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ACHIEVING SUCCESSFUL INFORMATION MANAGEMENT THROUGH EFFECTIVE INFORMATION QUALITY MANAGEMENT (IQM) IN BANKING SERVICES

(Perspectives from Commercial Banks in Kenya)

Peterson Obara Magutu, Lecturer, University of Nairobi, School of Business, Department of Management Science, Nairobi - Kenya: magutumop@uonbi.ac.ke
Richard Bitange Nyaoga, Lecturer, Narok University College, School of Business, Department of Management Science, Nairobi - Kenya: rnyaoga@yahoo.com
Gladys Monchari Ondimu, MBA (Information Systems) Student, University of Nairobi, School of Business.

Abstract
Information is not a byproduct, nor documentation. It is a direct product of processes that capture knowledge about the persons, places, things and events discovered while conducting business transactions.The major purposes of this study were to This study therefore investigated the effective information quality management practices employed by commercial banks to ensure successful information management. The following research questions were to be answered: which factors accurately determine information quality management in the banking sector? Which factors accurately determine successful information management in banksA survey research design sought information from various banks in Kenya to investigate the effective information quality management practices employed by commercial banks to ensure successful information management. The population of the study consisted of 44 commercial banks that are currently operating in Kenya . This study relied on both primary and secondary data. The questionnaires were filled by the bank's head of IT of the forty two commercial banks in Kenya in which the questionnaire had been administered. These questionnaire inputs were validated by at least two. Thus 100 questionnaires were dispatched. Following data collection, data were analyzed using descriptive statistics and factor analysis. The use of descriptive statistics such as means and tables. Together with correlation analysis, factor analysis was done to establish the relationships among the study variables To make interpretation easier, a linear transformation on the factor solution, varimax rotation was done, which gave fewer components (factors) that are uncorrelated with one another. SPSS (Statistical Package for Social Scientists) was used to analyze the data. The factors that accurately determine the quality of information in the banking sector to a very great extent include: the easy to understand form in which Information is provided, the level and characteristics of decision-making processes, the high quality of IS staff and the user-friendly operation of information systems. The factors were far too many, hence factor analysis was used to reduce the variables, and the key factors that accurately determine the quality of information in the banking sector include: quality of information systems in use & policy issues: information systems users, hardware and operation: presentation of the information: budgetary and accuracy of information provision: quality networks and distribution systems: presentation of Information and decision making processes. Secondly, the factors that accurately determine successful information management in the banking sector to a very great extent: Information quality has enabled the computerization of managerial functions to a very high level; Information quality has enhanced the bank's image within the context of distribution; Information quality has increased the bank's ability to deal with information that is pertinent to its business processes; It is easy to obtain information on organization performance down to specific transactions; and The information kept complies with the contractual arrangements to which the bank business process is subject. Thus good quality information leads to successful information management, where successful information management is seen as the benefits of using quality information.

Keywords: *Effective Information Quality Management, Successful Information Management& Commercial Banks*

1. Introduction

1.1 Background

The information age was born in 1946 when the Electronic Numerical Integrator and Calculator (ENIAC) came online. That was just before the turning point in the industrial age when Deming had gone to Japan to usher the quality revolution in the maturing of the industrial age through quality principles applied to manufacturing. These led to elimination of waste and increased focus on customer needs. The end effect was the decreased costs of doing business and increased business effectiveness and customer satisfaction (English, 1998). According to a report by English, (1998) without quality information an organization cannot thrive: Two 20-year-old "calculation errors" for pension withholding left Los Angeles County with $1.2 billion in unforeseen liabilities and will force the county to spend an additional $25 million a year to make up for insufficient contributions to the fund. Wrong price data in retail databases costs American consumers $2.5 billion in annual overcharges. A $2 billion company discovered it was not invoicing four percent of its orders, leaving $80 million in uncollected revenue. The bottom line is that data quality problems hurt the bottom line.

An important question that managers ask is how an organization can take best advantage of information technology in order to support its operations, add value to its products and services, and gain a competitive edge in the marketplace. As organizations embark on their journey to be more responsive to their customers (both internal and external) and to continuously improve the quality of their products and services, information systems must do the same. However, it appears that despite the importance of IT to the success of most organizations, the function has not been proactive when it comes to actively pursuing and implementing quality principles. In this paper, we will concentrate on IS quality (Kanungo and Bhatnagar, 2002).

Prior research indicates that most quality approaches concentrate too much on the technical and control-oriented aspects of managing quality. Specifically, research in this area focuses primarily on only subsets of IS quality for example software and data quality. It is equally centered on core IS development processes (Kanungo and Bhatnagar, 2002). Several approaches have been developed, but it seems that none of them provides a resolution framework that is generally accepted and adequately detailed for both scientific and practical purposes within the information systems (Dahlberg and Jarvinen, 1997). The evaluation of IS is often conducted using performance measures developed by the system designers (Kanungo and Bhatnagar, 2002).

Huang (1999) noted that if information is used to manage all the other resources of the enterprise, hence managing information as a by-product will not work well for organization. They must apply the same principles to information as they usually do to other resources, for example planning, directing, controlling and organizing all the information resources. According to Zuboff, (1988) and English (1998) if inaccurate and missing information causes processes to fail and increases costs of information scrap and rework that squanders all the other resources. These observations poses question whether the management principles should be applied to information quality management or not.

1.1.1 Concept of Information Quality

Information is not a byproduct, nor documentation. It is a direct product of processes that capture knowledge about the persons, places, things and events discovered while conducting business transactions. If electronically collected information has quality and is sharable, it can add high value (Kanungo and Bhatnagar, 2002). For information to have quality it must be produced according to a well-defined information product specification in the same way manufactured products are produced according to specs. Information customers need to understand the meaning of data in the same way products have an owner's manual to describe a product's use. Many costly business errors come from having different interpretations. The information supplier role applies to the person whose work causes knowledge to be created or updated. Information producers are those who create ideas or designs. Virtually everyone in the enterprise, whether a machine operator, an executive manager or a clerk who deals with customers, plays both roles. Some business roles do not produce information, but they transcribe it from one form to another, such as when someone takes a customer-completed order form and enters it electronically into a database (Shoshana, 1988).

A widely used definition for quality has been provided by the International Standards Organization (ISO 8402): 'The totality of features and characteristics of a product or service that bear on its ability to satisfy specified or implied needs.' From this standpoint, customers or end-users of either a product or service can construe quality to be a judgment (Kanungo and Bhatnagar, 2002). Hence, quality denotes the extent to which the customers or users believe the product or service meets or surpasses their needs and expectations. Quality has also been defined as 'fitness for purpose' (Juran, 1988).

Quality is "consistently meeting customer expectations." Knowledge workers those who use information to perform their work are information "customers." Information quality is "consistently meeting knowledge worker and end-customer expectations." The information quality characteristics include getting the right data, with completeness, in the right context, with the right accuracy, without uncontrolled redundancy, in the right format, for the right purpose, at the right place, and at the right time (Shoshana, 1988; Englis, 1998).

The above definitions of quality require one to consider whose needs are being satisfied, and through the medium of what product. A product is considered to be a generic term that encompasses both goods and services. The presence or absence of quality manifests itself in the use of the product; and not just in the production (Kanungo and Bhatnagar, 2002).

Information quality can be considered a multidimensional and multi-attributed concept that includes quality of hardware, software, data, information, management, and service. These dimensions of quality manifest themselves in various IS processes. Information quality is an organizational construct and the locus of attention is the set people, processes, and technology in the IS department and the rest of the enterprise (Kanungo and Bhatnagar, 2002).

There is no information quality model that formalizes relationships between information systems processes, stakeholders, and complementary influences offers significant value to both practitioners and researchers.

According to Stylianou and Kumar, (2000) information quality is taken to be total information systems quality and it is a multidimensional concept consisting of the following six dimensions: Infrastructure quality: the quality of the infrastructure (hardware and enabling software) that is fielded and maintained by IS. It includes, for example, the quality of the networks, and systems software. Software quality: the quality of the applications software built, or maintained, or supported by IS. Data quality: the quality of the data entering the various IS. Information quality: the quality of the output resulting from the IS. In many cases, the output of one system becomes the input of another. In that respect, information quality is related to data quality. Administrative quality: the quality of the management of the IS function. It includes the quality of budgeting, planning, and scheduling. Service quality: the quality of the service component of the IS function. It includes the quality of customer support processes such as those related to a help desk (Kanungo and Bhatnagar, 2002).

1.1.2 Information Quality Management

This is an information technology (IT) management discipline, which encompasses the COBIT Information Criteria of efficiency, effectiveness, confidentiality, integrity, availability, compliance, and reliability. The idea is for companies to have the risks of using a program diminished to protect private and sensitive information. Information Criteria are a core component of the COBIT Framework that describes the intent of the objectives, namely the control of: *Effectiveness* deals with information being relevant and pertinent to the business process as well as being delivered in a timely,correct, consistent and usable manner. *Efficiency* concerns the provision of information through the optimal (most productive and economical) use of resources. *Confidentiality* concerns the protection of sensitive information from unauthorised disclosure. *Integrity* relates to the accuracy and completeness of information as well as to its validity in accordance with business values and expectations. *Availability* relates to information being available when required by the business process now and in the future. It also concerns the safeguarding of necessary resources and associated capabilities. *Compliance* deals with complying with the laws, regulations and contractual arrangements to which the business process is subject, i.e., externally imposed business criteria as well as internal policies. *Reliability* relates to the provision of appropriate information for management to operate the entity and exercise its fiduciary and governance responsibilities (Kanungo and Bhatnagar, 2002).

Management in the context of information systems focuses on five functional areas: *planning* a well-defined data architecture like a blueprint and designing databases to support *all* knowledge worker requirements; *leading* and *directing* with information policies and data standards, and holding managers accountable for information just as they are accountable for financial and people resources; *controlling* costs by not developing redundant applications and databases; *organizing* with a strong information management function that provides leadership and direction, facilitates information planning and implements controls to assure quality information production (Kanungo and Bhatnagar, 2002).

In order to achieve the above five management functions and corporate objectives the information must reflect specific criteria which is described in COBIT as requirements for information specific to the individual company. Seven individual, partially

overlapping information criteria for the broader security requirements from the quality and fiduciary aspects were defined as follows: Effectiveness deals with the relevance and suitability of information for the business process as well as its appropriate provision in terms of time, accuracy, consistency and usability. Efficiency deals with the supply of information through the optimum (most productive and most efficient) use of resources. Confidentiality deals with the protection of sensitive information against unauthorized disclosure. Integrity relates to the accuracy and completeness of information as well as its validity in accordance with corporate values and expectations. Availability relates to the fact that information is available for the business process now and in the future. It also applies to the protection for necessary resources and their services. Compliance deals with the adherence to laws, regulations and contractual agreements which the business process has to take into account, such as e.g. externally imposed criteria or internal guidelines. Reliability relates to the appropriate nature of supplied information which is used by the management in order to steer the company and enable it to meet its obligations with regard to good faith and governance (Kanungo and Bhatnagar, 2002).

The COBIT Framework consists of high-level control objectives and an overall structure for their classification. The underlying theory for the classification is that there are, in essence, three levels of IT efforts when considering the management of IT resources. This study borrowed some elements from the model, but the intension is not to test the model.

1.1.3 Commercial Banks in Kenya

Commercial banks are profit making financial institutions that play a significant role in the financial system. Commercial banks offer a wide range of corporate financial services that address the specific needs of private enterprise. They provide deposit, loan and trading facilities but will not service investment activities in financial markets (Magutu et al., 2009).

Commercial banks in Kenya play a number of roles in the financial stability and cash flow of the country's private sector. They process payments through a variety of means including telegraphic transfer, internet banking and electronic funds transfers. They also issue bank cheques and drafts, as well as accept money on term deposits. They act as moneylenders, by way of installment loans and overdrafts. Loan options include secured loans, unsecured loans and mortgage loans. Commercial banks in Kenya provide a number of import financial and trading documents such as letters of credit, performance bonds, standby letters of credit, security underwriting commitments and various other types of balance sheet guarantees. They also take responsibility for safeguarding such documents and other valuables by providing safe deposit boxes. Currency exchange functions and the provision of unit trusts and commercial insurance are typically provided by the relevant departments in larger commercial banks (Omondi et al., 2010).

In today's competitive banking environment, they are continuously restructuring their operations in order to develop more cost effective and efficient operations (Magutu et al., 2009).

2.0 Statement of the Problem

The information age has changed how work is performed from manual labor to intellectual work at all levels in the enterprise. But the same information technology has been used in ways that have introduced unnecessary complexity and waste while automating the *manual* processes of the industrial age (English, 1998). No organization can manage its business successful without proper management of its information resources. Information quality management (IQM) focuses on the processes, tools and procedures employed to maintain current, consistent and accurate information. The raw material or data an organization uses for information and knowledge should be therefore as accurate and complete as possible (Kanungo and Bhatnagar, 2002).

Data quality and information quality have been primarily studied by researchers interested in computing, management information systems, databases and database management, data security and data warehouse quality. Researchers have concentrated on company environments and business information. Innovation studies in general and studies of regional innovation networks in particular have not tended to address issues relating to information quality (Kanungo and Bhatnagar, 2002). Studies in complex information management through effective information quality management (IQM) in banking services are very rare. There was need for study on the effective information quality management practices employed by commercial banks to ensure that information is kept accurate, up-to-date, complete and consistent.

According to Naisbitt, John and Aburdene, (1985) in the new information society, that key resource has shifted to information, knowledge and creativity. The quality principles Deming, Ishikawa, Juran, Crosby, Imai and others have applied to improve product quality have not been applied to information. These same quality principles, proven over the last fifty years, apply directly to the improvement of

information quality, the new "currency. Although the importance of IQM is improving, capability amongst most organizations is still immature. Ineffective IQM systems can excessively influence the organization's operational costs and time. This poses a lot of uncertainty to organizational operations and projects, especially in procurement and in-service support.

This study therefore investigated the effective information quality management practices employed by commercial banks to ensure successful information management. The following research questions were to be answered: which factors accurately determine information quality management in the banking sector? Which factors accurately determine successful information management in banks?

3.0 Research Strategy

The study strategy heavily relied on what Kanungo and Bhatnagar, (2002) had used in the study on the interpretive structural modeling (ISM) where they presented Kelly's (1955) theory of personal constructs that allows us the basis to use individuals' viewpoints (individually or collectively) to ascribe meanings to complex relationships. This theory stipulates that individuals construe their experiences to produce a system of constructs that are subsequently used to anticipate action in the world. In the context of IS, such emergent behavior also involves interplay between both technological and business artifacts and individual assumptions. Support for such a linkage comes from Hebel (2000), who formalizes the relationship between human value systems and technological change and in doing so shows behavior as emergence.

The guiding principle here was the objectives of the study. A survey research design sought information from various banks in Kenya to investigate the effective information quality management practices employed by commercial banks to ensure successful information management.

The population of the study consisted of 44 commercial banks that are currently operating in Kenya (See appendix B). This study relied on both primary and secondary data. The questionnaires were filled by the bank's head of IT of the forty two commercial banks in Kenya in which the questionnaire had been administered. These questionnaire inputs were validated by at least two managers in other functional areas with representations in the following dimensions; locally incorporated banks, banks incorporated elsewhere but operating in Kenya, banks in which the government has some share holding and also based on size. Thus 100 questionnaires were dispatched. The questionnaire is in Appendix A. Questionnaires were used because we perceived that it would save on our time and it would be flexible with the respondents' times who mostly have fixed schedules. The questions were structured in such a way that for fixed response questions were rated against five points scale, from extremely significant (1) to not significant(5). Room was provided for personal responses not captured in the fixed response-questions.

Our research approach used a combination of deductive and emergent approaches. The research model was based on literature reviewed in order to provide a solid theoretical basis for the constructs that would be used. Theoretical research models are a good starting point. However, according to the Kanungo and Bhatnagar, (2002) their use in organizational settings may be hindered by high levels of abstraction (too elemental), being too comprehensive and unwieldy, too normative or a combination of the above.

According to Kanungo and Bhatnagar, (2002) it is not unexpected that theoretical models like COBIT do not hold in all organizational settings. Based on literature that was reviewed, factors that influence successful information management, directly and indirectly, were identified. The measures perspectives of information quality were also identified. A questionnaire was prepared and administered to test the validity by way of understandability of the questionnaire item of each of these factors as well as to identify additional factors influencing information quality.

The questionnaire was piloted on 10 banks prior to data collection. This was necessary in order to identify any ambiguous and unclear questions and any questions that were not clear to the respondents were clarified. The questionnaires were then submitted to the participating firms after the pilot test in order to get the data and information required, which was administered using e-mail and drop-pick-later method. Follow up was done by telephone.

In order to preserve the richness of this conceptual framework and to be true to the metaphor of a 'person as scientist', a participatory research design methodology was called for. Furthermore, it was required that participants in the research move beyond the independent consideration of key issues to evaluating how issues at hand interact (Morgando et al., 1995).

Following data collection, data were analyzed using descriptive statistics and factor analysis. The use of

descriptive statistics such as means, percentages and tables. Together with correlation analysis, factor analysis was done to establish the relationships among the study variables. In particular, factor analysis procedure was used to measure and establish benefits and challenges that commercial banks face in implementing e-commerce products and services. This method was necessary to reduce a set of several difficult to interpret correlated variables to few conceptually meaningful relatively independent factors, which could be easily interpreted. This technique was applied to summarize fifty (48) and twenty-six (26) latent variables or sub-variables representing dominant quality information factors and successful information management respectively. To make interpretation easier, a linear transformation on the factor solution, varimax rotation was done, which gave fewer components (factors) that are uncorrelated with one another. SPSS (Statistical Package for Social Scientists) was used to analyze the data.

4.0 Data Analysis and Findings

Data was collected from hundred (100) managers from the commercial banks in Kenya of the 100 managers and heads of departments sampled, 84 responded, a reasonably high response rate of 84%.

4.1 Measures of Quality Information

According to Shoshana, 1988 and Englis, 1998, the information quality characteristics include getting the right data, with completeness, in the right context, with the right accuracy, without uncontrolled redundancy, in the right format, for the right purpose, at the right place, and at the right time. The first objective was therefore to investigate the factors accurately determine information quality management in the banking sector.

The respondents were given a list of forty-eight variable on the measures of information quality, and asked to rank to what extent they accurately determine information quality management in the banking sector. This was on a five point measurement scale whereby 1=Great Extent, 2= Moderate Extent, 3=Marginal Extent, 4= Not at all, 5= Can't Say. The results are as in table 4.1a&b.

Table 4.1a: Measures of Quality Information (Descriptive Statistics)

Measures Quality Information	N	Min	Max	Mean	Std. Dev
Information is provided in a form that is easy to understand	84	1.00	2.00	1.1739	.38755
The level and characteristics of decision-making processes determine information quality	84	1.00	3.00	1.2174	.51843
High quality of IS staff	84	1.00	3.00	1.2609	.54082
There is user-friendly operation of information systems	84	1.00	2.00	1.3913	.49901
The information provided by the bank is always up to date.	84	1.00	2.00	1.4348	.50687
The quality of equipment maintenance used is good	84	1.00	2.00	1.4348	.50687
The quality of IS staff is absolutely good	84	1.00	2.00	1.4348	.50687
The quality of IS support used is good	84	1.00	2.00	1.4348	.50687
There is strict authorization for use of specific facilities)	84	1.00	2.00	1.4348	.50687
Widespread use of IT in the organization	84	1.00	2.00	1.4348	.50687
Information is free from errors	84	1.00	2.00	1.4783	.51075
IS meets organizational needs	84	1.00	2.00	1.4783	.51075
Quality of data input as well as output	84	1.00	2.00	1.4783	.51075
There is standardization of Information System processes (e.g. for purchase of IT equipment	84	1.00	2.00	1.4783	.51075
The information is properly labeled based on time periods(past, present & future)	84	1.00	2.00	1.5217	.51075
The information is properly provided and classified as detailed or summarizes	84	1.00	3.00	1.5217	.59311
The information is provided as often as needed	84	1.00	3.00	1.5217	.59311
There is a free communication culture	84	1.00	2.00	1.5652	.50687
Information quality budget constraints	84	1.00	3.00	1.6087	.65638

The bank has clear process metrics (e.g. average time between a complaint and response)	84	1.00	3.00	1.6087	.58303
The level of information system integration used is good	84	1.00	3.00	1.6087	.58303
Information is arranged in a pre-determined sequence	84	1.00	3.00	1.6522	.64728
Information is provided in form of printed paper documents, video displays and other media	84	1.00	3.00	1.6522	.64728
Number of IS employees	84	1.00	3.00	1.6522	.64728
All information needed is provided by the bank to all partners/customers	84	1.00	3.00	1.6957	.63495
The quality of wide area network used is good	84	1.00	2.00	1.7391	.44898
There is error-free operation of information systems	84	1.00	2.00	1.7391	.44898
The scope is clearly defined either internal or external in distributing bank information	84	1.00	2.00	1.7826	.42174
There are information quality procedures in place	84	1.00	2.00	1.7826	.42174
There is full participation of users in development/modification of information systems	84	1.00	2.00	1.7826	.42174
Meaningful use of Information System	84	1.00	2.00	1.8261	.38755
There is proper training of information users	84	1.00	3.00	1.8261	.93673
The information is provided by the bank when needed	84	1.00	2.00	1.8696	.34435
The quality of local area network used is good	84	1.00	2.00	1.8696	.34435
There is clear definition of Information System process (e.g. new system case)	84	1.00	3.00	1.8696	.91970
There is even spread of computerization in organization	84	1.00	2.00	1.8696	.34435
Information is presented in narrative, numeric, graphic and other medias	84	1.00	3.00	1.9130	.41703
Proper Information Systems planning (e.g. anticipating future user and organizational needs)	84	1.00	2.00	1.9130	.28810
The attitude of individuals to information systems is positive	84	1.00	3.00	1.9130	.41703
The information provided by the bank reveals performance by measuring the activities accomplished	84	1.00	2.00	1.9130	.28810
Sophistication of the IT infrastructure	84	1.00	3.00	1.9565	.36659
There are rewards for efficient use of System, for upgrading Information System skills	84	1.00	3.00	2.1739	.71682
There is high reliability of the information system The quality of hardware used is good	84	1.00	3.00	2.1739	.71682
There is a positive attitude of the top management towards use of IS/IT	84	1.00	3.00	2.2174	.67126
Information from the bank relates to the needs of specific bank recipients for specific situation	84	1.00	3.00	2.2609	.61919
There is flexibility in decision making processes	84	1.00	3.00	2.2609	.61919
Everyone has a computer in the bank	84	2.00	3.00	2.3913	.49901

Source: Research Data

From the descriptive data in table 4.1a, the factors that accurately determine the quality of information in the banking sector to a very great extent (Mean<1.6) include:

- ✓ The easy to understand form in which Information is provided
- ✓ The level and characteristics of decision-making processes
- ✓ The high quality of IS staff
- ✓ The user-friendly operation of information systems
- ✓ The bank's ability to provide information in an up-to-date manner
- ✓ The good quality maintenance of equipment used is good
- ✓ The use of good quality IS support
- ✓ The strict authorization for use of specific facilities)
- ✓ Widespread use of IT in the organization
- ✓ Provision of information which is free from errors
- ✓ Making sure information systems meets organizational needs
- ✓ The high quality of data input as well as output
- ✓ Standardization of Information System processes (e.g. for purchase of IT equipment
- ✓ The properly labeling of information based on time periods (past, present & future)
- ✓ The properly provision and classification of information as detailed or summarizes
- ✓ The provision of information as often as needed
- ✓ A free communication culture
- ✓ Checking on information quality budget constraints

The other set of factors that accurately determine the quality of information in the banking sector to a moderate extent (1.6<Mean<2.0) include:

- ✓ The clear process metrics (e.g. average time between a complaint and response)
- ✓ The good level of information system integration
- ✓ Arranging information in a pre-determined sequence
- ✓ Providing information in form of printed paper documents, video displays and other media
- ✓ Sufficient number of IS employees
- ✓ Providing all information needed by the bank to all partners/customers
- ✓ The use of good quality wide area network
- ✓ The error-free operation of information systems
- ✓ Clearly definition of either internal or external in distributing of bank information
- ✓ The information quality procedures in place
- ✓ There full participation of users in development/modification of information systems
- ✓ The meaningful use of Information System

The factors were far too many, hence factor analysis was used to reduce the variables, and the results are as in table 4.1b in appendix C:

Key Variable Number one: Quality of Information Systems in use & Policy issues: where the variable Components include

- ✓ The quality of equipment maintenance used is good
- ✓ The quality of IS staff is absolutely good
- ✓ There is standardization of Information System processes (e.g. for purchase of IT equipment
- ✓ Everyone has a computer in the bank
- ✓ There is user-friendly operation of information systems
- ✓ The information is properly provided and classified as detailed or summarizes
- ✓ The quality of IS support used is good
- ✓ There is strict authorization for use of specific facilities)
- ✓ There is proper training of information users
- ✓ Widespread use of IT in the organization
- ✓ There is clear definition of Information System process (e.g. new system case)
- ✓ The information is provided as often as needed
- ✓ The level of information system integration used is good
- ✓ The bank has clear process metrics (e.g. average time between a complaint and response)
- ✓ Information is provided in form of printed paper documents, video displays and other media
- ✓ There is a free communication culture
- ✓ The information is properly labeled based on time periods(past, present & future)
- ✓ All information needed is provided by the bank to all partners/customers
- ✓ The information provided by the bank is always up to date.
- ✓ There is a positive attitude of the top management towards use of IS/IT

Key Variable Number Two: Information Systems Users, Hardware and Operation: where the variable Components include

- ✓ There is full participation of users in development/modification of information systems

- ✓ There is error-free operation of information systems
- ✓ There is high reliability of the information system The quality of hardware used is good
- ✓ There are information quality procedures in place
- ✓ There is even spread of computerization in organization
- ✓ The quality of wide area network used is good
- ✓ The scope is clearly defined either internal or external in distributing bank information
- ✓ There is flexibility in decision making processes
- ✓ There are rewards for efficient use of System, for upgrading Information System skills
- ✓ Meaningful use of Information System
- ✓ Sophistication of the IT infrastructure
- ✓ The attitude of individuals to information systems is positive

Key Variable Number Three: Presentation of the Information: where the variable Components include

- ✓ Information is presented in narrative, numeric, graphic and other medias
- ✓ High quality of IS staff
- ✓ IS meets organizational needs
- ✓ The information is provided by the bank when needed

Key Variable Number Four: Budgetary and Accuracy of Information Provision: where the variable Components include

- ✓ Information is free from errors
- ✓ Information is arranged in a pre-determined sequence
- ✓ Information quality budget constraints

Key Variable Number Five: Quality Networks and Distribution Systems: where the variable Components include

- ✓ The quality of local area network used is good
- ✓ Proper Information Systems planning (e.g. anticipating future user and organizational needs)
- ✓ Information from the bank relates to the needs of specific bank recipients for specific situation
- ✓ Quality of data input as well as output

Key Variable Number Six: Presentation of Information and decision making processes: where the variable Components include

- ✓ The information provided by the bank reveals performance by measuring the activities accomplished
- ✓ The level and characteristics of decision-making processes determine information quality
- ✓ Information is provided in a form that is easy to understand

4.2: Successful Information Management

The quality of information can highly influence the management of information with the organization and converse in true. If information is well managed, then the information output is expected to be of high quality and vice-versa. The respondents were asked to rank the extent to which a number of measures of successful information management accurately determine successful information management in the banking sector using a five point measurement scale where: 1=Great Extent, 2= Moderate Extent, 3=Marginal Extent, 4= Not at all, 5= Can't Say. The results are as in table 4.2a&b.

Table 4.2b: Successful Information Management (Descriptive Statistics)

	N	Min.	Max.	Mean	Std. Dev
Information quality has enabled the computerization of managerial functions to a very high level	84	1.00	2.00	1.0870	.28810
Information quality has enhanced the bank's image within the context of distribution	84	1.00	2.00	1.0870	.28810
Information quality has increased the bank's ability to deal with information that is pertinent to its business processes	84	1.00	2.00	1.0870	.28810
It is easy to obtain information on organization performance down to specific transactions	84	1.00	2.00	1.0870	.28810
The information kept complies with the contractual arrangements to which the bank business process is subject	84	1.00	2.00	1.0870	.28810
Information quality has increased the bank's ability to coordinate activities with few managers/clerks and production workers	84	1.00	2.00	1.1304	.34435
Information quality has increased the flow of information within the banking sector to one big organization	84	1.00	2.00	1.1304	.34435

The system provides management with appropriate information for the bank to use in operations decision making	84	1.00	2.00	1.1304	.34435
Manual work procedures have been replaced	84	1.00	2.00	1.2174	.42174
Information quality has increased the bank's ability to reduce costs of operation	84	1.00	2.00	1.3478	.48698
Information quality has increased the bank's ability to link customers and other banks	84	1.00	2.00	1.3913	.49901
Information quality has increased the bank's ability to offer quick service	84	1.00	2.00	1.3913	.49901
The systems provides users with financial reporting	84	1.00	2.00	1.3913	.49901
There is enhanced distributed and portable computing	84	1.00	2.00	1.3913	.49901
There is protection of sensitive information from unauthorized disclosure	84	1.00	2.00	1.3913	.49901
Information quality has led to service improvement	84	1.00	2.00	1.4348	.50687
The systems information on financial reporting to regulatory bodies with regard to compliance with laws and regulation	84	1.00	2.00	1.4348	.50687
There is easy to use graphics	84	1.00	2.00	1.4348	.50687
Information is consistently provide in a usable manner	84	1.00	2.00	1.4783	.51075
Information quality has led to empowerment of employees	84	1.00	2.00	1.4783	.51075
Information quality has recasted the bank management process	84	1.00	2.00	1.4783	.51075
Information quality has led to cost reduction	84	1.00	2.00	1.5217	.51075
Information quality has increased the bank's ability to solve problems and take advantage of new opportunities	84	1.00	2.00	1.7391	.44898
Information is always available when required by the business process	84	1.00	3.00	1.8696	.91970
Information quality has led to ability to respond to changes in the market place	84	1.00	2.00	1.8696	.34435
Information is always valid in accordance with business set of rules and expectations	84	1.00	2.00	1.9130	.28810

Source: Research Data

From the descriptive data in table 4.2a, the factors that accurately determine determine successful information management in the banking sector to a very great extent (Mean<1.6) include:

- ✓ Information quality has enabled the computerization of managerial functions to a very high level
- ✓ Information quality has enhanced the bank's image within the context of distribution
- ✓ Information quality has increased the bank's ability to deal with information that is pertinent to its business processes
- ✓ It is easy to obtain information on organization performance down to specific transactions
- ✓ The information kept complies with the contractual arrangements to which the bank business process is subject
- ✓ Information quality has increased the bank's ability to coordinate activities with few managers/clerks and production workers
- ✓ Information quality has increased the flow of information within the banking sector to one big organization
- ✓ The system provides management with appropriate information for the bank to use in operations decision making
- ✓ Manual work procedures have been replaced
- ✓ Information quality has increased the bank's ability to reduce costs of operation
- ✓ Information quality has increased the bank's ability to link customers and other banks
- ✓ Information quality has increased the bank's ability to offer quick service
- ✓ The systems provides users with financial reporting
- ✓ There is enhanced distributed and portable computing
- ✓ There is protection of sensitive information from unauthorized disclosure
- ✓ Information quality has led to service improvement
- ✓ The systems information on financial reporting to regulatory bodies with regard to compliance with laws and regulation
- ✓ There is easy to use graphics
- ✓ Information is consistently provide in a usable manner
- ✓ Information quality has led to empowerment of employees
- ✓ Information quality has recanted the bank management process
- ✓ Information quality has led to cost reduction

5.0 Conclusions

In line with the general objectives of the study, the following conclusions were arrived at:

The factors that accurately determine the quality of information in the banking sector to a very great extent (Mean<1.6) include: the easy to understand form in which Information is provided, the level and characteristics of decision-making processes, the high quality of IS staff and the user-friendly operation of information systems. The other set of factors that accurately determine the quality of information in the banking sector to a moderate extent (1.6<Mean<2.0) include: The clear process metrics (e.g. average time between a complaint and response), the good level of information system integration and arranging information in a pre-determined sequence.

The factors were far too many, hence factor analysis was used to reduce the variables, and the key factors that accurately determine the quality of information in the banking sector include: quality of information systems in use & policy issues: information systems users, hardware and operation: presentation of the information: budgetary and accuracy of information provision: quality networks and distribution systems: presentation of Information and decision making processes

Secondly, the factors that accurately determine successful information management in the banking sector to a very great extent (Mean<1.6) include: Information quality has enabled the computerization of managerial functions to a very high level; Information quality has enhanced the bank's image within the context of distribution; Information quality has increased the bank's ability to deal with information that is pertinent to its business processes; It is easy to obtain information on organization performance down to specific transactions; and The information kept complies with the contractual arrangements to which the bank business process is subject.

Thus good quality information leads to successful information management, where successful information management is seen as the benefits of using quality information.

5.1 Limitations and Suggestion for Further Research

There was time and financial constraint in carrying out the research. The managers were actually to busy and reluctant to participate in the research and had to be really convinced to answer. Some respondents were biased since they feared disclosing the weaknesses of their banks.

Further research can be done to establish the effects on successful information management and the business value of such investments.

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APPENDIX A: QUESTIONNAIRE

PART A: MEASURES OF QUALITY INFORMATION

2. For each of the following measures of information quality, to what extent do the following measures of information quality accurately determine information quality management in your bank. Use a five point measurement scale as follows. 1=Great Extent, 2= Moderate Extent, 3=Marginal Extent, 4= Not at all, 5= Can't Say.

Measures Of Information Quality	1	2	3	4	5
All information needed is provided by the bank to all partners/customers					
Everyone has a computer in the bank					
High quality of IS staff					
Information from the bank relates to the needs of specific bank recipients for specific situation					
Information is arranged in a pre-determined sequence					
Information is free from errors					
Information is presented in narrative, numeric, graphic and other medias					
Information is provided in a form that is easy to understand					
Information is provided in form of printed paper documents, video displays and other media					
Information quality budget constraints					
IS meets organizational needs					
Meaningful use of Information System					
Number of IS employees					
Prpper Information Systems planning (e.g. anticipating future user and organizational needs)					
Quality of data input as well as output					
Sophistication of the IT infrastructure					
The attitude of individuals to information systems is positive					
The bank has clear process metrics (e.g. average time between a complaint and response)					
The information is properly labeled based on time periods(past, present & future)					
The information is properly provided and classified as detailed or summarizes					
The information is provided as often as needed					
The information is provided by the bank when needed					
The information provided by the bank is always up to date.					
The information provided by the bank reveals performance by measuring the activities accomplished					
The level and characteristics of decision-making processes determine information quality					
The level of information system integration used is good					
The quality of equipment maintenance used is good					
The quality of IS staff is absolutely good					
The quality of IS support used is good					
The quality of local area network used is good					
The quality of wide area network used is good					
The scope is clearly defined either internal or external in distributing bank information					
There are information quality procedures in place					
There are rewards for efficient use of System, for upgrading Information System skills					
There is a free communication culture					
There is a postive attitude of the top management towards use of IS/IT					
There is clear definition of Information System process (e.g. new system case)					
There is error-free operation of information systems					
There is even spread of computerization in organization					
There is flexibility in decision making processes					
There is full participation of users in development/modification of information systems					
There is high reliability of the information system The quality of hardware used is good					
There is proper training of information users					
There is standardization of Information System processes (e.g. for purchase of IT equipment					
There is strict authorization for use of specific facilities)					
There is user-friendly operation of information systems					

Widespread use of IT in the organization					

Are there any other factors? Please specify.
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PART B: SUCESSFUL INFORMATION MANAGEMENT

3. For each of the following measures of successful information management, to what extent do the following measures of successful information management accurately determine successful information management in your bank. Use a five point measurement scale as follows. 1=Great Extent, 2= Moderate Extent, 3=Marginal Extent, 4= Not at all, 5= Can't Say.

Measures Of Information Quality	**1**	**2**	**3**	**4**	**5**
Information is always available when required by the business process					
Information is always valid in accordance with business set of rules and expectations					
Information is consistently provide in a usable manner					
Information quality has enabled the computerization of managerial functions to a very high level					
Information quality has enhanced the bank's image within the context of distribution					
Information quality has increased the bank's ability to coordinate activities with few managers/clerks and production workers					
Information quality has increased the bank's ability to deal with information that is pertinent to its business processes					
Information quality has increased the bank's ability to link customers and other banks					
Information quality has increased the bank's ability to offer quick service					
Information quality has increased the bank's ability to reduce costs of operation					
Information quality has increased the bank's ability to solve problems and take advantage of new opportunities					
Information quality has increased the flow of information within the banking sector to one big organization					
Information quality has led to ability to respond to changes in the market place					
Information quality has led to cost reduction					
Information quality has led to empowerment of employees					
Information quality has led to service improvement					
Information quality has recasted the bank management process					
It is easy to obtain information on organization performance down to specific transactions					
Manual work procedures have been replaced					
The information kept complies with the contractual arrangements to which the bank business process is subject					
The system provides management with appropriate information for the bank to use in operations decision making					
The systems information on financial reporting to regulatory bodies with regard to compliance with laws and regulation					
The systems provides users with financial reporting					
There is easy to use graphics					
There is enhanced distributed and portable computing					
There is protection of sensitive information from unauthorized disclosure					

Are there any other reasons? Please specify.
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4. Please give any other comment that you may deem useful for this exercise?
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APPENDIX B: COMMERCIAL BANKS IN KENYA

The following are the commercial banks which have been operating in Kenya lately. Most of them have their head offices in Nairobi.

Foreign banks

1) Bank of Africa, Nairobi
2) Bank of India, Nairobi
3) Citi bank, Nairobi
4) Habib Bank, Nairobi
5) Habib Bank A.G Zurich, Nairobi

Foreign owned but locally incorporated banks

1) Barclays Bank of Kenya, Nairobi
2) Stanbic Bank, Nairobi
3) Standard Chartered Bank , Nairobi
4) Diamond Trust Bank, Nairobi
5) Bank of Baroda, Nairobi

Banks with government participation

1. Stanbic Bank, Nairobi
2. Development Bank, Nairobi
3. Consolidated Bank Of Kenya Ltd4
4. Industrial Development Bank, Nairobi
5. Kenya Commercial Bank, Nairobi
6. National Bank of Kenya, Nairobi

Banks Locally owned

1) African Banking Corporation, Nairobi
2) African Development Bank, Nairobi
3) Akiba Bank, Nairobi
4) Bankers Trust, Nairobi
5) Biashara Bank of Kenya, Nairobi
6) Victoria Commercial Bank, Nairobi
7) CFC Bank, Nairobi
8) Transnational Bank Ltd
9) Credit Bank Ltd
10) Guardian bank Ltd
11) Investment &Morgages Bank Ltd
12) Middle East Bank (K) Ltd
13) Akiba Bank Ltd
14) Fina Bank Ltd
15) Imperial Commercial Bank
16) Victoria Commercial Bank
17) Prime Bank Ltd
18) Equatorial Commercial Bank
19) Giro Commercial Bank
20) Biashara Bank Ltd
21) Africa Banking Corporation Ltd
22) Chase Bank Ltd
23) City Finance Bank, Nairobi
24) Commercial Bank of Africa, Nairobi
25) Continental Bank of Kenya, Nairobi
26) Cooperative Bank of Kenya, Nairob
27) East African Development Bank, Nairobi
28) Equity bank

APPENDIX C:

Table 4.1 b: Rotated Component Matrix (a)

	Component						
	1	2	3	4	5	6	7
The quality of equipment maintenance used is good	**.954**	.106	.191	.098	-.086	.110	.115
The quality of IS staff is absolutely good	**.954**	.106	.191	.098	-.086	.110	.115
There is standardization of Information System processes (e.g. for purchase of IT equipment	**.926**	.061	-.061	.201	.014	.284	-.086
Everyone has a computer in the bank	**.914**	.298	.105	.086	.164	-.127	.105
There is user-friendly operation of information systems	**.914**	.298	.105	.086	.164	-.127	.105
The information is properly provided and classified as detailed or summarizes	**.902**	-.162	.132	-.195	.176	.107	.250
The quality of IS support used is good	**.887**	.182	-.126	-.176	.189	-.148	.274
There is strict authorization for use of specific facilities)	**.880**	.250	-.149	.189	.263	.051	-.098
There is proper training of information users	**.877**	.420	-.090	.045	.022	-.098	-.134
Widespread use of IT in the organization	**.866**	.147	.103	.165	.197	-.316	-.068
There is clear definition of Information System process (e.g. new system case)	**.853**	.278	.026	.106	-.080	-.411	-.072
The information is provided as often as needed	**.850**	-.165	.043	-.128	-.262	.276	.253
The level of information system	**.836**	-.439	.100	-.014	.105	-.230	.181

integration used is good							
The bank has clear process metrics (e.g. average time between a complaint and response)	**.809**	-.299	.361	-.009	-.021	-.270	-.182
Information is provided in form of printed paper documents, video displays and other media	**.807**	-.371	.246	-.306	-.098	.079	-.091
There is a free communication culture	**.789**	.042	-.307	-.247	.207	-.232	-.346
The information is properly labeled based on time periods(past, present & future)	**.787**	-.133	-.164	.036	.103	-.534	.189
All information needed is provided by the bank to all partners/customers	**.786**	-.432	.017	-.187	-.143	.215	-.046
The information provided by the bank is always up to date.	**.752**	.322	-.570	-.006	.025	-.010	.066
There is a positive attitude of the top management towards use of IS/IT	**.679**	.632	.154	-.126	-.090	.039	.289
There is full participation of users in development/modification of information systems	-.074	**.960**	-.014	.121	.049	.168	-.125
There is error-free operation of information systems	-.047	**.951**	.272	-.004	-.068	-.040	.110
There is high reliability of the information system The	.469	**.782**	-.099	.271	-.129	-.157	.056
There are information quality procedures in place	-.093	**.696**	-.148	.588	.046	.011	.277
There is even spread of computerization in organization	.028	**.690**	.266	.170	.502	-.020	-.395
The quality of wide area network used is good	.132	**.688**	.408	.211	.364	.079	.397
The scope is clearly defined either internal or external in distributing bank information	.044	**.674**	.006	.444	-.108	.533	.185
There is flexibility in decision making processes	.626	**.664**	-.145	.047	.090	-.169	.211
There are rewards for efficient use of System, for upgrading Information System skills	.572	**.655**	-.221	.183	-.117	.182	.297
Meaningful use of Information System	.165	**.616**	.682	-.073	-.056	.310	.151
Sophistication of the IT infrastructure	.204	-.039	**.931**	.126	.190	-.159	.053
The attitude of individuals to information systems is positive	.146	.138	**.692**	.108	-.500	.333	.259
Information is presented in narrative, numeric, graphic and other medias	.201	.151	.088	.055	**.913**	.085	.190
High quality of IS staff	.096	-.786	-.129	-.070	**.538**	-.151	-.094
IS meets organizational needs	-.720	.070	.291	-.477	**.333**	.141	.177

The information is provided by the bank when needed	.203	.392	-.047	.064	.298	**.675**	.488
Information is free from errors	-.630	-.099	.284	.153	.277	**.639**	.064
Information is arranged in a pre-determined sequence	-.438	-.616	.412	.246	.165	**.413**	-.002
Number of IS employees	-.441	-.515	.487	-.304	-.012	**.354**	.231
Information quality budget constraints	-.440	-.318	.266	-.613	.293	**.303**	.284
The quality of local area network used is good	.144	.206	.267	.105	-.027	.124	**.913**
Proper Information Systems planning (e.g. anticipating future user and organizational needs)	-.166	.400	.107	-.068	-.644	-.375	**.341**
Information from the bank relates to the needs of specific bank recipients for specific situation	-.594	.309	.340	.506	.206	.234	**.265**
Quality of data input as well as output	-.893	.084	.061	-.280	-.049	-.094	**.257**
The information provided by the bank reveals performance by measuring the activities accomplished	.101	.108	.277	.909	.159	.160	**.134**
The level and characteristics of decision-making processes determine information quality	.126	-.856	.321	.169	-.309	.115	**-.055**
Information is provided in a form that is easy to understand	.118	-.612	.460	-.298	-.086	.018	**-.524**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 14 iterations.