, there are not neat and agreed models to rely upon when it comes to the assessment of IS Investments. They point out that

... Moreover, because the field of IS/IT is characterized by constant technological change, even though the problems are not new, there is no steady accumulation of experience or conventional wisdom to fall back on. There are few universally accepted guidelines for evaluating information systems projects. There is not agreed language of accounting for ISs.

(Farbey, B. et al. 1993: 45)

Suchman and Bawden(1990) also point out on the absence of a common model/method for the assessment of IS investments by saying that:

The process of evaluating is highly complex and subjective. Inherently it involves a combination of basic assumptions underlying the activity being evaluated and of personal values of both those whose activities are being evaluated and those who are doing the evaluation. The task for the development of evaluative research as a “scientific” process is to “control” this intrinsic subjectivity, since it cannot be eliminated.

(Suchman, E.A. in Bawden, D. 1990: 9)

Other researchers like Davern and Kauffman still indicate that there is no unique model for the assessment or evaluation of Information Technology investments. They observe that:

Information Technology value has been measured at various levels of analysis, yet few authors would contend that the research value has reached a point where practitioners and theoreticians are satisfied with its outcomes.

(Davern, M.J. and Kauffman,R.J. 2000: 121-144).

To sum up, the fact that information systems (ISs) are socio-technical and based on a fast changing technology the assessment of their investment is not a straight forward exercise for it has to take into account both the tangible variables, intangible variables, personalities and their politics and the environment where the assessment takes place. An assessment method/model would have to include tangible variables like monetary benefits and costs on the one side and intangible variables like the system’s potential capability to hook in customers, suppliers and stakeholders and their capability to keep track of information concerning the competitors’ capabilities and other environmental variables and future benefits, on the other side. In essence, an IS/IT Investment Assessment model/method needs to have the least number of gaps so that important factors for the assessment of their investments are not bypassed.

A study by Kimaro (1999) made some attempts at coming up with a model for the evaluation of the benefits of Decision Support Systems(DSS) for some selected Dar-es-Salaam city firms in Tanzania but did not consider intangible benefits nor did it consider the whole spectrum of ISs which might have existed in the said firms. Also the study may not be generalized to co-operatives which are rural-based and which cannot as yet be considered as completely free from the governments’ influence in terms of business operations monitoring, including the auditing of their accounts and fetching for markets.

Another study done in Tanzania was one by Juma (1997) which considered the impact of information technology investments on productivity in Tanzanian business firms. The study sought to come up with the criteria for the determination of financial gains from the use of IT, to find out whether

investments in IT had been beneficial with reference to Tanzanian business undertakings and lastly to investigate and recommend the conditions for ensuring increases in productivity, efficiency, effectiveness, transformation and competitiveness through the use of IT in Tanzanian businesses. Just like the study by Kimaro (op cit.) Juma's study was centred on the Dar-es-Salaam city business firms and the findings may not be generalized to co-operative organizations which are rural based and communally owned.

1.2.0: Statement of the research problem.

Going back to the discussion in the "Background Information to the Research Problem" sections, Tanzanian Coffee Marketing Co-operative organizations have all along not been exposed to competitive business environment as they have been protected from competition by the government by giving them monopoly in the coffee business. The introduction of liberalized trade, especially in coffee marketing, magnified the inability of the Coffee Marketing Co-operatives to compete. This inability was shown by the significant decline of their coffee market share. The studies done on the problems of the Coffee Marketing Co-operatives in Tanzania, among other factors, indicated that lack of appropriate business information and hence lack of appropriate information systems contributed to their inability to compete in the liberalized trade environment. There could have been a number of gaps in the models/methods used in the assessment/appraisal of proposed IS investments which might have led to having inappropriate information systems for the Coffee Marketing Co-operatives in Tanzania. Such gaps could include the consideration of tangible benefits only which could be easily measured by accounting models or the gaps could include consideration of intangible benefits only.

Or in other situations no models might have been used in approving new IS investment proposals, in which case some management personalities might have just used intuition or political influence to approve or disapprove a proposed investment. Hence, it is the interest of this study to establish the gaps/shortfalls that might exist in the models/methods used in the assessment of newly proposed IS investments in the Coffee Marketing Co-operatives and improve on them so that the investments may be adequately assessed.

1.3.0: Research objectives:

The general objective of the research project is to come up with Information Systems (ISs) Investment Assessment Models/methods for use in Coffee Marketing Co-operatives and other related rural-based agricultural marketing co-operatives in Tanzania. The purpose is to have appropriately assessed/appraised IS investments which can support Coffee Marketing Co-operatives and related agricultural marketing co-operatives in a liberalized trade environment. In addition to the general objective given above, below is a list of specific objectives around which this study was done.

The specific objectives are to:

1. Identify the types of IS investments (manual, mechanical, electronic or any combination of the three) in use in the Coffee Marketing Co-operatives in Tanzania since 1982 to 2003;

Identification of the types of ISs will facilitate knowing if there are any modern ISs within co-operatives. Modern ISs are expected to be electronic (or computer-based ISs), which when properly thought-out before their installation, are expected to perform better than manual or mechanical ISs in terms of the production of information for effective decisions. Information produced by computer-based ISs is expected to be timely, accurate and produced in different forms to suit its recipients. However, as commented elsewhere in the literature review, computerized ISs will not automatically perform better than other types of ISs if their installation is not planned for. Lucey (op. cit.) substantiates on this point by giving the example that

... If IT is misapplied or installed without sufficient analysis of the real management or organizational problems then no benefits will be gained and money will be wasted. Example abounds; the £48m computer system developed by the Government for use by the Training and Enterprise Councils (TECs) was unused because it did not meet the TEC's needs. The TAURUS system for computerizing the Stock Exchanges was finally abandoned in 1992 at a cost of £400m because it could not meet the Stock Exchange's requirements, the reversion to manual systems by the manufacturers of Parker Knoll furniture and so on.

The Parker Knoll example is of particular interest because it is an example of de-automation producing dramatic efficiency gains. Parker used to monitor the movements of 1700 parts on an inventory control network with 15 shop-floor computer terminals. These have been replaced by a basic manual card system (adapted from the Japanese KANBAN system) whereby a card is placed in each pile of stocks. When the stocks fall sufficiently for the card to appear, staff arrange for a further batch to be made...

(Lucey 1997: 7-8)

Lucey (ibid) points out that the key moral from this example is that automating inefficient methods, as Parker did previously does not produce benefits. The methods and systems must be right before any attempt is made to automate them and no IT system should be installed unless it is demonstrably better than the best manual method.

2. Identify the frequency of assessing/reviewing the performance of existing IS investments in co-operatives.

This information will indicate if co-operatives have the habit of reviewing their existing IS investments so that they take into account changes in information

flow requirements in their business environments. With a dynamic market, a market where there is acute competition like where we have liberalized trade as it is the case in Tanzania, internal and external information flows will require constant monitoring in order to keep track of business opportunities and where possible to maintain a competitive edge.

3. Identify factors/items which are considered important in approving proposed IS investments in co-operatives. The interest is to see if tangible, intangible benefits and the human element are considered in appraising IS investment proposals.

This information will facilitate to know if the models/methods used in the assessment/appraisal of proposed IS investments have gaps/shortfalls. It is important to remember that ISs are socio-technical in nature a situation where their benefits and costs are both tangible and intangible. Tangible benefits could include, for example, the return on invested money or reduction in the headcount. Tangible benefits or costs can easily be gauged with the help of common accounting models like the Net Present Value (NPV) or the Internal Rate of Return (IRR) or other Return On Investment models like the Payback models whereas intangible benefits or costs can be assessed through the assignment of weights to factors under consideration. Examples of intangible benefits could include the systems ability to hook in customers and suppliers through prompt supply of information or to have them have on-line links on the other hand, through fast and accurate data processing, systems users may have some extra time for other activities. As most writers agree, the measurement of intangible costs and benefits is a difficult task which most business practitioners would like to avoid by sticking to easily measurable benefits and costs which can be easily worked out by the use of accounting models. Avoidance of consideration of intangible variables and the human element or the non-consideration of variables which can lead to the approval of adequate IS/IT investments may be called a gap/shortfall in this study.

4. Identify factors/items considered important in assessing/reviewing the performance of existing IS investments in the co-operatives

Again this information will help in knowing if the models/methods used in assessing/reviewing the existing IS investments have gaps/shortfalls. The information will also indicate as to whether co-operative organizations take time to learn new opportunities inherent in the ISs but which might not have been planned for.

5. Identify/come up with a list of models/methods used, in practice, in the assessment of proposed IS investments in the co-operatives.

This will help to tell if there exist any IS investment assessment models/methods and their nature. In some situations business practitioners

could be found considering only tangible benefits without taking into account intangible benefits or the human element in assessing proposals for the investment of ISs in their organizations. As it has been pointed out above, this could indicate a gap or shortfall in such models. Such gaps could be indicated by investigating the models/formulae/frameworks which are in practical use in co-operative organizations under study.

6. Identify gaps/shortfalls (e.g. lack of consideration of intangible benefits and costs or lack of consideration of tangible benefits and costs or lack of consideration of the human element or other important factors which lead to adequate IS assessment models) in the assessment of newly proposed IS investments in co-operatives. This information will cast light on the practice followed in the assessment of newly proposed IS investments among co-operative organizations in Tanzania.
7. Come up with proposed models/methods/frameworks which can be used in the assessment of IS investments in co-operatives. These will contribute to the existing knowledge on the formulation of models for the assessment of proposed IS investments.
8. Identify the extent to which different co-operative managers at different management levels are satisfied with existing ISs in effecting communication between the co-operative organizations and their: members, suppliers(e.g. financial suppliers like banks, agricultural inputs suppliers and other suppliers), customers/markets, competitors and co-operative movement facilitators.

This information will open an eye on how different management levels of co-operative organizations perceive effectiveness of ISs in supporting communication in their co-operative organizations.

1.4.0: Research questions:

The following is a list of research questions for which the research project was expected to come up with answers:

1. What types of ISs are used in the Coffee Marketing Co-operatives in Tanzania?
2. Is the performance of IS/IT tools/facilities in co-operative organizations reviewed in order to take account of business and technological changes in the Coffee Marketing business?
3. What factors are considered important in approving the purchase of an IS/IT tools/facility to be used in a co-operative organization?
4. What factors are considered important in reviewing/appraising the performance of existing IS/IT tools/facilities?
5. What models/methods are used in assessing proposals for the purchase of new IS/IT tools/facilities in a co-operative organization?

6. Are there gaps/shortfalls in the models/methods used in the assessment of proposals for the purchase of new IS/IT tools/facilities?
7. Can improved models/methods be formulated for the assessment of proposals for the purchase of new IS/IT tools/facilities in co-operative organizations?
8. To what extent are the IS/IT users in co-operatives satisfied with their ISs' performance in effecting communication between the co-operative organizations and their members, customers, suppliers, competitors and facilitators?

1.5.0: Hypotheses:

The following hypotheses refer to research question number (8) in section (1.4.0) above. The hypotheses were tested at a 0.05 level of significance. Peil, M (1995:142) points out that "...the 0.05 level of significance is often accepted as the boundary between 'statistically significant' and 'insignificant' ...".

The following hypotheses were tested for the adequacy of ISs in effecting communication between co-operative organizations and their: members, customers, suppliers, competitors and facilitators.

Stating the hypotheses:

Hypothesis 1 in a null form is:

H_{01} : There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their members as effective and the number of co-operators who do not perceive the ISs support for communication between the co-operative organizations and their members as effective.

The alternative hypothesis is:

H_{a1} : The majority (more than 50%) of co-operators perceive ISs support for communication between co-operative organizations and their members as effective.

Hypothesis 2 in a null form is:

H_{02} : There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their suppliers as not effective and the number of co-operators who perceive ISs support for communication between the co-operative organizations and their suppliers as effective.

The alternative hypothesis is:

H_{a2} : The majority (more than 50%) of co-operators perceive ISs support for communication between co-operative organizations and their suppliers as not effective.

Hypothesis 3 in a null form is:

H₀₃: There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their customers as effective and the number of those who do not perceive the ISs support for communication between the co-operative organizations and their customers as effective.

The alternative hypothesis is:

H_{a3}: The majority (more than 50%) of the co-operators perceive ISs support for communication between co-operative organizations and their customers as effective.

Hypothesis 4 in a null form is:

H₀₄: There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their competitors as effective and the number of those who do not perceive the ISs support for communication between the co-operative organizations and their competitors as effective.

The alternative hypothesis is:

H_{a4}: The minority (less than 50%) of co-operators perceive ISs support for communication between co-operative organizations and their competitors as effective.

Hypothesis 5 in a null form is:

H₀₅: There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and the co-operative support institutions as effective and the number of those who do not perceive the ISs support for communication between the co-operative organizations and the support institutions as effective.

The alternative hypothesis is:

H_{a5}: The majority (more than 50%) of co-operators perceive ISs support for communication between co-operative organizations and the support institutions as effective.

1.6.0: Rationale, significance and contribution of the study:

Coffee Marketing Co-operatives have been significantly contributing to employment, to the national economy, to poverty eradication among co-operators and hence the importance to improve them through the improvement of their IS/IT investments. The importance of an effective use and management of information resources in the creation of economic wealth and corporate growth and hence the importance of adequate information systems investments cannot be overemphasized. It is through information systems that a business organization like a marketing co-operative organization can adequately maintain its information flows between itself and its environment. There should be effective

information flows between the co-operative organizations and their: members, customers both local and international, suppliers, competitors and facilitating institutions. Sweeney's point of view on the importance of information in the creation of economic wealth and corporate growth emphasizes the need to revisit IS/IT investments in coffee marketing co-operatives so that they are improved and hence contribute more to the economic wealth of the co-operatives. The requirement for the improvement of the IS/IT investments calls for a study, in particular, by looking at their appropriateness in supporting co-operatives in the liberalized trade environment. Improvements in the wealth and corporate growth of the co-operative organizations will have a contribution to poverty eradication among co-operators at least in the short run if not in the long run. Improvements on IS investments in co-operatives may be effected by using IS Investment-assessment models/methods with least gaps/shortfalls; models which can facilitate in approving appropriate IS investments.

The rationale of undertaking the study is based on the fact that no such study has been explicitly undertaken and documented for practical use in Tanzanian co-operative organizations as indicated by the Kahama report (2001 op cit.) and other reviewed studies.

In addition to contributing towards the fulfilment of the Ph.D. degree requirements by the St. Clements University, successful completion of the study will add knowledge in the formulation of models to be used in the assessment of IS/IT investments in Coffee Marketing Co-operatives and related rural-based agricultural marketing co-operatives in Tanzania and other developing countries in sub-Sahara Africa.

1.7.0: Expected beneficiaries

Beneficiaries of the output of this research project will include:

Myself, as I will have fulfilled the academic requirements of the award of a Ph.D. degree of the University of St. Clements of the British West Indies, managers of coffee marketing co-operatives in Tanzania and other related agricultural marketing co-operatives in developing countries in sub-Sahara Africa, government policy makers in issues related to Information Systems in co-operatives, researchers, academicians and Information Systems professionals and will add to the stock of reading materials for students at the Co-operative College and scholars elsewhere.

1.8.0: Assumptions

In this study it has been assumed that since the study concerns coffee marketing co-operatives, all of which have been registered under the same ministry for Co-operatives and Marketing in Tanzania and as are other Agricultural Marketing Co-operatives (AMCOs), all of the co-operative organizations under this study had similar organizational structures, operational processes and experience the same government influence. This implied that the co-operative organizations were relatively homogeneous a situation which made the use of a small sample

of co-operatives in the study as quite adequate, as Peil (ibid) points out "... if a group is truly homogeneous, a large sample is unnecessary (one or two people could provide as much information as 500)..."

1.9.0: Limitations and scope of the study

The number of coffee marketing co-operative organizations studied was limited due to the wide geographical spread of the organizations. These co-operatives are spread along the bordering regions of the country (see appendix A: Map of Tanzania which shows where coffee is grown with substantial amounts-see the hatched area in the map). They are concentrated in the north western part (Kagera region), north eastern part (Mara, Kilimanjaro and Arusha regions), western part (Kigoma region), south western part (Mbeya region), southern part (Ruvuma region) and eastern part (Morogoro region). Due to financial and transport limitations convenience sampling was employed at union co-operative organizations level. Here co-operative organizations studied included those which could be conveniently reached in the available time period and research funds limitations. Transport was a limitation as it was not possible for the researcher to hire transport of his own as hiring transport was too expensive to be covered by the research funds accessible to the researcher. Other limitations included the difficulty of obtaining consistently documented data. In some cases data was not available at all as there were no systems to make sure that data was consistently recorded and kept for future reference. However, for much of the field work, the researcher depended on transport used by co-operative union leaders which they used during their visits to primary co-operative societies for inspection and distribution of farm inputs.

The co-operative societies and unions studied were those in Kilimanjaro, Arusha, and Mbeya regions. This sample constituted 37.50% of the total number of regions which grow coffee in significant amounts. However, as pointed out in section (1.8.0) the sample of co-operative organizations studied represented a fair sample for the study.

1.10.0: Conclusion

Basing on the above discussions, especially the discussion on problems faced by co-operative organizations after independence (1961), the following conclusions can be made.

That, co-operative organizations in Tanzania were not given an opportunity to practice business as true co-operatives on the basis of the International Co-operative Alliance (ICA) co-operative principles. The co-operative organizations have all along been treated as the ruling party's and government's channels through which policies could reach people in rural and urban areas. Also that co-operators had no opportunity to prepare suitable information technology infrastructure to support information systems which could enable them to get effective business information for effective competition in the liberalized trade environment.

That, the aim of the government was not bad for it would have been easier to channel development projects to large numbers of people if they were grouped together in villages or in other such groupings. However, it overdid in trying to experiment simultaneously on two relatively new concepts; the concepts of “co-operation” and “socialism”. The concepts seem to be similar but they are not congruent.

That, coffee marketing co-operatives, in particular, needed effective information flows so that they could effectively communicate with their members, track what competitors were doing, effectively and efficiently communicate with their customers, suppliers, and institutional facilitators. The need to design and implement effective and efficient information systems required to have a thorough understanding of the co-operative organizations, internal and external information flows and suitable models/frameworks for the assessment of proposed IS/IT investments. In particular the study intended to focus on the consideration of the inclusion of tangible, intangible and the human element in the assessment of IS investment proposals.

1.11.0: Definition of key concepts

Data:

This term has been given different definitions by different writers some even equate the term data to information. However, people like Lucey(1997: 13) define the term data as “Facts, events, transactions and so on which have been recorded. They are the input raw materials from which information(see the definition of information below) is produced”. For the purpose of this study the term “data” is defined as “a set of recorded facts about an event(s) or transaction(s) or an entity and unless put into a meaningful form it may not be useful for decision making, control or planning”.

Information:

As are other IS related terms, the term information has been given various definitions by different writers so that they fit prevailing requirements. For example, Osion, M.H. and Davis, G.B.(1985: 9) generally define the term information as “Data that is meaningful or useful to the recipient”. However, the same authors in the same book(pp: 200) give a more comprehensive definition of the term information for the purpose of information systems as: “Data that has been processed into a form that is meaningful to the recipient and is of real or perceived value in the current or prospective actions or decisions”. In this later definition they emphasize the recognition of both the value of information in a specific decision and the value of information in motivation, model building, and the background affecting future decisions and actions. The definition shows clearly the relationship between data and information as analogous to the relationship which exists between raw materials to finished products in a factory. They point out that the analogy illustrates the concept that information for one person may be raw data for another. They point out that it is because of this relationship between data and information that the two words are at times used interchangeably. However, this is their opinion as for practical purposes one will fix one variable while defining the other and also one will take of the context in which the word is used. What can be said here is that the term “data” should not be taken to mean “information” at the same point in unless the context in which the words are used is understood.

Anderson(1987: 83) defines the term “information” as “ the output element of a data processing system”. He points out that information is derived from data which has been subjected to a number of data processing operations converting related groups of related but meaningless data into a useful form for its recipients. By implication, Anderson’s definition of information considers data to be the raw material of information just as what Osion and Davis(op cit: 200) emphasize.

Lucey(op cit: 13) on the other hand defines information as data that has been processed in such a way as to be useful to the recipient. This definition emphasizes that the result of data processing must be useful to the recipient.

Again this definition underscores the important fact that the mere act of processing data may not result into information, but that the result of processing the data must be useful to the recipient otherwise it might be termed as semi-processed data which might require further processing in order to be useful.

For the purpose of this study the definition of the term “information” is as given by Osmon and Davis (op cit: 200) as “Data that has been processed(or put) into a form that is meaningful to the recipient and is of real and perceived value in the current or prospective actions or decisions”.

Data processing:

The term “data processing” has been defined by Anderson, R.G. (1990:3) as “a process consisting of those activities concerned with the systematic recording, arranging, computing, updating, displaying and printing of details relating to business transactions”. On the other hand Sanders,D.H. (1975:10-12) describes “data processing” as consisting of the steps concerned with originating, classifying, sorting, calculating, summarizing, storing, retrieving, reproducing and communicating”. He adds that the means of performing data processing steps may vary according to the complexity of processing. Some steps may be done manually, electromechanically or electronically. He adds that in many cases these methods are mixed although one or two may dominate.

These definitions carry the same meaning of the term “data processing”. However, for the purpose of this study the definition given by Anderson is adopted as more appropriate but without losing sight of Sanders description.

Organization:

The term “organization” has no universally accepted definition. Some writers like, Pugh define an organization as “ A system of interdependent human beings” and Barnard define an organization as “ A system of co-operative human activities”(Lucey, op cit. :52). However, Lucey (ibid 52) observes that the following features describing organizations would be accepted by most people and the features are that, organizations are:

- (a) goal oriented, that is they are formed by people with a purpose;
- (b) social systems, that is they are a collection of organized people working in groups;
- (c) technical systems, that is they are a collection of organized people who use knowledge, techniques and machines;
- (d) the integration of structured activities, that is there is a collection of organized people who co-ordinate their efforts.

The four features describing an organization can be diagrammatically represented as shown in figure 1.1 below

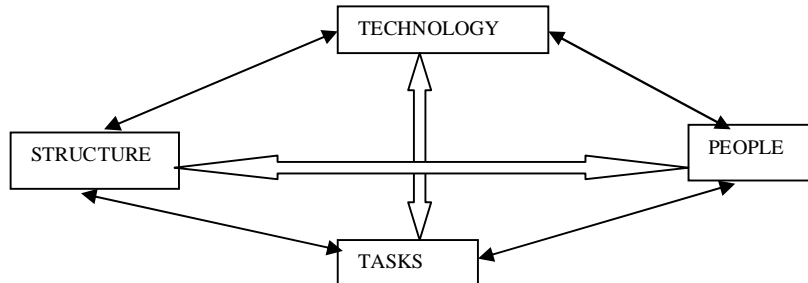


Figure 1.1

Source: Lucey (ibid 45)

The above features emphasize the socio-technical theory developed by Trist and the Tavistock Institute which suggest that organizations consist of four inter-related elements, namely: tasks, people, structure and technology Lucey (ibid: 45). Here, it is considered that any production system requires both a technological organization which would involve: equipment, processes, methods etc and a work organization relating to those who carry out the necessary tasks to each other, i.e. the social system. Based on this view an organization is not just a technical or social system but it is the structuring of human activities around various technologies.

However, on the other hand Thomas, R. and Ballard, M. (1995: 31) define the term “organization” as a group of people combined to achieve specific objectives”

In addition to underscoring the important features describing organizations, as pointed above, this study adopts, but with modifications, Thomas and Ballards’ definition of an organization as “a group of people who work together to achieve specific objectives”. This definition, implicitly takes into account the existence of other features described by Lucey(op cit).

System:

Lucey (ibid) adopts the definition for the term “system” as an assembly of parts where:

1. The parts or components are connected together in an organized way.
2. The parts or components are affected by being in the system (and are changed by leaving it).
3. The assembly does something.

4. The assembly has been identified by a person as being of special interest.

(Lucey *ibid*: 29)

Following this definition it may be said that the component parts of a system work together towards the accomplishment/achievement of the objective for which the system was designed.

Anderson(*op cit.*: 19) defines the term “system” as “a combination of interrelated elements, or subsystems, organized in such a way as to ensure the efficient functioning of the system as a whole, necessitating a high degree of co-ordination between the sub-systems, each of which is designed to achieve a specific purpose”.

Thomas and Ballard(*op cit.*) define the term system as “a complex assemblage of things that form a connected whole”.

However, although Anderson’s definition carries the same meaning as Lucey’s, it is circular in that it uses the term “system” in the definition of the same term being defined and therefore for the purpose of this research we adopt Lucey’s definition as more appropriate.

Information System (IS):

Various writers define the term IS in various ways depending on the prevailing situation requiring the definition of the term or the orientation/background of the writer. For example, the Laudons(*op cit.*) defined the term IS as “a set of procedures which collect(or retrieve), processes, stores, and disseminates information to support decision making and control” and they consider that in an organization there are various ISs to provide for information required at the various management levels. They, the Laudons, define the various ISs in an organization with respect to the different management levels they serve in an organization as:

Operational-level systems keep track of the elementary activities and transactions of the organization, such as sales, receipts, cash deposits, payroll, credit decisions and flow of materials in a factory. Systems serving this level of the organization are typically called transaction processing systems (TPS). The principal purpose of systems at this level is to answer routine questions and to track the flow of transactions through the organization.

Knowledge-level systems support knowledge and data workers in the organization. Examples of knowledge workers are engineers, architects, scientists, researchers and other professionals. Examples of data workers are secretaries, accountants, file clerks, sales persons and other persons whose job largely involve the processing of information.

Office automation systems (OAS) of many kinds primarily serve data workers: Knowledge work systems (KWS) serve engineers, graphics artists, medical technicians and other kinds of professional knowledge workers. The central purpose of KWS is to help the business integrate new knowledge into the business and to help it control information for its own purpose.

Management-level systems are designed to serve the monitoring, controlling, decision-making, and administrative activities of an organization. A management information system (MIS) focuses on daily, weekly, and monthly summaries of transactions that are useful for monitoring and controlling operational-level activities (Gorry and Morton, 1971).

Decision Support Systems (DSS) are customized middle-management level systems which support non-routine decision making (Keen and Morton, 1978). They tend to focus on less structured decisions for which information requirements are not always clear, especially “what-if” questions: What would be the impact on production schedules if we double sales in the month of December?

Strategic-level systems address strategic issues and long-term trends, both in the firm and in the external environment, that are of interest to senior management. The principal concern is to match changes in the external environment with existing organizational capability. For example, what will employment levels be in five years to come? What are the long-term industry cost trends and where do we fit in? What products should we be making in five years? Special senior management systems called executive support systems (ESS) have been created to organize and present data from different sources. Examples include the integrated boardroom graphics display system that charts the movement of 40 key corporate indicators for Gould, Inc.

(The Laudons, *ibid*: 7-10)

What is important to note, from the above quotation, is that different management levels in a given organization require information with different characteristics in order to suit the information requirements of a manager at that management level. This in turn calls for different ISs at the different management levels.

Other writers like Davis and Olson (*op cit.*) take the term IS as having the same definition as that of the term Management Information System (MIS) which they define as “an integrated, user-machine system for providing information to support operations, management, and decision making functions in an organization. The system utilizes computer hardware and software; manual procedures; models for analysis, planning, control and decision making and a database”. Davis and Olson (*ibid*: 6) emphasize that the fact that MIS is

considered as an integrated system should not be implied that it is a single, monolithic, structure; but that its parts fit into an overall design. One may take this emphasis as meaning that MIS has subsystems which are to be integrated. However, one may ask: What are these sub-systems (or parts) which makeup the said MIS?

For the purpose of this study the Laudons' definition of an IS which also considers an IS as a socio-technical subsystem of an organization is adopted. The Laudons (op cit.:20) point out that ISs are socio-technical systems as they are composed of machines, devices and "hard" physical technology and also that they require substantial social, organizational, and intellectual investments in order to work properly. In addition it may be emphasized that an IS can be manual, mechanical, electronic (e.g. computer-based) or any combination of the three. In this respect it may be considered that equipment like computers with their software and telecommunication facilities as tools to make the IS's effective. A manual IS is that IS in which a big percentage of the operations are base based on paper-and-pencil technology. A mechanical IS is an IS in which a big percentage of the operations are based on the application of mechanical devices like cash registers, typewriters and other similar mechanical tools used in data processing. One may expect to come across a manual system in operation in developing countries. For example, some co-operative unions and primary co-operative societies have accounts sections which use the paper-and-pencil technology for all their data identification, collection and recording, sorting, calculating and reporting. Of course the systems are slow and not very accurate to allow the organizations to be competitive. On the other hand an electronic IS is an IS in which a big percentage of the operations are based on the use of computers (also known as computer-based ISs). However, in all ISs the human element is an inseparable and important part. The human element is important because one cannot assess the effectiveness or efficiency or productivity of an IS without considering the technical know-how of human beings in the system. Cleary (1998), for example, observes that,

"... Experienced systems designers and users have also begun to realize that in order for the IS to function efficiently it must be acceptable to the workforce which has actually to operate it..."

(Cleary 1998: 229)

Formal and Informal ISs:

One may classify an IS as formal or informal. A formal IS is an IS based on accepted and relatively fixed definitions of data and of procedures for collecting, storing, processing, disseminating and using these data and an informal IS by contrast, rests on implicit agreements and unstated norms of behaviour (the Laudons *ibid* :5). The Laudons observe that both these classes of systems are important for the survival of an organization.

Management Information System (MIS):

This term "MIS", unlike other IS related terms like DSS or TPS, requires to be looked at in more detail and more carefully as many writers look at it in different ways possibly because of its historical background. As discussed above, when defining the term "IS", a Management Information System(MIS) was identified as just one type of an IS which serve middle-management levels in an organization. Lucey (op. cit.) points out, for example, that there is not as yet an agreed upon definition of the term MIS most probably because of the rapid changes in the technology supporting it. Lucey(op cit. pp: 27) says ... "There is no universally accepted definition of MIS and those that exist reflect the emphasis and prejudice of the particular writer". He points out, also, that for some writers the term MIS has become almost synonymous with computer-based data processing systems. He quotes Kelly's definition of MIS as one such example where MIS is equated to a computer-based system as "a combination of human and computer-based resources that results in the collection, storage, retrieval, communication and use of data for the purpose of efficient management of operations and for business planning".

Again Lucey(ibid :195-196) stresses that computers are not essential for MIS but they can be very useful. He emphasizes that the study of MIS, for example, is not about the use of computers, it is about the provision and use of information relevant to the user. He points out, however, that there is undoubtedly an important and growing role for computers and IT in MIS.

Lucey(ibid :27) puts forward a definition which takes a decision focus and views MIS as a means of processing data and defines it as: "A system to convert data from internal and external sources into information and to communicate that information, in an appropriate form to managers at all levels in all functions to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible." This definition may lead one to think that there exists one amorphous IS which can provide information to managers at all levels and all functions in an organization. This would mean the existence of an organization/enterprise-wide IS. However, Lucey(ibid: 7) recognizes that other ISs may exist in the same organization, like the Transaction Processing Systems(TPS), Office Support Systems(OSS) and End-User Systems.

However, for the purpose of this study we adopt the definition given by the Laudons.

In the context of this study it is emphasized that MIS does not mean an organization-wide IS and that it does not necessarily need to be computer-based. In other words, it is emphasized that MIS is an IS which serves the middle management level and that there can be manual, mechanical, electronic or any combination of the three. However, as pointed out above computerization would be desirable in order to meet current competitive business demands where information with qualities which support the competitiveness of an organization would be needed. Properly installed ISs matched with opportune management

would have optimum response times and have a bigger capability of tracking business opportunities. For example, customers, suppliers and other interested parties would be able to get information from a firm with computerized ISs quickly.

The Socio-technical nature of ISs:

The study of ISs can be approached in a number of ways depending on the purpose of the study. Some of the important approaches, as pointed out by the Laudons(op cit.), are: technical, behavioural and Socio-technical.

The Laudons(ibid: 21-23), for example, point out that the technical approach emphasizes mathematically based, normative models as well as physical technology and formal capabilities of these systems. On the other hand they point out that a growing part of the IS field is concerned with behavioural problems and issues. A large part of MIS, for example, is concerned with behavioural problems of system utilization, implementation, and creative design that cannot be designed with normative models. Other behavioural disciplines also play a role. Sociologists, for example, focus on the social, group, and organizational impacts and uses of systems. Political scientists deal with the political impacts and uses of information. Psychology is concerned with individual responses to system realities and cognitive models of reasoning.

It may be emphasized that so long as ISs are designed and implemented in organizations, which by their nature are social based, and that in addition to being interdisciplinary, the study of ISs is more socio-technical than otherwise; hence this study adopts a socio-technical perspective of looking at ISs. The study has been looking at the appropriateness of the technical ISs on the one hand and how the co-operative organizations (which are social settings) access their (the ISs) benefits on the other hand. As the Laudons (ibid) observe,

... A socio-technical perspective helps to avoid a purely technological approach to information systems. This means that technology must be changed and designed in such away as to fit organizational and individual needs. At times, the technology may have to be “de-optimized” to accomplish this fit. Organizations and individuals must also be changed through training, learning, and planned organizational change in order to allow the technology to operate and prosper.

(The Laudons pp: 22-23)

Effective IS:

Hornby, A.S (1995) in The Oxford Advanced Learner's Dictionary defines the term 'effective', as an adjective, as “something having the desired effect, producing the intended result”. Lucey(op cit.:6) defines the term “effectiveness” as something doing the right thing, that is producing the desired results. Using these definitions an effective IS in a coffee marketing co-operative organization may be considered as that IS which practically and positively supports the co-operative organization in its current business environment. For example, enables the co-

operative organization to get and provide useful information to its members, customers, stakeholders and can get information from competitors as well.

Efficient IS:

Hornby (op cit) defines the term 'efficient', as an adjective, as "something able to work well and without wasting time or resources". On the other hand Lucey(op. cit.:6) defines the term "efficiency" as a noun, as a measure of the use of resources to achieve results. Using these definitions it may be considered that an efficient IS in a coffee marketing co-operative organization is that IS which practically and positively supports the co-operative in its current business environment and enables the co-operative organization to get and provide useful information to its members, customers, stakeholders and can get information from its competitors at an optimum cost and within the required time period.

Appropriate IS:

Hornby (ibid) defines the term 'appropriate', as an adjective, as "something suitable, acceptable or correct in the circumstances". Another definition of the word 'appropriate' by the same dictionary is "to take something for one's own use, especially without permission or illegally". However, for the purpose of this research the former definition is adopted. That is an IS, in a coffee marketing co-operative organization, may be considered appropriate if it is useful for the existing business environment in the relevant co-operative organization at its technological level.

Information Technology (IT):

Anderson(op cit.:1) gives a brief definition of the term IT as a term which generally covers the harnessing of electronic technology for the information needs of businesses at all levels. However, Lucey(op. cit.:195) gives a more comprehensive and practical definition of the term IT as "the acquisition, processing, storage, and dissemination of vocal, pictorial, textual and numeric information by a micro-electronics based combination of computing and telecommunications". It may be gathered from Lucey's definition that computers and other telecommunication facilities are IT tools and this definition is adopted for this study.

As a matter of clarity it is important to note that there exists a relationship between the terms IT and IS as put forward by Edward, C. et al. (1991: 2). Edward et al. (ibid) point out that IT is concerned with the supply of know-how and tools to be used in order to make an IS effective, they also point out that an IS is concerned with demand issues. In other words ISs are concerned with the ascertainment of demand for applications and IT is concerned with satisfying demand for the applications. They also point out that the phrases IS and IT cannot be used to have exclusive definitions because some of the issues associated with matching supply and demand overlap. This understanding makes some writers to use the terms IS/IT when discussing IS or IT issues. Even

in this study, where the interest is not really to demarcate between IS and IT, the term IS/IT will be used.

IS/IT investment benefits:

The Oxford Advanced Learner's Dictionary ((OALD): 100) defines the term "benefit", as a noun, as "a thing that one gains from something; an advantage that something gives". The OALD (ibid: 629) defines the term "invest" as a verb as (1) to use money to buy, for example, shares or property, develop a business enterprise, etc. in order to earn interest, bring profit or improve the quality of something, or (2) to give time, effort or energy to a particular task, especially for some serious purpose or useful result. However, for the purpose of this study the term "IS/IT investment benefits" will mean the benefits accruing from the investments made on Information Systems to an organization, for example, a co-operative organization (say, a co-operative union or primary co-operative society) or to an individual member of a co-operative organization or stakeholders of co-operative organizations.

An "IS/IT investment" may include the purchase of a computer in order to automate some secretarial functions for an organization or to pay for the training of an employee whose responsibilities are related to IS/IT functions, for example, to train somebody so as to improve on his/her data processing skills of in using Microsoft Excel or Microsoft Word or SPSS+ for analyzing data related to research.

In order to be able to identify possible benefits and disbenefits/costs resulting from IS/IT investments in an organization different IS/IT benefits may be mapped into a framework similar to the model of organizational structure described in Minzberg's *Structure in Fives* where Minztberg (1983), in Farbey et al. (1993:25), describes the basic parts of an organization as: Strategic apex, Technostructure, Middle line management, Support staff and the Operating core. This mapping of the classes of the IS/IT benefits onto a framework makes it easy to organize the list of possible benefits and prompted us to be more critical in coming up with more benefits for each class based on the purposes of the IS/IT investment.

IS/IT investments are made so as to meet different information requirements at different organizational levels. The different organizational levels may include: Strategic where strategic-level systems like Executive Support Systems(ESS) are used, Management where management-level systems like Decision Support Systems(DSS) and Management Information Systems(MIS) are used, Knowledge where knowledge-level systems like Knowledge Work Systems(KWS) and Office Automation Systems(OAS) are used and Operational where operational-level systems like Transaction Processing Systems(TPS) are used. Benefits are expected of the different IS/IT investments made at the different organizational levels.

It is important to note that the ISs are related and dependent on one another with respect to information flows between them.

Figure2 below, which takes an analogy of the Minztberg's Structure in Fives but which uses a Structure in Fours, illustrates the relative positions and dependency on information flows between ISs in an organization. From the figure it may be noted that operational-level systems, that is the TPSs provide information to all the other ISs in an organization. This position of TPSs signifies their relative importance to an organization in that once data and information tracked at this level is of poor quality then the top-level ISs may be misled or if staff at this level do not effectively and efficiently communicate with the external environment then the organization may be at risk and may be misrepresented to its external environment.

Sketch diagram representing the relative positions of ISs in an organization (figure 1.2 below):

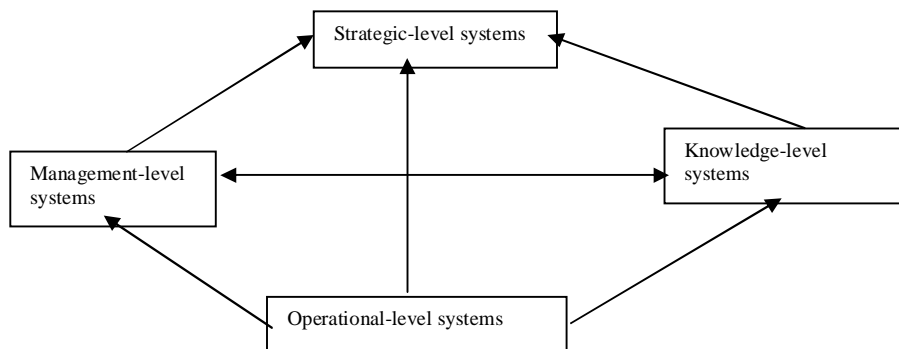


Figure1.2

Classification of IS investment benefits in relation corresponding management levels in an organization:

Possible benefits at the Strategic-level (use of ESSs):

Facilitation in the:

- Development of corporate strategies.
- Business process re-designs.
- Internal integration.
- Management of the organization's boundaries.
- Development of business vision and mission.
- Competitive advantage (e.g. able to hook in customers).
- Development of new business.

•

Possible benefits at the management-level (use of MISs and DSSs):

Facilitation in the:

- Collection and processing of information on the performance of departments/ sections.
- Aggregation and passing of information to the strategic management-level.

- Effective decision making and control.
- Allocation of resources.
- Management of resources (Human, Financial, Physical and Information).
- Management of departmental/section boundaries.

Possible benefits at the knowledge and data work-level (use of KWSs and OASs):

Facilitation in the:

- Simulation.
- Improving communication.
- Bringing facilities in-house.
- Providing internal support systems.
- Integration of information from various sources.
- Better account handling.
- Elimination of the distance barrier: office to office, home to office, office to customer, office to competitor, office to supplier office to other stake holder.

Possible benefits at the Operational-level (use of TPSs)

Facilitation in the:

- Improvement of data collection from documents of the primary entry.
- Improvement in time saving.
- Headcount reduction.
- Reduction in printing costs.
- Improvement in the timeliness and accessibility of data.
- Improvement in accuracy.
- Addition of value to data.
- Improvement in response customers.
- Improvement in communications to stakeholders.

Assess (as a verb):

Hornby (op cit:61) in his Oxford Advanced Learner's Dictionary (OALD) defines the term "assess", as a verb, as to: (1) estimate the nature, quality or value of somebody/something, (2) to decide or fix the amount or extent of something. For the purpose of this study we adopt definition (1).

CHAPTER TWO: LITERATURE REVIEW

2.1: The concept of Information Systems (ISs)

2.1.1: Information Systems and their place in an organization

A big part of the success of a business organization, in a liberalized trade environment, is attributable to its management's responsibility and creativity in the management of knowledge and information relevant to its business transactions and environment. Here knowledge, as defined by Lillrank, P. et al. (2001) may be taken to mean "the dynamic understanding of how the world works". If it is a business world then business knowledge would mean the "the dynamic understanding of how the business world works". An organization will obtain knowledge, a very important asset, through its learning experiences as it does its business. As defined by the Laudon and Laudon (2002: 372), "an organizational learning is the creation of new standard operating procedures and business processes that reflect an organization's experience". It is through a set of information systems that a given organization can systematically record, process, store and disseminate information and knowledge pertaining to its business transactions for the purpose of decision making, co-ordination, planning and control. It is through information systems that internal and external information flows can be effected to the advantage of an organization. Customers, suppliers and institutional supporters can be hooked to an organization through its information systems. It is through well founded information systems with *competent and dedicated management* that a business organization can capture business opportunities, track and outsmart competitors and enjoy a competitive advantage over other firms in its market or at least survive for an extended period of time.

As discussed in chapter one of this thesis, the importance of information cannot be overemphasized. Remenyi, D. (2001) in his article for the Electronic Journal of Information Systems Evaluation (EJISE) quotes Evans and Wurster (1997) on the importance of information to a business organization as saying "Information is the glue that holds together the structure of all businesses". Remenyi adds that, through their provision of information, "information systems, if not usually, play an important integrating type role in organizations". He continues to quote Evans and Wurster that

When managers talk about the value of customer relationship, for example, what they really mean is the proprietary information which they have about their customers and what their customers have about the company and its products. Brands after all, are nothing but the information-real or imaginary, intellectual or emotional-that customers have in their heads about a product. And the tools used to build brands-advertising, promotion, and even shelf space-are themselves information or ways of delivering information.

(Remenyi, D. 2000:4)

Contemporary information systems whether in developing or developed countries are essential for data collection/capture, processing, communication and provision of analytical power needed by business firms for conducting trade and managing business on a global scale (Laudon, K.C. and Laudon, J.P. 2002:5). Take for example, the coffee business in Tanzania; a coffee marketing co-operative organization is competing with multinational organizations, organizations which operate globally. To compete in such a business one needs to be able to communicate effectively in the process of scanning markets for customers who can buy the product, coffee, at competitive prices and attractive conditions and being aware of what competitors are doing. All this requires well founded information systems for the purpose of handling internal and external information flows. Here, a well founded information system can be considered as that IS which can effectively and efficiently link the organization to its internal and external business environment at an advantage.

To have well founded information systems, an organization must consciously and carefully design and manage its information technology infrastructure so that it has the set of technology services it needs for the work it wants to accomplish with the information systems (the Laudons *ibid*:13).

2.1.2: The information systems concept.

A number of IT related concepts seem to be in their formative stages possibly due to the rapid advances in the IT field such that definitions of concepts overlap or that one concept is defined differently by different writers and each one claiming to be right.

Examples of having different definitions for the same term abound. For example, the term “information systems (IS)” is given different definitions. Some for example, consider a computer system, say, a personal computer (PC) as an information system in its broad sense. Some consider databases in PCs as information systems. For example, Doyle (1996: 1) considers a telephone directory as an example of a manual information system. Others, for example, consider a system/processor unit of a computer system as the central processing unit (C.P.U.).

Another term considered to have various definitions by IT/IS professionals is “IT-value”. For example, in his paper when discussing about the nature of value, Bannister, F. (1999) says that,

... Even when value is formally defined there is a broad range of definitions in use. For example, De Rose (1991) defines value as: ‘the satisfaction of purchase requirements at the lowest total cost in use’. But value can go well beyond such narrow confines. It may, for example, be regarded as a measure of the organization’s effectiveness. Accountants use the concept of ‘monetary measure’ (Sidebotham 1970) which posits money as a common denominator for

comparing value. Sidebotham states that for the accountant: "In general, value means historic cost to the accounting units; ...

... Parker and Benson (1988) base their concept of IT-value on Porter's value chain (Porter 1985). Value in their definition, may be summarized as 'the ability of IT to enhance the business performance of the enterprise'. Wiseman (1992), develops Parker and Bensons' ideas by differentiating between value and benefits, asserting that value is both larger and more important than benefits...

Berghout and Renkema (1997) define value as the outcome of financial and non-financial consequences of the IT investment.
(Bannister, F.,1999:4)

This anomaly of coming up with different definitions for the same term will continue to make communication between IT professionals difficult until IT stabilizes as a discipline in the far future. This situation may also have some impacts on the agreement of models for the assessment of the benefits or dis-benefits of IS/IT investments, a situation which some professionals (Mahmood and Szewczak, 1999:491) in Walter, S. (2003) call the immaturity and fragmented nature of the IT field. However, this situation may also be a reflection of the fast developments in the IT field and should not be seen as a problem but be seen as a challenge to IS/IT professionals. After all, where confusion is suspected to exist, a writer will need to put forward the context in which he/she gives the definition.

The above comments notwithstanding, a contemporary approach to the study of information systems recognizes that the study is interdisciplinary. In particular, it involves technical and behavioural approaches. These approaches influence the definition of the term Information System (IS). To be exact, the two approaches are complementary in that they reflect the two important sides of ISs. On the one hand ISs involve the application of physical and technical sciences where computers, communication equipment and similar tools are used while on the other hand an existing information system will reflect the social and behavioural aspects of an organization for which it(the IS) was designed. The behavioural and social aspects of an IS are a result of the presence of the human-element. This socio-technical aspect of ISs is also supported by many other IS/IT professionals. For example, in his journal article titled "IS/IT Evaluation A Context-based and Process Oriented Perspective" Kefi,J.(2003:2) proposed an IS/IT evaluation framework based on structurational perspectives (and noted the contributions of Giddens, 1987; Orlikowski, 1992, 1993, 200; De Sanctis et Poole, 1994; Swanson and Ramiller, 1997) which emphasizes on the dual nature of technology as comprising social and technical interrelated components.

The Laudons(op cit:14) point out that the technical approach includes disciplines such as Computer Science which is concerned with the development of theories

of computability, methods of computation and efficient data storage and access; Management Science which emphasizes on the development of models for decision making and management practices; Operations Research which focuses on mathematical techniques for optimizing selected parameters of organizations such as transportation, inventory control and transport costs. On the other hand the Laudons (ibid) observe that the behavioural approach includes disciplines such as Sociology which looks at how groups and organizations shape the development of systems and how systems affect individuals, groups and organizations. Psychology looks at how human decision makers perceive and use formal information. Economics looks at the impact of systems within the firm and within markets.

Like the Laudons and Kefi, Parker and Case (1993) in Needham, et al. (1999: 566) also consider information systems to be socio-technical for the reason that they are composed of technology-related products and concepts that can only be understood within the context of the people and organizations which use them.

The preceding paragraphs imply that the results of the effectiveness and efficiency of ISs is a function of the technical and human elements of the given system. As a result of this an installed system will need to balance the technology used and the technological level of people intended to use it. In the language of Needham et al. (ibid: 566) it may be emphasized that ISs must be geared to the level of sophistication of the people using them. After all, in addition to other variables, the assessment of possible IS-benefits and dis-benefits cannot be done without considering the human element as part and parcel of the system.

Now, from a technical point of view the Laudons (op cit.:7) define an IS as “Interrelated components working together to collect(retrieve), process, store, and disseminate information to support decision making, co-ordination, control, analysis and visualization in an organization”. However, from a business perspective they (the Laudons) define an IS as “An organization and management solution, based on information technology, to a challenge posed by the environment”. Well, for the purpose of this study, as pointed out in chapter one, the technical definition of ISs, given above, is the most appropriate of all. It is comprehensive and clear for one to follow. In fact it makes other definitions redundant. As the IS concept is being looked at it is also important to note that like Lucey(1997), the Laudons (ibid) also observe that ISs are not computers but computers are tools to make computer-based systems effective and efficient. In addition to computers, other tools used in computer-based information systems include all communication facilities like telephones, modems, acoustic couplers, fax machines, TV and radios just to mention some. The analogy to the note given by the Laudons is that when one considers a transport system, he/she would not consider a car or bicycle or a donkey or an airplane as a transport system on its own. Cars, donkeys or airplanes and similar other items are tools used to facilitate transportation in a transport system as are computers in an information

system. Of course one may talk about a computer system or car system. This distinction between an IS and a computer system makes it clear that to assess the performance and/or benefits of an IS does not mean to assess a computer system alone. But it means to assess all those items which make up an IS including the human-element.

In a more general sense an IS can either be manual, mechanical, electronic or any combination of the three. This classification of ISs, into manual, mechanical or electronic depends on the extent to which the various technologies are used. For example, where much pencil-and-paper technology is used the systems will be considered as manual. Examples abound, say, where there is a small business like a primary co-operative society in a rural area where much of the data identification, verification, validation, recording, and processing are done by the use of pencil-and-paper technology and information communication is done through a messenger, the information system will be considered to be manual. Or where much of data processing and information communication are done mechanically then the system will be considered to be mechanical. Similarly, where much data recording, input, processing and information communication are done electronically then the system will be classified as electronic or computer-based information system. In other situations an IS may be a combination of the three types in which case a system may involve the use of manual, mechanical and electronic facilities in roughly equal proportions. In many cases the distinction between the three types of ISs may be a difficult task requiring the involvement of careful judgement. However, as pointed above, while defining an IS it is important to remember the presence of the human element. The human element is inseparable even if an organization is near to being a digital firm, where a digital firm is an organization where nearly all significant business processes and relationships with customers, suppliers, and employees are digitally enabled, and key corporate assets are managed through digital means (the Laudons *ibid*: 6). As observed by Hutchinson and Sawyer (2000), there are six elements of a computer-based information system and these include: hardware, software, data/information, people, procedures and communications. Hutchinson and Sawyer (*ibid*: 1.6) emphasize that people constitute the most important component of a computer-based information system. They say that it is people who operate the computer hardware, it is people who create and use computer software and that it is people who face ethical issues and decisions regarding the use of information technology.

As observed in the first chapter of this thesis and depending on the complexity of an organization, there can exist several types of ISs each of which provides information to managers at different management levels; namely top/strategic, middle/tactical, and supervisory management. ISs may not be seen by an individual's eyes but they can be traced by first knowing the different management levels in an organization and then identifying the systems which provide information to the different management levels. However, care would need to be taken as the functions of ISs may overlap, in particular one IS may

use information from ISs at lower management levels as its data for further processing. For example, information from transaction processing systems (TPSs) may be data for ISs at higher management levels of an organization like management information systems (MISs) or decision support systems (DSSs).

2.2: The need for the assessment of proposed IS/IT investments.

Resources, especially financial resources, are always scarce. However, with the desire of having a competitive edge business organizations increasingly spend large amounts of money on IS/IT investments. Khalifa, G. et al.,(2001), for example, observe that growth in global IT spending of about US\$ 3 Trillion forecasted by 2004, represent a 33.3% increase from last year's expenditure (WITSA, 2000). Among other variables, this high expenditure in IS/IT investments adds pressure on decision makers to have better justification for the investments. On the other hand Walter, S. (2003) observes that,

“Today a significant share of corporate funds is spent on the implementation, upgrading and maintenance of information systems. Recent studies show that in 2001 the IS budget of companies worldwide accounted for an average 8.8% of total corporate revenues (cf. CSC, 2001). Consequently, a thorough evaluation of investments in information systems before, during and after the implementation of a project is important.

(Walter, S.G. 2003:1)

Under normal circumstances, IS/IT and non-IS/IT investment projects will compete for scarce resources which may be financial and/or human or some other important resource that might be required. If, say, interest is to invest on IS/IT projects only then again the several IS/IT projects will compete for the resources until one of the projects gains approval from management that it is worthwhile investing on it and that it should be undertaken. To identify a worthwhile IS/IT project on which to invest assessments are made by using different kinds of models/methods/frameworks.

The problem of trying to assess the worthiness of investing on a particular IS/IT project is not a new problem. All along attempts have been made to try to come up with more suitable IS/IT assessment models. That is models which would help management to see the justification of approving or not approving expenditure on a proposed IS/IT investment.

Walter (ibid: 1) observes that,

However, the normative literature reports a great deal of difficulty in the appraisal of these investments (cf. Irani, 2002:11). Although IS evaluation has been an issue for both academics and managers for more than three decades now, there are still serious concerns about how to select projects for investments, how to control the development and how to measure benefits after the implementation (cf. Farbey, 1999:189). This concern has been matched by increased research

activity which prevailed through two broad streams. The first stream aimed to directly measure the payoff of IS investments for companies and came to mixed conclusions (cf. Dehning and Richardson, 2002:8). The second stream addressed the question of how IS investments can actually be assessed by decision-makers and particularly focused on the research of evaluation criteria, evaluation methods and the very nature of the evaluation process (cf. Avgerou, 2000:570).

(Walter, S. G. 2003:1)

Despite the several attempts of looking for better methods/models for the assessment of IS/IT investments no convincing results have been arrived at yet. Again Walter observes that,

Of late, several deficiencies in the field of evaluation methods have induced call for in-depth research. Academics have criticised the current state of the field as being immature and fragmented (cf. Mahmood and Szewczak, 1999:491) and have thus demanded “an overview of the whole panoply of evaluation methods, together with ... the assumptions they depend on ... [in order to enable]... the identification of gaps.” (Farbey, Land and Target, 1999:205).

(Walter, S. G. 2003:1)

In addition to what Walter pointed out above, Farbey, B., et al. (1993:3) also list a number of incidences made on attempts to look for better IS/IT assessment models over time as follows,

In 1961 IFIP (International Federation of Information Processing) held its first conference on the Economics of Informatics, and published the outcome in a book with the same title.

In 1971 the NCC (National Computing Council) commissioned a survey of how investments in IT were justified by British industry and commerce. This was followed by a conference which discussed alternative approaches to the problem.

In 1974 IFIP held its second conference on the Economics of Informatics and again published the proceedings as a book.

In 1976 EDUCOM, an American educational consultancy, held a conference titled ‘we can produce cost effective systems now’ which surveyed methods of evaluation.

In 1987 IFIP convened yet another conference on Information Systems Assessment and published the proceedings under the same title.

When asked by the House of Commons Select Committee on Trade and Industry in 1988 what issue the government needed to address most urgently in relation to IT, Tony Cleaver, Chief Executive of IBM

UK, suggested finding reliable ways of assessing investment in information systems. The government responded by commissioning a report on IT evaluation for small and medium-sized companies.

(Farbey, B. et al. 1993: 3)

The above quotations and discussions, in this section, show that the problem of looking for better IS/IT assessment models/methods is an old but a continuing process.

Unlike the problem of assessing non-IS/IT investments, the problem of assessing IS/IT investment proposals is always made new due to the fact that IT is characterized with rapid advances and changing roles in business and society and hence bringing about continuous uncertainties concerning the values and advantages/benefits of the proposed investments. The rapid advances in IT, like the ever increasing processing power of the computer, the merging of computing and telecommunications (connectivity) and the related reduction in computer systems prices encourage organizations to increasingly invest on IT. With increased competition in business as a result of the introduction of liberalized trade in several economies again forces organizations to invest on IT in order to gain some competitive advantage over other business firms in their industries or markets. Of course, as discussed in chapter one above, investing on computer-based information systems may not automatically lead a firm to having a competitive advantage unless the investment on an information system has been well-thought-out. However, even if the investment of an IS might have been well-thought-out the duration of the competitive advantage for the organization may still be in doubt as obsolescence may come in at any time due to the rapid advances in IT.

The problem of assessing IS/IT investments is further made complicated by the fact that a number of benefits and advantages of the use of ISs are not tangible, they are difficult to measure or quantify in which case it is difficult to compare several IS/IT projects by using the same scale as it would be the case for other non-IS/IT projects where monetary cash flows are used to isolate profitable investments from non-profitable investments. It would be difficult, for example, to measure the benefits of using an IS where data processing has been speeded up or where an IS has made it possible to hook in customers or suppliers or where a manager has been able to get all the required information in time or to calculate, for example, the direct benefits, to a bank, of installing an automatic teller machine (ATM) as compared to other banks which do not have an ATM at the material time.

Again, as discussed above, an IS/IT investment is a social-technical issue meaning that the assessment of an IS/IT investment cannot be done without putting into consideration aspects of the interest of people who will own it, use it, sponsors of the assessment, champions and other stakeholders.

However, despite the difficulties inherent in the assessment of IS/IT investment benefits, there are many benefits that can be gained from the assessment of IS/IT investments. As observed by Farbey et al. (1993:12), evaluation provides benchmarks for what is to be achieved in economic, operational or organizational terms from the IS/IT investments. Subsequently the benchmarks can be used to provide a reference point for the measurement of the success or failure of the actual implementation of the IS/IT projects.

In summary, although the assessment of IS/IT investment proposals have subjective influences due to their socio-technical nature, the uncertainty and unpredictability of IS/IT investments as observed by Farbey, B. et al. (1993: 6) and the benefits accruing from the capability to ascertain the advantages of an IS/IT investment point to the need for continuous improvements on IS/IT investment assessment models.

2.3: Related literature on models/methods used in the assessment of proposed IS/IT Investments.

As discussed in the preceding sections of this chapter, there are strong reasons for the need to assess proposed IS/IT investments in organizations. Management must be convinced that a proposed IS/IT investment is going to be of benefit to the organization or at least must be seen to have value in order to justify its approval.

However, the assessment of proposed IS/IT investments is a difficulty exercise as discussed elsewhere in the above sections. The exercise is difficult due to a number of factors. Among the factors are that, first there are uncertainties on whether a proposed IS/IT investment will payback before it is obsolete due to rapid advancements in IT. Second, a number of benefits associated with IS/IT investments are intangible, for example, the ability of an IS to hook customers or suppliers to an organization, the resulting better corporate image due to higher client satisfaction, enhanced employee goodwill, improved resource control, more timely information and other similar benefits whose value cannot be easily expressed in numerical or monetary terms or be directly associated to a newly introduced IS. What is being put forward here is that the impact of an IS/IT investment on the performance of an organization is not direct and immediate.

Lillrank, P. et al., (2001) summarize the impact of IS/IT investments to an organization by saying that,

The impact of IT materializes over a chain of enablers and effects connected by choices and various conditions. The fundamental objective of IT is to improve the quality of information, i.e. the bits that tell a producer exactly what to do, when, for whom and what knowledge bases and tools to use.

Having done so, output becomes more accurate and precise, thus reducing cost, improving customer satisfaction and possibly opening up some new options of how to create value...

When it has delivered its operational results other mechanisms, such as pricing, strategy, or volume take over all the way to the bottom line.
(Lillrank, P., et al., 2001:1)

In other words Lillrank et al., want to emphasize that IS/IT investments should be seen as enablers, they enable other functions or operations to be profitable or beneficial.

The third factor is that ISs are socio-technical in nature, the assessment of their benefits has to take into account a broad spectrum of the interests of several interested parties or stakeholders including for example, the interests and background of prospective system users/operators, the interests and politics of system sponsors, senior management, the interests of system champions (people who are ready to defend the approval of the system with all their efforts), the direct and system beneficiaries, the background and orientation of system evaluators.

However, despite the above difficulties inherent in the assessment of IS/IT investment proposals, IS/IT professionals and academics are continuously researching and coming up with a number of proposed approaches/methods to the problem. Berghout et al., (2003:9), for example, observe that a number of overviews on the evaluation of IS investments have been published (they quote Swinkels and Irsel, 1992; Farbey et al., 1992; Willcocks, 1992; Blackler and Brown, 1988; Powell, 1992, Berghout and Renkema, 1994). They also point out that Berghout and Renkema (1994) refer to over sixty IS evaluation methods. However, they observe that the said IS evaluation methods present in the IS evaluation literature are not conclusive as they support just a little part of the decision making process with respect to IS investment justification.

On the other hand Cronholm and Goldkuhl (2003) say that,

Evaluation is never an easy task and consequently there are a lot of suggestions for how to evaluate IT-systems. Much of the literature takes a formal-rational view and sees evaluation as a largely quantitative process of calculating the likely cost/benefit on the basis of defined criteria (Walsham, 1993). There are also interpretive approaches (e.g. Remenyi, 1999; Walsham, 1993). The interpretive perspective views IT-systems often as social systems that have information technology embedded into it (Goldkuhl & Lyytinen, 1982).

There are formative and summative approaches containing different measures or criteria. Some approaches are focusing on harder economical criteria and others are focusing on softer user-oriented

criteria. According to Walsham(1993) and Scriven(1967) formative evaluation aims to provide systematic feedback to the designers and implementers while summative evaluation is concerned with identifying and assessing the worth of program outcomes in the light of initially specified success criteria after the implementation of the change programme is completed. The criteria used are often derived from one specific perspective or theory.

All of the approaches, formal-rational, interpretive or criteria-based are different ways and their primary message is how the evaluator should act in order to perform evaluation.

(Cronholm, S. and Goldkuhl, G. 2003:1)

In their conclusion, Cronholm and Goldkuhl, observe that the different evaluation methods are not conclusive and that they have shortfalls. To minimize the weaknesses found in the methods, Cronholm and Goldkuhl propose the methods should be combined. The researchers have proposed to do another research so that they make an analysis on how the different types of evaluation methods can be combined.

Other writers like Kefi (2003:1) observe that a number of studies have been made on the evaluation of IS/IT investments. He points out that the studies have drawn on multiple evaluation perspectives; like (1) the technical perspective which includes: monitoring, data quality management, technological viability and risk evaluation; (2) the financial and economic perspective which includes: ex-ante and/or ex-post assessment of IS/IT contributions to performance, productivity ratios, return over investment ratios and financial auditing; (3) the strategic perspective which includes: IS/IT value chain and IS/IT-based competitive advantages and (4) the organizational perspective which includes IS/IT contribution to organizational effectiveness and IS/IT-enabled organizational change.

Kefi also observes that most of these studies rely on variance models and cross-sectional quantitative data; he quotes Markus and Robey(1988) on this observation.

Basing IS/IT evaluation on methods which mostly rely on quantitative data may fail to show a true picture of all IS benefits. Research by Ballantine and Stray(1998) and Lycett and Giaglis(2000) as quoted by Khalifa, G. et al., (2000) also indicate that most IT investment decisions use quantitative or financial based evaluation methods. Khalifa et al. (ibid), point out that such methods usually have a limited definition of the stakeholders and typically target direct tangible costs and benefits. This is an anomaly since IS/IT investments have both tangible and intangible benefits and have an important human element which may not be easily reflected in quantitative biased evaluation methods.

In addition to the general researches done on methods used in the assessment of IS/IT investment projects there are some interesting case studies done by some IS/IT professionals which give more light on the intricacies involved in the IS/IT evaluation in practice. One of the case studies is the one which was done by Farbey, B. et al., (1993).

In attempts to study how IS/IT investments are done in practice Farbey, B. et al. (1993: 46-58), did a case study concerning an evaluation of information systems in sixteen U.K. based organizations. The results of the case studies, although they cannot be generalized as sampling techniques used were not disclosed and that all were from urban areas of a developed country, give some good experience on how IS/IT investment proposals are assessed in practice.

Farbey, B. et al., (ibid: 46-58) studied the sixteen organizations by considering six issues; namely: (i) The existence of an IT strategy on which IS investment proposals were to be based, (ii) the expected level of change sought as a result of investing on IT, (iii) the type of procedures used in justifying the approval of an IT investment, (iv) attempts made at quantification in order to seek for the justification of an approval, (v) the stages at which IT investments were evaluated and (vi) the analysis of stakeholders who took part in the IT investment justification process.

On the first issue, the study indicated that more than a half of the sixteen organizations claimed to have no IT strategy on which they should have based IS proposals. However, only one organization indicated to have a corporate IT strategy. As observed by the researchers this situation was contrary to information systems theory where one was not expected to be thinking of an IS investment in an organization without first having IT and IS strategies on which to base IS demands. This remark by Farbey, B. et al. (ibid: 46) is supported by Edwards, C. et al. (1991: 23) who observe that "... in the past the IS strategy of many organizations was the summation of activities and plans and were often driven from the bottom-up development of systems rather than a coherent business driven plan". Ward, J. et al. (1990: 38) observe also that "... unlike the planning for earlier (before the 1970s) IS/IT strategies, current IS strategies must be developed within the context of the wider corporate and business strategic planning processes. They add that, by developing IS strategies on the basis of the wider corporate and business strategy in that way the expenditure on information processing within an organization, consisting of central information systems departments, distributed departmental computing, and end-user computing environments, can be directed towards the achievement of corporate and business unit objectives and goals".

On the second issue, researchers (Farbey, B. et al. (1993) enumerated the levels of change sought by the studied organizations before installing the new ITs and compared them with Michael Porter's suggested hierarchy for IT impacts. The levels sought by the organizations were that: three organizations sought to

automate current activities, four organizations sought to optimize their activities, four sought to enhance functionality, one sought to reconfigure work in new ways, five sought to be able to coordinate their activities which were geographically spread and one sought to link to others inside and outside their firm.

However, the research results showed that, with one exception, the organizations were not yet using the technology as sought before the installation of the new ITs. Farbey, B. et al. (ibid) observe that few of the organizations had reached the levels of sophistication suggested in the literature, either in the way they considered IT or in the way they went about installing it and justifying its use. Also the levels of change sought did not match with Michael Porter's theoretical suggested hierarchy for IT impacts. This implies that in practice, an installed IS/IT may be found being used for purposes other than the ones for which it was planned. That is at times an IS installation may bring in benefits or costs which were not planned for. This in turn implies that management would have identified the IT levels of their staff and tried to match the levels of change sought in the use of IT to the IT levels of their staff. However, even then it is, in practice, impossible to get rid of the surfacing up of unplanned for costs and benefits and therefore management might have anticipated such a situation.

On the third issue, researchers point out that even though some justification had been required for the approval of an IT investment only about a half of the sixteen organizations followed standard/formal justification procedures and only a half required any quantification of IT benefits. Farbey, B. et al. (ibid) point out that it was up to the champion to do whatever he/she thought was necessary to gain approval.

As the researchers (Farbey, B. et al. (ibid)) observe, the study indicated that: Nine of the sixteen projects used a formal justification. Of the nine projects four were justified by using the Return on Investment (ROI) techniques. Of these four, three were "for real", that is the approval was actually based on the results of the ROI computations. However, the remaining one was just for rationalization as the actual approval was based on some other considerations not formally presented.

In the remaining five cases the formal justification did not involve quantification. Only one of the five cases was "for real" and the others seemed to be rationalizations.

Of the seven cases which were not formally justified, two were justified as "got-to-do" projects. That is the two organizations had no way but to install the new IT. Researchers point out that, in the first of the two cases the main reason given was that the company's U.S. based clients were used to a better standard of presentation and service than obtained in the U.K. and therefore the change had to be made if clients were not to be lost. In the second of the two cases the investment was considered an essential part of the IT strategy. Five of the seven

cases were considered as being “acts of faith”. This observation is also given by Khalifa et al.,(2001:117) where they say that there is evidence to suggest that IT investment decision-making frequently result in “gut feel” or “acts of faith” while ignoring the use of any IT evaluation methods and IT systems users and quote(Kaplan, 1984). On the other hand Bannister (1999) observes that,

... Several researchers found that, when pushed, decision makers, both individual and corporate, often describe their decisions as being based on instinct. Indeed, the more complex the decision, the more likely this seems to be. For the scientist, such defection from the solid ground of rational positivist decision making is, at first sight anyway, disturbing. A variety of terms is used to describe this decision making process, for example “acts of faith”(Farbey at al., 1993, Deitz and Renkema, 1985), “blind faith” (Weill 1990) and “gut instinct” (Powell 1992, Katz 1993).

(Bannister, 1999:2)

From the preceding discussion it may be noted that the use of the “acts of faith” or “gut instinct” in making decisions is resented by some IS/IT evaluation methods researchers. However, some researchers like Bannister support the approach. For example in summarizing his journal article he says that,

... But much of the time, and particularly for large and/or complex decisions, the process of evaluating IT is the application of *phronesis*, the application of the absorption of a range of input information including data, evaluation techniques, personal experience, personal knowledge, corporate or departmental politics, personal desires and intuition; a process of filtration and distillation of frequently very complex data, information and knowledge to levels manageable to the human mind.

Whether the incorporation of all these factors is conscious or unconscious, they are always present. Models which seek to provide surrogates for such “irrational” factors may be employed, but if they conflict with the inner conviction of the decision maker(s), they may be rejected. The positivist may describe such rejection as “irrational”, but this view is based on the premise that the decision maker shares the same values and has the access to exactly the same knowledge as the observer something that is arguably never the case. The disconcerting fact remains that good business (and other) decisions are sometimes taken in the teeth of the “evidence”. [Military history is a good example of such examples, a particular good case is US decision making during the battle of Midway (Prange et al, 1982)]. It is this capacity to make intuitive leaps that often distinguishes the great manager from the competent functionary.

This internalized, subjective and idiosyncratic knowledge and knowledge processing, referred to in this paper as instinct, is an

essential part of decision making and should not be in any way disregarded or denigrated. In fact it is the authors' suggestion that this instinct should not only be defended but it should actually be celebrated as part of not only that which differentiates man from machine but separates mediocre from top flight management.

(Bannister, 1999:10)

This is a challenge to IS evaluation researchers. More research has to be done so as to come up with appropriate and manageable evaluation methods or guidelines to be used in IS evaluation.

On the fourth issue, the researchers point out that tangible benefits were identified in ten projects out of the sixteen projects. In the remaining six projects, even benefits which were considered tangible, and therefore might have been measured, quantification was not attempted. Only three of the sixteen projects attempted to quantify intangible benefits. At this, researchers (Farbey et al., 1993) observe that people had a general view that intangibles would not be accepted as justification to those in authority.

In seven cases intangible benefits were added as extra arguments to support the case of going ahead.

Researchers (Farbey, B. et al. (ibid)) observed that, in addition to focusing on short-term, quantifiable and tangible benefits, often the justification procedure excluded anything but the most immediate operational benefits. In one case this observation was true even though there were much larger strategic benefits which might have been included.

On the fifth issue, researchers point out that justification was done at the "feasibility study" stage only. The researchers were worried that what they found from the study was in contradiction to the IS literature which puts it that most evaluations are undertaken at "sign off" (Kumar, K. 1990). However, to this contradiction, researchers explained that justification was done at this stage because all of the sixteen projects involved the purchase of off-the-shelf applications programs.

On the sixth issue, researchers observe that the process of justifying investments in new information systems projects involved a wide range of people/stakeholders. The researchers observe that post-installation audits were also carried out but at the request of vendors. The audits involved employees and system vendors ("suppliers") directly. It appeared peculiar for vendors to be directly involved in the justification process. However, the reason behind this was that vendors forced the organizations to do the audits so as to maintain a relationship with their customers and as a result develop accounts with them.

The researchers Farbey, B. et al. (op cit.) used the generic stakeholders map (see figure 2.1 below) taken from Gilber et al. (1988) to show internal and external stakeholders who should have been involved in the justification of the investments on new IS projects. The researchers observe that the stakeholders map was not complete as it would be increasingly necessary to consult with people external to the firm as part of the justification and auditing processes.

Map of stakeholders in a large organization

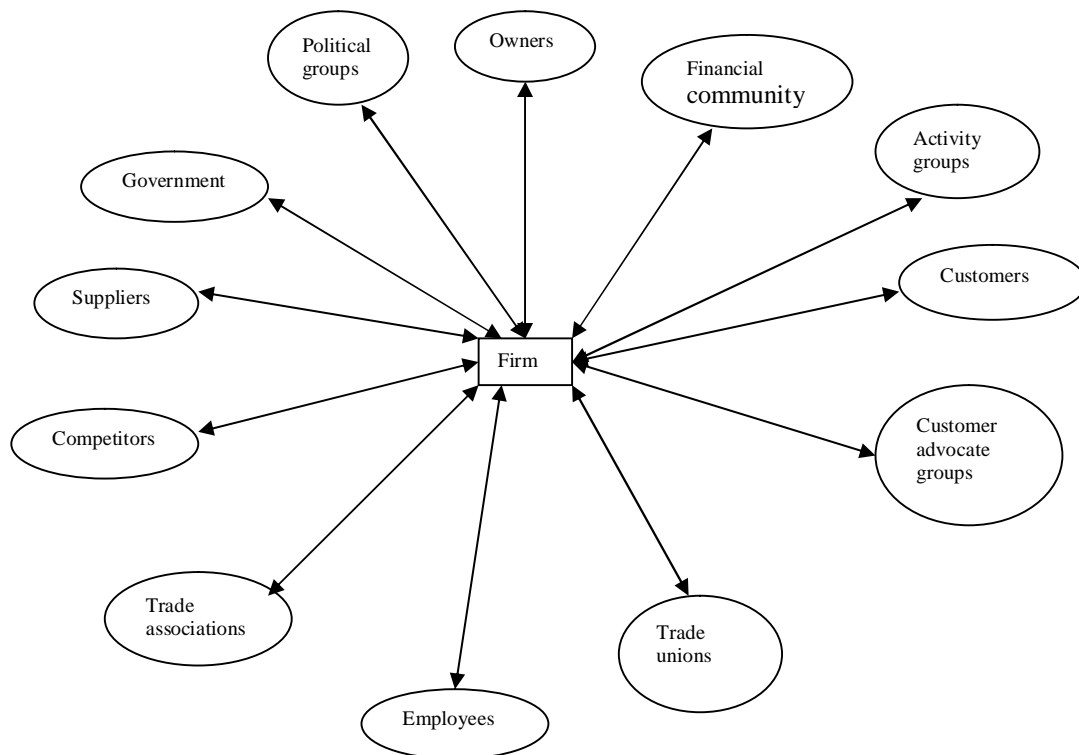


Figure 2.1: Stakeholder map of a large organization.

Source: Farbey, B. et al. (1993:51)

As can be seen from figure 2.1 above, cost justification procedures had involved management at senior levels. Researchers point to another important note that the justification of most investments on new information systems relied heavily on a "champion"; a specific person who had taken up the idea of the ISs and persuaded the organization that the investment would be worthwhile.

Farbey et al., (1993:92) add that in addition to the case study discussed above about the evaluation of IS/IT investments they have also learnt from other researchers that:

- Evaluation is a multi-layered activity, which include: content - that which is being measured; process- the way in which it is carried through; and

context – the complex organizational (or even inter-organizational) situation in which the evaluation is done.

- The process by which the evaluation is carried out can present an opportunity for organizational learning and improve communication.
- Evaluation is a sensitive activity. Careful thought needs to be given early on to practical issues such as the composition of the “evaluation party” and its relationship to other stakeholders as well as to presentation and communication.

The researchers (Farbey et al., 1993:57) summarize the findings from the case study done by saying that very few attempts were made to treat the systems differently from any other capital budgeting expenditure. They add that no single method will cope with this peculiarly complex problem of evaluating IS/IT investment projects and that no one method has been accepted by professionals as sufficient. This means that there still exist gaps in the IS/IT evaluation models/methods and therefore that more researches have to done.

Summarizing from researches done by other researchers, Bannister (1999:5-7) has categorized IS/IT evaluation methods into three basic techniques which, he says, can be used in two different ways as: Fundamental, Composite and Meta methods.

Bannister describes the methods as follows:

1. *Fundamental measures* as metrics which attempt to parameterise some characteristic or closely related set of characteristics of the investment down to a single measure. The key characteristic of such methods is that they provide a single score or statistic which is used to assess an investment. He observes that measures of this type are not confined to purely financial, although financial measures are the most common.
2. *Composite approaches* try to combine several fundamental measures to get a “balanced” overall picture of value and/or investment return. Composite measures include the Information Economics of Parker and Benson (1988), portfolio methods, the Balanced Scoreboard of Kaplan and Norton (1996), BSC(Ward 1994) and SMART(Goodwin and Wright 1998). He says that few organizations would try to evaluate their information systems activity today or try to choose between competing projects without using some variant of the composite approach although many of these methods are themselves composite.
3. *Meta approaches* (e.g..Farbey et al., 1993 and Peters 1994) attempt to select the best set of measures for a context or given decision. This meta orientation is generally not structured. Each case will be different and there is no question of the organization wishing to use this approach for any sort of benchmarking.

Bannister says that, the three approaches may be applied in the following two different ways:

1. *Positivist or Reductionist* where the decision maker allows (one might almost say empowers) the methodology to make the decision. The decision maker establishes a series of mechanical (and replicable) operations which often reduce the decision to a single score.
2. *Hermeneutic*, here defined as methods of interpretation of data which use non-structured and non-formal approaches to both understanding and decision making. Using this approach the decision maker takes on board several different metrics directly and combines them in his or her mind in a manner that is, at best, extremely difficult to describe formally. When decisions are made this way, instinct and intuition generally play a major role.

On the basis of the above exposition, Bannister observes that much of the current research into IT evaluation is focused on the positivist approaches at the expense of what, to him, is more interesting, but much more difficult to confront, hermeneutic.

However, in their joint paper, titled “The Societal Value of ICT: First Steps Towards an Evaluation Framework”, Bannister and Dan Remenyi(2003) express their feeling that IS evaluation is a complex process and therefore suggest the need for multi-perspective approach. They observe out that,

A number of authors have suggested multiple perspective approaches to the evaluation of information systems. These include Symons’ multiple perspectives (1994), Cronk’s concept of holistic construal (Cronk 1999), Remenyi et al., (2000) and others. Outside information systems, one of the most influential models for general business evaluation and appraisal of recent years has been the balanced scorecard (Kaplan & Norton 1992; 1993; 2000). Of these options, the holistic construal might eventually offer the most powerful analytical tool to this problem, but given the enormous complexity of the issues involved and the relatively embryonic state of this concept in ICT, the simpler and better established approach of a balanced scorecard may be the most appropriate model for this approach.

(Bannister and Remenyi 2003:5)

In their article for the “Electronic Journal of Information Systems Evaluation (EJISE), McBride and Fidler (2003:6) observe that formal rationalistic approaches to the evaluation of information systems like the Executive Information Systems(EIS), say, Decision Support Systems(DSS) are limited in that they focus on the system itself and on the quantified benefits, omitting consideration of the wider organizational issues. They recognize the fact that information systems are socio-technical by observing that the social and political contexts within which the system will be utilized are as important as the system’s

technical features (they quote Waema & Walsham, 1990 for this argument). McBride and Waema proposal the use of an “Interpretive” approach in the evaluation of information systems. They argue that an Interpretive approach addresses qualitative issues and is aimed at producing an understanding of the social contexts and the social processes of the organization into which the IS is to be introduced.

They say that interpretivism is concerned with approaches to the users’ understanding of reality. They say that interpretivism asserts that such knowledge, within the domain of human action, is necessarily a social construction and inevitably subjective (they quote Walsham, 1993). They assert that the interpretive approach is based on examination of content, context, process and context/process linkage. These elements have also drawn the attention of Farbey et al., (1993:80-81) when looking at the social perspective during the evaluation of an information system.

McBride and Fidler (op cit.) explain that when analysing the content, the problem requiring an IS solution must be understood. Things like products, processes and systems of the organization must be investigated and the nature of the proposed IS must be analyzed. They add that the second element is an understanding of the social context into which the information system will be placed. They say that this, context, comprises a static view of the organization. The third element is the social process by which the information system will influence the organization examined. They emphasize that this dynamic view encompasses both a cultural and a political perspective.

The researchers say that the final element in the interpretive framework concerns the linkage between social context and social process. They say that it is here where structuration theory provides the key conceptual approach (they quote Walsham & Han, 1991 for this).

McBride and Fidler (ibid 15) conclude that approaches to evaluation should seek to shed light on the uniqueness and derive a benefits profile that takes into account the cultural and political issues. They end up by saying that further research, involving case studies of successful and unsuccessful executive information systems in a variety of organizations, will lead to refinement of the approach.

While McBride and Fidler (ibid) propose the use of the interpretive approach, which applies qualitative research techniques, in the IS/IT investment evaluation, Jones and Hughes(2003: 1-2) propose to complement the interpretive approach with Grounded Theory(GT). They (Jones and Hughes) argue that when presented with unstructured, non-numeric data derived from a qualitative research study, such as data from interviews there is a noticeable absence of practical guidance for the coding and analysis of data when an interpretive approach is used. They argue that relief can be found with the use of Grounded

Theory (they quote Glaser and Strauss, 1967) which is one of the practical methods that is prominent amongst the various research strategies recommended for conducting interpretive research (Myers, 1997).

Jones and Hughes (op cit.) have described Grounded Theory by saying that,

Grounded Theory is a method for the collection and analysis of qualitative data developed by Glaser and Strauss (1967). Although the method dates back to 1967, its use in Information Systems research is recent. It is growing in popularity, particularly in the interpretive IS research paradigm, for enabling rich and context sensitive analysis of social situations (Baskerville and Pries-Heje, 1999; Urquhart, 1999; Hughes and Wood-Harper, 1999; Trauth, 2000)...

In the method, conceptual properties and categories may be 'discovered' or generated from the qualitative data by following a number of guidelines and procedures where the aim is to indicate the importance of the actors in the social setting. It is they who provide the transcript data from interviews. As soon as the first transcript is prepared, coding begins. The term 'coding' is used here to describe the process of annotating or labelling interview transcripts with a piece of text. At this stage the coding is 'open' and is fairly unrestricted, in the sense that each line, and sometimes each word, is scrutinized in order to produce a code which initially may appear as a simple repetition or summary of the text. The purpose is to 'open' the inquiry into the data and at this stage any element of the data may seem relevant. As more data is collected, the researcher continues the open coding, but also begins to identify 'categories' rather than labels. The categories are formed from groups of words from the initial coding which pertain to the same phenomenon.

(Jones and Hughes 2003: 2-3)

Jones and Hughes observe that when considering the use of Grounded Theory in the IS field there are inconsistencies in both the understanding of the method and the application of the method. They argue that this could be because Grounded Theory is more or less appropriate for addressing certain kinds of research questions or at certain stages of the research process. However, they observe that meanwhile further investigation into the relationship between the ways in which Grounded Theory is adapted and the kinds of research questions are being studied, they would further argue that since Grounded Theory has had limited application, researchers would be well advised to explore its use in different contexts. The researchers (Jones and Hughes) would prefer to avoid making sweeping generalizations about its recommended use.

Owens, I., (1998) in his paper asserts that a number of frameworks have been suggested in the literature for evaluating investments in information systems. He observes that the majority of the frameworks focus on the feasibility or

justification stage of IS projects, rather than providing frameworks for ascertaining whether expected or anticipated benefits actually materialize. He points out that exceptions to this include work done by Ward and Peters. He adds that in addition to not having been operationalized or implemented the majority of the published frameworks use traditional Cost Benefit evaluation techniques to evaluate IS investments (he quotes Willcocks and Lester 1991 and Ballantine et al., 1996, 1997). In addition he quotes Ballantine et al., (1997) that the majority of companies surveyed by Ballantine and his colleagues used cost/benefit and other investment appraisal techniques to IS investments at the feasibility study stage in much the same way as they evaluated other capital investments. Owens, (1998:7) quotes the analysis of Ballantine et al., on the distribution of the most commonly used investment appraisal techniques used in the 96 UK surveyed as:

1. Payback (68%).
2. Cost Benefit analysis (66.7).
3. Return On Investment (ROI)/Average Rate of Return (ARR) (48.1%).
4. Net Present Value (27.8%).
5. Return on Management (ROM) (13.0%)
6. Profitability Index (1.9%).

On the other hand Owens adds that, Guy Fitzgerald (1998) has described a framework that combines traditional investment appraisal techniques with other less traditional measures to form a multidimensional approach to IS evaluation at the feasibility stage. He says that the approach calls for eight tasks and evaluations to be undertaken by organizations considering making an investment in an IS. The eight tasks quoted included the:

1. Identification of costs.
2. Assessment of the contribution to the business strategy.
3. Analysis of the expected benefits.
4. Identification of second-order effects.
5. Evaluation of the flexibility of the project.
6. Assessment of the practicability or implementability of the project.
7. Assessment of project risks.
8. Testing of the business idea.

According to Owens the model has not been operationalized and used to practical reviews of actual IS projects.

Although Fitzgerald's model is not different from any logical steps that could be followed in evaluating an IS investment project, the list of the tasks in the model is a good prompt for one to consider when preparing for an IS-project assessment/appraisal. However, the major challenge, usually, is with the evaluation of intangible costs and benefits and looking at IS investments as enablers. In particular, the difficult part is with tasks (1), (2), and task (4). In task (1) an evaluator would have to identify both tangible and intangible costs. In task

(2) an evaluator would have to identify the expected contribution of the proposed IS as an enabler. In task (3) as in tasks (1) and (2) an evaluator would have to analyse expected tangible and intangible benefits of the proposed IS as an enabler. In task (4) an evaluator would have to identify expected second-order effects, this would be quite involving and tricky as the evaluator would have to take into account the rapid advances in IT which would make investments in IS obsolete before the anticipated life-time of the system.

Other researchers like Ulfelder(2003), Jong et al., (1999), Margrabe 1978, Dos Santos 1991, Kambil et al., 1993 and Kumar (1997) have looked at the possibilities of using the Option Pricing theory in the evaluation of IS/IT investments. Their argument is that the theory provides a means for the evaluation of derived investments that is investments which may not exist before the existence of prior investments as is the case with IS/IT investments. According to Jong et al., (1999) the option pricing theory is a theoretical model commonly used in the financial world to determine the price of an option on a derived market. That is a market which comes up after having invested in some other previous market(s) or for the IS/IT investment the model would be used to value IS/IT projects which exist only when other IS/IT investments had been previously made. For example, an investment on an IS in an organization will only exist after having, invested on an IT infrastructure. Quoting Jong et al., (ibid)

In the world of IT, the use of the option theory based on the Black and Scholes model was proposed by Dos Santos (1991) to value second-stage projects. In 1993, Kambil, Henderson and Mohsenzadel, introduced the options perspective. For them option pricing is a critical first step in establishing linkage between many categories of IT investments and business value.

Jong et al., (1999:4)

Jong et al., (ibid) define the following terms related to the option theory in finance as: “Exercise or strike price” as the price at which a share of stock is to be bought or sold. “Call option” as an option which gives an individual the right to buy a stock and a “put option” as an option which gives an individual the right to sell a stock.

To illustrate the original option pricing model used in the finance world, Jong et al., (ibid:5) quote the option pricing model developed by Black and Scholes in 1972 as follows:

$$C = SN(d_1) - Ee^{-rt}N(d_2) \quad (1)$$

Where

$$d_1 = \frac{\ln(S/Ee^{-rt}) + \sigma^2 t/2}{\sigma\sqrt{t}} \quad (2)$$

$$d_2 = d_1 - \sigma\sqrt{t} \quad (3)$$

C = the price of a call option on a stock;

S = the stock price;

E = the option exercise price or strike price;

r = the risk-free rate of return (continuously compounded);

t = the time to option expiration;

σ = the standard deviation of the instantaneous, annualised rate of return on the stock;

$N(d_x)$ = the cumulative standard normal density function;

ln = the natural logarithm function.

In this model the assumption is that the value of a call option only depends on the stock price S, the exercise price E, the interest rate r, the time to expiration t, and the volatility, or standard deviation of the stock σ .

Looking at the model, it is complex and not intuitive (Brenner et al., 1994). It would require a good mathematician to understand it, to be able to follow its analysis and apply its results.

Jong et al., (ibid), exemplify the use of the Black and Scholes model in the world of IT by considering an IT infrastructure investment and derived investments. They give an example of a situation where a Graphical User Interface (GUI) is installed on personal computers in order to improve on the productivity of employees. On successful installation of the GUI (first-stage investment) a spreadsheet package (second-stage investment) would be installed. Jong et al., argue that the option to use the spreadsheet application under the new interface adds value to the GUI investment. They point out that the traditional capital budgeting methods like the discounted cash flow (DCF) methods do not incorporate this extra information of looking at the derived investment as adding value to the preceding investment. They observe that authors like Dos Santos and Kambil et al., see this as the key aspect for introducing the option theory. In the language of Jong et al., if the net present value (NPV) were to be used to take care of both the first and second stage investments, then the expression would be:

$$\text{NPV}(\text{total investment}) = \text{NPV}(\text{GUI-investment}) + \text{NPV}(\text{spreadsheet-investment}).$$

Jong et al., argue that by incorporating the NPV of the second-stage (or follow up investment) management flexibility, with regard to investment decision making, would have been taken care of.

Jong et al., have used the GUI and Spreadsheet example to illustrate on how the evaluation of the investments would have been carried out by using the analogy of Black and Scholes parameters and Dos Santos definitions as follows:

In the following example-model Jong et al., describe parameters used in the model as:

1. B is the current value of the expected Benefits of the second-stage(in this example, the spreadsheet), excluding the development costs of the first-stage project (in this example the GUI);
2. C is the current value of the expected development Costs of the second-stage project;
3. r is the risk-free interest rate;
4. t the time before which the option to develop the second-stage project must be exercised;
5. σ^2 is the instantaneous variance of the ratio B/C, the variance Dos Santos uses, accounts for the different variances for both the costs(C) and benefits (B), as well as the correlation between the two. For reasons of simplicity, it is assumed that the same σ applies for B and C, and no correlation between the two.
 σ^2 can be calculated by using the expression:
 $\sigma^2 = \sigma_C^2 + \sigma_B^2$

The option pricing model used by Dos Santos is:

$$V_{\text{opt}} = BN(d_1) - CN(d_2)$$

Where

$$d_1 = \frac{\ln(B/C) + \sigma^2 t/2}{\sigma \sqrt{t}}$$

$$d_2 = d_1 - \sigma \sqrt{t}$$

Jong et al., point out that to determine the value of B and C the value of the second-stage project today must be estimated and this implies the use of discount rates to calculate the present value of B and C. Jong et al., use an example to illustrate on how to find the value of V_{opt} . They also assume that the present value of the costs of the spreadsheet per installation to be \$500 (5 installations), and the present value for the overall benefits of the project of to be \$3,500. They assume that the product will be obsolete in 2 years, so that t equals two. They again assume that the probability of cash flows fluctuating within a range of 20% above or below the expected value to be estimated at 66% so that B and C equal 0.2($\sigma^2 = 0.08$).

Following the above assumptions the value of the option is calculated as:

$$d_1 = \frac{\ln(3,500/2,500) + 0.08 \cdot 2/2}{0.28 \cdot \sqrt{2}} = 1.0412$$

$$d_2 = 1.0412 - 0.28\sqrt{2} = 0.6412$$

$$V_{\text{opt}} = 3,500 \cdot N(1.0412) - 2,500 \cdot N(0.6412) = \$1,131$$

The value of the option (NPV (second-stage)) according to the model is therefore \$1,131. This is the extra value of using the GUI on top of the NPV generated by the GUI itself.

Jong et al., observe that this model has problems which make it not appropriate. They point out that the estimation of the input values for the variance and NPV of the second-stage project is hard; the model is too simplistic because too many assumptions are being made, for example, having a constant interest rate, no transaction costs and the stock pays no dividends, and also that the model is too complex to communicate.

They further observe that the estimation of the NPV of the second-stage project remains the same old problem for management to predict cash flows and determine the appropriate discount rate. They conclude that the options model does not solve the problem with the DCF, it only creates more.

Kumar, R.L. (1997), on his part, considered possibilities of using the option pricing theory in the evaluation of IT-enabled responsiveness.

Kumar emphasizes that traditional calculations such as NPV may not capture all factors that need to be considered in IS/IT investments, especially intangible factors, (he quotes Clemons 1990, Dixit and Pindyck 1994, Dixit and Pindyck 1995, Nichols 1994, Pindyck 1991, Tam 1992, Trigeorgis 1995 and Trigeorgis 1996)

In his paper Kumar examined possibilities of quantifying organization's responsiveness as a result of investing in IT.

He used an example where the BOEING company used CATIA (Computer-Aided Three-dimensional Interactive Application) and ELFINI (Finite Element Analysis System) in its aircraft design work. In his research he followed the use of a model proposed by Majd and Pindyck (1987) for valuing sequential investment opportunities. The reason for using the model was that the model explicitly models investment projects as taking time to complete and requiring sequential investment, which is typical of many IT-related investment projects.

Kumar (1997:3) defines the term responsiveness as "the ability to quickly react to changes". He considers "responsiveness as one of several different types of "flexibility" (Sethi and Sethi 1990). He also defines an *option* as "a right but not an obligation"; *financial options* as "options on financial assets", for example an option to buy or sell shares at a stock market; *real options* as "options on real

assets such as options to buy personal computers; *simple options* as “options where when exercising an option results in an asset”; *compound options* as “options where when exercising an option results in another option” for example, when investing in a telecommunications network results into investing on electronic commerce.

Kumar points out that several factors affect the value of a real option. The factors may include: the type of the option (whether the option is a call, American, European, simple or compound option, or some other type of option), cost of exercising the option, the benefits obtained from exercising the options, the nature of uncertainty of the costs and benefits, time available for exercising the option, and whether the underlying asset of the real options produces any intermediate cash flows. He observes that option valuation involves using an appropriate model that captures some or all of these parameters. In other words parameters used for the evaluation of one option may not hold for another option. Parameters are to be derived according to the uniqueness of an investment under consideration.

Now referring to the CATIA example, the value V of the opportunity to invest on CATIA is a function of B^* , C^* , k , ∂ , σ , and r and is denoted as: $V(B^*, C^*, k, \partial, \sigma, r)$.

Kumar observes that $V(B, C, k, \partial, \sigma, r)$, where C is the additional investment required in order to complete the project and which is assumed to be known with certainty and B is the value of benefits from the project and is a stochastic variable whose present value is denoted by B^* , can be obtained by numerical solution of partial difference equations (he quotes Dixit and Pindyck 1994, Majd and Pindyck 1987 for details on the model).

However, it is important to note also that from Kumar's discussion the complete use of the model will involve some NPV computations Kumar (ibid: 8).

On his CATIA example, Kumar (ibid: 6-7) describes parameters that appear in the model as follows (see table 1 below):

Table 2.1: Description of major model parameters used in the evaluation of the CATIA system.

PARAMETER	DESCRIPTION
C^*	Estimate of the present value of additional cash outflows for the completion of design (at any point in time)
B^*	Expected present value of cash flows from the sale of aircrafts minus any variations on cost of design from C^*
C/k	Expected minimum cycle time for design of an aircraft.
σ	Standard deviation of the percentage change in B^* per year.

∂	Opportunity cost of delaying investment (expressed as a % return on investment).
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Source: Kumar (1997: 6-7)

Kumar further explains that:

- $1/k$ represents the minimum cycle time for investment and is a function of resource availability as well as the processes involved in the investment.
- ∂ represents the opportunity cost of waiting to invest. A high value of ∂ denotes a scenario where delaying is expensive. This could be a scenario where competition is intense and early investment pre-empts competition.
- σ is the percentage change in project cash flows representing the net benefit over unit time and r denotes the risk-free rate of return.

Unlike Jong et al., (1999) who observe that option pricing models may not be that useful in the evaluation of IS/IT investment projects, Kumar emphasizes the use of the models by arguing that they provide additional insight into the effects of uncertainty, responsiveness, and competition on the value of an investment opportunity.

He adds that major organizations use the real options theory to understand complex investment scenarios (he quotes Dixit and Pindyck 1995, Kemna 1993 and Nichols 1994).

Kumar (ibid: 10) concludes by saying that choice of model parameters may be difficult in some cases and requires further research. He adds that several avenues for further research may include the study of other real options models in the context of IT investments, combination of real options frameworks with decision theory, case studies of the application of real options concepts to real IT valuation problems, and empirical research on the valuation of real options resulting from IT investments.

2.4: Conclusion

The general objective of this research project is to come up with Information Systems (ISs) Investment Assessment Models/Methods for use in Coffee Marketing Co-operatives and other rural-based agricultural marketing co-operatives (AMCOs) in Tanzania. The purpose is to have appropriately assessed/appraised ISs investments which can support Coffee Marketing Co-operatives and related marketing co-operatives in a liberalized trade environment.

This chapter, the literature review chapter, has briefly looked at: the importance of information and information systems in the existence of organizations, the concept of information systems as understood by IS/IT professionals and has reviewed literature pertaining to efforts made and being made by IS/IT professional researchers in attempts to come up with IS/IT investment assessment models/methods.

In section 2.1.2 of this chapter it has been acknowledged that the term “Information System (IS)” has been given various definitions by different writers. However, for the purpose of this thesis the Laudons’(2002) technical definition is adopted, that is an IS is “Integrated components working together to collect(retrieve), process, store and disseminate information to support decision making, co-ordination, control, analysis and visualization in an organization”. This definition is an improvement of the definition which appears in the Laudons (1991:5) which was quoted in chapter one of this thesis.

Following a contemporary approach to the study of information systems, this study considers ISs as socio-technical systems. That is they have a dual aspect which needs to be taken care of during their appraisal before and after their implementation. It is also to be pointed out that as different management levels in an organization require information with characteristics unique to each management level then there should exist different information systems in one organization. For example, at strategic management levels, strategic information systems like Executive Support Systems (ESSs) will be required or at the operational level transaction processing systems (TPSs) will be required.

Also, depending on the complexity and the economic environment of an organization, one may come across information systems which are either manual or mechanical or electronic (i.e. a computer-based information system) or a system which reflects a combination of the existence of manual, mechanical and electronic sub-systems. For example, in most developing countries it is not surprising to come across a transaction processing system which is totally manual, that is where only the pencil-and-paper technology is used. Of course such systems are not very useful in information intensive businesses like in marketing or financial institutions such as banking and insurance.

Literature on the investment of IS/IT projects shows that there is a continuous increase in the investment of both ISs and IT infrastructure in organizations of both developed and developing economies.

Among other factors which make organizations be attracted to invest in computer-based ISs and IT infrastructure are that: information technology has indicated contribution in the improvement of the performance of organizations and make them (the organizations) have a competitive advantage, especially, when looking at them (the IS and IT) as enablers. Other factors are that the price of computers has been declining, computer power has been increasing, and the computer systems’ physical size has been declining while making them (the computer systems) user-friendly. These push-and-pull factors make management decide to invest on computer systems even where other systems could perform effectively and efficiently.

As investment in IS/IT projects require the use of scarce resources there must be justification for a proposed IS/IT investment project before it is approved by management. However, unlike other non-IS/IT capital investments, the justification for the approval of IS/IT investment projects poses a difficult challenge to both practitioners and researchers. In the first case the difficulty comes in when one remembers that ISs are socio-technical systems where one will have to assess, in addition to tangible costs and benefits, intangible costs and benefits with a lot of subjectivity based on the stakeholders' politics. Here the term "stakeholder" is all inclusive; it includes individuals who propose for the IS/IT investment, sponsors of the investment, owners of the investment, users of the investment and other interested parties who will either benefit or be disadvantaged by the installation of the proposed information systems. Here, it may be interesting to note that there are people who lose or miss jobs as a result of the installation of computer-based information systems in organizations!

In the second case the difficulty comes in when one remembers that most IS/IT investments play the role of enablers in the improvement of organizations' performance. Also that the issue of being an enabler is not guaranteed as the entity to be enabled may either respond favourably or remain not responsive or may respond in a negative or unfavourable way. For example, an IS may produce "quality" information in order to enable a manager to make an effective decision. Now, if the manager is knowledgeable and dedicated to use the information to the advantage of his/her organization then the effects of the contribution of the IS may be partially seen through improved performance. However, if the recipient of the information is not either capable of using the information or not dedicated to using the information to the advantage of his/her organization, the effects of the invested IS/IT may be seen as a loss. However, also, although an IS/IT investment may be contributing to the performance of an organization, the contribution may not be very easy to detect as there will be other factors contributing to the same performance. This scenario would require one to use complex econometric/statistical models which will try to isolate the different causes and effects to the improvements of performance. At an ex-ante assessment these factors may be approximated in order to convince management, but it is still a difficult task.

In the third case the difficulty or challenge is brought about by the fast advancements in the IT field which is the basis of information systems. This third case continuously brings about uncertainties in the IS/IT investments and makes the coming up with IS/IT investment assessment models/methods a continuous and seemingly new problem for researchers to look into.

The three cases above put together have attracted the attention of IS/IT professionals in researching for appropriate models/methods/frameworks for use in assessing the justification of approving proposed IS/IT investment projects in organizations.

Literature on the evaluation of IS/IT investment projects shows that in practice IS/IT evaluators use three types of approaches; some use purely quantitative methods mostly involving the use of the traditional capital budgeting models which include the: Payback method, Cost/benefit analysis, Return on Investment(ROI)/Average Rate of return(ARR), Net Present Value(NPV), Return on Management(ROM), Profitability index and the Option Pricing models based on the Option Pricing Theory used in finance. Most researchers argue that the use of the traditional capital budgeting models alone in the assessment of IS/IT investment projects is not enough for these models do not capture the true nature of ISs. They point out that these models are not able to capture intangible costs and benefits and the human element inherent in IS investments.

At the other extreme IS/IT investment projects evaluators use qualitative approaches only and at times they even venture to use what are known as “acts of faith” or “gut feel” or “instincts”. In this case they do away with the difficult IS/IT investment assessment models which are mostly quantitative and require statistical expertise to analyse and interpret their results. Literature points out that practitioners resort to the use of their instincts or very simple approaches in situations where decisions are found to be complex. However, in other cases justification is based on a “champion”- someone who will defend the project proposal until it is approved. Champions can be found at any management level in an organization.

Literature also shows that some IS/IT investment project evaluators use a mixture of methods. In one project an evaluator may use both quantitative and qualitative approaches. For example, one may use a combination of the traditional capital budgeting models and qualitative methods like the interpretive methods which in some cases incorporate the use of the Grounded Theory a theory which has been found useful in social science researches.

Most IS/IT investment projects evaluation researchers suggest that an evaluator should try to use a combination of methods and techniques in the evaluation of IS/IT investment projects in order to cover up for the weaknesses of single methods. They observe that most suggested approaches are not conclusive and many of them have not been exhaustively researched on to guarantee perfection and acceptance by all IS/IT professionals. The researchers also observe that no one method is suitable for all situations and therefore each IS/IT evaluation case should be approached according to prevailing circumstances. Hence, it is the interest of this study to come up with suggested models/methods for the assessment of proposed IS/IT investment projects in Coffee Marketing Co-operatives in Tanzania.

The next chapter, Chapter Three, is on Research Methodology. It gives details on the methods and procedures followed in doing the research project.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1: Research design

As the heading above indicates, this chapter is concerned with the research methodology and procedures employed in the study.

The general objective of this research project is to come up with Information Systems (ISs) Investment Assessment Models/Methods for use in Coffee Marketing Co-operatives and other related rural-based agricultural co-operatives in Tanzania. The purpose is to have appropriately assessed/appraised IS investments which can support Coffee Marketing co-operative organizations in a liberalized trade environment.

This research project employed a descriptive type of study. Gay (1981) in Mugenda, O.M. and Mugenda, A, G. (1999:160-161) describes a descriptive research as “a process of collecting data in order to test hypotheses or answer questions concerning the current status of the subjects in the study”. In addition, the Mugendas (ibid: 160) point out that the purpose of a descriptive research is to determine and report the way things are done. The Mugendas’ continue saying that this type of research attempts to describe such things as possible behaviour, attitudes, values and characteristics. These descriptions, of a descriptive research, match with the purpose of this study as its intention was to study how coffee marketing co-operative organizations assess new proposed IS/IT investments for approval and also to see how co-operators perceive the effectiveness of existing ISs in supporting the co-operative organizations in the liberalized trade environment.

The study used a cross-sectional design by picking up and studying a sample of coffee marketing co-operative organizations at a single point in time. This design was thought to be more appropriate than other designs, like the longitudinal designs, due to fears of lack of continuity of information in data kept in the co-operative organizations as a result of not having effective ISs to keep track of long time and trend based records. Now within this type of design, the cross-sectional design, a combination of both survey and case study approaches were employed. It is considered as a case study approach as only a sample of coffee marketing co-operative organizations out of many agricultural co-operative organizations were considered. However, the findings and recommendations applicable to the co-operative organizations included in the study will also apply to other related rural-based agricultural marketing organizations in Tanzania as, in the first place, all co-operative organizations in Tanzania operate on the basis of the same co-operative laws throughout the country. Second, all co-operative organizations in Tanzania have similar organizational structures, similar management approaches and have been having a similar influence from the ruling political party and its government with respect to financing, supervision, inspection of their activities and legislation requirements.

3.2: Study population, types of data required and data sources

3.2.1: The study population:

Hair, J.F. JR. et al. (2000:328) define the term population as “the identifiable total set of elements of interest being investigated by a researcher”. The Mugendas (op cit: 9) define the term population as “referring to the entire group of individuals, events or objects having a common observable characteristic.” The Mugendas add that a population may also be considered as “the aggregate of all that conforms to a given specification.” In the context of this research project these two definitions carry the same meaning. For this research then the study population constituted all coffee marketing co-operative organizations in Tanzania. It is a sample of these organizations which have been studied with respect to their Information Systems.

3.2.2: Types of data required and their sources.

1. Primary data:

This study adopts the Mugendas’ definition of the term “Primary data” which is referred to as “the information a researcher obtains from the field that is from the subjects in the sample” (Mugenda & Mugenda *ibid*: 12).

In this study the primary data collected from respondents of the studied co-operative organizations included:

- (i) The types of information systems (manual, mechanical, electronic and any combination of the three) used in coffee marketing co-operative organizations.
- (ii) Frequencies of assessing/reviewing the performance of existing IS/IT investments.
- (iii) Factors considered in assessing/reviewing the performance of existing IS/IT investments (e.g. financial, non-financial, the human element and both tangible and intangible costs and benefits).
- (iv) Models/Methods/frameworks used in the assessment of new IS/IT investment proposals.
- (v) The existence of corporate/strategic and information systems plans in co-operative organizations.
- (vi) Levels of satisfaction on the effectiveness of ISs in supporting communication between the co-operative organizations and their members, customers, suppliers, competitors and co-operative movement institutional facilitators.
- (vii) Awareness, among co-operators, of the existence of customers (local and foreigners), suppliers (local and foreigners), competitors (local and foreigners) and co-operative movement institutional facilitators (local and foreigners).
- (viii) Major means of communication in co-operative organizations.

2. Secondary data:

Mugenda and Mugenda (*ibid*: 12) define the term “secondary data” as referring to the information a researcher obtains from: research articles,

books and casual interviews. Cooper, D.R. and Schindler, P.S. (2003:152) define the term “secondary data” as data collected during studies made by others for their own purpose. These definitions carry the same meaning. However, for the purpose of this study Cooper and Schindler definition is adopted as it is more comprehensive. In this regard this study collected secondary data by extracting information from the co-operative organizations’ documents. The data included:

- (i) Academic and professional qualifications of respondents.
- (ii) Respondents’ positions and responsibilities.
- (iii) Managers’ and secretaries’ experiences in years.
- (iv) Data/information processing and information communication facilities used in co-operative organizations.

3.3: Sampling methods and procedures:

In order to obtain a representative sample of co-operative organizations and individual respondents for this study, multistage sampling was applied as discussed below.

First, stratified sampling was used, here, regions in which coffee is grown in substantial amounts and where co-operative organizations are active were grouped into geographical zones and from each zone one region was selected through simple random sampling. Here, Davis, A.H. (1973:83) describes a simple random sample as “a sample in which every item in the universe to be surveyed is given equal chance with every other unit in the universe of being included in the sample on its own merits and without any relation to its inherent characteristics, except as a member of that universe.” Second, from each of the randomly selected regions one co-operative union and two affiliated primary co-operative societies were again randomly selected.

In Tanzania main land there are six regions in which coffee is grown in substantial amounts and marketed through co-operative organizations. These regions include: Kagera and Mara (in the northern zone), Arusha and Kilimanjaro (in the north-eastern zone) and Ruvuma and Mbeya (in the southern zone). This procedure of sampling resulted into having: The Kilimanjaro Native Co-operative Union (KNCU) with two affiliated primary co-operative societies all from Kilimanjaro region in the north-eastern zone, Kagera Co-operative Union (KCU) with two affiliated primary co-operative societies all from Kagera region in the northern zone, and Mbozi Co-operative Union (MBOCU) with two affiliated primary co-operative societies all from Mbeya region in the southern zone.

However, due to transport, financial and time constraints the above sample had to be reworked and this resulted into replacing the Kagera Co-operative Union (KCU) with the Arusha Co-operative Union (ACU) and Rungwe Co-operative Union (RUCU) hence having the following composition of co-operative organizations for the study: Kilimanjaro Native Co-operative Union with two

affiliated primary co-operative societies, Arusha Co-operative Union with two affiliated primary co-operative societies, Mbozi Co-operative Union with two affiliated primary co-operative societies and Rungwe Co-operative Union (RUCU). This resulted into having four co-operative unions and six primary co-operative societies thus making a total of ten co-operative organizations for the study. In effect the sampling procedure was reduced to convenience sampling in which KCU was replaced by ACU and RUCU which could be conveniently accessed within the limits of the resources available to the researcher then.

For the purpose of this study a sample of ten (10) co-operative organizations is considered adequate for the fact that all co-operative organizations in the country operate under similar working conditions as discussed above, under the Research Design section. They use the same co-operative law; have been having a similar political and government influence in terms of government protection from competitors and all have not been prepared for the introduction of liberalized trade in the country. These reasons underscore the point that for studying units which have uniform characteristics of interest the sample size to be used is not a critical factor; any sample size considered reasonable and obtainable is adequate. For example, Peil, M. (1995:35) points out that "... if a group is truly homogeneous, a large sample is unnecessary (one or two people could provide as much information as 500)."

3.4: Data collection.

3.4.1: Preparation of data collection tools (questionnaires and interviews schedules):

In order to collect data, structured and undisguised, questionnaires and interview schedules were prepared (see appendix B, a copy written in the English language of the composite data collection tool) in Swahili language, a national language, which most co-operators in both rural and urban areas would understand without much difficulty.

In addition to the questionnaires and interview schedules a summary sheet (see appendix C) was prepared for each question appearing in a questionnaire or interview schedule. As soon as a questionnaire was completed its data was entered into its corresponding summary sheet.

The preparation of summary sheets for corresponding questions in the questionnaires facilitated in knowing, in advance, as to what data could be feasibly summarized and in what form. Thus, the summary sheets facilitated in designing the data collection tools (Bell, 1999: 183-184).

Now, the composite data collection tool appearing in appendix B is made up of four sections labelled A, B, C, and D. Section A is made up of question one which asks for information pertaining to co-operative organizations' basic data, like: name of the co-operative union or society, name of co-operative union to which a primary co-operative society is affiliated etc. and individual respondents'

background data like: name of department/section in which a respondent works, respondent's position like, General manager or secretary or ordinary member, respondent's academic and professional qualifications etc. This first question has several sub-questions and stands on its own as a questionnaire to be filled up by all respondents.

Section B is made up of four questions (i.e. 2, 3, 4, and 5). These four questions ask information about data/information processing, communication equipment/facilities and information systems used in co-operative organizations. This section forms one questionnaire which was filled up by all respondents. Section C is made up of question 6 (with sub-questions 6(a) and 6(b)). Question 6(a) asks questions concerning respondents' awareness of their co-operative organizations': suppliers, customers, competitors and institutions which facilitate the development of the co-operative movement in Tanzania. Question 6(b) asks questions concerning the existence of corporate/strategic and information systems plans in the co-operative organizations. This section stands on its own as an interview schedule. Question 6(a) was a guide for interviewing all respondents while question 6(b) was a guide for interviewing Co-operative Union General Managers and Primary Co-operative Society Secretaries only.

Section D is made up of question 7 which is based on a five-point Likert Scale. The question has five subsections labelled V, W, X, Y and Z. Subsection V consists of six statements, items (1) to (6) all of which are intended to measure perceptions of respondents concerning the effectiveness of ISs' support for communication between the co-operative organizations and co-operative members. Subsection W consists of five statements, items (7) to (11) all of which are intended to measure perceptions of respondents concerning the effectiveness of ISs' support for communication between co-operative organizations and suppliers, for example, suppliers of farm inputs. Subsection X consists of five statements, items (12) to (16) all of which are concerned with the measurement of respondents' perception on the effectiveness of ISs' support for communication between the co-operative organizations and customers. Subsection Y consists of four statements, items (17) to (20) all of which are intended to measure perceptions of respondents concerning the effectiveness of ISs' support for communication between co-operative organizations and competitors. Subsection Z consists of four statements, items (21) to (24) all of which are concerned with the measurement of respondents' perceptions concerning the effectiveness of ISs' support for communication between the organizations and co-operative movement support institutions like, the Co-operative College of Moshi, the Tanzania Federation of Co-operatives (TFC), the Ministry concerned with co-operative development and similar other local and international institutions. This section D stands on its own as a questionnaire to be filled up by all respondents.

From these above paragraphs, it may be noted that sections A, B and D were prepared as separate questionnaires and section C was prepared as an interview

schedule. This arrangement made data collection easier and quicker as not all respondents were expected to answer all the questions. Also the questionnaires are in a short form so as to encourage respondents to fill them up.

Now, as it is pointed out above, question 7 which constituted section D is based on a five-point Likert Scale for the purpose of gauging co-operators' perceptions/feelings about the effectiveness of ISs used in their co-operative organizations. The Likert Scale was selected as a suitable scale for this study for the reasons that it is the most suitable and straight forward attitude measuring scale as compared to other scales like the Thurstone and Guttman (Bell, 1999: 185, Cooper and Schindler, 2003: 253) also with the Likert scale it is possible to administer multi-item measures of perceptions/beliefs and attitudes (Jeff Han 2002).

As it can be noted in question 7 multi-item measures have been used. This required respondents to indicate their agreement or disagreement in relation to a number of indicators that stand for the same concept. For example, subsection V of question 7 has got six items, items (1) to (6), which try to measure the perception of respondents' on the effectiveness of ISs in support of communication between co-operative organizations and their members. The indicator for each statement was scored from 1 for strongly disagreeing to 5 for strongly agreeing with a given statement. The scores for each concept were then added up to form an overall score for each respondent.

As it is pointed out by Jeff Han (ibid: 53), multiple scales are used for several reasons, and these include: First, several questions/statements are more likely to capture the totality of a broad concept than a single question/statement. Second, multiple scales represent the possibility to draw finer distinctions between respondents. For example, the measurement of the perception for effective support of ISs for communication between co-operative organizations and members comprised six statements which were scored from 1 to 5, so that respondents' overall scores could vary between 6 and 30. However, if only one statement was used, the variation would be from 1 to 5 only which would have been a very narrow range of potential variation. Third, as again observed by Jeff Han (ibid), if a statement happened to be misunderstood by a respondent, when only one statement was presented, then that respondent would not be appropriately classified; however, where several statements are presented for one concept, one misunderstood statement could be offset by those which were properly understood.

Also, to minimize bias which could be brought in by errors of lenience which could be brought in by "easy" or "hard" raters, common with rating scales (Cooper and Schindler, 2003:256- 257 and Jeff Han 2002), the wording of some of the statements in the questionnaire was reversed. During data analysis the scales related to the reversed statements were then re-coded such that a score of 1 on the scale was re-coded to 5, a 2 to 4, a 4 to 2 and a 5 to 1.

3.4.2: Reliability and validity tests.

Before going out into the field, for data collection, the questionnaires and the interview schedules were first piloted by using a sample of a nearby co-operative organization staff and some of the researcher's colleagues. The purpose of the piloting was to test if the data collection tools were clear (i.e. if the tools to be used could be understood), if they were reliable (i.e. to see if similar question items could produce similar responses from respondents in the same or similar working environments). This study adopts Bell's (op cit.: 103) definition of the term "reliability", which he defines as "the extent to which a test or procedure produces similar results under constant conditions on all occasions". Wragg (1980:17) in Bell (op cit: 103) adds emphasis on how to check on the reliability of questions in a questionnaire by insisting on researchers to ask questions such as: "Would two interviewers using the schedule or procedure get a similar result?" "Would an interviewer obtain a similar picture using the procedures on different occasions?" Wragg observes that questions framed this way will try to crosscheck the reliability of statements or questions in a questionnaire or interview schedules.

Bell (op cit.: 104) observes further that there are a number of devices which can be used for checking reliability in scales and tests. He gives examples such as: the test-retest test (i.e. administering the same test sometime after the first), the alternative/equivalent forms methods (where equivalent versions of the same items are given and results correlated) and the split-half method (where the items in the test are split into two matched halves and results correlated). Bell points out that the methods are not always feasible or necessary, and that there are disadvantages and problems associated with all three.

As Bell (ibid), Hair, J.F. JR. et al. (2000:390-391) comment that the three reliability tests, discussed above, have some drawbacks as follows: First, for the test-retest method, some of the respondents who completed the scale the first time might be absent for the second administration of the scale. Second, respondents might become sensitive to the scale measurement so that they may be deliberately "easy" or "hard" raters. Here, an "easy" rater is a respondent who easily assigns high rates to a given statement in a Likert or some other scale, while a "hard" rater is a respondent who has a tendency of consistently assigning low rates to given statements in a Likert or some other scales. Third, environmental or personal factors may change between the two administrations, thus causing changes in the respondents' responses in the second measurement.

For the alternative/equivalent form method, Hair et al. (ibid) observe that there are two potential drawbacks which are: first, if the testing process can be achieved, it might not be worth the time, effort, and expense of determining that the two similar yet different scales can be used to measure the same construct.

Second, it is very difficult and perhaps impossible to create two totally equivalent scale measurements.

As for the split-half method, Hair et al. (ibid), observe that the method is too involving and time consuming to be applicable.

Now, basing on the above arguments, related to reliability tests, this study did not administer any of the three reliability tests discussed but instead reliance was based on comments from the piloting exercise. Comments from individuals who took part in the pilot tests were taken into consideration while questionnaires and interview schedules were edited accordingly so that the final drafts were produced for field work. In addition to Hair et al. (ibid) observations, on the drawbacks of the reliability tests, this study also relied upon observations made by Bell (op cit.: 104) that “the check for reliability comes at the stage of question wording and piloting of the instrument”; this observation can have the implication that it would be enough to spend much efforts on proper wording of statements and questions so as to have reliable and valid questionnaires.

As it was done for the reliability tests of the data collection tools, the validity tests for the tools were based on comments which resulted from the piloting exercise. In order to check for the validity of the data collection tools, first, some colleagues were request to check if the questions which appeared in the data collection tools could collect valid data as specified in the specific objectives. This attempt of collecting valid data was done by directly matching the question or statement items appearing in the data collection tools with their corresponding specific research objectives (see appendix B). Second, individuals who were involved in the piloting of the data collection tools were requested to give comments on the questions appearing in the data collection tools if they could collect the expected data. These comments were used to improve on the data collection tools before the actual data collection exercise started.

The term “validity test” hereby in this study is taken to mean “that test which tells us whether an item measures or describes what it is supposed to measure or describe” (Bell ibid: 104).

3.4.3: Preparations for data collection.

Having piloted and edited the data collection tools (questionnaires and interview schedules), preparations for data collection were done. First, the researcher asked permission from his head of institution, the Principal of the Co-operative College Moshi, so that he (the researcher) could go out for data collection. After getting the permission, the researcher wrote letters (see appendix D) which were signed by the Principal, asking permission from the Coffee Marketing Co-operative organizations (General Managers for co-operative unions and Secretaries for primary co-operative societies) which were included in the study sample. On being granted permission to undertake the study in the sampled out co-operative organizations the researcher distributed time schedules(see

appendix D) which indicated dates when each co-operative organization could be visited by the researcher for data collection.

3.4.4: Procedures followed in data collection.

As the sample size was manageable and basing on the researcher's study supervisor's advice, respondents filled in questionnaires in the presence of the researcher and his research assistant. This was done in order to make sure that questionnaires were completed in time and that they were answered correctly. This procedure was important as respondents in rural areas included some fairly aged individuals who could not complete the questionnaires without a direct follow up from the researcher.

3.5: Data processing, analysis and interpretation.

3.5.1: Data processing:

Data processing involved the use of a computer package known as "Statistical Package for Social Scientists" (SPSS ver. 10). Data was extracted from filled summary sheets (see appendix C) and processed. The major computations involved, included: totals, means, averages, distributions, proportions and statistical Z-sample values for the purpose of testing hypotheses. More details on data processing are given in chapter four.

3.5.2: Data analysis and interpretation.

Again as detailed in chapter four, much of the data analysis and interpretation were descriptive and involved the analysis of results obtained from computations of extracted variable-values from summary sheet tables. The testing of hypotheses, on the perceptions of co-operators on the effectiveness of ISs support for communication, involved univariate hypothesis testing based on the Z-variable. Here, sample proportions (p) were computed and their significance tested by using the Z-variable, a standard normal variable at a 5% level of significance. Results of the hypothesis testing were interpreted and, in appropriate cases, related to other research findings.

3.6: Limitations of the research methods and procedures used

The first limitation faced was that time for the research project was underestimated. The actual completion of the research project, including the writing of the research report, took one month more than it was initially estimated. The major parts of the project which consumed much time were data collection and the writing of the final report for submission to the St.Clements University for evaluation. It was easy and less time consuming to get co-operative union general managers and primary co-operative societies' secretaries but the case was not the same to the committee and ordinary members; although time schedules for meeting them had already been sent to their respective co-operative organizations. However, all respondents were generally co-operative and provided the researchers with data which could be availed then.

The second limitation, which is actually a result of the first limitation, was that of timing the data collection activity. Data collection was arranged so that it could coincide with coffee selling months so that in turn it could be easy to get ordinary and committee members as they brought in their coffee produce. However, it happened that for most of the time farmers' timing could not exactly match with the times set for interviews and the filling up of questionnaires, this resulted into taking more time per co-operative organization than had been planned for. However, time re-scheduling could be done without difficulty as co-operators seemed to be interested in the study.

The third limitation was the difficulty of trying to minimize errors inherent in rating scales. The process of handling the Likert scale required special attention from the researcher. It was important for the researcher to make sure that respondents had understood and made good judgement of the purpose of the research project and the individual statements making up the questionnaire in order to minimize errors/bias which could possibly be brought in by respondents' tendencies. To facilitate the minimization of the said errors the researcher had to be present when the questionnaire, based on the Likert scale, was being filled up. Cooper and Schindler (2003:256-257) observe that errors to avoid when dealing with rating scales, like the Likert scale, include: the errors due to respondents' "lenience", which occur when a respondent assigns high or low rates to questions or statements in the scale; errors due to "central tendency", which occur when a respondent assigns only average rates and is reluctant to give extreme judgements and errors due to the "halo effect", which occur when a respondent carries over a generalized impression of the subject from one rating to another. As can be learned from the Cooper and Schindler's observations these errors come in basically because of lack of knowledge of the purpose of the study and its accompanying questionnaire items.

The fourth limitation, which is actually due to lack of availability of extra time and funds, is the research approach employed. This research project was designed as a timed research project such that it has its starting and ending dates so that a final research report is presented to the St. Clements University for evaluation. However, if more time and funds were available, the research project would have been designed as a continuous project in order to suit the situation being studied. As it has been pointed out elsewhere above, ISs are socio-technical systems whose development and use need to take into account the human-element whose one of its attributes is education and education is an iterative and active process requiring feedback before going on to the next step.

Now, not having been given an orientation to entrepreneurship and business information systems the Tanzanian co-operator needed a step-by-step educative approach in order to appreciate, develop and implement information systems in the coffee marketing co-operative organizations. Time and funds allowing, the preceding sentence points to the use of an *action research* approach in studying ISs in the co-operative organizations. The justification for the action research

approach is that it has inbuilt attributes of basing further development action on previously learnt experiences. Bell (1999) observes that the term “action research” has many definitions. He quotes Cohen and Manion’s (1994:192) description of action research as:

An on-the-spot procedure designed to deal with a concrete problem located in an immediate situation. This means ideally, the step-by-step process is constantly monitored over varying periods of time and by a variety of mechanisms (questionnaires, diaries, interviews and case studies, for example) so that the ensuing feedback may be translated into modifications, adjustments, directional changes, redefinition, as necessary so as to bring about lasting benefits to the ongoing process itself rather than to some future occasion...

(Bell 1999:8)

Bell (ibid) adds that, Cohen and Manion point to the important feature of action research which is that the task being studied for improvements is not finished when the project ends. They observe that participants continue to review, evaluate and improve practice.

Again, Bell (ibid) quotes Elliot’s (1991:69) definition of action research that:

It aims to feed practical judgement in concrete situations, and the validity of the “theories” or hypotheses it generates depends not so much on “scientific” tests of the truth, as on their usefulness in helping people to act more intelligently and skilfully. In action research “theories” are not validated independently and then applied to practice. They are validated through practice.

(Bell 1999:9)

Bell (ibid) emphasizes on the attractiveness of the *action research approach* by saying that:

The essentially practical, problem-solving nature of action research makes this approach attractive to practitioner-researchers who have identified a problem during the course of their work and see the merit of investigating it and, if possible, of improving practice...

(Bell 1999: 9)

3.7: Summary and conclusions.

This chapter has discussed issues related to methods, procedures and approaches followed in executing the research project. The discussion can be summarized and concluded as follows:

That because co-operative organizations were working under similar government and political influences such as legislation requirements, government inspection and supervision; the organizations’ working conditions were relatively similar such that the sample size used in the study was not a critical factor. The

similarity assumption implied that the research findings would be applicable even to other related coffee marketing co-operative organizations and other rural-based agricultural marketing co-operatives in Tanzania.

That a cross-sectional design was more adequate for the study than other designs, like longitudinal designs, for the fear that co-operative organizations were not having information systems capable of keeping data records from which to develop trends. That is the research would suffer a problem of discontinuity of data.

That the piloting of data collection tools, the questionnaire and interview schedules, was necessary and sufficient for the study to assume that the data collection tools were fairly reliable and valid so that data collected would be relied upon.

That the research project time and funding was among important limitations which had implications on the sample size used. However, the homogeneity of the attributes of the co-operative organizations studied guaranteed the validity of the research findings and related recommendations appearing in Chapter Five.

That if more time and funds were to be available, the *action research approach* would have been a better approach than the one-time approach employed in this study. The action research approach would lead to practical and sustainable development and implementation of information systems in a Tanzanian situation were co-operators had not been given an orientation to entrepreneurship and appreciation of the importance of the use of information systems in business.

The next chapter, Chapter Four, will be on the Analysis and Interpretation of Research Findings.

CHAPTER FOUR: ANALYSIS AND INTERPRETATION OF RESEARCH FINDINGS

4.1: Introduction

This chapter is concerned with the analysis and interpretation of research findings.

The general objective of this research project is to come up with appropriate Information Systems (ISs) Investment Assessment Models/Methods/Frameworks for use in Coffee Marketing Co-operatives and other related rural-based agricultural co-operatives in Tanzania. The purpose is to have appropriately assessed/appraised IS investments which can support Coffee Marketing co-operatives in a liberalized trade environment.

To be more exact, the study was guided by specific objectives, as detailed in chapter one section 1.3.0., whose successful achievement was meant to indicate the success of this project. Also, in order to collect data in order to implement the eight(8) specific objectives eight(8) research questions(see chapter one section 1.4.0.) were written such that each question corresponded to one specific objective.

Now, order to get answers to the above research questions data was collected through questionnaires, interviews and observations (see Appendix B). The collected data were summarized into questionnaire-summary sheets which are documented as tables in appendix E. Each table corresponds to a question in the questionnaire or interview schedule.

From each table data were extracted for purposes of analysis, interpretation and presentation. This was done by matching results of analysis and interpretation to each stated specific objective as discussed in the following sections.

4.2: Data analysis and Interpretation of research findings:

4.2.1: Types of Information Systems used in Coffee Marketing Co-operatives (see objective 1 in sub-section 4.1 above):

The summarized data pertaining to the types of ISs used in Coffee Marketing Co-operative organizations appear in tables 1, 2(a) and 2(b) in appendix E. The data were collected from four co-operative union managers who came from four different unions and six secretaries who came from six different primary co-operative societies. The ten respondents are employees of the respective co-operative organizations. These respondents are directly involved with the day-to-day use of ISs and management of their respective organizations. They were in a better position to provide information about the types of ISs in their organizations than any other individuals.

4.2.1.1: Analysis and interpretation of data in table 1 in appendix E:

From table 1, two important things in respect to the types of ISs found in coffee marketing co-operative organizations can be noted:

1. Out of the ten managers of the co-operative organizations studied only one was computer literate. This situation is a good predictor as to what type of ISs can be found in the majority of co-operative organizations in the country. One would expect a computer literate manager to appreciate the powers of computer-based ISs in the production of information which is accurate and timely for effective decision making as compared to what manual ISs can do. The appreciation for the advantages of computer-based ISs would have pushed more managers to invest more on computer-based ISs than on manual systems.
2. Again out of the ten co-operative organizations studied only five of them had electric power. And again this is a good indicator to the types of ISs that can be found in most co-operative organizations in the country. One may not, for example, have computer-based ISs where there is no electric power. It should be noted also that lack of electricity in co-operative organizations is more acute in primary co-operative societies than in co-operative unions as most primary co-operative societies are located in rural areas where there is less electrification than in urban centres where most co-operative unions are located. As it is indicated in table 1 all four co-operative unions had electric power and only one primary co-operative society out of the six primary co-operative organizations had electric power.

4.2.1.2: Analysis and interpretation of data in table 2(a) in appendix E:

From table 2(a) it is noted that out of the ten (10) co-operative organizations studied only one organization, a co-operative union, owned and used a computer system for data processing and information communication. The union had other communication facilities, like the Internet, telephone, fax and rented a post office box. The other nine co-operative organizations depended on calculators for data processing and on telephone and post office services for most of their information communication. However, interviews as shown in table 2(b) appendix E show that although not all co-operative organizations, especially the unions, own computers and Internet services, they get Internet services for information communication from nearby Internet cafes run in town centres. Preparation of hard copies of documents is done by using typewriters and in many cases, especially for primary co-operative societies, preparation of documents is done by hand.

Communication between the co-operative organizations and their members, unions/societies, local and international customers, competitors, banks and transporters is done through a number of ways, which include: Postal services, telephone, meetings, church announcements, mosque announcements, e-mail, messengers, posters and “**Others**”. Table 4.1 below shows the frequency

distribution of use of information communication facilities found in the studied co-operative organizations.

Table 4.1: Frequency distribution of the means of information communication in the studied co-operative organizations in Tanzania.

Means of communication	Frequency of use	Percentage
Postal Service	13	23.21
Telephone	10	17.86
Meetings	5	8.93
Church announcements	4	7.14
E-mail	3	5.36
Messengers	3	5.36
Posters	2	3.57
Mosque announcements	1	1.79
Internet	1	1.79
"Others"	14	25.00
Total	56	100

Source: Extracted from table 2(b) in appendix E

In table 1 above the **"Other"** means of communication (i.e. the **"Others"** item) include use of members to get information from competitors, use of co-operative union chief accountants or primary co-operative society secretaries to go to banks or other financial institutions, use of co-operative union management to contact transporters on behalf of primary co-operative societies and in some cases use of unions to look for farm inputs on behalf of primary societies. However, as will be seen later, not all unions give support to primary co-operative societies in search of farm inputs or other services.

As it is revealed from interviews and observations, primary co-operative societies depended on mobile phones for most of their official communication as most of

them did not have electric power to operate wired telephones of the national telecommunication company (the Tanzania Telecommunication Company Limited-TTCL). The primary co-operative societies find mobile telephones to be effective, cheaper to operate and maintain in comparison to the TTCL fixed telephones.

4.2.2: Frequency of assessing/reviewing the performance of information systems in Coffee Marketing Co-operative organizations (see specific objectives 2 and 4 in sub-section 4.1 above).

Of the ten (10) studied co-operative organizations (see table 3 in appendix E), seven (7) organizations reported to review the performance of their IS/IT investments (including IS/IT tools/facilities) at most twice in a year, mostly just before the coffee harvest periods. The tools reviewed included weighing machines, typewriters, calculators and computer systems.

Five (5) of the seven (7) co-operative organizations reported to review the performance of the IS/IT tools/facilities when a problem was detected to exist otherwise no reviews were done. Two (2) organizations reported to review the performance of IS/IT tools/facilities according to review schedules set by management.

Data collected through questionnaires (see table 4 in appendix E) show that one (1) organization used internal experts, usually the user of the tools/facilities, to review the performance of the tools/facilities. Four (4) organizations used external experts and two (2) organizations used both internal and external experts. Interviews indicated that co-operative unions were able to sub-contract experts for the review of the performance of their IS/IT tools/facilities as they had more financial power than the primary co-operative societies in rural areas.

On the other hand three (3) co-operative organizations, two unions and one primary co-operative society, which did not review the performance of their IS/IT investments (like the IS/IT tools/facilities) gave reasons for not reviewing the tools/facilities as lack of awareness of the importance of making reviews on the performance of the tools/facilities and lack of experts in their neighbourhood who could do the reviews.

However, in theory, co-operative unions were supposed to give support to primary co-operative societies in activities which the societies were unable to perform individually for the reason that co-operative unions were formed by the primary co-operative societies as a means through which the efforts of the societies' members are pooled together and share the economies of scale. However, through interviews it was found that unions were not keen to facilitate primary co-operative societies in the acquisition of services needed by the individual societies either due to lack of funds or loss of vision and mission on the part of the unions. This observation is important as can be seen from table 6(b) in

appendix B that during the interviews, a number of co-operative organizations studied did not indicate to have strategic plans. Out of the ten(10) studied co-operative organizations only five(5) of them indicated to have strategic plans and only one organization, a co-operative union, indicated to have an IS plan. In such a situation where strategic plans lack among co-operative organizations, it is not surprising to find that some important co-operative union responsibilities, like facilitating primary co-operatives societies, are not taken seriously or not considered at all.

A keen observer would have anticipated the scenario discussed in the above paragraph as, in the first place, co-operative organizations in the country were not running on business lines as discussed in chapter one in the “Background Information to the Research Problem”. Now as a result of lack of business orientation, among co-operators, the introduction of liberalized trade with its accompanying “cut-throat” competition made both the co-operative unions and primary co-operative societies lose track of what they were supposed to do. In fact, among other things like politics, this loss of business direction resulted into some primary co-operative societies disaffiliating themselves from their former co-operative unions.

Co-operative unions and primary co-operative societies which attempted at making reviews of the performance of IS/IT investments (including IS/IT tools/facilities) considered the following factors as the most important of all factors all to be taken into account during the reviews; Five (5) of the seven(7) co-operative organizations considered the “original purpose for the purchase of an IS/IT tools/facilities (like typewriters, telephone, implementation of websites, fax and weighing machines)” as the most important factor to be followed up during the reviews. They did not consider new upcoming benefits or costs as very important.

The other two (2) co-operative organizations of the seven (7) organizations considered the “original purpose plus tangible unplanned for benefits and costs which came up during the use of the IS/IT tools/facilities as important factors.

However, none of the seven (7) co-operative organizations which reviewed the performance of their IS/IT tools/facilities seriously considered the incorporation of the human-element like the user-friendliness, implication of the use of the tool/facility with respect to the user’s health, safety, user’s preparations for self-advancements or the safety of the user’s environment other than the user’s capabilities to operate the IS/IT tool/facility. Reasons given out for this lack of seriousness were that it would require special expertise and would be time consuming if all the factors were to be taken into account. None of the seven (7) co-operative organizations considered the review of the performance of the IS/IT tools/facilities as part of learning, much of it was considered a wastage of time with no direct payoffs.

4.2.3: Factors used as a basis for the justification of approving proposed IS/IT investments (which include the purchase of IS/IT tools/facilities see specific objective 3 in sub-section 4.1 above).

As it can be noted from table 5 in appendix E, of the ten (10) studied co-operative organizations, five(5) organizations indicated to do some justification in approving proposed IS/IT investments. Two (2) of the five organizations depended on advices from external experts. In particular, this was the case for co-operative organizations which procured expensive systems like computer and telephone systems. Interviews indicated that an idea for the purchase of an IS/IT tool/facility might come from among co-operative organization's employees like accountants (for unions) or secretaries (for primary co-operative societies) or from other interested co-operators, and then the idea would be taken to an individual knowledgeable of the workings of the tool/facility. If the expert recommended the purchase of the IS/IT tool/facility then the idea would be taken to the general meeting (a meeting which is made up of the co-operative manager, primary co-operative secretaries, co-operative organization chairpersons, committee members and co-operative organizations' ordinary members) and the meeting which would approve and not approval the IS/IT investment proposal. Interviews indicated that no complex computations, like those used for capital budgeting are involved, rather than the consideration of the competitiveness of the price of the IS/IT tool/facility and the availability of enough funds on the part of the co-operative organization for the purpose of the tool/facility.

Two (2) other co-operative organizations considered four factors which included a competitive price, operating cost of the IS/IT tool/facility, the capability of the IS/IT tool/facility to enable the co-operative organization to communicate with its members and to simplify office work.

The remaining one (1) of the five (5) co-operative organizations, which attempted to justify approvals for investments on IS/IT tools/facilities considered the price of an IS/IT tool/facility to invest on as one most important factor.

All respondents interviewed indicated the availability of funds as one among the most important factors considered before an IS/IT a tool/facility was procured. In attempts to look for justification for the purchase of an IS/IT tool/facility, none of the studied co-operative organizations indicated to have used capital budgeting models or complex computations rather than the comparison of the available funds and the price of the tool/facility to be procured. The first main reason put forward for not being seriously involved in looking for factors for the justification of approving IS/IT investment proposals was that the co-operative organizations, most of which are rural based, did not have experts who could guide them on issues related to IS/IT investments. The second reason was that the IS/IT tools/facilities considered were not meant for direct money generation, as would be the case for computer systems used in Internet cafes or training computer courses or computers used for offering secretarial services or for telephone

systems used in commercial telephone booths. This being the case no much effort was spent on looking for complex considerations before an IS/IT investment proposal was approved by the general meeting. Interviewees indicated that even at the general meetings issues concerning the purchase of IS/IT tools/facilities were not much discussed as it rarely happened that two or more IS/IT tools/facilities were required to be purchased at the same time. However, respondents observed that their organizations were careful not to spend much money on IS/IT investments at the expense of not being able to invest on none IS/IT investments in the near future.

Respondents indicated that the human-element was given a “general” consideration when trying to justify approvals for the purchase of IS/IT tools/facilities. The respondents indicated that IS/IT tools/facilities like weighing machines, TTCL telephone systems, mobile phones, computer systems, the use of Internet facilities and typewriters required some knowledge before being operated or used. However, the extent of the knowledge required varied from tool/facility to tool/facility. For example, before an individual used a typewriter or TTCL telephone or a computer system or Internet facilities he/she needed a more formal training than an individual who needed to use a mobile telephone. Hence, before an IS/IT tool/facility was purchased management, especially in co-operative unions, would first see to it that it employed an individual who was formerly trained on how to use the tool/facility. It rarely occurred, among primary co-operative societies affiliated to co-operative unions, to think of buying sophisticated tools/facilities which would need formally trained personnel as these would need a high pay for the work.

4.2.4: Models/methods/frameworks used in the justification of approvals for the proposed IS/IT investments (e.g. purchase of IS/IT tools/facilities -see objective 5 in section 1.3.0 in chapter one).

The study found that although some general considerations were given for the justification of approving proposed IS/IT investments none of the ten (10) co-operative organizations studied indicated to have any formally pre-prepared and documented models/methods/frameworks. Interviews indicated that at times the approval of the purchase of an IS/IT tool/facility only depended on the efforts of a champion (an individual who defended the approval of something to be done), of course in addition to the availability of funds.

It is also important to note that none of the ten (10) co-operative organizations studied tried to have any pre-pared list of expected benefits or costs tangible or intangible of the proposed IS/IT tools/facilities other than expected direct usage of the tools/facilities. As it is discussed in chapter one, this situation could have been anticipated for the fact that since independence (1961) co-operators were not given opportunities to run their co-operatives as entrepreneurs and as such no body would think of making close follow up on models/methods/frameworks to

be used in the assessment of the justification of approving proposed IS/IT investments.

4.2.5: Gaps/shortfalls in models used in the assessment of newly proposed IS/IT investments in co-operative organizations (see specific objective 6 in chapter one section 1.3.0).

In this study gaps/shortfalls in models/methods/frameworks used in the assessment of newly proposed IS/IT investments are factors whose non-consideration when justifying the approval of a new IS/IT investment or purchase of an IS/IT tool/facility would lead to incorrect IS/IT investment decision(s). The factors to be considered are situational, that is their consideration would depend on the prevailing investment decision and environment.

As it is discussed in sub-section 4.2.4 above, none of the studied co-operative organizations had pre-prepared and documented models/methods/frameworks for practical use in the assessment of new proposed IS/IT investments and therefore no list of gaps/shortfalls for any specific model/method/framework could be put down as specified in objective 6 as it appears in subsection 4.1. This situation of not having documented IS/IT investment-assessment models/methods/frameworks among co-operative organizations is a result of the non-existence of IS/IT plans within co-operative organizations as can be noted in table 6(b) in appendix E. In the table it is shown that only one (1) co-operative organization reported to have an IS plan and the other nine had none and five(5) out of the ten (10) co-operative organizations reported to have strategic plans. Existence of IS/IT plans among co-operative organizations would, among other things, have prompted co-operators to come up with documented practical models/methods/frameworks which would help them with the assessment of newly proposed IS/IT investments.

4.2.6: Proposed framework for the assessment of newly proposed IS/IT investments in coffee marketing co-operatives in Tanzania (see objective 7 in section 1.3.0 in chapter one).

In sub-section 4.2.4 it was noted that there were no prepared and documented models/methods/frameworks for practical use in the assessment of proposed IS/IT investments in co-operative organizations in Tanzania. As prompted by object seven(7) in sub-section 4.1 above this study has come up with a proposed framework(as detailed in chapter five(5)) for the assessment of proposed IS/IT investments in coffee marketing co-operative organizations and other rural based co-operative organizations in Tanzania and similar rural-based agricultural co-operative organizations in developing countries.

However, details of the recommended framework appear in chapter five under the section of recommendations, in this chapter and in this sub-section in particular, attention is given to the interpretation and analysis of the

factors/environment under which the recommendations for the framework are given.

Among important characteristics, of coffee marketing co-operative organizations in Tanzania, which may have a bearing effect on the expected type of proposed IS/IT investments and their corresponding assessment models/frameworks for are approval are summed up as follows:

1. That with the exception of co-operative unions, most coffee marketing co-operatives are rural-based. This means that most of them(see table 1(a) in appendix E) do not have electric power, do not have an easy access to modern and fast communication facilities found in urban centres like: Internet cafes, secretarial or telephone services or other fast communication services including transport.
2. That individuals forming co-operative organizations are economically poor (see chapter one page 3, 2nd paragraph); they cannot individually invest on expensive communication facilities. They form co-operative organizations in order to pool up and share resources and market their coffee produce jointly. This means that the co-operative organizations are communally owned and therefore that transparency is of great importance. Whatever, is done should be understood by the majority and be seen to benefit all members.
3. That with the exception of co-operative union management staff and primary co-operative societies' secretaries and some other functionaries, the majority of the members forming rural co-operative organizations are semi-literate (see table 1(b) in appendix E). This implies that whatever models or procedures to be proposed for use need to be simple and understood by the majority or else the models or procedures may be questionable or abandoned all together as observed by Khalifa et al. (2001: 117) and Bannister, F. (1999: 2), as quoted in chapter two of this dissertation, that when a model is complex and difficult to apply decision makers resort to using their instincts or "gut feel" also called "acts of faith".
4. That, members forming coffee marketing co-operative organizations are small holder farmers. Each takes care of his/her coffee husbandry duties individually. They meet for coffee business at the coffee-produce selling points, which are at the co-operative organizations or some established coffee selling centers.
5. That members forming coffee marketing co-operative organizations, as are other Tanzanians, have been working under the influence of socialist ideals from 1967 up to 1984/85 when trade liberalization was introduced into the country, this means that most of them have not been exposed to entrepreneurial practice in their businesses. This implies also that to

most, concepts of corporate planning, planning for information technology infrastructure and planning for information systems and the alignment of information systems plans to corporate plans are new concepts. This would mean that before introducing IS/IT investment assessment models/methods/frameworks co-operative members or co-operators in general would first need to be introduced to the importance of the need for business information planning, information resource management and planning for business information systems.

4.2.7: Testing of hypotheses (see specific objective 8 in sub-section 4.1 above).

As it has been introduced in Chapter Three, in order to test the perceptions of co-operators in the coffee marketing co-operative organizations on the effectiveness of ISs in supporting communication between the co-operative organizations and their members, suppliers, customers, competitors and institutional co-operative movement facilitators, data was collected through a questionnaire based on a five-point Likert scale.

Now, with the five-point Likert scaling, respondents were requested to indicate their degree of agreement or disagreement on a one (1) to five (5) point range. The answer to each question was scored from 1 for strongly disagree to 5 for strongly agreeing with the statement. Score 3 corresponded to a situation where a respondent could neither agree nor disagree with the given statement. The points scored by a respondent, on statements corresponding to a particular perception item, were summed up and averaged to give an average score for each respondent (as detailed in tables 7(a) through table 7 (e) in appendix E). A sample proportion (p) to be tested for its significant difference from the value of 0.5 as presented by respective null hypotheses was computed by dividing the number of individuals whose average score was greater than three (3) or whose average score was less than three (3) respectively by the total number of respondents (n) forming the sample.

The testing of the hypotheses involved a univariate hypothesis testing approach. Sample proportions were computed as explained above and their significance tested at a 5% level of significance (i.e. $\alpha = 0.05$). In each test the sample proportion (p) was assumed to be a random variable whose frequency distribution approximated a normal distribution for the reason that the sample size ($n=35$) was large ($n>30$) (Hair, J.F. et al. 2000:533). Also, with a large sample size it was considered adequate to use the Z-test (a normal random variable with a standard normal distribution). The results of the Z-test for the five hypotheses are presented in appendix C of this chapter.

The individual hypotheses were tested as they are discussed in the following sub-sections:

4.2.7.1: Hypothesis 1:

The majority (more than 50%) of co-operators perceived ISs support for communication between co-operative organizations and their members as effective.

Statistically expressed hypothesis 1 is:

$$H_{a1}: p > 0.5$$

The null hypothesis for hypothesis 1 above is:

H_{01} : There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their members as effective and the number of co-operators who do not perceive the ISs support for communications between the co-operative organizations and their members as effective.

Statistically expressed the null hypothesis becomes:

$$H_{01}: p = 0.5$$

The test for this hypothesis involved an upper-tailed test. The test results show that the computed sample value of the Z-variable does not fall within the rejection region and this means that there is not enough evidence, at the 5% level of significance, to conclude that the majority (more than 50%) of the co-operators perceive ISs in co-operative organizations as providing effective support for communication between the co-operative organizations and their members.

4.2.7.2: Hypothesis 2:

The majority (more than 50%) of co-operators perceive ISs support for communication between co-operative organizations and their suppliers as not effective.

Statistically expressed hypothesis 2 is:

$$H_{a2}: p > 0.5$$

The null hypothesis for hypothesis 2 is:

H_{02} : There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their customers as not effective and the number of co-operators who perceive ISs support for communication between the co-operative organizations and their customers as effective.

Statistically expressed the null hypothesis is:

$$H_{02}: p = 0.5$$

The test for this hypothesis involved an upper-tailed test. The test results show that the computed sample value of the Z variable does not fall within the rejection region and this means that there is not enough evidence, at the 5% level of significance, to conclude that the majority (more than 50%) of the co-operators perceive ISs in co-operative organizations as providing effective support for communication between the co-operative organizations and their customers/markets.

4.2.7.3: Hypothesis 3:

The majority (more than 50%) of co-operators perceive ISs support for communication between co-operative organizations and their customers as effective.

Statistically expressed hypothesis 3 is:

$$H_{a3}: p > 0.5$$

The null hypothesis for hypothesis 3 above is:

H_{03} : There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their suppliers as effective and the number of those who do not perceive the ISs support for communication between the co-operative organizations and their customers as effective.

Statistically expressed the null hypothesis becomes:

$$H_{03}: p = 0.5$$

The test for this hypothesis involved an upper-tailed test. The test results show that the computed sample value of the Z variable does not fall within the rejection region and this means that there is not enough evidence, at the 5% level of significance, to conclude that the majority (more than 50%) of the co-operators perceive ISs in co-operative organizations as providing effective support for communication between the co-operative organizations and their customers.

4.2.7.4: Hypothesis 4:

The minority (less than 50%) of co-operators perceive ISs support for communication between co-operative organizations and their competitors as effective.

Statistically expressed hypothesis 4 is:

$$H_{a4}: p < 0.5$$

The null hypothesis for hypothesis 4 above is:

H_{04} : There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and their competitors as effective and the number of those

who do not perceive the ISs support for communications between the co-operative organizations and their competitors as effective.

Statistically expressed the null hypothesis becomes:

$$H_{04}: p = 0.5$$

The test for this hypothesis involved a lower-tailed test. The test results show that the computed sample value of the Z variable does not fall within the rejection region and this means that there is not enough evidence, at the 5% level of significance, to conclude that the minority (less than 50%) of the co-operators perceived ISs in co-operative organizations as providing effective support for communication between the co-operative organizations and their competitors.

4.2.7.5: Hypothesis 5:

The majority (more than 50%) of co-operators perceive ISs support for communication between co-operative organizations and the support institutions as effective.

Statistically expressed hypothesis 5 is:

$$H_{a5}: p > 0.5$$

The null hypothesis for hypothesis 5 above is:

H_{05} : There is no significant difference between the number of co-operators who perceive ISs support for communication between co-operative organizations and support institutions as effective and the number of those who do not perceive the ISs support for communication between the co-operative organizations and the co-operative movement support institutions as effective.

Statistically expressed the null hypothesis becomes:

$$H_{05}: p = 0.5$$

The test for this hypothesis involved an upper-tailed test. The test results show that the computed sample value of the Z variable does not fall within the rejection region and this means that there is not enough evidence, at the 5% level of significance, to conclude that the majority (more than 50%) of the co-operators perceive ISs in co-operative organizations as providing effective support for communication between the co-operative organizations and the co-operative movement support institutions.

Now, the results of the tests of the five hypotheses indicate that there was not enough evidence to reject the null hypotheses which asserted that there was not significant difference between the proportions of co-operators who perceived ISs as providing effective support to communication between the co-operative organizations and their members, suppliers, customers/markets, competitors and

co-operative movement support institutions and the proportions of the co-operators who do not perceive the ISs as providing effective communication. This result is a reflection of lack of clear understanding, among co-operators, of the essentials of information systems in supporting co-operative business. If, say, information systems demonstrated significantly their support to communication in the co-operative organizations then the majority (significantly more than 50%) of the co-operators would have reported that the ISs are significantly effective.

The above hypothesis test-results are in line with findings discussed in sub-section 4.2.5 and supported by table 6(b)(see appendix E) which shows that the studied co-operative organizations, with the exception of one co-operative union, did not indicate to plan for ISs. The existence of ISs in the co-operative organizations is taken for granted. Interviewees indicated that ISs in co-operative were assumed to automatically evolve as activities increased.

However, although the hypothesis testing results are still valid and inline with other findings, the data in summary sheets of tables 7(a) through table 7(e) in appendix E may not have completely escaped errors/bias common with rating scales which might have been brought about by respondents' tendencies. The suspected errors could include, among others, the errors of "lenience" which occurs when a respondent is either an "easy rater" or a "hard rater"; "central tendency" which occurs when a rater is reluctant to give extreme judgements even when they deserve; "halo effect" which is a systematic bias which occurs when a rater carries over a generalized impression of the subject from one rating to another (Cooper and Schindler 2003: 256-257). However, attempts to minimize the errors were made by making sure that the respondents understood the objective of the study and the individual statements in the Likert scale-based questionnaire.

4.3: SUMMARY AND CONCLUSIONS

Now gathering from the study made, the following conclusions can be drawn:

1. Information systems used in coffee marketing co-operative organizations are a combination of manual and mechanical systems. Although some co-operative organizations, especially co-operative unions, strive to get access to computer-based systems from nearby secretarial service centres in towns still time for the access to computer-based systems is insignificant to allow them to scan for local or international market information or make attempts to advertise their coffee produce, for example, through the Internet. Hence, among other things, like lack of *entrepreneurial* orientation among co-operators, co-operative organizations have not been able to compete effectively in running the coffee business due to lack of effective information systems which could provide the organizations with information. In the preceding paragraph the term *entrepreneurial (adjective)* comes from the term *entrepreneur (noun)* which the Oxford Advanced Learner's Dictionary (1998) defines it as "a

person who starts or organizes a commercial enterprise, especially one involving financial risk.”

2. Of the ten studied co-operative organizations, three (two co-operative unions and one primary co-operative society) of them did not indicate to make reviews of the performance of their ISs. This situation makes co-operative organizations fail to think of improving and updating their information systems so that they may take note of important changes in the performance of the systems. Constant reviews would enable them to be aware of what is to be improved on or replaced. Lack of constant reviews makes the co-operative organizations not aware of business opportunities that come up with new information and communication technology (ICT) which could enable them to be linked to coffee markets in the world, for example, through the Internet. This lack of system reviews can be attributed to lack of appreciation of the importance of effective information systems among co-operators as pointed out in the preceding paragraph. Again, this lack of appreciation of information systems may be attributed to lack of orientation to entrepreneurship among co-operators.
3. Nine of the ten studied co-operative organizations did not have information systems plans. This lack of ISs plans among the co-operative organizations, is a business weakness which has been a result of the belief, among co-operators, that information systems come up automatically as activities in the organizations evolve. This belief has made the organizations not think of how they could use ISs to improve on their business activities so as to be more competitive. Again, as pointed out in the above paragraphs, lack of deliberate planning for ISs is due to lack of entrepreneurship orientation. One would need to plan for ISs for it is through them that information flows can be maintained. With quality information, management can control the direction of a business and minimize risks where appropriate.
4. With the introduction of liberalized trade in the country, a number of co-operative organizations lost their business direction. Responsibilities of co-operative unions to primary co-operative societies and vice versa were forgotten. For example, two of the four studied co-operative unions indicated not to have facilitated primary co-operative societies to get important services like getting experts to review IS/IT tools/facilities. This situation, among other factors like politics, led to dissatisfaction among primary co-operative societies which in turn led to some of them disaffiliating themselves from their co-operative unions. This loss of business direction, among co-operative organizations, can be traced back to lack of planning for the future and this situation can again be attributed to lack of entrepreneurship orientation among co-operators. Before the introduction of liberalized trade all co-operative organizations were under the influence of socialist ideals where the government attempted to have a

centralized plan for all economic sectors including the running of co-operative organizations. This socialist environment could not give co-operators an opportunity to run co-operative organizations as true business units whose success required to be planned for.

5. The main factors considered when justifying for IS/IT investment proposal approvals included: price of IS/IT tools/facilities, availability of funds to invest and potential ability of the proposed IS to enable a co-operative organization to communicate with its members. Consideration of the human element did not go beyond the requirement for an IS/IT tool/facility operator/user to be able to operate/use the IS/IT tool/facility. Issues like the effect of the IS/IT tool/facility on the operator's health or environment or operator's future career advancement were not considered. They were thought to be issues beyond the co-operative organizations' capabilities as they required more expertise than that was available in the co-operative organizations then. Lack of awareness of the importance of the consideration of the human-element can be attributed to lack of awareness, among co-operators, of the concept of information systems as socio-technical systems whose efficiency and contribution to an organization's competence depends on the human element with its accompanying attributes like politics and system acceptability, or as Remenyi (2000: 7) observes, the success or failure of an IS/IT investment is a function of the skill and commitment of the information systems principal stakeholders.
6. Money spent on IS/IT investments was considered as sunk cost and as such co-operators did not spend much time looking for factors like intangible costs or benefits. Interviewees in the studied co-operative organizations argued that, since IS/IT investments did not generate money directly to their organizations, there was no incentive for spending much effort in trying to justify for their approvals. From the interviews, again, it was gathered that provided a "champion" managed to convince the general meeting and if there were enough funds, IS proposals were approved without much discussion. Again this scenario can be considered as a result of lack of entrepreneurship orientation and appreciation, among co-operators, of the concept of information systems as enablers whose payoff is, in many cases, not direct, instant and whose benefits are mostly intangible. Lillrank et al. (2001: 1) summarizes the impact of IS/IT investments on the performance of an organization by saying that "The impact of IT materializes over a chain of enablers and effects connected by choices and various conditions". As discussed in chapter one, when an IS/IT investment is not considered as an enabler one will be led to conclude that the investments do not have payoffs and whatever expenditure is incurred on investing on an IS/IT is considered as a sunk cost to the organization.

7. No co-operative organization was found to have pre-prepared and documented Models/Methods/Frameworks for practical use in the assessment of proposed IS/IT investments. Such models/methods/frameworks did not exist as the activity of justifying for the IS/IT investment approvals was not a regular activity and that it would require IS/IT expertise to come up with such models/methods/frameworks. This absence of documented models/methods/frameworks to be used for the assessment of IS/IT investment proposals, among co-operative organizations, can again be attributed to lack of awareness, among co-operators, of the need for the existence of appropriate and effective information systems. If the need for effective information systems was considered important there would have been a documentation of some guidelines on how to assess/appraise proposed IS/IT investments before they were approved for implementation.
8. Having no pre-prepared and documented models/methods/frameworks for the assessment of IS/IT investment proposals, as pointed out in the preceding paragraph, this study did not come up with any gaps/shortfalls related to any specific IS/IT investment assessment models as required by the sixth objective. Of course, the fact that co-operative organizations did not indicate to have documented models/methods/frameworks is itself a gap to be addressed by this research project by putting forward proposed models/methods/frameworks as discussed in detail under the section of recommendations below.

Results from the testing of hypotheses, all of which related to co-operators' perceptions on the effectiveness of information systems in supporting communication in co-operative organizations, indicated lack of enough evidence to reject the null hypotheses in favour of alternative hypotheses. These results implied that co-operators did not notice the effectiveness of the systems in supporting communication. If information systems demonstrated to be significantly effective in supporting communication in the co-operative organizations then a significant proportion of interviewed co-operators (significantly more than 50% of the number of co-operators interviewed) would have reported that the ISs were significantly effective and the test results would probably have indicated this.

CHAPTER FIVE: SUMMARY OF MAJOR RESEARCH FINDINGS AND RECOMMENDATIONS

5.1: Summary of major research findings.

The major objective of this study was to come up with Information Systems Investment Assessment Models/Methods for use in Coffee Marketing Co-operatives and other related rural-based agricultural marketing co-operatives in Tanzania. The purpose is to have appropriately assessed/appraised IS investments which can support coffee marketing co-operatives in a liberalized trade environment. The background information to the research problem of this study, as discussed in chapter one, has shown that after the introduction of liberalized trade co-operative organizations exposed their inability to compete through the decline of their coffee market share and that among the factors which contributed to the inability to compete, as revealed by other studies, is lack of availability of national and international market information. This situation led to the need to find out about information systems in co-operative organizations in Tanzania generally, but in particular to look into gaps which might have existed in methods or models used in justifying the approval of the IS/IT investments in the co-operatives.

This study started by looking into the background information to the research problem as presented in chapter one, then by critically reviewing literature on the assessment/appraisal of IS/IT investments and lastly by analysing and interpreting data collected through questionnaires, interview schedules and observation from randomly selected co-operative organizations.

Now what follows is a summary from the background information to the research problem presented in chapter one and literature review on the assessment of IS/IT investments as presented in chapter two. Immediately after this summary there follows a summary of major findings from the data collected from the studied co-operative organizations.

5.1.1: Summary of the major findings from the background information and literature review:

1. Before independence (1961) co-operators in Tanzania ran their coffee marketing co-operative organizations without prior coffee marketing business education which could have helped them with the marketing of their coffee produce. The co-operators depended on European and Asian middlemen to look for coffee foreign markets.
2. After independence (1961) and before the introduction of liberalized trade (1984/85) co-operators did not practice entrepreneurship in running their co-operative organizations as co-operatives were to serve for political ends. During this period (1961 to 1984/85) the government used co-operative organizations as channels through which to propagate its

socialist ideals and politicians used the organizations as political platforms through which they propagated their political propaganda. Also, since by then the country was trying to adopt socialism, all economic planning including the planning for the development of co-operatives was centralized. This situation did not give room for co-operators to prepare plans including corporate, IS and IT strategic plans. Observations made in the first and this second paragraph indicate that co-operators have an educational challenge to contend with.

3. Among other factors, the situations discussed in the preceding paragraphs also did not prepare co-operative organizations to compete in a liberalized trade environment. The inability to compete by the coffee marketing co-operative organizations is demonstrated by the decline of their coffee market share over time after the introduction of the liberalized trade in the country.
4. Studies made to find out the weaknesses of the coffee marketing co-operatives in the country indicated that lack of access to marketing information on national and international arenas was one among the major problems which led to the decline in the market share experienced by the coffee marketing co-operative organizations.
5. The above paragraph points out the lack of adequate information for effective market decision making in the co-operative organizations. The need for adequate market information among co-operatives would call for the need for effective information systems (ISs) to exist in the co-operatives. Reviewed literature, in chapters one and two, show that to have effective information there would be need to have IS and IT strategic plans which are in line with the co-operatives' corporate/strategic plans so that the IS and IT plans are implemented according to corporate requirements. This preceding sentence emphasizes the fact that planning should commence at the strategic/top level of the organization so that planning at the tactical/functional and operational/supervisory level takes place within the guidelines of strategic plans.
6. Now in order to come up with effective and appropriate information systems for co-operatives there would be need to have appropriate IS/IT investment assessment/appraisal models/methods/frameworks which would take into account the environment, nature and working conditions of co-operative organizations. The reviewed literature shows that the process of assessing IS/IT investment proposals is complex and subjective. The process is multi-layered and it involves knowledge of content-that is what is to be measured; process - that is how to measure and context-that is the complex organizational or even inter-organizational situation in which the measurement is done. Also IS/IT investment assessment requires careful thought on issues such as composition of the

“assessment team or group” and its relationship to other stakeholders as well as to presentation and communication of findings and recommendations resulting from the assessment. The literature also show that professionals have come up with many models and frameworks for the assessment of IS/IT investments but none has been agreed upon and that many models still need further research before they are used.

7. The study shows that there are a number of factors which make it difficult for IS/IT professionals to come up with one agreed upon IS/IT investment assessment model/framework. Among the important factors pointed out are that: (i) IS/IT investments are enablers, they enable other processes to be more effective and efficient and therefore the contribution of the IS/IT investments cannot be directly associated with changes in the performance or productivity of an organization. (ii) IS/IT investments are socio-technical which requires that their assessment would not only involve the technical aspects but would also involve the assessment of the human element, something which is subjective and situational. Examples are that, a manager may get timely and quality information but to know if the information will be used profitably is another multi-layered consideration. (iii) Being socio-technical IS/IT investments do not only involve tangible benefits and costs but they also involve intangible benefits and costs which are usually difficult to measure. Intangible benefits and costs cannot be easily measured by using quantitative models like the traditional capital budgeting models used by accountants. (iv) IS/IT investments are based on IT which advances so rapidly that some projects become obsolete even before they have made returns to the invested capital. This situation brings about uncertainty and makes the challenge of looking for appropriate IS/IT investment assessment models/frameworks a continuous task although it has been a long time challenge among IS/IT researchers, professionals and practitioners.
8. Basing on the difficulties of assessing IS/IT investments, as sited in paragraph (7) above, IS/IT professionals recommend the use of a combination of existing IS/IT investment assessment models/frameworks found to be approximate for the prevailing situation. It is pointed out that the use of a combination of models/frameworks covers up for the weaknesses which might be inherent in an individual model/framework. They further more recommend that models to be used should take into account the uniqueness of the proposed IS/IT investments and that the group or team to be involved in the assessment of an IS/IT investment should be knowledgeable of the situation in which the proposed IS/IT investment will be used and the objectives for which the IS/IT investments are proposed.
9. However, although the IS/IT investment assessment process is complex and demanding, literature show that it may present an opportunity for

organizational learning and improvement of communication. Identified potential benefits and costs may set benchmarks from which to tell if the projects are successful or not, after their implementation.

10. Literature on IS/IT investment assessment models/frameworks/methods points out that within the extremes of quantitative and qualitative methods of assessing IS/IT investments there are three basic techniques of assessing the investments and these include: (i) “*Fundamental measures*” which attempt to parameterize some characteristics or closely related set of characteristics of investment down to a single measure which can be used to discriminate among several IS/IT investments. (ii) “*Composite approaches*” which try to combine several fundamental measures to get a “balanced” overall picture of value and/or investment return. (iii) “*Meta approaches*” which attempt to select the best set of measures for a context or given decision. Literature also shows that at the qualitative extreme of the IS/IT investment assessment methods some professionals just use their instincts to approve an IS/IT project for implementation. It is pointed out that this situation of the use of instinct also called “*gut-instinct*” or “*blind faith*” or “*acts of faith*” comes up among decision makers when they encounter a complex decision making situation. However, this use of instinct is defended by saying that it differentiates between man and machine or between mediocre and top flight management. However, in other situations the approval of an IS/IT investment depends on a champion, someone who works hard until a proposal is approved for implementation.

5.1.2: Summary of major findings on information systems from data collected from the studied co-operative organizations:

In order to execute the study, eight specific objectives were formulated, as detailed in chapter one, for each one of the eight specific objectives one research question was set up. On the basis of the research questions questionnaires and interview schedules were formulated for purposes of data collection. The eight research questions were as follows:

1. What types of ISs are used in the Coffee Marketing Co-operatives in Tanzania?
2. Is the performance of IS/IT tools/facilities in co-operative organizations reviewed in order to take account of the business and technological changes in the Coffee Marketing business?
3. What factors are considered important in approving the purchase of an IS/IT tool/facility to be used in a co-operative organization?
4. What factors are considered important in reviewing the performance of existing IS/IT tools/facilities?

5. What models/methods are used in assessing proposals for the purchase of new IS/IT tools/facilities in a co-operative organization?
6. Are there gap/shortfalls in the models/methods used in the assessment of proposals for the purchase of new IS/IT tools/facilities?
7. Can improved models/methods be formulated for the assessment of proposals for the purchase of new IS/IT tools/facilities in co-operative organizations?
8. To what extent are the IS/IT users in co-operative organizations satisfied with their ISs' performance in effecting communication between the co-operative organizations and their members, suppliers, customers, competitors and co-operative development facilitators?

Now, the major research findings from the analysis and interpretation of the data collected from co-operative organizations are summarized as follows:

1. Information systems used in coffee marketing co-operative organizations in Tanzania are a combination of manual and mechanical systems. Having basically manual and mechanical ISs, the co-operative organizations have a limited access to the use of computer-based information systems. However, at times the organizations make use of computer-based systems from nearby secretarial-services centres for sending and receiving e-mail and fax. This situation of depending on manual and mechanical systems, from outside the organizations, limits the co-operatives access to national and international coffee marketing information which might be accessed through the internet and this situation in turn makes the co-operatives less competent.
2. The majority (seven out of ten) of the studied co-operative organizations never reviewed the performance of their information systems tools/facilities. This situation makes the co-operative organizations fail to think of improving and updating their IS/IT tools/facilities. Interviewees indicated that lack of constant reviews for the IS/IT tools/facilities was due to lack of plans for ISs. The study also found out that out of the ten studied co-operative organizations only one organization indicated to have an IS plan. The reason for the absence of plans was that their ISs were assumed to automatically come up as activities evolve in their co-operative organizations. Now lack of IS plans and reviews makes the organizations not aware of business opportunities that come with new information and communication technologies which could enable them to be linked to coffee world markets.
3. No co-operative organization was found to have pre-prepared and documented models/methods/frameworks for practical use in the assessment of proposed IS/IT investments. Interviewees justified the

non-existence of the models by pointing out that the justification for IS/IT investment proposals was not a regular activity, that IS/IT investments do not have direct returns on capital invested and therefore no much efforts were spent on their justification and that it would require IS/IT expertise to come up with such IS/IT investment assessment models/methods/frameworks.

4. Having no pre-prepared and documented models/methods/frameworks for the assessment of IS/IT investment proposals among co-operative organizations, this study thus did not come up with any specific gaps/shortfalls related to any specific IS/IT investment assessment model/method related to any specific IS/IT investment assessment models. However, the fact that the studied co-operative organizations did not have pre-prepared and documented IS/IT investment assessment models/methods/frameworks is itself a gap to be addressed by this research project by putting forward a proposed model/framework as discussed in detail under the section of recommendations below.
5. Results from the testing of hypotheses related to the co-operators' perception on the effectiveness of information systems in supporting communication in co-operative organizations, indicate that co-operators did not notice the effectiveness of information systems in supporting communication in their co-operative organizations. This lack of effectiveness of information systems in co-operative organizations contributed to lack of competitiveness among the co-operatives as they would not get information for effective decision making and the control of business operations.
6. In addition to not having models/frameworks for the assessment of IS/IT investments so as to come up with effective ISs, as pointed out in paragraph (3) above, the above summary shows one major problem which exists among co-operators and which make them fail to run their co-operative organizations as competitive business organizations. This problem is lack of entrepreneurship orientation among co-operators and this is a result of co-operators not having exposed to running their co-operative organizations as entrepreneurs as pointed out in the summary of findings from the literature review section, that is section 5.1.1 above. With entrepreneurship orientation co-operators are expected to know the importance of ISs, the importance of planning for ISs and the importance of having guidelines or models/frameworks which would help them with the assessment/appraisal of IS/IT investments so as to come up with effective information systems.

Now basing on the above summary of major research findings from literature review in section 5.1.1 and the findings from the analysed data in section 5.1.2 this study comes up with two recommendations as follows:

5.2: Recommendations.

5.2.1: To run entrepreneurship orientation courses for co-operators.

The summary of the major research findings discussed in the first and second paragraph of section 5.1.1 has noted that lack of entrepreneurship orientation among co-operators is a major educational challenge for the co-operators to deal with. Now in order to alleviate the problem this study proposes to run short-term tailor-made training programmes for co-operators orientation on entrepreneurship.

Through the courses on entrepreneurship orientation co-operators will be introduced on how to be competitive in business in a liberalized trade environment by considering a number of things to be covered in the courses. Hopefully, co-operators will also be introduced to planning generally, to strategic planning for information systems and information technology since, as pointed out in section 5.1.2 paragraph two(2) concerning findings from data collected, co-operators indicated to be not aware of the need to deliberately plan for the ISs. Other course topics to be included should be on the understanding of the nature of ISs as socio-technical systems, to consider the ISs investments as enablers to the competitiveness of a business organization, to consider the ISs investments as not having a direct return on invested and that most of the ISs investments' costs and benefits are intangible but important to be taken into account. This last statement takes note of the thinking among co-operators, as pointed out in section 5.1.2 in paragraph three(3) that not much effort is taken in the assessment of IS/IT investment proposals as they do not have direct returns on invested capital.

Now, on successful completion of the courses on entrepreneurship co-operators are expected to have been sensitized enough to realize the importance of the need for effective information systems in their co-operative organizations and therefore the need to have adequately assessed/appraised IS/IT investment proposals before they are approved. The need to have adequately assessed/appraised IS/IT investments will make co-operators to have the need for IS/IT investment assessment models/methods/frameworks.

The idea of running short-term courses on entrepreneurship orientation for co-operators should be initiated by the researcher of this project when reporting the results of this study to co-operative organizations which were covered by this study. The researcher and management of the individual co-operative organizations may together identify competent institutions to

run the courses. Among the institutions to be considered is the Moshi University College of Co-operative and Business Studies (MUCCoBS), a public university college in Tanzania.

5.2.2. To help co-operators with the formulation and use of IS/IT investment assessment models/frameworks.

On successful implementation of the first recommendation above, then the second recommendation should follow. This second recommendation is based on the assumption that co-operators will have been sensitized enough to feel the need for IS/IT investment assessment models/frameworks so that the co-operators may come up with effective IS/IT investments in their co-operative organizations.

Now what follows is a summary of the proposed IS/IT investment assessment framework to be used in the coffee marketing co-operative organizations and other agricultural marketing co-operatives in Tanzania and other rural-based economies in developing countries. This framework is broken down into eight stages. For details on the framework see appendix G.

The stages for the framework are:

Stage I:

This involves the review (or re-writing) of the co-operative organization's corporate plan, mission, vision, strategic objectives, IS and IT strategic plans (see appendix H for the illustration of the IS/IT strategic planning process). The presence of this stage is to make sure that other basic business issues like the mission, vision and strategic business objectives are in place before other problems are tackled. Also, this first stage takes note of the importance of coming up with a corporate/strategic plan before coming up with the IS and IT strategic plans and this follows from the literature discussed in section 5.1.1 paragraph five(5) where it has been pointed out that "planning should commence at the strategic/top level of the organization so that planning at the tactical/functional and operational/supervisory level takes place within the guidelines of strategic plans". This recommendation also follows from the findings from data collected from the ten studied co-operative organizations that they do not plan for their ISs, as discussed in section 5.1.2 paragraph two (2).

Stage II:

This involves the review (or preparation) of a prioritized list of prospective IS or IS/IT tools/facilities investments. The list should be inline with the IS/IT strategic plans. This emphasizes on the need that IS/IT investment activities should be within what has been planned for at a strategic level in order to avoid sub-optimization of the performance of the organization.

Stage III:

This involves the estimation of basic tangible costs (this calls for an actual survey of relevant costs) for each one of the prospective IS or IS/IT tool/facility appearing in the prioritized list in stage II above. This stage requires an individual with relevant experience in the use and costs of the prospective IS or IS/IT tools/facilities in order to come up with relevant cost estimates.

Stage IV:

This involves the estimation of cost savings (tangible cost savings). As in stage III above this stage requires an individual with relevant experience in the use and costs of the prospective IS or IS/IT tools/facilities in order to come up with relevant cost saving estimates.

Stage V:

This involves the use of the traditional capital budgeting models to select between IS/IT investment alternatives. However, use of the traditional capital budgeting models should be restricted to IS/IT investments whose return on investment is direct and which involve a negligible amount of intangible costs and benefits else the models may be measuring variables which do not exist and it may lead to a false return on investment paradox. This stage takes note of literature on how IS/IT investments contribute to the competitiveness of an organization as observed in section 5.1.1 paragraph seven(7) that IS/IT investments are enablers, they enable other activities or functions in an organization to be efficient and profitable. That is the contribution of an IS/IT investment to an organization is mostly not direct. That attempts to measure the direct contribution of an IS/IT investment, as may be done using the traditional capital budgeting models used by accounts, may lead to wrong results and hence to wrong recommendations to decision makers.

Stage VI:

This involves the use of scoring models to value intangible benefits and costs. As detailed in appendix G, this stage will call for individuals knowledge of the environment and workings of co-operative organizations in order to come up with a comprehensive list of decision criteria and corresponding weights and ratings on the basis of which to determine the most preferable IS/IT out of the many prospective IS/IT investment alternatives. This last statement is a result of IS/IT investment literature findings as discussed in section 5.1.1 paragraph eight(8) that individuals selected to assess/appraise an IS/IT investment must be knowledgeable of the situation in which the proposed IS/IT investment will be used and the objectives for which the IS/IT investments are proposed.

Stage VII:

This involves summarizing results from stages III to VII and then converting the summarized values into proportions for easy comparison among several ISs or IS/IT tools/facilities investments.

Stage VIII:

This involves the selection of alternative IS or IS/IT tools/facilities investments on the basis of the highest score obtained in stage VII above.

As discussed in section 5.1.1 paragraph ten (10), the above recommended IS/IT investment assessment framework is based on the “Fundamental measures” technique where an IS/IT investment alternative with the highest score figure is taken as the best alternative.

Also, this framework has included the use of scoring models as one means of dealing with intangible costs, intangible benefits, the human element and the second investment effects inherent in IS/IT investments.

The framework is meant to be simple so that co-operators are encouraged to use it and not resort to the use of instinct as literatures points out in section 5.1.1 paragraph ten (10). However, it is not the interest of the researcher to discourage the use of instinct although it is to be pointed out that it is not everybody who can use instinct successfully and all the time.

5.3: Suggestions for further research:

Based on the literature covered in chapters one, two and three of this dissertation and the research findings discussed in chapter four, a lot has yet to be done before IS/IT professionals come up with practical models/frameworks for the assessment of IS/IT investment proposals. More practical oriented researches need to be done on the development and operationalization of new and existing model/frameworks for the assessment of IS/IT investments, specifically more researches can be done on:

1. The development and implementation of ISs in co-operative organizations in Tanzania with an emphasis on the use of *action research approaches* as discussed in chapter three of this dissertation. Application of the *action research approach* will give an opportunity to both researchers and co-operators to make continuous studies and improvements on the implementation and use of ISs while learning important factors which make the ISs successfully enable business organizations to be more competitive with time.
2. The design of models/frameworks which can practically facilitate an average person in a rural setting to account for both tangible and intangible costs and benefits in the assessment/appraisal of IS/IT investment proposals.

3. Possibilities of using *scoring models* to facilitate in taking care of intangible costs and benefits, the human element and instinct when justifying approvals for IS/IT investments.
4. Possibilities of information and communication technology (ICT) companies, in Tanzania, to reach more people in rural areas. This will create a communication infrastructure for co-operators and other rural-based farmers in the country so that they may be linked to world markets for their agricultural produce.

5.4: Dissertation tie-up.

This study sought to contribute towards the existing knowledge of the formulation of models/frameworks for use in the assessment/appraisal of IS/IT investment proposals in rural-based organizations. The study used Coffee Marketing Co-operatives in Tanzania as a case. In addition to adding knowledge in the formulation of IS/IT investment assessment models/frameworks the main aim was to come up with effective IS/IT investments which can support the co-operative organizations in the liberalized trade environment. The need to come up with effective IS/IT investments in co-operative organizations has been brought about by the fact that since the introduction of liberalized trade for coffee in Tanzania(1992), as discussed in chapter one in the “*Background information to the research problem*”, has revealed the inability of the Coffee Marketing Co-operative organizations to compete. This inability has been revealed through the organizations drop in their coffee market share. Also, reviewed literature showed that among other reasons for the co-operatives not to be competitive has been the lack of access to national and international market information for the coffee marketing co-operative organizations.

Now in order to come up with models/frameworks for use in the assessment of IS/IT investments this research project has studied existing information systems in the Coffee Marketing Co-operatives in Tanzania but with special emphasis on possible gaps/shortfalls on models/frameworks used in the assessment/appraisal of existing IS/IT investments. Knowledge of gaps on models used in assessing/appraising the existing IS/IT investments may help to show the causes of the ineffectiveness of the ISs investments in supporting information communication in the co-operatives.

To focus the direction of the study, the literature on the background information concerning existing ISs used in the coffee business was reviewed as detailed in chapter one and also existing literature on models/frameworks used in the assessment/evaluation of IS/IT investments and related theories were reviewed as discussed in chapter two. The reviewed literature shows that management of organizations demand for the justification of investing on IS/IT projects as the investments use up scarce resources which include funds, personnel time and space, among others. Although IS/IT professionals have come up with several models/frameworks for the assessment of IS/IT investments most of the models/frameworks have not be operationalized and that there has not been agreed upon IS/IT investment assessment models/frameworks yet. The literature also shows that the nature of IS/IT investments as socio-technical, as enablers whose return is not direct and most of which is intangible, the nature of IS/IT investments of having second investment effects and the fast advances in IT which is the basis of IS investments makes the coming up with commonly agreed upon IS/IT investment assessment models/frameworks difficult. Moreover, the literature also reveals that as most of the several IS/IT investments assessment models/frameworks have not being completely researched upon and operationalized researchers and practitioners should use them in combinations in

order to cover up for their individual weaknesses. And since IS/IT investments are socio-technical and involve the human element, the design of such models/frameworks need to take account of the uniqueness of the prospective IS/IT investment for which they are being designed and the interests of stakeholders.

With the above literature review findings in mind, a study on IS/IT investments in ten (10) Coffee Marketing Co-operatives was undertaken as a case study. The study employed a descriptive research design within a cross-sectional research approach as detailed in chapter three. The study revealed that there were no pre-prepared and documented IS/IT investment assessment models/frameworks, that there were no IS or IT strategic plans and that, co-operators had no entrepreneurship orientation. Following the research findings as detailed in chapter four and the reviewed literature this study has come up with two recommendations suggested to be implemented in stages. The recommendations include: (1) To run entrepreneurship orientation courses for co-operators and (2) to help co-operators with the development and implementation of IS/IT investment assessment framework to be used in the Coffee Marketing Co-operative organizations (see appendix G for details of the framework). The proposed framework forms the researcher's contribution towards the existing knowledge in the formulation of IS/IT investments assessment models/frameworks. In addition to the two recommendations given in section 5.2, suggestions for further research have been pointed out in section 5.3.

In order to implement the recommendations, all co-operative organizations which took part in this research project will be given a feedback of the research results by the researcher. It is at this time of giving the feedback to the co-operative organizations that the different managers of the coffee marketing co-operatives will be requested to express their interest in being involved in the implementation of the two recommendations given above.

Although the study encountered time and funds limitations and that it does not claim to be conclusive, as more researches need to be done, it is the feeling of the researcher that the research project has been successful enough for its results to contribute towards the improvement of IS/IT investments in coffee marketing co-operative organizations in Tanzania.

Table 4: SUMMARY SHEET FOR QUESTION FOUR

MOST IMPORTANT FACTORS CONSIDERED DURING THE REVIEW OF THE PERFORMANCE OF ISS TOOLS/EQUIPMENT

ORG_ID	IS/IT TOOLS/EQUIPMENT												REMARKS
	01	02	03	04	05	06	07	08	09	10	11	12	
03		A		A	B		A	A	A		A		
04											A		
15	A	A		B							A		
25													DO NOT MAKE REVIEWS
28	A	A		B							A		
30	A	A									A		
32	A	A		A							A		
33													DO NOT MAKE REVIEWS
36	A										A		
38													DO NOT MAKE REVIEWS

Source: Summarized data from field questionnaires.

Key:

1. List of IS/IT tools/facilities codes: Typewriter (01), Calculator (02), Cash Register(03), Telephone (04), Computer (05), Internet (06), Website (07), Local Area Network (08), Fax (09), Telex (10), Weighing machine (11), Others (12).
2. List of most important factors:
 - A. Original purpose for purchasing the tool/facility.
 - B. Original purpose plus tangible unplanned for benefits and costs which came up during the use of the tool/facility.
 - C. B above plus other intangible benefits and costs which came up during the use of the tool/facility.
 - D. Other factors.

Table 5: SUMMARY SHEET FOR QUESTION FIVE

**MODELS/METHODS/FRAMEWORKS USED AS A BASIS
FOR THE JUSTIFICATION OF APPROVING THE
PURCHASE OF AN IS/IT TOOL/FACILITY**

ORG_ID	IS/IT TOOLS/EQUIPMENT												REMARKS
	01	02	03	04	05	06	07	08	09	10	11	12	
03		A		A			A						
04											I		
15	A	A		C							I		
25	H	H		E					D		D		
28	H	H		E							H		
30													DID NOT FILL
32													DID NOT FILL
33													DID NOT FILL
36													DID NOT FILL
38													DID NOT FILL

Source: Summarized data from field questionnaires.

Key:

3. Code for IS/IT tools/facilities: Typewriter (01), Calculator (02), Cash Register (03), Telephone (04), Computer (05), Internet (06), Website (07), Local Area Network (08), Fax (09), Telex (10), Weighing machine (11), Others (12).
4. Factors constituting formulae/models/frameworks used as a basis for the justification of approving the purchase of IS/IT tools/equipment/facilities.
 - A. Depended on advice from experts.
 - B. Considered an affordable price.
 - C. (B) above plus consideration of cheaper operating costs.
 - D. (C) above plus consideration of accuracy and timeliness of information received/sent.
 - E. Considered its capability to bring in/send out information to the organization's members.
 - F. Considered its capability to bring in/send out information to the organizations' suppliers.
 - G. Considered its capability to bring in/send information to the organization's customers/markets.
 - H. Considered its capability to bring in/send out information to the organization's competitors.
 - I. (B) above plus a consideration to simplify office work.
 - J. Considered the need to be modern.
 - K. It was necessary/There was other way.
 - L. Other methods (please, specify the method).

Table 6(a): SUMMARY SHEET FOR QUESTION 6(a)

KNOWLEDGE/AWARENESS OF CO-OPERATORS ABOUT THEIR CO-OPERATIVE ORGANIZATIONS': SUPPLIERS, CUSTOMERS, COMPETITORS AND CO-OPERATIVE MOVEMENT INSTITUTIONAL SUPPORTERS

RESP_ID	SUPPLIERS		CUSTOMERS		COMPETITORS		FACILITATORS	
	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN
01	0	0	0	1	1	0	1	0
02								
03	1	1	0	1	1	0	1	0
04								
05	1	0	0	0	1	1	1	0
06	1	0	0	0	1	1	1	0
07	1	0	0	0	1	0	1	0
08	1	0	0	0	0	1	0	0
09	0	0	0	0	1	0	1	0
10	1	0	0	0	1	0	1	0
11	0	0	0	0	1	0	1	0
12	0	0	0	0	1	1	1	0
13	0	0	0	0	1	0	1	0
14	0	0	0	0	0	0	0	0
15	1	0	0	0	1	0	1	0
16	1	0	0	0	0	1	1	0
17	1	0	0	0	1	1	1	0
18	1	0	0	0	0	1	1	0
19	1	0	0	0	0	0	1	0
20	1	0	0	0	0	0	1	0
21	1	0	0	0	0	1	1	0
22	1	0	0	0	0	0	1	0
23	1	0	0	0	0	1	1	0
24	1	1	1	1	1	1	1	0
25	1	0	1	1	1	0	1	0
26	1	0	0	0	1	0	1	0
27	1	0	0	1	1	0	1	0
28	1	0	0	1	1	0	1	0
29	0	0	0	0	1	1	1	0
30	1	0	0	0	1	0	1	0
31	1	0	0	0	1	0	1	0
32	1	0	1	0	1	0	1	0

CXXX

33	1	0	0	0	1	0	1	0
34	0	0	0	0	0	0	0	0
35	1	0	0	0	1	0	1	0
36	1	0	0	0	1	0	1	0
37	1	0	0	0	0	0	0	0
38	1	0	1	0	1	0	1	0
TOTAL	29	2	4	6	25	11	32	0
Sample size: n = 35	0.81	0.06	0.11	0.17	0.69	0.31	0.89	0.00

Source: Summarized data from filed questionnaire.

Key to coding: 0 = NO and 1 = YES

From the table (last row. Sample size (n) is 35):

- a. 81% of co-operators respondents knew their organization's local suppliers.
- b. 6% of co-operators knew their organization's foreign suppliers.
- c. 11% of co-operators knew their organization's local customers.
- d. 17% of co-operators knew their organization's foreign customers.
- e. 69% of co-operators knew their organization's local competitors.
- f. 31% of co-operators knew their organization's foreign competitors.
- g. 89% of co-operators knew their organization's local support institutions.
- h. 0% of co-operators knew their organization's foreign support institutions.

Table 6(b): SUMMARY SHEET FOR QUESTION SIX(b)

EXISTENCE OF BUSINESS AND IS STRATEGIC PLANS IN THE SURVEYED CO-OPERATIVES.

ORG_ID	BUSINESS STRATEGIC PLAN	IS STRATEGIC PLAN	TOTAL	REMARKS
03	1	1		
04	1	0		
15	1	0		
25	0	0		
28	0	0		
30	0	0		
32	0	0		
36	1	0		
33	1	0		
38	0	0		
Total	5	1		

Source: Summarized data from field questionnaires.

Key: In coding: 0 = NO and 1 = YES

Table 7(a): SUMMARY SHEET FOR QUESTION 7(a)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR MEMBERS.

RESP_ID	PERCEPTION ITEMS						RESPONDENT'S SUMMATED RATINGS	RESPONDENT'S AVERAGE RATINGS	1 = AVERAGE > 3 0 = AVERAGE <= 3
	1	2	3	4	5	6			
01	4	4	4	4	4	5	25	4.17	1
03	4	4	4	1	5	5	23	3.83	1
05	4	5	4	1	3	5	22	3.67	1
06	5	5	5	4	4	4	27	4.50	1
07	5	5	5	4	4	5	28	4.67	1
08	4	4	4	5	4	2	23	3.83	1
09	5	5	5	2	4	4	25	4.17	1
10	5	5	5	5	5	5	30	5.00	1
11	5	4	5	4	5	4	27	4.50	1
12	4	4	5	3	4	5	25	4.17	1
13	5	5	5	5	5	5	30	5.00	1
15	5	5	4	1	5	5	25	4.17	1
16	4	5	4	5	5	2	25	4.17	1
17	4	5	5	2	5	5	26	4.33	1
18	5	4	5	4	5	4	27	4.50	1
19	3	4	4	2	2	3	18	3.00	0
20	5	4	5	5	5	5	29	4.83	1
21	5	5	5	5	5	5	30	5.00	1
22	5	5	5	5	5	5	30	5.00	1
23	1	1	2	4	4	1	13	2.17	0
24	5	1	1	1	1	1	10	1.67	0
25	4	4	3	3	2	4	20	3.33	1
26	4	4	4	1	4	5	22	3.67	1
27	4	4	4	2	4	4	22	3.67	1
28	4	4	4	4	4	5	25	4.17	1
29	4	4	2	2	3	5	20	3.33	1
30	5	5	5	4	5	5	29	4.83	1
31	5	5	3	5	5	5	28	4.67	1
32	4	4	4	5	4	4	25	4.17	1
33	4	4	4	4	4	5	25	4.17	1
34	5	5	1	3	4	1	19	3.17	1
35	4	5	4	4	4	5	26	4.33	1
36	5	5	5	5	5	5	30	5.00	1
37	5	5	5	5	5	5	30	5.00	1

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38	2	2	2	2	2	2	12	2.00	0
TOTAL								141.83	31

Source: Summarized data from field questionnaires.

Sample size $n = 35$. Computed mean from totals = 24.31, Std (from totals) = 5.16
and Std (of means for individuals) = 0.86

Table 7(b): SUMMARY SHEET FOR QUESTION 7(b)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR SUPPLIERS.

RESP_ID	CONCEPT ITEMS					RESPONDENT'S SUMMATED RATINGS	RESPONDENT'S AVERAGE RATINGS	1 = AVERAGE > 3 0 = AVERAGE <= 3
	7	8	9	10	11			
01	3	3	3	3	3	15	3.00	0
03	5	4	5	5	5	24	4.80	1
05	1	1	1	2	1	6	1.20	0
06	1	2	1	2	1	7	1.40	0
07	1	1	1	4	3	10	2.00	0
08	2	2	1	4	2	11	2.20	0
09	5	1	3	1	5	15	3.00	0
10	1	1	1	1	1	5	1.00	0
11	1	1	1	1	1	5	1.00	0
12	1	1	1	1	1	5	1.00	0
13	1	1	1	2	5	10	2.00	0
15	3	2	3	2	2	12	2.40	0
16	5	4	3	3	4	19	3.80	1
17	4	5	4	5	5	23	4.60	1
18	3	3	2	2	3	13	2.60	0
19	4	3	3	5	4	19	3.80	1
20	4	5	4	5	5	23	4.60	1
21	5	5	5	5	5	25	5.00	1
22	5	5	5	5	5	25	5.00	1
23	3	5	1	3	1	13	2.60	0
24	4	4	2	2	1	13	2.60	0
25	3	4	3	4	3	17	3.40	1
26	4	4	5	5	4	22	4.40	1
27	4	2	2	4	4	16	3.20	1
28	4	4	4	4	4	20	4.00	1
29	1	3	3	3	3	13	2.60	0
30	5	5	5	5	5	25	5.00	1
31	1	4	4	5	4	18	3.60	1
32	4	4	4	5	4	21	4.20	1
33	4	4	4	4	4	20	4.00	1
34	3	4	4	1	5	17	3.40	1
35	4	5	4	5	4	22	4.40	1
36	3	3	2	1	1	10	2.00	0
37	3	3	2	1	5	14	2.80	0
38	2	2	2	4	2	12	2.40	0

TOTAL								109.00	17
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Source: Summarized data from field questionnaires.

Sample size $n = 35$. Computed mean from totals = 15.57, Std(from totals) = 6.1896 and Std(of means for individuals) = 1.24.

Table 7(c): SUMMARY SHEET FOR QUESTION 7(c)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR CUSTOMERS.

RESP_ID	CONCEPT ITEMS					RESPONDENT'S SUMMATED RATINGS	RESPONDENT'S AVERAGE RATINGS	1 = AVERAGE > 3 0 = AVERAGE <= 3
	12	13	14	15	16			
01	4	3	4	4	4	19	3.8	1
03	5	4	5	5	5	24	4.8	1
05	4	3	3	2	2	14	2.8	0
06	3	4	4	5	4	20	4	1
07	3	5	4	5	5	22	4.4	1
08	3	3	3	3	3	15	3	0
09	3	3	3	2	3	14	2.8	0
10	3	5	3	5	5	21	4.2	1
11	3	3	1	2	4	13	2.6	0
12	4	3	3	5	5	20	4	1
13	3	5	5	5	5	23	4.6	1
15	3	5	1	5	3	17	3.4	1
16	5	2	2	3	5	17	3.4	1
17	4	4	2	4	4	18	3.6	1
18	2	1	1	2	3	9	1.8	0
19	5	3	3	3	3	17	3.4	1
20	4	5	4	5	5	23	4.6	1
21	5	5	5	5	5	25	5	1
22	4	4	4	5	5	22	4.4	1
23	5	5	1	1	1	13	2.6	0
24	1	1	1	2	2	7	1.4	0
25	4	3	3	2	2	14	2.8	0
26	4	2	1	2	4	13	2.6	0
27	2	4	3	4	4	17	3.4	1
28	4	4	2	2	4	16	3.2	1
29	3	3	3	3	3	15	3	0
30	1	1	1	1	1	5	1	0
31	3	1	1	5	1	11	2.2	0
32	3	4	2	4	4	17	3.4	1
33	3	3	5	4	4	19	3.8	1
34	3	3	5	4	2	17	3.4	1
35	3	4	1	5	5	18	3.6	1
36	3	4	1	1	2	11	2.2	0
37	3	4	5	1	1	14	2.8	0
38	2	2	2	2	2	10	2	0

TOTAL								114	20
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Source: Summarized data from field questionnaires.

Sample size $n = 35$. Computed mean (from totals) = 16.29. Std (from totals) = 4.7993

Std (of means for individuals) = 0.959.

Table 7(d): SUMMARY SHEET FOR QUESTION 7(d)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR COMPETITORS.

RESP_ID	CONCEPT ITEMS				RESPONDENT'S SUMMATED RATINGS	RESPONDENT'S AVERAGE RATINGS	1=AVERAGE > 3 0=AVERAGE <=3
	17	18	19	20			
01	4	4	4	3	15	3.75	1
03	5	4	5	5	19	4.75	1
05	5	3	2	3	13	3.25	1
06	5	4	5	4	18	4.5	1
07	5	3	5	3	16	4	1
08	2	3	3	3	11	2.75	0
09	5	1	5	1	12	3	0
10	4	1	4	2	11	2.75	0
11	5	1	5	1	12	3	0
12	5	4	5	4	18	4.5	1
13	1	4	1	4	10	2.5	0
15	5	1	5	5	16	4	1
16	5	3	5	1	14	3.5	1
17	5	2	2	3	12	3	0
18	5	3	2	1	11	2.75	0
19	5	4	3	3	15	3.75	1
20	5	4	5	1	15	3.75	1
21	5	1	1	1	8	2	0
22	5	4	5	1	15	3.75	1
23	5	1	1	1	8	2	0
24	5	1	2	1	9	2.25	0
25	5	3	2	2	12	3	0
26	5	1	1	2	9	2.25	0
27	5	2	2	2	11	2.75	0
28	5	2	2	2	11	2.75	0
29	2	4	4	4	14	3.5	1
30	5	5	1	1	12	3	0
31	5	1	2	2	10	2.5	0
32	5	4	4	4	17	4.25	1
33	4	4	4	4	16	4	1
34	3	3	5	5	16	4	1
35	4	4	4	1	13	3.25	1
36	5	1	1	2	9	2.25	0
37	5	1	1	1	8	2	0

38	4	2	2	2	10	2.5	0
TOTAL						111.5	16

Source: Summarized data from field questionnaires.

Sample size $n = 35$. Computed mean (from totals) = 12.74. std (from totals) = 3.11

std (of means for individuals) = 0.777.

Table 7(e): SUMMARY SHEET FOR QUESTION 7(e)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THE CO-OPERATIVE MOVEMENT INSTITUTIONAL SUPPORTERS.

RESP_ID	CONCEPT ITEMS				RESPONDENT'S SUMMATED RATINGS	RESPONDENT'S AVERAGE RATINGS	1=AVERAGE >3 0=AVERAGE <=3
	21	22	23	24			
01	4	4	4	4	16	4	1
03	4	5	5	5	19	4.75	1
05	4	4	4	5	17	4.25	1
06	5	5	5	5	20	5	1
07	5	5	5	4	19	4.75	1
08	2	4	4	5	15	3.75	1
09	5	1	5	4	15	3.75	1
10	4	5	5	5	19	4.75	1
11	4	2	4	4	14	3.5	1
12	5	5	5	5	20	5	1
13	5	2	5	2	14	3.5	1
15	5	5	5	4	19	4.75	1
16	5	2	4	5	16	4	1
17	5	4	5	4	18	4.5	1
18	4	2	2	2	10	2.5	0
19	3	3	4	4	14	3.5	1
20	4	5	4	5	18	4.5	1
21	5	5	1	5	16	4	1
22	4	5	4	5	18	4.5	1
23	2	2	5	2	11	2.75	0
24	1	2	1	2	6	1.5	0
25	3	2	3	3	11	2.75	0
26	5	4	4	4	17	4.25	1
27	5	4	4	4	17	4.25	1
28	4	4	4	4	16	4	1
29	4	5	4	5	18	4.5	1
30	5	5	5	5	20	5	1
31	4	1	5	2	12	3	0
32	4	4	5	4	17	4.25	1
33	5	4	4	4	17	4.25	1
34	4	3	2	1	10	2.5	0
35	5	4	5	4	18	4.5	1
36	2	2	5	5	14	3.5	1

cxli

37	2	1	1	5	9	2.25	0
38	4	4	4	4	16	4	1
TOTAL						136.5	28

Source: Summarized data from field questionnaires.

Sample size $n = 35$. Computed mean (from totals) = 15.6. Std(from totals) = 3.4658

Std (of means for individuals) = 0.8664

APPENDIX F:

Results of the computed sample Z -value and theoretical $Z_{\alpha = 0.05}$ value used in testing hypotheses.

In the following results: r = number of respondents of a perception of interest to be tested.
 n = the constant sample size ($n = 35$).
 p = proportion(r/n) of interest for testing a hypothesis.
 α = constant level of significance ($\alpha = 0.05$)

HYPOTHESIS 1:

Source of data: Table 7(a) in appendix B

$r = 31$

$n = 35$

Computed sample Z = 0.5167

Value of Z at $\alpha = 0.05$ is 1.64

HYPOTHESIS 2:

Source of data: Table 7(b) in appendix B

$r = 18$

$n = 35$

Computed sample Z is 0.0183.

Value of Z at $\alpha = 0.05$ is 1.64

HYPOTHESIS 3:

Source of data: Table 7(c) in appendix B

$r = 20$

$n = 35$

Computed sample Z is 0.0915

Value of Z at $\alpha = 0.05$ is 1.64

HYPOTHESIS 4:

Source of data: Table 7(d) in appendix B

$r = 16$

$n = 35$

Computed sample Z is -0.0549

Value of Z at $\alpha = 0.05$ is -1.64.

HYPOTHESIS 5:

Source of data: Table 7(e) in appendix B

$r = 28$

$n = 35$

Computed sample Z is 0.3928

Value of Z at $\alpha = 0.05$ is 1.64.

APPENDIX G: Illustration of the stages involved in the preparation of an IS/IT investment assessment framework.

Stage I: Review of corporate, IS and IT strategic plans

This stage will involve top co-operative organizations' managers to answer the following questions.

1. Is there a corporate plan for the co-operative organization?(Y/N)
If the answer is NO prepare a corporate plan, otherwise answer question two (2).
2. Does the corporate plan reflect business activities carried out by the co-operative organization? (Y/N).
If the answer is NO revise the corporate plan so that it reflects relevant business operations for the organization, otherwise answer question three (3).
3. Is there an IS strategic plan as part of the corporate plan?(Y/N)
If the answer is NO, prepare the plan (see appendix H for an illustration), otherwise answer question four (4).
4. Is the IS strategic plan aligned with the corporate plan? (Y/N). If the answer is NO, align the plan with the corporate plan, otherwise answer question five (5).
5. Is there an IT strategic plan? (Y/N). If the answer is NO prepare the plan (see appendix H for an illustration), otherwise answer question six (6).
6. Is the IT strategic plan aligned with the corporate plan? (Y/N). If the answer is NO align the plan with the corporate plan and then answer question seven (7).
7. Does the IT strategic plan show how the IS demands will be met/supplied? Y/N. If the answer is No then revise the IT strategic plan so that it shows how the IS demands will be supplied, otherwise go to **Stage II** below.

Stage II: List of prospective IS and/or IS/IT tools/facilities investments list

As it is for stage I above top co-operative organizations' managers will be requested to answer the following questions.

8. Is there a list of ISs to invest on? (Y/N). If the answer is NO prepare the list, otherwise answer question nine (9) below.
NB: If the intension is to invest on ISs.

9. Is the list in line with the IS strategic plan? (Y/N). If the answer is NO review the list of ISs.

10. Is there a list of IS/IT tools/facilities/services which is in line with the IT strategic plan? Y/N. If the answer is NO review the list so that it is in line with the IT strategic plan.

NB: If the intension is to invest on IS/IT tools/facilities.

What follows is a simple example of prospective IS/IT tools/facilities/services that might be invested on in order to have an effective IS:

- Computer system hardware, printer(s), scanner(s), uninterruptible power supplies (UPS), typewriter(s), cash register(s), calculator(s), computer applications software (e.g. accounts packages, payroll packages, stocks control packages, word processors, electronic spreadsheets etc).
- Telecommunication equipment (e.g. TTCL fixed telephones, mobile telephones, fax machines, internet dishes etc).

Stage III: Estimation of basic tangible costs (an actual survey of relevant costs should be made)

11. Prepare the basic costs of each one of the prospective IS/IT tools/facilities/services to invest on ; these will have been listed in stage II above.

The basic costs may include costs for:

- i. the purchase of computer system hardware(e.g. PC., printer, scanner etc);
- ii. purchase of computer software(e.g. operating system and applications programs like accounting packages, payroll packages, electronic spreadsheets, word processing packages etc);
- iii. purchase of telecommunications hardware (e.g. TTCL fixed telephone, mobile telephones, modems, satellite dishes and associated wiring etc);
- iv. preparation of an office to accommodate the IS/IT tools/facilities/services and staff or renting an office or restructuring an existing office;
- v. installation of computer hardware, computer software and telecommunication facilities;
- vi. IS/IT tools/facilities/services maintenance; and
- vii. Training of personnel to run and manage the prospective ISs investments.

These basic tangible costs will be applicable to all IS/IT tools/facilities or services and may be compared among competing systems or IS/IT

tools/facilities as some of these tools/facilities/services might be cheaper than others and if cheapness is an important factor then cheaper system tools/facilities might be preferred to more expensive ones. Also, if cheapness is the only factor considered then the process of selection among system tools/facilities might end here. However, in the real world other factors will need to be considered as discussed below.

Stage IV: Estimation of tangible cost savings:

In the real world a number of factors will need to be considered in addition to the consideration of tangible costs looked at above before a system or IS/IT tool/facility is identified as the most preferable of all the others. These other factors may include the estimation of cost savings resulting from installing the new system or IS/IT tool/facility. The estimation of cost savings will depend on experience from the use of similar IS/IT tools/facilities/services. This means that the estimation of cost savings will need to be done by experienced individuals. If the co-operative organization does not have such an individual it will need to seek for external help.

Estimation of cost saving items, among others, may include:

1. Impact on productivity (that is a measure of output per unit input). The higher the productivity the better the system or IS/IT tool/facility.
2. Impact on operational costs. The lower the operational costs the better the system or IS/IT tool/facility.
3. Impact on the number of workers required. The lower the number of workers required the better the system or IS/IT tool/facility. However, this item may be political as it might touch on the interests of some co-operators. Co-operative organizations provide employment to some co-operators or their relatives. If the installation of an IS investment leads to reduction of formerly employed co-operators or their relatives (e.g. children, uncles etc) then this factor may be looked at differently. If major conflicts occur, IS/IT strategic plan or even the mission and vision may be revisited in order to take account of differences among stakeholders.
4. Maintenance costs (the lower the maintenance costs the better).
5. Administrative costs. The lower the administrative costs the better the system or IS/IT tool/facility.

These estimated cost savings may also facilitate in the selection of competing prospective IS/IT investments, as the interests for co-operative organizations would be to minimize costs so as to increase income to co-operators as individuals and to their co-operative organizations.

Stage V: Application of traditional capital budgeting models.

Traditional capital budgeting models which can be used in the evaluation of IS/IT investments may include:

- payback method

- accounting rate of return on investment (ROI).
- cost-benefit- ratio.
- net present value (NPV).
- profitability index.
- internal rate of return (IRR).

All of these models are well defined in most accounting books and the formulas used are also found in computer packages, like MS-Excel, as paste functions.

Stage VI: Valuing intangible benefits

As it may be difficult to assign monetary values to intangible benefits, then a **scoring model** may be recommended. Carefully designed and administered scoring models can facilitate the assignment of quantitative values to intangible benefits and other attributes. The quantitative values can be summarized and help one with the making of comparisons between prospective IS/IT investment alternatives. As defined by the Laudons (ibid: 345) a “scoring model” is “a quick method of deciding among alternative systems based on a system of ratings for selected objectives”. Otherwise, the Laudons (ibid) quote Matlin (1989) and Buss (1983) who describe the term “scoring models” as “models which give alternative systems a single score based on the extent to which they meet selected objectives”. Although the definitions carry the same meaning, the Laudons’ definition is comprehensive enough for use in this study.

Now, in order to develop a scoring model for the purpose of selecting the best IS/IT investment alternative a group of individuals, with an interest in facilitating a co-operative organization to invest on an IS/IT, is selected. For a primary co-operative society the group may be made up of the society chairperson, the society secretary, a short list of committee members, a short list of selected ordinary members, expected IS/IT tool/facility users/operators and an individual knowledgeable of the workings of the intended IS/IT tool/facility. For a co-operative union the group may be made up of the general manager, the chief accountant, the co-operative union chairperson, expected IS/IT tool/facility users/operators, a short list of secretaries from primary co-operative societies affiliated to the co-operative union and an individual knowledgeable of the workings of the intended IS/IT tool/facility. However, the actual composition of the groups may differ from the above suggested group compositions depending on the magnitude and level of sophistication of the intended IS/IT investment. It has also to be noted, as the Laudons (ibid: 346) put it, that individuals constituting a group to come up with a scoring model should be people who understand the organizational, management and technology issues for which the scoring model is to be developed. This observation is important for the fact that when it comes to awarding weights to decision criteria, the weights should closely reflect the expectations of co-operative members in particular and co-operative stakeholders in general as this will take care of the context within which a particular IS or IS/IT tool/facility is required.

Now, the tasks of the group and individual group members will be to:

1. Through discussions, develop and agree on **sufficient decision criteria** to be applied in judging prospective IS/IT investments (this is to be done by the group as a whole). It has to be noted that the phrase “sufficient decision criteria” should be underscored as it is the key to the inclusion of all important intangible factors on which a prospective IS/IT investment will be judged.
2. Assign a relative weight to each decision criterion (this is to be done by the group as a whole- see column (2) in table 8.2 below). These weights should be a result of the agreement by group members on the relative ranks/importance of the decision criteria developed in item (1) above. The weights can be decimal fractions so that their total is 1 or any values which can make the arithmetic easy to follow.
3. Next, each individual group member assigns relative ratings to the prospective IS or IS/IT tools/facilities to indicate the extent to which each of the IS or IS/IT tool/facility meets a given decision criteria (e.g. the extent to which a system is environment friendly or facilitates communication in rural areas or user-friendly to users) and then find the average relative rating given by all group members so as to get a single figure for the IS or IS/IT tool/facility(see column (3) or column (5) or column (7) in table 8.2).
4. Find the product of values in items (2) and (3) above and get a **score** for each criterion for a given IS or IS tool/facility (see columns (4), (6) and (8) in table 8.2).
5. Find the **sum** of the **scores** for each of the alternative prospective IS or IS/IT tool/facility (see total **scores** at the bottom of columns (4), (6) and (8) in table 8.2).
6. The **sums** of the **scores** for the several prospective IS or IS/IT tools/facilities investment alternatives are compared and the IS or IS/IT tool/facility investment alternative with the highest **score** is considered as the most favourable of all the alternatives.

In table 8.1 below is an example of some coded decision criteria which **group members** might come up with. The table presents a set of sample decision criteria constituting intangible benefits with their corresponding codes.

Table 8.2 is an illustration of how to assign weights to decision criteria, how to assign relative ratings to the alternative IS or IS/IT tools/facilities and how to compute average and total scores for the respective alternative IS/IT investments (e.g. a computer system, a TTCL fixed telephone and a mobile telephone).

Table 8.1: Sample of intangible benefits used as decision criteria.

CODE	CRITERIA
A	Enable easy accessibility of information from and to members in rural areas.
B	Enable accessibility to more accurate information.
C	Allows organizational learning.
D	Support local and international communication
E	Enables to meet industrial/legal requirements.
F	Improve employee job satisfaction.
G	Safe for the user's/operator's health.
H	Prepare ground for future IS/IT developments.
I	Prepare user's/operator's future advancements.
J	Improves on organizational image
K	Incorporates environmental friendly features.
L	User-friendly.
M	Enables to get competitor's business information.
N	Incorporates security features for the organization's data and information.
O	Enables easy communication with suppliers, customers and facilitators.
P	Possibility of minimizing risks of failure to implement.

Source: Fictitious list of sample decision criteria.

Table 8.2: Coded sample decision criteria, weights, relative rates and scores.
(Refer to table 8.1 above for **decision criteria** corresponding to the criteria codes in column (1))

Criteria codes (1)	Decision Criteria weights (2)	Computer System (with Internet programs)		TTCL-fixed Telephone		Mobile telephone	
		Relative Rate (3)	Score (4)	Relative Rate (5)	Score (6)	Relative Rate (7)	Score (8)
A	0.20	4	0.80	2	0.40	3	0.60
B	0.25	4	1.00	2	0.50	2	0.50
C	0.20	5	1.00	3	0.60	3	0.60
D	0.10	4	0.40	2	0.2	2	0.20
E	0.25	2	0.50	1	0.25	1	0.25
Total scores	1.00		3.50		2.35		2.15

Source: From table 8.1 above.

Key for this table 8.2:

1. Numbers in brackets appearing below each column heading represent corresponding column numbers put up in order to facilitate referencing.

2. Entries in column (2) represent the weights given to the **decision criteria** by the group. This is done by considering the relative importance of each **decision criteria** to the organization for a given time period.
3. Entries in columns (3), (5) and (7) have been obtained by averaging the relative rates assigned by the individual group members to the prospective IS/IT tools/facilities of each decision criteria.
4. Scores in column (4) have been obtained by multiplying entries in columns (2) and (3); scores in column (6) have been obtained by multiplying entries in columns (2) and (5), scores in column (8) have been obtained by multiplying entries in columns (2) and (7).
5. Total scores appearing at the bottom of columns (4), (6) and (8) have been obtained by adding up the scores in the corresponding columns.

Stage VII: Tabulate the values resulting from stages III to VI (see table 8.3) and convert the values into proportions (see table 8.4).

From the above discussion it may be gathered that a number of factors can be considered in the justification for the approval of an IS/IT investment proposal. In this study four discrimination results are proposed and they include (i) results of estimated basic tangible costs (as discussed in Stage III above), (ii) results of the estimated cost savings (tangible benefits as discussed in Stage IV above), (iii) results of the application of the traditional capital-budgeting models (as discussed in Stage V above) and (iv) results of the application of a scoring model (as discussed in Stage VI above). The four results have been summarized in table three (8.3) below.

Table 8.3: Illustration of how to summarize results from (i) Estimated Basic Tangible Costs, (ii) Estimated Cost Savings (Tangible), (iii) Capital budgeting results (tangible) and (iv) scoring model's results (for intangible benefits).

	ITEM NAMES	COMPUTER-BASED IS(with Internet programs)	TTCL-FIXED TELEPHONE	MOBILE PHONE	TOTALS
1*	Basic tangible costs.	(10,000)	(5,000)	(5,000)	(20,000)
2	Cost savings	5,000	2,000	3,000	10,000
3**	Capital budgeting results	0.6	0.2	0.2	1
4	Scoring model results(see table 2 above)	12	4	4	20

Source: Fictitious figures for illustration only.

- * Entries in this row represent cash outflow and therefore they have been assigned a negative sign and this has been maintained throughout all the computations.
- ** IS/IT investments which do not lead to direct and immediate cash inflows will have their capital budgeting row entries reduced to zero. This means

that, as discussed in stage V above, it would be unrealistic to use traditional capital budgeting models to IS/IT investments meant to be used as enablers for this would mean trying to assign values which do not exist.

Table 8.4: Entries in table 8.3 converted into proportions.

	ITEM NAMES	COMPUTER-BASED IS(with Internet programs)	TTCL- FIXED TELEPHONE	MOBILE PHONE	TOTALS
1*	Basic tangible costs.	- 0.5	-0.25	-0.25	-1.0
2	Cost savings	0.50	0.20	0.30	1.00
3	Capital budgeting results	0.60	0.20	0.20	1.00
4	Scoring model results(see table 2 above)	0.70	0.20	0.10	1
5	Totals	1.3	0.35	0.35	

Source: Figures of table 8.4 converted into proportions.

In this table the column totals for the computer-based IS, TTCL-fixed telephone and mobile telephone are 1.3, 0.35 and 0.35 respectively.

Stage VIII: Selecting the most favourable IS/IT investment alternative.

From the table of proportions (table 8.4 above), the most favourable IS/IT tool/facility investment alternative is selected on the basis of the highest score in the totals row. In this example the Computer-based system is selected as the most favourable alternative as it has the highest score (i.e. 1.3).

However, it is important to note that results in table 8.4 may not lead to the final judgement as to which system to invest on. At this point the final judgement may come from the most senior decision maker(s) who may add their instincts/feelings as to what system they feel will do best. If this happens then the final decision maker(s) may need to have their remarks put down for future reference and for information to other stakeholders of the co-operative organization being considered.

APPENDIX H: Illustration of the IS/IT strategic planning process

What follows is a discussion of what would be involved in the preparation of IS and IT strategic plans. Because of space, discussion on the preparation of mission, vision, strategic objectives and corporate planning have not been discussed in detail. However, it is to be noted that the IS and IT strategic plans should be a result of the corporate planning process. In other words the resulting

IS strategic plan and the IT strategic plan are component parts of the corporate plan as are, for example, the marketing or transport strategic plan or other strategic plans which constitute the corporate plan.

Now preparation of IS and IT strategic plans may take the following steps:

- I. The existing mission and vision statements for a co-operative organization under consideration be revisited and where necessary be reviewed so that they reflect the purpose and future aspirations of the organization respectively. This study adopts the definitions of the terms mission and vision as given by Martinelli, F. (2004: 11) who defines the mission of an organization as “the broad description of what we do, with/for whom we do it, our distinctive competence, and WHY we do it”. He also defines the term “vision” in particular “strategic vision” as “the statement that describes what we want the organization to look like in ideal terms in the future- the results we will be achieving and characteristics the organization will need to possess in order to achieve the results”.
- II. The existing corporate plan of the co-operative organization under consideration be studied and checked if it relates to the actual business carried out as reflected in the mission statement. This study adopts Lucey’s (ibid:126) definition of the term “corporate plan” which is also called “strategic plan” which he defines as “the systematic planning of the direction and total resources of the organization so as to achieve specific objectives over the medium to long term”. Now, if the corporate plan is comprehensive it will be expected to have, among other strategic plans, both the IS and IT strategic plans which are aligned with the corporate plan.
- III. If the corporate plan is not comprehensive then it would need to be revised so that it reflects the co-operative organization’s actual business and that it incorporates both the IS and IT strategic plans as it would do for other strategic plans, like strategic plans for marketing, transport or production all of which would be a result of the corporate plan planning process. Here, again, this study adopts Martinelli’s (op cit: 11) definition of the term “strategy” as “a statement of major approach or method (the means) for attaining broad goals and resolving specific issues”. Where the term “goal” is defined by Martinelli (ibid: 11) as “a broad statement of what the organization hopes to achieve in the next 3-5 years.” Martinelli (ibid) again defines the term “objective” as “specific, concrete, measurable statements of what will be done to achieve a goal generally within a one-year time frame”.
- IV. However, if it happens that a co-operative organization does not have a corporate plan then the plan would have to be written from scratch. The IS and IT strategic plans will also have to be written and aligned with the

corporate plan so that IS and IT investments are implemented according to corporate requirements so as to use the organization's resources optimally. The preceding sentence emphasizes the fact that planning must commence at the strategic/top level of the organization so that planning at tactical/functional and operational/supervisory levels takes place within the guidelines of strategic plans (Lucey op cit: 124).

The development of a corporate plan for a coffee marketing co-operative organization would involve the analysis of internal and external factors which have influence on the running of the organization as a coffee marketing co-operative organization. In addition to other factors, the analysis of information and communication technology (ICT) opportunities and implications would have to be included. Now, as the corporate plan is developed strategic objectives, policies and action plans will need to be spelled out in clear terms for every stakeholder to understand. In order to achieve objectives whose achievement requires the existence of information flows, for example advertising, search for information on coffee markets or coffee world prices, production of reports relating to coffee business transactions, a co-operative organization will need to specify information systems requirements in order to get the required information flows for the organization. This statement of requirements will lead to the development of an IS strategy which will define the required ISs and related resources. Having defined the IS requirements there would be a need to have a strategy which will define how the ISs and related supply of resources, including technology, will be implemented and this strategy will lead to the development of an IT strategy which will spell out how the IS requirements and priorities, which will include IS tools and expertise will be supplied.

To be specific, the development of IS and IT strategies will need four inputs which will be a result of the assessment of the organization's internal and external business environment and internal and external IS/IT environments. The four important inputs will result into future applications portfolio for the organization (Edwards et al. 1991: 27-32).

The four inputs are:

- The internal business environment.
- External business environment.
- Internal IS/IT environment.
- External IS/IT environment.

The internal business environment:

The purpose of this input is to provide information on the internal structures, processes and operations of the organization under study. The information will be obtained through the assessment and analysis of what is done in the organization, for what purpose, for what future aims, how it does what it does and how the business operations are managed. It will also look into the politics, formal and informal information flows in the organization as a co-operative

organization. While the analysis is done, the organization's mission and vision and objectives will need to be in view so as to identify successes and failures and be aware of existing strengths and weaknesses. This analysis should facilitate to identify information and information systems needs in order to make the organization competitive both on the short- and long-run.

The external business environment:

The purpose of this input is to provide information on existing external forces to the organization. This information will be obtained through the assessment and analysis of forces likely to have an impact on the success or failure of the organization but which the organization does not have a direct control. Such forces could include factors such as political, environmental, gender, economic, technological, social, lifestyles, demographic, competition and legislative. Based on this environmental scan the organization can identify growth opportunities to capitalize on and threats to be aware of in order to succeed as a business organization owned by co-operative members.

The internal IS/IT environment:

The purpose of this input is to get information on the suitability of existing information systems, information resources including IS/IT assets and other resources like the capability of IS/IT personnel in their contribution towards the success of the organization in the near and far future. Attention will be paid to the strengths and weaknesses of the systems so that attempts are made to minimize the weaknesses and maximize strengths.

The external IS/IT environment:

The purpose of this input is to get information on IS/IT trends in business terms and how others, including competitors, customers and suppliers in the industry, use it. The information will enable a co-operative organization to appreciate and understand developments in information technology and trends in the economics of its use and practicalities of applying new technologies in its business needs. As Edwards et al. (1991: 29) observe, an understanding of potential supply options and different vendors and their product offerings will enable more appropriate solutions to business needs to be considered and new application opportunities to be identified. Again, as Edwards et al. (ibid) observes, knowledge of the use of IS/IT in other industries can provide a source of good ideas which can be transplanted. Below is a sketch diagram (figure 6.2) which summarizes the IS/IT strategic planning process as discussed above.

Summary of the IS/IT strategic planning process

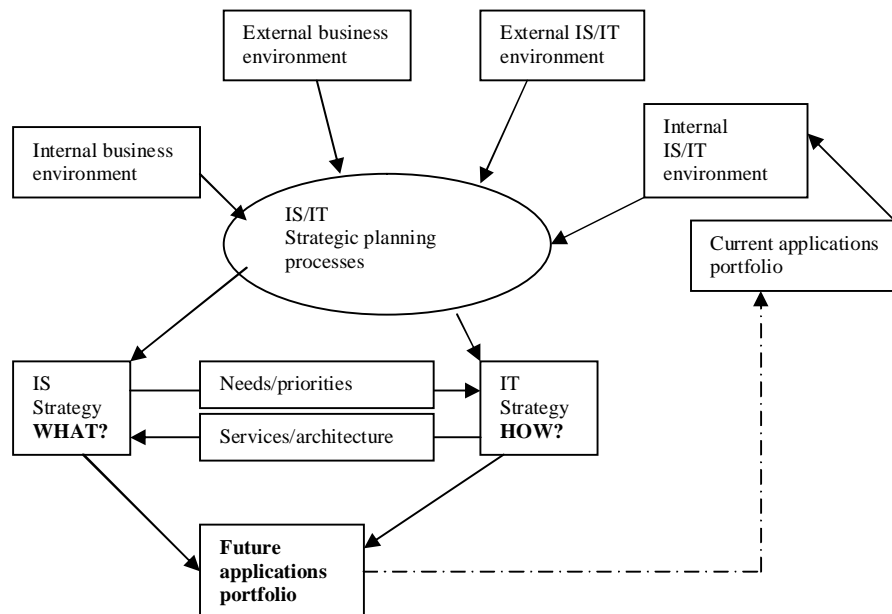


Figure 6.2: IS/IT strategic planning process

Source: Edwards et al. (1991: 27) figure 4.2.

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APPENDIX B

Specific research objectives and a composite data collection tool.

I: SPECIFIC RESEARCH OBJECTIVES:

1. Identify the types of IS investments (manual, mechanical, electronic or any combination of the three) in use in the Coffee Marketing Co-operatives in Tanzania since 1982 to 2003;

Identification of the types of ISs will facilitate knowing if there are any modern ISs within co-operatives. Modern ISs are expected to be electronic (or computer-based ISs), which when properly thought-out before their installation, are expected to perform better than manual or mechanical ISs in terms of the production of information for effective decisions. Information produced by computer-based ISs is expected to be timely, accurate and produced in different forms to suit its recipients. However, as commented elsewhere in the literature review, computerized ISs will not automatically perform better than other types of ISs if their installation is not planned for. Lucey (op. cit.) substantiates on this point by giving the example that

... If IT is misapplied or installed without sufficient analysis of the real management or organizational problems then no benefits will be gained and money will be wasted. Example abounds; the £48m computer system developed by the Government for use by the Training and Enterprise Councils (TECs) was unused because it did not meet the TEC's needs. The TAURUS system for computerizing the Stock Exchanges was finally abandoned in 1992 at a cost of £400m because it could not meet the Stock Exchange's requirements, the reversion to manual systems by the manufacturers of Parker Knoll furniture and so on.

The Parker Knoll example is of particular interest because it is an example of de-automation producing dramatic efficiency gains. Parker used to monitor the movements of 1700 parts on an inventory control network with 15 shop-floor computer terminals. These have been replaced by a basic manual card system (adapted from the Japanese KANBAN system) whereby a card is placed in each pile of stocks. When the stocks fall sufficiently for the card to appear, staff arrange for a further batch to be made...

(Lucey 1997: 7-8)

Lucey (ibid) points out that the key moral from this example is that automating inefficient methods, as Parker did previously does not produce benefits. The methods and systems must be right before any attempt is

made to automate them and no IT system should be installed unless it is demonstrably better than the best manual method.

2. Identify the frequency of assessing/reviewing the performance of existing IS investments in co-operatives.

This information will indicate if co-operatives have the habit of reviewing their existing IS investments so that they take into account changes in information flow requirements in their business environments. With a dynamic market, a market where there is acute competition like where we have liberalized trade as it is the case in Tanzania, internal and external information flows will require constant monitoring in order to keep track of business opportunities and where possible to maintain a competitive edge.

3. Identify factors/items which are considered important in approving proposed IS investments in co-operatives. The interest is to see if tangible, intangible benefits and the human element are considered in appraising IS investment proposals.

This information will facilitate to know if the models/methods used in the assessment/appraisal of proposed IS investments have gaps/shortfalls. It is important to remember that ISs are socio-technical in nature a situation where their benefits and costs are both tangible and intangible. Tangible benefits could include, for example, the return on invested money or reduction in the headcount. Tangible benefits or costs can easily be gauged with the help of common accounting models like the Net Present Value (NPV) or the Internal Rate of Return (IRR) or other Return On Investment models like the Payback models whereas intangible benefits or costs can be assessed through the assignment of weights to factors under consideration. Examples of intangible benefits could include the systems ability to hook in customers and suppliers through prompt supply of information or to have them have on-line links on the other hand, through fast and accurate data processing, systems users may have some extra time for other activities. As most writers agree, the measurement of intangible costs and benefits is a difficult task which most business practitioners would like to avoid by sticking to easily measurable benefits and costs which can be easily worked out by the use of accounting models. Avoidance of consideration of intangible variables and the human element or the non-consideration of variables which can lead to the approval of adequate IS/IT investments may be called a gap/shortfall in this study.

4. Identify factors/items considered important in assessing/reviewing the performance of existing IS investments in the co-operatives 3

Again this information will help in knowing if the models/methods used in assessing/reviewing the existing IS investments have gaps/shortfalls. The information will also indicate as to whether co-operative organizations take time to learn new opportunities inherent in the ISs but which might not have been planned for.

5. Identify/come up with a list of models/methods used, in practice, in the assessment of proposed IS investments in the co-operatives. 4

This will help to tell if there exist any IS investment assessment models/methods and their nature. In some situations business practitioners could be found considering only tangible benefits without taking into account intangible benefits or the human element in assessing proposals for the investment of ISs in their organizations. As it has been pointed out above, this could indicate a gap or shortfall in such models. Such gaps could be indicated by investigating the models/formulae/frameworks which are in practical use in co-operative organizations under study.

6. Identify gaps/shortfalls (e.g. lack of consideration of intangible benefits and costs or lack of consideration of tangible benefits and costs or lack of consideration of the human element or other important factors which lead to adequate IS assessment models) in the assessment of newly proposed IS investments in co-operatives. This information will cast light on the practice followed in the assessment of newly proposed IS investments among co-operative organizations in Tanzania. 5
7. Come up with proposed models/methods/frameworks which can be used in the assessment of IS investments in co-operatives. These will contribute to the existing knowledge on the formulation of models for the assessment of proposed IS investments. 7
8. Identify the extent to which different co-operative managers at different management levels are satisfied with existing ISs in effecting communication between the co-operative organizations and their: members, suppliers(e.g. financial suppliers like banks, agricultural inputs suppliers and other suppliers), customers/markets, competitors and co-operative movement facilitators. 8

This information will open an eye on how different management levels of co-operative organizations perceive effectiveness of ISs in supporting communication in their co-operative organizations

II: COMPOSITE DATA COLLECTION TOOL:

PROPOSED QUESTIONNAIRE (filename: Q_naïre1.doc. Last updated: 25/08/03)

From: Benedict L.K.Mwaibasa

Respondent No:___ Sex(M/F)___

Questionnaire No.:_____

Date answered:_____

:_____

This is a copy of a questionnaire for a study being carried out as part of the requirements of a Ph.D. programme I am currently pursuing at the St.Clements University of the British West Indies. As such, the purpose of this study is purely academic in nature and the data collected will not be used for any other purpose other than this.

This questionnaire is meant to find out a few things about you, the data/information processing facilities, information communication facilities and models/methods/frameworks used in unions/societies in the assessment of proposed Information Systems (ISs) investments. The purpose is see if improvements can be made on the assessment of proposed IS/IT investments in co-operative organizations so as to come up with effective IS/IT investments.

Please, kindly answer the questions to the best of your knowledge. Whenever, you find problems in filling parts of the questionnaire do not hastate to ask.

Instructions for each question for have been included, but you can still ask if they are not clear.

I take this opportunity to thank you in advance for devoting your efforts and time to participate in this study.

:_____

SECTION A:

QUESTION 1:

(i) Name of Union/Society: _____.

(ii) Name the union of affiliation if you have entered "Name of Society" in (i) above):_____.

(iii) Name of headquarters location:_____

(iv) Name of district: _____.

(v) Name of Region: _____.

(vi) Name of your department/section (e.g. GMs office, Marketing, Sales, Accounts, Purchases, Secretarial, etc.):_____.

(vii) Your position/rank(e.g. GM, Marketing Manager, Chief Accountant, Financial Manager, Chairperson, Committee person, Ordinary member etc):
:_____.

- (viii) Your work experience in years: _____(years).
- (ix) Your highest academic qualification(e.g. Primary School Certificate, Secondary Education, Post Secondary School Education):_____.
- (x) Your highest professional qualification(e.g. Secretary, Certified Public Accountant (CPA (T)), Salesmanship, etc.):_____.
- (xi) Major function(s) of your department/section (e.g. Marketing, Sales, accounting secretarial, Purchasing, etc):_____.
- (xii) Has your union/society reliable electric power?
 Yes
 No
 Put a tick (✓) against the appropriate answer.

SECTION B:

QUESTION 2(a):

- (i) In the table below, put a tick (✓) in the relevant cell of an equipment owned and used by your union/society.

S/N o	NAME OF EQUIPMENT	UNION/SOCIETY HAS & USES (✓)	QUAN- TITY	UNION/SOCIETY PLANNED FOR ITS PURCHASE(✓)	IT WAS DONATED (✓)
1	Typewriter				
2	Calculator				
3	Cash register				
4	Telephone:	Landline			
		Mobile			
5	Computer(stand alone)				
6	Computer network(LAN)				
7	Internet/e-mail facility				
8	Internet/Web site facility				
9	Fax				
10	Telex				
11	Weighing scale/machine				
12	*Other equipment				

- Please, explain if you have any other equipment in use.

- (ii) In the following table indicate your department's estimated percentage usage of the equipment/facility used in the preparation and communication of reports by putting a tick(✓) in the relevant row and column:

EQUIPMENT		PERCENTAGE USAGE OF DATA PROCESSING EQUIPMENT				
		0 - 20	21 - 40	41 - 60	61 - 80	81 - 100
Typewriter(s)						
Calculator(s)						
Cash-register(s)						
Telephone	Landline					
	Mobile					
Computer(stand alone)						
Computer Network(LAN)						
Internet/e-mail facility						
Internet/web site facility						
Fax						
Telex						
Weighing scale/machine						
Hand and pencil						
Other means*						

- If you use some other equipment/means, please explain.

:_____.

- (iii) Indicate, by putting a tick(✓) against an estimated percentage of proficiency your department has in using one or more of the equipment shown in the table below:

EQUIPMENT		ESTIMATED PERCENTAGE OF EQUIPMENT USAGE PROFICIENCY				
		0 - 20	21 - 40	41 - 60	61 - 80	81 - 100
Typewriter						
Calculator						
Cash-register						
Telephone	Landline					
	Mobile					
Computer(stand alone)						
Computer Network(LAN)						
Internet/e-mail facility						
Internet/Web site facility						
Fax						
Telex						
Weighing scale/machine						

Hand and pencil					
Other means*					

- Please, if your department uses some other equipment/means, explain.

(iv) In the table below indicate by putting a tick (√) against an equipment/facility in which its operator was trained to use and show the time duration of the course.

EQUIPMENT		PUT A √ AGAINST THE EQUIPMENT WHOSE USER WAS TRAINED	ENTER THE COURSE DURATION IN MONTHS
Typewriter			
Calculator			
Cash-register			
Telephone	Landline		
	Mobile		
Computer(stand alone)			
Computer Network(LAN)			
Internet/e-mail facility			
Internet/web site facility			
Fax			
Telex			
Weighing scale/machine			
Hand and pencil			
Other equipment*			

* Explain if any other equipment is in use.

QUESTION 2(b)

In the table below, indicate by putting a tick (√) in the relevant column and row the major destination of your report(s) and the major means of communication used:

MAJOR	MAJOR MEANS OF COMMUNICATION IN OUR UNION/SOCIETY
-------	---

REPORT DESTINATION	(1) Messenger	(2) Telephone	(3) Internet (e-mail)	(4) Internet	(5) Church Announcements	(6) Mosque Announcements	(7) Post services	(8) Posters	(9) Discussions	(10) *Other means (specify)
Ordinary members										
Local Markets										
Foreign Markets										
Local Suppliers										
Foreign Suppliers										
Local Banks										
Foreign Banks										
Competitors										
Sales Agents										
Transporters										
Other*										

- Please, explain if there are other destinations of your reports and means of communication.

_____.

_____.

QUESTION 3:

Your department/section produces reports/documents for use in decision making and control.

- (i) Do you ever review the performance/adequacy/appropriateness of the equipment used for report production? Put a tick ✓ against the correct answer: Yes
No.
- (ii) If your answer to question (i) above is No, explain why reviews are not made and then go to question 5, otherwise continue to (iii).

_____.

- (iii) If your answer to (i) above is Yes, indicate in the table below how often you make reviews in a year by putting a tick (✓) against the relevant number of times you review.

RANGE OF TIMES OF REVIEW IN A YEAR	PUT A TICK ✓
1 TO 3	
4 TO 6	
7 TO 10	

MORE THAN 10	
--------------	--

- (iv) Who makes the reviews for the performance/adequacy of your equipment?
Put a tick against the correct option in the table below:

	REVIEWER OF EQUIPMENT	PUT A TICK √
A	INTERNAL USERS/OPERATORS	
B	EXTERNAL EXPERTS	
C	COMBINATION OF (A) AND (C) ABOVE	
D	* OTHER	

- Please, explain if there are any other equipment review arrangements.

_____.

- (v) When is the equipment reviewed? Put a tick √ against the correct option.
- A. When there is a problem.
 - B. According to the set schedule.
 - C. Both (A) & (B) above.
 - D. Other conditions(please specify)

QUESTION 4:

Against the equipment/facility you use in your union/society write down a factor you considered to be the most important of all factors when assessing/reviewing its performance.

Example: (a) Typewriter: A

This means that only its original purpose for which it was purchased is considered.

Note: The list of factors is just below this list of equipment.

LIST OF EQUIPMENT

- 2) Typewriter: ____.
- 3) Calculator: ____.
- 4) Cash register: ____.
- 5) Telephone: Landline: ____.
a. Handset/ Mobile phone: ____.
- 6) Computer (stand alone): ____.
- 7) Internet/e-mail facility: ____.
- 8) Internet/Web site facility: ____.
- 9) Local area network: ____.
- 10) Fax: ____
- 11) Telex: ____
- 12) Weighing scale/machine: ____.
- 13) Other equipment (please, explain): ____.

LIST OF FATCORS:

A- Its original purpose for which it was purchased only.

- B- Its original purpose for which it was purchased plus tangible (measurable) unplanned benefits and costs which came up during its use only.
- C- (B) above plus other intangible (immeasurable) and unplanned benefits and costs which came up during its use.
- D- Other factors (Please, explain): _____.

QUESTION 5:

Against data/information processing/communication facilities you purchased for use in your union/society, write down a letter of the combination of formulae/models used as a basis for approving the purchase of the IS/IT facilities.

Note: The combinations of formulae/models are just below this list of equipment/facilities.

LIST OF EQUIPMENT

- 1) Typewriter: ____.
- 2) Calculator: ____.
- 3) Cash register: ____.
- 4) Telephone: Landline: ____.
1. Handset/Mobile phone: ____.
- 5) Computer (stand alone): ____.
- 6) Local Area Network(LAN): ____
- 7) Internet/e-mail facility: ____.
- 8) Internet/Web site facility: ____.
- 9) Fax: ____.
- 10) Telex: ____.
- 11) Weighing scale/machine
- 12) * Other equipment(please, explain): _____

* Please, explain if you have any other equipment/facilities in use: _____.

LIST OF COMBINATIONS OF FORMULAE/MODELS

- A- Return on Investment (ROI) formula only (e.g. Payback model) only.
- B- ROI + Net Present Value (NPV) only.
- C- ROI + NPV + Internal Rate of Return (IRR) only.
- D- (C) above plus weighted intangible benefits (e.g. produce accurate, timely information and in different formats to suit the user).
- E- (D) above plus its capability to link the union/society to its members effectively and efficiently.
- F- (D) above plus its capability to link the union/society to its suppliers (e.g. financial and agricultural inputs suppliers).
- G- (D) above plus its capability to link the union/society to its market/customers/distribution channels.
- H- (D) above plus its capability to link the union/society to its competitors (e.g. other unions/societies, private companies, associations of individuals in a similar business).
- I- Give weights to D or E or F or G or H plus a weighting for the capability of the user of the equipment/operator.
- J- * Other formulae/models.
* Please, explain if you use other procedure/basis for approving the purchase of equipment.

SECTION C:

QUESTION 6(a)

(For interviewing all respondents):

- (i) Do you know the suppliers of your union/society?
Yes.
No.
- (ii) If your answer to question (i) above is Yes, give two examples:
Local suppliers: _____
Foreign suppliers: _____
- (iii) Do you know the customers of your union/society?
Yes.
No.
- (iv) If your answer to question (iii) above is Yes, give two examples:
Local customers: _____
Foreign customers: _____
- (v) Do you know the competitors of your union/society?
Yes.
No.
- (vi) If your answer to question (iv) above is Yes, give two examples:
Local competitors: _____
Foreign competitors: _____
- (vii) Do you know any institutions which facilitate co-operative development?
Yes.
No.
- (viii) If the answer to question (vii) above is Yes, give two examples:
Local facilitators: _____
Foreign facilitators: _____

QUESTION 6(b):

(For interviewing union managers and primary society secretaries only):

- (i) Do you have a business plan for your co-operative organization?
(YES/NO)_____.
- (ii) If your answer to (i) above is YES, is the business plan short-term(less than two years) or long-term (two years and more)? _____
- (iii) If your answer to (i) is NO, briefly explain why the organization does not have a plan and how the organization is run without a plan.

- (iv) Do you have an information systems plan for this organization? (YES/NO)____

- (v) If your answer to (iv) is NO, briefly explain how you make sure that the co-operative organization communicates effectively with its: members, customers, suppliers, competitors and co-operative movement supporting institutions.
- (vi) If your answers to both (i) and (iv) above are YES, briefly explain how the two plans (the business plan and the information systems plan) are related in terms of alignment. _____

SECTION D:

QUESTION 7:

This question requires you to indicate whether you: (1) Strongly Disagree (SD) or (2) Disagree (D) or (3) Undecided (U) or (4) Agree (A) or (5) Strongly Agree (SA) to the given statement by circling the relevant number under SD or D or U or A or SA respectively.

(Please, see the following example.).

Example:

Start of example:

Statement

↓

I am always happy with my boss.

Scale

↓

SD	D	U	A	SA
1	2	3	4	5

This means that I agree (A) to the given statement.

End of example.

Start of questions to fill:

Statement

Scale

Sub-section V:

- | | | | | | |
|---|----|---|---|---|----|
| 1. The existing ISs facilitate effective communication between the union/society and its members. | SD | D | U | A | SA |
| | 1 | 2 | 3 | 4 | 5 |
- Note: ISs = Information Systems

2. Members get all the necessary Information from their Union/society.	SD 1	D 2	U 3	A 4	SA 5
3. Our union/society has effective Communication with its members.	SD 1	D 2	U 3	A 4	SA 5
4. Several times this union/society has been facing problems in passing important information to its members.	SD 1	D 2	U 3	A 4	SA 5
5. Members of this union/society have been having difficulties of getting information from their union/society.	SD 1	D 2	U 3	A 4	SA 5
6. There is no clear means of communication between the union/society and its members.	SD 1	D 2	U 3	A 4	SA 5

Sub-section W:

7. The existing ISs facilitate communication between the union/society and its suppliers (e.g. of farm inputs, finance and other supplies).	SD 1	D 2	U 3	A 4	SA 5
8. Suppliers get all the necessary information from this union/society whenever required.	SD 1	D 2	U 3	A 4	SA 5
9. Suppliers of our union/society have been having communication problems with our union/society.	SD 1	D 2	U 3	A 4	SA 5
10. There is no clear means of communication between our union/society and our suppliers.	SD 1	D 2	U 3	A 4	SA 5
11. Our union society has effective communication with its suppliers.	SD 1	D 2	U 3	A 4	SA 5

Sub-section X:

12. The existing ISs facilitate effective communication between the	SD 1	D 2	U 3	A 4	SA 5
---	---------	--------	--------	--------	---------

union/society and its markets/
customers.

13. Our union/society can get all necessary national market information for its products.	SD 1	D 2	U 3	A 4	SA 5
14. Our union/society can get all necessary international market information for its products.	SD 1	D 2	U 3	A 4	SA 5
15. Our union/society has no clear ISs for the acquisition of market information for its products.	SD 1	D 2	U 3	A 4	SA 5
16. It is difficult for our union/society to get market information for its products.	SD 1	D 2	U 3	A 4	SA 5

Sub-section Y:

17. The existing ISs facilitate communication between our union/society and its competitors(e.g. other unions/ societies or other organizations doing similar functions).	SD 1	D 2	U 3	A 4	SA 5
18. Our union/society can get all necessary information from its competitors.	SD 1	D 2	U 3	A 4	SA 5
19. There is no clear means of getting information from our competitors.	SD 1	D 2	U 3	A 4	SA 5
20. There is no need for our union/ society of getting competitors' information.	SD 1	D 2	U 3	A 4	SA 5

Sub-section Z:

21. Our union/society can communicate effectively with its facilitators.	SD 1	D 2	U 3	A 4	SA 5
22. Our union/society can exchange and share information with	SD 1	D 2	U 3	A 4	SA 5

facilitators without problems.

- | | | | | | |
|--|---------|--------|--------|--------|---------|
| 23. It has always been difficult for our union/society to communicate effectively with its facilitators. | SD
1 | D
2 | U
3 | A
4 | SA
5 |
| 24. There is no clear means of communication between our union/society and facilitators. | SD
1 | D
2 | U
3 | A
4 | SA
5 |

END OF QUESTIONNAIRE.

I THANK YOU VERY MUCH FOR YOUR HELP.

APPENDIX C:

Summary sheets by questions

Common keys to summary sheets:

ORG_ID = Identification code for a co-operative Organization.

RESP_ID = Identification Code for a respondent.

Table 1(a): SUMMARY SHEET FOR QUESTION ONE
BASIC DATA FOR MANAGERS AND SECRETARIES

ORG_ID	U/S_NAME	H/QUARTER	UNION_AFFL'N	DEPT/SEC_NAME	SEX(M/f)	EXP_ENCE(yrs)	PROF_QUAL	DEPT/SEC_FUNC	COMP_LIT(Y/N)	ELECTRICITY(Y/N)

Key: In the COMP_LIT_CE(Y/N) and ELECTRICITY(Y/N)

Columns 1= Y(YES) and 0 = N(NO).

U/S_NAME = Union/Society Name

H/QUARTER = Head Quarter

UNION_AFFL'N = Union Affiliation.

DEP/SEC_NAME = Department/Section Name.

EXP_ENCE(yrs) = Experience in years.

PROF_QUAL = Professional qualifications

DEPT/SEC_FUNC = Department/Section functions.

COMP_LIT(Y/N) = Computer literate(yes/no).

Table 1(b): SUMMARY SHEET FOR QUESTION ONE
EDUCATIONAL DATA FOR ALL RESPONDENTS

[illegible]

Table 2(a): SUMMARY SHEET FOR QUESTION TWO(a)

DATA/INFORMATION PROPCESSING & COMMUNICATION FACILITIES IN THE STUDIED CO-OPERATIVE ORGANIZATIONS

[illegible]

Table 2(b): SUMMARY SHEET FOR QUESTION TWO (b)

TABLE SHOWING MAJOR MEANS OF COMMUNICATION
WITHIN SURVEYED CO-OPERATIVE ORGANIZATIONS.

ORG_ID	Members	Union/Society	Local Customers	International Customers	Local Suppliers	International Suppliers	Competitors	Banks	Transporters

Table 3: SUMMARY SHEET FOR QUESTION THREE
REVIEW OF ISS TOOLS/EQUIPMENT
PERFORMANCE

(1) ORG_ID	(2) NO. OF REVIEWS PER YEAR (Range)	(3) REASONS FOR NOT REVIEWING	(4) CAUSES FOR REVIEW	(5) SOURCE OF REVIEWERS USED	(6) REMARKS

Key: 1. Column (4) to represent a list of reasons for reviewing IS tools/equipment:

- A: When there are problems with the tools/equipment.
- B: According to the set schedule.
- C: Other conditions.

- 2. Column (5) to represent types of people to take part in reviewing the performance of ISS tools/equipment e.g.

- 1: Internal users/Operators
- 2: External experts.
- 3: Combination of (1) and (2) above.
- 4: Others.

Table 4: SUMMARY SHEET FOR QUESTION FOUR

**MOST IMPORTANT FACTORS CONSIDERED DURING THE
REVIEW OF THE PERFORMANCE OF ISs
TOOLS/EQUIPMENT**

ORG_ID	IS/IT TOOLS/EQUIPMENT												REMARKS
	01	02	03	04	05	06	07	08	09	10	11	12	

Key:

5. List of IS/IT tools/facilities codes: Typewriter (01), Calculator (02), Cash Register(03), Telephone (04), Computer (05), Internet (06), Website (07), Local Area Network (08), Fax (09), Telex (10), Weighing machine (11), Others (12).
6. List of most possible important factors:
 - A. Original purpose for purchasing the tool/facility.
 - B. Original purpose plus tangible unplanned for benefits and costs which came up during the use of the tool/facility.
 - C. B above plus other intangible benefits and costs which came up during the use of the tool/facility.
 - D. Other factors.

Table 5: SUMMARY SHEET FOR QUESTION FIVE

**MODELS/METHODS/FRAMEWORKS USED AS A BASIS
FOR THE JUSTIFICATION OF APPROVING THE
PURCHASE OF AN IS/IT TOOL/FACILITY**

ORG_ID	IS/IT TOOLS/EQUIPMENT												REMARKS
	01	02	03	04	05	06	07	08	09	10	11	12	

Key:

7. Code for IS/IT tools/facilities: Typewriter (01), Calculator (02), Cash Register (03), Telephone (04), Computer (05), Internet (06), Website (07), Local Area Network (08), Fax (09), Telex (10), Weighing machine (11), Others (12).
8. Possible factors constituting formulae/models/frameworks used as a basis for the justification of approving the purchase of IS/IT tools/equipment/facilities.
 - A. Depended on advice from experts.
 - B. Considered an affordable price.
 - C. (B) above plus consideration of cheaper operating costs.
 - D. (C) above plus consideration of accuracy and timeliness of information received/sent.
 - E. Considered its capability to bring in/send out information to the organization's members.
 - F. Considered its capability to bring in/send out information to the organizations' suppliers.
 - G. Considered its capability to bring in/send information to the organization's customers/markets.
 - H. Considered its capability to bring in/send out information to the organization's competitors.
 - I. (B) above plus a consideration to simplify office work.
 - J. Considered the need to be modern.
 - K. It was necessary/There was other way.
 - L. Other methods (please, specify the method).

Table 6(a): SUMMARY SHEET FOR QUESTION 6(a)

KNOWLEDGE/AWARENESS OF CO-OPERATORS ABOUT THEIR CO-OPERATIVE ORGANIZATIONS': SUPPLIERS, CUSTOMERS, COMPETITORS AND CO-OPERATIVE MOVEMENT INSTITUTIONAL SUPPORTERS

[illegible]

Codes to be entered in the columns are 0 and 1

Key to coding: 0 = NO and 1 = YES

Table 6(b): SUMMARY SHEET FOR QUESTION SIX(b)

EXISTANCE OF BUSINESS AND IS STRATEGIC PLANS IN THE SURVYED CO-OPERATIVES.

ORG_ID	BUSINESS STRATEGIC PLAN	IS STRATEGIC PLAN	TOTAL	REMARKS
Total				

Codes to be entered are 0 and 1.

Key: In coding: 0 = NO and 1 = YES

Table 7(a): SUMMARY SHEET FOR QUESTION 7(a)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR MEMBERS.

[illegible]

Table 7(b): SUMMARY SHEET FOR QUESTION 7(b)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR SUPPLIERS.

RESP_ID	CONCEPT ITEMS					RESPONDENT'S TOTAL	RESPONDENT'S AVERAGE	1 = AVERAGE > 3 0 = AVERAGE <= 3
	7	8	9	10	11			
TOTAL								

Table 7(c): SUMMARY SHEET FOR QUESTION 7(c)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR CUSTOMERS.

RESP_ID	CONCEPT ITEMS					RESPONDENT'S TOTAL	RESPONDENT'S AVERAGE	1 = AVERAGE > 3 0 = AVERAGE <= 3
	12	13	14	15	16			
TOTAL								

Table 7(d): SUMMARY SHEET FOR QUESTION 7(d)

EFFECTIVENESS OF ISs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THEIR COMPETITORS.

RESP_ID	CONCEPT ITEMS				RESPONDENT'S TOTAL	RESPONDENT'S AVERAGE	1=AVERAGE > 3 0=AVERAGE <=3
	17	18	19	20			
TOTAL							

Table 7(e): SUMMARY SHEET FOR QUESTION 7(e)

EFFECTIVENESS OF ISSs IN SUPPORTING CO-OPERATIVE ORGANIZATIONS TO COMMUNICATE WITH THE CO-OPERATIVE MOVEMENT INSTITUTIONAL SUPPORTERS.

RESP_ID	CONCEPT ITEMS				RESPONDENT'S TOTAL	RESPONDENT'S AVERAGE	1=AVERAGE >3 0=AVERAGE <=3
	21	22	23	24			
TOTAL							

APPENDIX D:

- I: Sample letters requesting permission for the researcher to collect data from co-operative organizations.

THE CO-OPERATIVE COLLEGE

TELEGRAMS: "ELIMU"/ "MASOMO"
TELEPHONE: (027) 27-54401/3

(027) 27-52776 OR 2752611

PERSONAL LINE (027) 27-51833

Mobile: 0744289463

PRINCIPAL'S Res. (027) 2752058

TELEFAX: (027) 2753857 or 2750806

E-mail : cckwing@africaonline.co.tz

: ushirika@kilionline.com

P.O. BOX 474

SOKOINE ROAD
MOSHI

TANZANIA

Your Ref. No: CC/PF/9/216

25/06/2003

Our Ref. No:

THE GENERAL MANAGER,
KNCU,
P.O. BOX 3032,
MOSHI.

Dear General Manager

RE: REQUEST FOR PERMISSION TO LET MR. BENEDICT L.K. MWAIBASA COLLECT DATA PERTAINING TO INFORMATION SYSTEMS IN YOUR UNION.

The above heading refers.

Please, the College asks permission from you to allow Mr. Benedict L.K. Mwaibasa to collect data pertaining to information systems used in your organization.

Mr. Mwaibasa is a member of staff of this College and he is pursuing a Ph.D. programme offered by the St. Clements University of the British West Indies. As part of the Ph.D. award requirements Mr. Mwaibasa is doing a research project on models/methods/frameworks used in the assessment of IS/IT investment proposals in co-operative organizations. The main objective of this study is to come up with well assessed/appraised IS systems which can adequately support co-operative organizations in the current liberalized trade environment.

We shall be thankful to get your permission.

Yours Sincerely

Signed by the principal
S.A. Chambo
PRINCIPAL.

Enclosed: 1. One copy of the questionnaire
2. A copy of proposed time schedule.

THE CO-OPERATIVE COLLEGE

TELEGRAMS: "ELIMU"/ "MASOMO"

TELEPHONE: (027) 27-54401/3

(027) 27-52776 OR 2752611

PERSONAL LINE (027) 27-51833 Mobile: 0744289463

PRINCIPAL'S Res. (027) 2752058

TELEFAX: (027) 2753857 or 2750806

E-mail : cckwing@africaonline.co.tz
: ushirika@kilionline.com

P.O. BOX 474

SOKOINE ROAD
MOSHI

TANZANIA

Your Ref. No: CC/PF/9/216

25/06/2003

Our Ref. No:

THE CHAIRPERSON,
MARANGU EAST PRIMARY CO-OPERATIVE SOCIETY,
P.O. BOX 3032,
MOSHI.

Dear General Manager

RE: REQUEST FOR PERMISSION TO LET MR. BENEDICT L.K. MWAIBASA COLLECT
DATA PERTAINING TO INFORMATION SYSTEMS IN YOUR UNION.

The above heading refers.

Please, the College asks permission from you to allow Mr. Benedict L.K. Mwaibasa to collect data pertaining to information systems used in your organization.

Mr. Mwaibasa is a member of staff of this College and he is pursuing a Ph.D. programme offered by the St. Clements University of the British West Indies. As part of the Ph.D. award requirements Mr.Mwaibasa is doing a research project on models/methods/frameworks used in the assessment of IS/IT investment proposals in co-operative organizations. The main objective of this study is to come up with well assessed/appraised IS systems which can adequately support co-operative organizations in the current liberalized trade environment.

We shall be thankful to get your permission.

Yours Sincerely

Signed by the principal
S.A.Chambo
PRINCIPAL.

Enclosed: 1. One copy of the questionnaire
 2. A copy of proposed time schedule.

II: Provisional time schedule for data collection from co-operative organizations:

S/No:	PEOPLE TO FILL THE QUESTIONNAIRE	DATE TO FILL THE QUESTIONNAIRE
1	KNCU and two affiliated primary co-operative societies.	04/09/2003 (Thursday) to 18/09/2003(Thursday)
2	ACU and two affiliated primary co-operative societies.	22/09/2003 (Monday) to 26/09/2003 (Friday).
3	MBOCU and two affiliated primary co-operative societies	03/10/2003 (Friday) to 10/10/2003 (Friday)
4	RUCU	16/10/2003 (Thursday) to 17/10/2003 (Friday)*

* Actually data collection was completed on 14th November, 2003.

APPENDIX E

List of filled in questionnaire summary sheets

(Table 4.1(a) to table 4.7(e))

Key for all summary sheets:

ORG_ID = Identification code for a co-operative organization.

RESP_ID = Identification code for a respondent.

Table 1(a): SUMMARY SHEET FOR QUESTION ONE
BASIC DATA FOR MANAGERS AND SECRETARIES

ORG_ID	U/S_NAME	H/QUARTER	UNION_AFFL'N	DEPT/SEC_NAME	SEX(M/F)	EXPT_ENCE(yrs)	PROF_QUAL	DEPT/SEC_FUNC	COMP_LIT (Y/N)	ELECTRICITY(Y/N)
03	KNCU	Moshi	N/A	GM'S Office	M	16	Administration	Administration	0	1
04	KOMBO	Kombo	KNCU	Secretarial	F	2	NONE	Management	0	0
15	Marangu East	Marangu East	KNCU	Secretarial	F	16	Co-operative Management	Management	0	1
25	ACU Engare Olmotonyi	Arusha	N/A	Marketing	M	5	College Certificate	Marketing & Purchases	0	1
28	i	Engare Olmotonyi Unga Ltd	ACU	Secretarial	M	7	Book-Keeping	Management	1	0
30	Koimere	Arusha	ACU	Secretarial	F	3	Book-Keeping	Management	0	0
32	MBOCU	Mbozi	N/A	GM'S Office	M	4	Accounting	Management	0	1
33	Mlangali	Mlangali	MBOCU	Secretarial	M	9	Book-Keeping	Management	0	0
36	Igamba	Igamba	MBOCU	Secretarial	M	4	Book-Keeping	Management	0	0
38	RUCU	Tukuyu	N/A	GM'S Office	M	1	Co-operative Management	Management	0	1
TOTAL									1	5

Source: Summarized data from questionnaires.

Key: In the COMP_LIT(Y/N) and ELECTRICITY(Y/N) columns: 1= Y (YES) and 0 = N (NO).

In this table: The first column represents Co-operative organizations' codes

Column headings:

U/S_NAME = Union/Society Name

H/QUARTER = Head Quarter

UNION_AFFL'N = Union Affiliation.

DEP/SEC_NAME = Department/Section Name.

EXP_ENCE (yrs) = Experience in years.

PROF_QUAL = Professional qualifications

DEPT/SEC_FUNC = Department/Section functions.

COMP_LIT(Y/N) = Computer literate (yes/no).

Co-operative unions are: KNCU (Kilimanjaro Native Co-operative Union)

ACU (Arusha Co-operative union)

MBOCU (Mbozi Co-operative Union)

RUCU (Rungwe Co-operative Union)

**Table 1(b): SUMMARY SHEET FOR QUESTION ONE
EDUCATIONAL DATA FOR ALL RESPONDENTS**

RESP_ID	EDUCATIONAL QUALIFICATION	POSITION IN SOCIETY/UNION	NAME OF SOCIETY/UNION
01	College Diploma	Deputy Marketing Manager	KNCU Ltd.
02	College Diploma	Purchasing Manager	KNCU Ltd.
03	University Degree	Ag. GM	KNCU Ltd
04			
05	Primary school education (Class VII)	Ordinary member	Kombo- AMCOS
06	Secondary school education (Form IV)	Secretary	Kombo -AMCOS
07	Primary school education (Class VII)	Committee member	Kombo- AMCOS
08	Primary school education (Class VIII)	Committee member	Kombo -AMCOS
09	Primary school education (Class VII)	Committee member	Kombo -AMCOS
10	Primary school education (Class VII)	Ordinary member	Kombo -AMCOS
11	Primary school education (Class VII)	Committee member	Kombo- AMCOS
12	Primary school education (Class VII)	Ordinary member	Kombo-AMCOS
13	Secondary school education (Form IV)	Chairperson	Kombo - AMCOS
14			
15	Secondary school education(Form IV)	Secretary	Marangu-East- AMCOS
16	University Degree(Civil Engineer)	Ordinary member	Marangu-East- AMCOS
17	Secondary school education (Form IV)	Committee member	Marangu-East- AMCOS
18	College Education	Deputy Chairperson	Marangu-East AMCOS
19	Secondary school education(Form IV)	Ordinary member	Marangu-East AMOS
20	Secondary school education(Form IV)	Committee member	Marangu-East AMCOS
21	Secondary school education (Form IV)	Committee member	Marangu-East AMCOS
22	Primary school education (Class VII)	Ordinary member	Marangu-East AMCOS
23	College Certificate	Ordinary member	Marangu-East AMCOS
24	University degree	General Manager	ACU Ltd
25	Secondary school education (Form IV)	Marketing Manager	ACU Ltd
26	College Diploma	Deputy Chairperson	ACU Ltd
27	Secondary school education (Form IV)	Chairperson	ACU Ltd
28	College Certificate	Secretary	Engare Olmotonyi AMCOS
29	Primary school	Chairperson	Engare Olmotonyi

	education(Class VII)		AMCOS
30	Secondary school education(Form IV)	Secretary	Koimere AMCOS
31	Primary Education (Class VII)	Committee member	Koimere AMCOS
32	College Diploma(Advanced Diploma A/c)	Chief Accountant	MBOCU Ltd
33	Primary school education(Class VII)	Secretary	Mlangali AMCOS
34	Primary school education (Class VII)	Committee member	Mlangali AMCOS
35	Primary school education(Class VII)	Chairperson	Mlangali AMCOS
36	Secondary school education (Form IV)	Secretary	Igamba AMCOS
37	Primary school education(Class VII)	Chairperson	Igamba AMCOS
38	College Diploma(PGD- Coop. B.Mngt)	Ag. Manager	RUCU Ltd

Source: Summarized data from questionnaires

Key: AMCOS = Agricultural Marketing Co-operative Society

Summary:

<u>Education Category</u>	<u>Number</u>
---------------------------	---------------

Primary education certificate	13
-------------------------------	----

Secondary education certificate	11
---------------------------------	----

College education certificate	8
-------------------------------	---

University degree	3
-------------------	---

Table 2(a): SUMMARY SHEET FOR QUESTION TWO(a)

DATA/INFORMATION PROPCESSING & COMMUNICATION FACILITIES IN THE
STUDIED CO-OPERATIVE ORGANIZATIONS

ORG_ID	PC		CALULA-TORS		TELE-PHONE		FAX		INTER-NET	POST OFFICE		TYPEWRI TERS IN USE	
	Qty	% Usage Intervals	Qty	% Usage Intervals	Qty	% Usage Intervals	Qty	% Usage Intervals	% Usage Intervals	Qty	% Usage Intervals	Qty	% Usage Intervals
03	1	81-100	2	81-100	1	81-100	1	81-100	81-100	1	61-80	0	0 – 2-
04	0	0 - 20	2	81-100	0	0 - 20	0	0 - 20	0 - 20	1	61-80	0	0 - 20
15	0	0 - 20	1	81-100	1	81-100	0	0 - 20	0 - 20	1	81-100	0	
25	0	0 - 20	2	61-80	3	61-80	1	41-60	0 - 20	1	61-80	1	81-100
28	0	0 - 20	2	81-100	1	0 - 20	0	0 - 20	0 - 20	1	61-80	0	0 - 20
30	0	0 - 20	2	81-100	1	81-100	0	0 - 20	0 - 20	1	61-80	0	0 - 20
32	0	0 - 20	3	81-100	1	61-80	0	0 - 20	0 - 20	1	61-80	1	21-40
33	0	0 - 20	1	41-60	2	41-60	0	0 - 20	0 - 20	1	61-80	0	0 - 20
36	0	0 - 20	2	81-100	0	0 - 20	0	0 - 20	0 - 20	1	61-80	0	0 - 20
38	0	0 - 20	4	81-100	1	81-100	0	0 - 20	0 - 20	1	61-80	1	61-80
TOTAL	1		21		11		2			10		3	

Source: Summarized data from field questionnaires.

Table 2(b): SUMMARY SHEET FOR QUESTION TWO (b)

TABLE SHOWING MAJOR MEANS OF COMMUNICATION
WITHIN SURVEYED CO-OPERATIVE ORGANIZATIONS.

ORG_ID	Members	Union/Society	Local Customers	International Customers	Local Suppliers	International Suppliers	Competitors	Banks	Transporters
03	05+06+09			02+03+04				10 (C/A)	
04	09	09					10	10(secretary)	
15	05+06+09	01+02+07			01		10(ordinary members)	10-secretary	02
32	01+07		02+07				10(ordinary members)	02+ 07+ 10(C/A)	08
33	08+10(committee members)	02+07+ 10(leaders)			10(union mgt)		10(Village gvnt)		10(union mgt)
36	05+07+08+09	07							
38	07	07	02+07+ 10	03	03		02+07	02+ 07+ 10(C/A)	02+ 07

Source: Summarized data from field questionnaires.

Key to types of communication:

Messenger (01), Telephone (02), Email (03), Internet-website (04), Church announcements (05), Mosque announcements (06), Postal services(07), Posters(08), Meeting discussions(09) and other means(10).

**Table 3: SUMMARY SHEET FOR QUESTION THREE
REVIEW OF ISS TOOLS/EQUIPMENT PERFORMANCE**

(1)	(2)	(3)	(4)	(5)	(6)
ORG_ID	NO. OF REVIEWS PER YEAR (Range)	REASONS FOR NOT REVIEWING	CAUSES FOR REVIEW	SOURCE OF REVIEWERS USED	REMARKS
03	2		A	2	
04	2		B	1	
15	1		A	3	
25	0	CANNOT GET EXPERTS	N/A	N/A	
28	1		A	3	
30	1		B	2	
32	1		A	2	
36	1		A	2	
33	0	CANNOT GET EXPERTS	N/A	N/A	
38	0	LACK OF AWARENESS	N/A	N/A	

Source: Summarized data from field questionnaire.

Key: 1. Column (4) represents a list of reasons for reviewing IS tools/equipment:

A: When there are problems with the tools/equipment.

B: According to the set schedule.

C: Other conditions.

2. Column (5) represents types of people who take part in reviewing the performance of ISS tools/equipment.

1: Internal users/Operators

2: External experts.

3: Combination of (1) and (2) above.

4: Others.

6.0: APPENDICES AND REFERENCES

6.1: APENDICES

APPENDIX A: Map of Tanzania showing areas where coffee is grown in substantial amounts.

This page, map of Tanzania-East Africa, could not be downloaded.

Reference may be made to the dissertation hard copy. Any inconvenience is regretted.

Figure 6.1

Coffee is grown in substantial amounts in the regions: Kagera, Mara, Kilimanjaro, Arusha, Ruvuma, Mbeya, Morogoro and Kigoma.
Prepared by: Benedict L.K.Mwaibasa