STAKEHOLDERS' PERCEPTIONS ON THE INFLUENCE OF INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGY ON ACADEMIC AND HUMAN RESOURCE MANAGEMENT IN KENYAN PUBLIC UNIVERSITIES

Daniel Karanja

A Thesis Submitted to the Graduate School in Partial Fulfillment for the Requirements of the Doctor of Philosophy Degree in Educational Management of Egerton University

EGERTON UNIVERSITY

September, 2018

DECLARATION AND RECOMMENDATION

DECLARATION

This thesis is my original work and has not been presented for a degree or diploma in this or any other university.

Signature:…….. Date:……..

Daniel Karanja

ED15/0346/12

RECOMMENDATION

This thesis has been submitted for examination with our approval as university supervisors.

Signature:…….. Date:……..

Prof. Anthony K. Sang

Department of Curriculum, Instruction and Educational Management

Egerton University

Signature:…….. Date:……..

Prof. Mwangi Ndirangu

Department of Curriculum, Instruction and Educational Management

Egerton University

COPYRIGHT

DEDICATION

To all my parents: Mr. Peter Mbuthia Ndirangu; Mrs. Grace Wairimu Mbuthia; Mr. Samson Macharia Kamau and Mrs. Margret Kanyi Macharia; darling wife Mrs. Leah Wangari Karanja and siblings for their prayers and invaluable encouragement. To my lovely children: Joy, Bill and Don for their understanding when I was not there for them while I carried out this work.

ACKNOWLEDGEMENT

It takes great support from God, family, friends, colleagues, supervisors and all those involved for one to undertake and complete such a task. I owe an immense debt of gratitude to Egerton University, my supervisors Professor Antony K. Sang and Professor Mwangi Ndirangu. Their sound advice and critical review of my write-ups has enabled me to reach this far. My friends deserve appreciation and gratitude for their encouragement. I am grateful to all students and faculty in the universities that participated in this study for their time and honest information they provided during the field study. My deepest gratitude also goes to my family for their prayers, encouragement and patience.

ABSTRACT

Information and Communication Technology (ICT) has become an important tool in modern management of universities because of its ability to facilitate acquisition, use and management of information that is crucial for decision-making. In Kenya, despite the many efforts and initiatives that have been put into place by the government, the private sector and the institutions themselves to leverage the use of ICT in public universities, little is known on how this integration has enhanced institutional management process. This study thus sought to investigate the stakeholders' perceptions on the influence of integration of ICT on academic and human resource management (HRM) in public universities in Kenya. It adopted a descriptive survey research design with the target population comprising of all the 240,551 students, their 5,189 lecturers, 22 registrars administration and 22 registrars academics. Purposive sampling technique was used to select the three oldest public universities in the country namely: University of Nairobi, Moi and Kenyatta Universities from a list of seven initial ones that were started before the year 2012. The same method was used to select three registrars' academics and three registrars' administration from the sampled institutions. Determination of sample sizes for the lecturers and students was done using the Cochran's formula and then proportional sampling employed to obtain samples as follows: 132 students from the University of Nairobi; 123 from Moi and 119 from Kenyatta. The same was applied to obtain 167; 77 and 100 lecturers from the three universities respectively. The study population was thus 724 respondents. Questionnaires were used to collect data and their content validity was determined through expert judgment. Based on data from a pilot study, a Cronbach alpha coefficient of 0.79 was obtained for students' questionnaire; 0.73 for lecturers'; 0.82 for registrars' academics and 0.80 for registrars' administration. Both descriptive and inferential statistics were used to analyze data. The study found that the universities had invested in requisite ICT based programs for supporting academic and HRM processes. Students also had necessary ICT skills for using the automated academic management services. Both processes (academics and HRM) however had inadequate number of computers while lecturers lacked the necessary skills for effective interaction with the automated services. The study also established that ICT integration had a positive influence on academic management processes. However, the integration was only perceived to have positive influence on HR administrative functions such as employee's record management and payroll administration and not on the more strategic applications such as staff recruitment and selection, training and development as well as performance management. The key impediments to effective integration of ICT were noted to be lack of users' awareness on its capabilities; insufficient funding; inadequate ICT staff and their low work motivation. The study recommended that public universities need to review their ICT strategic plans so as to add more impetus to increased budgetary allocation for ICT integration; investment in requisite hardware and software programmes; improved numbers, competencies and motivation of the ICT staff; as well as capacity building among the service providers and users within the universities.

TABLE OF CONTENTS

DECLARATION AND RECOMMENDATION ..... **ii**
COPYRIGHT ..... **iii**
DEDICATION ..... **iv**
ACKNOWLEDGEMENT ..... **v**
ABSTRACT ..... **vi**
TABLE OF CONTENTS ..... **vii**
LIST OF TABLES ..... **x**
LIST OF FIGURES ..... **xii**
LIST OF ABBREVIATIONS AND ACRONYMS ..... **xiii**
CHAPTER ONE:INTRODUCTION **1**
1.1 Background to the Study 1
1.2 Statement of the Problem 6
1.3 Purpose of the Study 7
1.4 Objectives of the Study 7
1.5 Research Questions 7
1.6 Significance of the Study 8
1.7 Scope of the Study 8
1.8 Limitations of the Study 8
1.9 Assumptions of the Study 9
1.10 Definition of Terms 10
CHAPTER TWO:LITERATURE REVIEW **12**
2.1 Introduction 12
2.2 The Impact of ICT in Society Today 12
2.3 Integration of ICT in the Management of Higher Educational Institutions (HEIs) 13
2.4 Influence of ICT Integration on Organizational Management 15
2.4.1 ICT and Organizational Efficiency 15
2.4.2 ICT and Cost Effectiveness in Organizational Management 17
2.4.3 ICT and Organization's Competitiveness 18
2.5 Integration of ICT in Institutional Management by Universities in Kenyan 19
2.6 Challenges to effective Integration of ICT in HEIs Management 22
2.7 Theoretical Framework 25
2.8 Conceptual Framework 26

CHAPTER THREE:RESEARCH METHODOLOGY 29
3.1 Introduction 29
3.2 Research Design 29
3.3 Location of the Study 29
3.4 Target Population 29
3.5 Sampling Procedures and Sample Size 30
3.6 Instrumentation.....33
3.6.1 Validity of the Research Instruments 34
3.6.2 Reliability of the Research Instruments.....35
3.7 Data Collection Procedures.....35
3.8 Data Analysis 35
CHAPTER FOUR:RESULTS AND DISCUSSION.....37
4.1 Introduction 37
4.2 Response Rate 37
4.3 ICT Integration in Academic and Human Resource Management 39
4.3.1 Students' Perceptions on ICT Integration in Academic Management 39
4.3.2 Lecturers' Perceptions on ICT Integration in Academic Management.....41
4.3.3 Registrars' (Academics) Perceptions on ICT Integration in Academic Management 43
4.3.4 Lecturers' Perceptions on ICT Integration in Human Resource Management 46
4.3.5 Registrars' (Administration) Perceptions on ICT Integration in HRM.....48
4.4 Influence of ICT Integration on Academic Management 51
4.4.1 Students' Perceptions on the Influence of ICT Integration on Academic Management 51
4.4.2 Lecturers' Perceptions on the Influence of ICT Integration on Academic Management 55
4.4.3 Registrars' Perceptions on Influence of ICT Integration on Academic Management 59
4.5 Influence of ICT Integration on Human Resource Management.....63
4.5.1 Lecturers' Perceptions on the Influence of ICT Integration in HRM.....63
4.5.2 Administrators Perceptions on Influence of ICT Integration on HRM 67
4.6 Challenges to Integration of ICT in Academic and Human Resource Management 72

4.6.1 Students' Perceptions on Challenges of ICT integration in Academic Management 72
4.6.2 Lecturers' Perceptions on Challenges of ICT integration in Academic Management 74
4.6.3 Registrars' (Academics) Perceptions on Challenges to ICT integration in Academic Management 75
4.6.4 Lecturers' Perceptions' on Challenges to ICT Integration in HRM....77
4.6.5 Administrators Perceptions' on Challenges to ICT Integration in HRM 79
CHAPTER FIVE:SUMMARY, CONCLUSIONS AND RECOMMENDATIONS....82
5.1 Introduction 82
5.2 Summary 82
5.3 Conclusions 84
5.4 Recommendations 86
5.5 Recommendation for Further Research…. 87
REFERENCES....89
APPENDIX I: INTRODUCTORY LETTER TO RESPODENTS 98
APPENDIX II: REGISTRARS (ACADEMIC AFFAIRS) QUESTIONNAIRE 99
APPENDIX III: REGISTRARS (ADMINISTRATION) QUESTIONNAIRE....103
APPENDIX IV: LECTURERS QUESTIONNAIRE....108
APPENDIX V: STUDENTS QUESTIONNAIRE 114
APPENDIX VI: NACOSTI RESEARCH AUTHORIZATION....117
APPENDIX VII: NACOSTI PERMIT 117
APPENDIX VIII: LETTERS OF DATA COLLECTION APPROVAL FROM THE UNIVERSITIES....118

LIST OF TABLES

Table 1: Study Population.....30
Table 2: Sampled Subjects by their Respective Categories.....33
Table 3: Response Rate.....37
Table 4: Students' Perceptions on ICT Integration in Academic Management 40
Table 5: Lecturers' Perceptions on ICT Integration in Academic Management 41
Table 6: Registrars' (Academics) Perceptions on ICT Integration in Academic Management.....43
Table 7:ICT Based Programs Supporting Academic Management in Universities.....45
Table 8:Lecturers' Perceptions on ICT Integration in Human Resource Management.....47
Table 9: Registrars' (Administration) Perceptions on ICT Integration in Human Resource Management.....49
Table 10: Students' Perceptions on Influence of ICT Integration on Academic Management.....51
Table 11:SPSS Output for Regression Analysis Showing Model Summary.....53
Table 12:SPSS Output for Regression Analysis Showing ANOVA[a] 54
Table 13:SPSS Output for Regression Analysis Showing Coefficients[a] 54
Table14: Lecturers' Perceptions on Influence of ICT Integration on Academic Management.....55
Table 15:SPSS Output for Regression Analysis Showing Model Summary.....57
Table 16:SPSS Output for Regression Analysis Showing ANOVA[a] 57
Table 17:SPSS Output for Regression Analysis Showing Coefficients[a] 58
Table 18: Registrars' (Academics) Perceptions on Influence of ICT Integration on Academic Management 59
Table 19: Registrars' (Academics) Perceptions on Benefit of ICT Integration on Academic Management 61
Table 20: Lecturers Perceptions on Influence of ICT Integration in Human Resource Management.....63
Table 21:SPSS Output for Regression Analysis Showing Model Summary.....65
Table 22:SPSS Output for Regression Analysis Showing ANOVA 66
Table 23:SPSS Output for Regression Analysis Showing Coefficientsa 66
Table 24: Registrars (Administration) Perceptions on Influence of ICT Integration in HRM 68

Table 25: Registrars' (Administration) Perceptions on Benefits of ICT Integration in HRM 70
Table 26: Students' Perceptions on Challenges to ICT integration in Academic Management..... 72
Table 27: Lecturers Perceptions on Challenges to ICT integration in Academic Management..... 74
Table 28: Registrars' Perceptions on Challenges to ICT integration in Academic Management..... 76
Table 29: Lecturers' Perceptions' on Challenges to ICT Integration in Human Resource Management..... 78
Table 30: Registrars' (Administration) Perceptions' on Challenges to ICT Integration in HRM 80

LIST OF FIGURES

Figure 1: Organizational Information Processing Model 25

Figure 2: Relationships between Variables of the Study 27

LIST OF ABBREVIATIONS AND ACRONYMS

AMS: Academic Management System

ERP: Enterprise Resource Planning

FEO: Finance and Enterprises Office

FMS: Finance Management System

HEIs: Higher Educational Institutions

HRM: Human Resource Management

HRIS: Human Resource Information System

ICT: Information Communication Technology

IUCEA: Inter-University Council of East Africa

KENET: Kenya Education Network

KESSP: Kenya Education Sector Support Program

LMS: Learning Management System

LQ: Lecturer Questionnaire

MIS: Management Information System

MOE: Ministry of Education

NACOSTI: National Commission for Science, Technology and Innovation

OIPT: Organizational Information Processing Theory

RAQ: Registrar (Administration) Questionnaire

RAAQ: Registrar (Academics Affairs) Questionnaire

RUFORUM: Regional Universities Forum for Capacity Building in Agriculture

SAIDE: South African Institute for Distance Education

SPSS: Statistical Package for Social Sciences

SQ: Student Questionnaire

UNESCO: United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Information and Communication Technology (ICT) refer to a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information (UNESCO, 1999). ICT is currently permeating every aspect of human life. It is playing salient roles in work places, business, education and entertainment. In higher education, ICT has become a vital instrument for supporting institutional management. This is because information is a critical ingredient in facilitating decision-making and therefore, ICT is being seen as a crucial tool that enhances acquisition, use and management of this information. Manual and mechanical systems can no longer cope with the current demands of management processes in higher educational institutions (HEIs) due to the fact that accurate and timely information is vital in planning and decision-making (Acosta, 2004).

The history of HEIs' engagement in ICT-mediated administration and management in areas such as student admission and records, examination results and transcripts, finance database, human resources database and management information dates back to the early 1970s (UNESCO, 2009). According to UNESCO (2009) the rapidly increasing student population in higher educational institutions accelerated the need for ICT in order to process, store and retrieve data in a fast, systematic and accurate fashion. On average, 57% of school-leavers in OECD countries went on to university in 2006, compared with 37% in 1995.

The need to manage this increasing student number and monitor their progression through the education system required HEIs administrators to turn to ICT solutions. Similarly, the growing power, effectiveness and potential of ICT also meant that technology could provide possibilities that did not exist three decades ago. Some examples of new ICT applications that have become available to administrators include: online student registration, access to course outlines and materials, assignment submissions and discussion forums between students and instructors. UNESCO (2009) further observes that as a result of applying ICT in university administration and management, a dynamic new shift occurred in higher education where large and complex institutions could be created and function in a highly efficient and user friendly manner. One such example is the UK Open University with over 200,000 students.

A model ICT application in HEIs management that has gained popularity is the Enterprise Resource Planning (ERP) system. ERP is a management solution that integrates information

and business processes to enable information entered once into the system to be shared throughout an organization. As late as in the nineties, the range of ERP systems broadened from those supporting manufacturing activities to processes like orders, finance, assets and human resource management. Lately, these systems have been used in grants management, marketing automation, ecommerce, student systems and supply chain systems (Swartz & Orgill, 2001).

Zornada and Velkavrh (2005) note that ERP systems in higher education develop in the direction of support for key administrative and academic services. Typical administrative functions may include human resource management, accounting, payroll, and billing. Academic functions include recruitment, admissions, registration, and all aspects of student records. According to these authors, the main benefits of ERP for higher education institutions have included improved access to accurate and timely information; enhanced workflow, increase in efficiency, and a reduced reliance on paper; tightened controls and automated e-mail alerts; provision of user-friendly Web-based interfaces; streamlined processes and easy adoption of best business practices. ERP is also capable of establishing a foundation for new systems and integrating existing ones.

Hong Kong University (HKU) which is the oldest tertiary education institutions in Hong Kong and recognized as a high ranking international university, has a long history of using ICT in management. Since the academic year 1998-1999, HKU has introduced an online Students Information System (SIS) named 'Student Connect'. The system provides real-time information regarding student registration, personal particulars, course enrolment, and examination timetables. Once students are enrolled in the system, they can navigate through a series of screens to find the information they need. Students are able to update their information whenever necessary on the 'Student Connect' system without the need to fill and or submit any paper forms. This system also calculates standard scores of the exams, analyses the results and manages the transcripts (UNESCO, 2011). In addition, there are a number of functional modules accessed through the university web portal for administrative staff to use in handling academic/student matters, such as: Course Approval System; Course Database Enquiry; Departmental Student Load; Enrolment Information; Marks Entry System; Provisional Class Lists and Transcript Data Entry System.

UNESCO (2011) further observes that HKU derives the following benefits from using this form of technology in students' management. Firstly, it provides better guidance to students

in course selection because all the courses taught and their entry requirements are available in the system. Secondly, ICT use leads to better integration of functions within the system and between administrative sections of the university which helps to improve efficiency and eliminate errors. Thirdly, it ensures comprehensive reporting and timely availability of management information. ICT integration also improves accessibility of relevant information to all authorized users because it is placed online. It as well enhances support for students, including the availability of student self-service because the system provides course information such as lecture venues, learning outcomes and assessment methods. Students are in addition able to view online or print their own unofficial academic transcripts and debit notes from the university.

As appertains to human resource management, HKU has implemented the use of Oracle's PeopleSoft software to support staff selection, recruitment and appointment, contractual agreements, performance management and staff development among other HRM functions. UNESCO (2011) observes that the university expects to draw the following long term sustainable benefits from this ICT integration. Firstly, there will be improved efficiency of the Human Resource (HR) and Finance and Enterprises Office (FEO) operations with minimal errors. This will be achieved through the introduction of staff self-service capability, elimination of duplicate handling of data, data capturing and verification at the source with inbuilt data validation tools, and well integrated and support interfaces to other applications at the university. Secondly, improved quality and timeliness of HR, budgeting and payroll management and operational information and reporting.

This will be achieved through maintaining all data in a single integrated and trusted database for use by all applications, use of inbuilt data validation techniques and easy and ready reporting. Thirdly, improved transparency, user experience and understanding. This is because information provided by the system is accurate, relevant and readily accessible, the interaction between HR and FEO appear seamless to the user of HR services, and more self-service functions are available to managers, staff members and job applicants. Fourthly, reduction of the use, physical flow and storage of paper. Here hard copies are set to be eliminated and replaced by computer-generated email notifications, benefits applications can be submitted and handled online, and the electronic database that captures personal and employment records can be easily accessed by authorized persons.

The above noted benefits of integrating ICT in HEIs management notwithstanding, King (2002) observes that many institutions of higher learning have not implemented integrated management information systems that are capable of allowing a seamless flow of information between their different users due to the belief that they are 'better off' with their current information solutions or their unwillingness to embrace changes. This has left such institutions to continue laboring with manual and mechanical systems that are unreliable and often susceptible to misuse.

Despite the clear importance of investment in university education for economic growth and social development, the sector has been in a crisis throughout the world. Universities are caught up in a time of rapid political, socio-economic and technological change. The numerous internal and external pressures on them demand a careful examination of educational practices from a new perspective to face challenges that lie ahead in knowledge-based societies (Pittinsky, 2003). These pressures include: need for a greater number and variety of higher education places without corresponding increases in funding (Phillips, 2005); a large population of learners from varied backgrounds, needs, motivations, abilities, learning preferences, availability of time and course content requirements (Bates, 2000); a demand for more 'client' responsive and flexible courses (Ryan & Stedman, 2002); and the drive to use ICT in teaching and management (Challis, Holt & Rice, 2005). In facing such challenges, higher education needs to rethink organizational structures, operational strategies, and policies appropriate for the changing educational scene (Duderstadt, Atkins & Van Houweling, 2002).

Chacha (2004) while assessing emerging issues in higher education in Africa indicated that trends show that the rise of new stakeholders, internal factors, globalization and the rapid pace at which new knowledge is being created and utilized, provide major challenges to higher education institutions across the world and Africa in particular. Chacha identifies lack of ICT capacity and its utilization in the running of the institutions as being one of the key challenges and further notes that there is need to tap the tools' potential to strengthen management information systems in HEIs.

In Kenya, effective management of the higher educational institutions has become one of the most challenging issues facing higher education sector today. Failure to sufficiently address the emerging management challenges impacts negatively on the growth of the institutions. Consequently, most of the country's higher education institutions have suffered and continue

to suffer financial losses, poor academic performance, staff dissatisfaction and their high turnover, loss of students and erosion of public confidence. The upshot of this has been a diluted quality of education and production of half-baked graduates which becomes a direct threat to the attainment of the national development of the country (Ngumbi, 2010; Ngila, 2016).

Ngumbi (2010) further notes that the existing management practices in some universities are not adaptable to the 21st century higher education system which is characterized by massive technological expansion and development, and cannot therefore propel the institutions to the full realization of their objectives. The poor management is manifested in such ways as breakdown in communication between the administrators of institutions, academic staff, students and other stakeholders. This breakdown often results to crises that usually culminate into student unrests which lead to damages that could otherwise be avoided by making available accurate and timely information, a product of effective integration of ICT in management processes.

Kenya has however made some significant efforts to place ICT in the service of educational management (Edmond, 2008). The country for instance drafted an ICT policy in January 2006. The policy objective sought to encourage the use of Information Technology in schools, colleges, universities and other educational institutions in the country so as to enhance institutional management as well as improve the quality of teaching and learning (Republic of Kenya (RoK), 2006). In addition, Kenya's Ministry of Education (MoE) articulated the role of ICT in education in documents such as Kenya Education Sector Support Program (KESSP). The KESSP provided a roadmap for investment in ICT in education and suggested provisional budgets to support educational activities. The proposed investment programme on institutional management systems for instance was intended to achieve efficiency and effectiveness on management of institutional data, decision-making and administration as well as planning (RoK, 2005).

In terms of ICT initiatives, the government as well as most of the Kenyan universities have invested heavily in ICT projects. Ndirangu and Kabira (2012) observe this by noting that key projects include the Kenya Education Network (KENET) Bandwidth Expansion Project at a cost of US$ 12 million and the East African Marine Cable System at a cost of about Ksh. 6 billion. These authors add that universities are buying computers, increasing bandwidth and

connectivity, as well as enhancing their other infrastructure to harness the potential of ICT use in education activities.

Despite the above efforts, Kashorda, Waema, Omosa and Kyalo (2007) on their study on E-readiness survey of higher educational institutions in Kenya, noted that HEIs in the country have many ICT projects and activities that do not support the core mission of the institutions such as improved learning outcomes of the graduates or management efficiency. In addition, although many of the Kenyan universities have implemented enterprise systems for finance and accounting, student admissions, examinations management and library services; there are significant differences in the strengths and weaknesses among the private and public universities in the capabilities of the systems they have implemented. The public universities are noted to have weaker systems that are incapable of allowing seamless flow of information within their organizations sub units (Nyandiere, Kamuzora, Lukandu & Omwenga , 2012).

Proper integration of ICT into the higher educational institutions management functions has been noted to improve the effectiveness and efficiency in their service delivery. The institutions, which are unlikely to switch to integrated information solutions, will find it difficult to retain their market share of clients. Students and staff will sooner or later demand services offered by other institutions (Ahmad, 2009). Hence, there is a great need for an assessment of the influence of ICT integration on academic and human resource management in Kenyan public universities. Provision of such information will help determine how the institutions are benefitting from the current ICT integration in their management functions.

1.2 Statement of the Problem

Contribution of ICTs to the core operations and general synergies of organizations has become more important, and the fast evolution of these technologies demands a change of approach to corporate technology management. In response to this, the Kenya Government has put into place policies that favour the leveraging of ICT in all sectors of the economy including higher educational institutions (HEIs). The government in collaboration with the private sector has also laid down a robust ICT connectivity infrastructure through projects such as the Kenya Education Network (KENET) Bandwidth Expansion and the East African Marine Cable System. Public universities on their part have invested on computers, bandwidth and connectivity as well as other ICT related infrastructure with an aim of harnessing the potential of ICTs use in education activities. Despite all these, it is not clear how the heavy investment in ICTs has benefited public universities in their management

processes. This is because no systematic study had been conducted to assess the influence of ICT integration on institutional management in the country's public universities. Such a study would give the concerned stakeholders a clear pointer on where the institutions stand in terms of ICT integration as well as the benefits they are getting so that proper interventions may be implemented where necessary. It is in this context that this study sought to fill this gap by investigating the influence of integration of ICT on academic and human resource management in Kenyan public universities.

1.3 Purpose of the Study

The purpose of this study was to investigate the influence of integration of ICT on academic and human resource management in Kenyan public universities.

1.4 Objectives of the Study

The following were the research objectives:

i. To determine the status of ICT integration in academic and human resource management in public universities in Kenya.
ii. To determine the influence of ICT integration on academic management in public universities in Kenya.
iii. To determine the influence of ICT integration on human resource management in public universities in Kenya.
iv. To identify the challenges affecting effective integration of ICT in academic and human resource management processes in public universities in Kenya.

1.5 Research Questions

The study addressed the following research questions:

i. What is the status of ICT integration in academic and human resource management in public universities in Kenya?
ii. What is the influence of ICT integration on academic management in public universities in Kenya?
iii. What is the influence of ICT integration on human resource management in public universities in Kenya?
iv. What are the challenges affecting effective integration of ICT in academic and human resource management processes in public universities in Kenya?

1.6 Significance of the Study

This study is likely to assist educational planners and policy makers in Kenya with empirical data which may be used to formulate relevant ICT policy that can improve the quality of institutional management in Kenya's higher education sector. The results of this study may provide information on the status of ICT integration in public universities. This may enable appropriate strategies to be put into place in the institutions so that they may implement ICT integration that can enhance provision of effective and efficient academic and human resource management services. The aforesaid interventions would benefit students, university employees as well the public at large by ensuring that they are served fast and accurately thereby raising the competitiveness of Kenya's public universities in this information age. The government and the institutions may also use the findings to mobilize resources from the public and private sector in order to support implementation of ICT integration in public universities. The research also adds to the body of knowledge in the area of the influence of ICT integration on academic and human resource management by contributing additional literature.

1.7 Scope of the Study

The study confined itself to investigating the influence of integration of ICT on academic and human resource management in Kenyan public universities. It covered academic and human resource management functions because the two areas have a great significance in the day-to-day running of higher educational institutions and they also interact and link with all other areas of administration and management in a tertiary institution. The study was carried out in three public universities namely the University of Nairobi, Moi University and Kenyatta University. The three universities are the oldest and most established going by their students' enrolment and population of teaching staff. These universities were also noted to have designed and implemented use of ICT to support their institutional management functions (Kashorda, et al. 2007; Nyandiere, et al. 2012).

1.8 Limitations of the Study

i. Some respondents may not have been fully conversant with the extent of integration and uses of ICT in academic and human resource management. The researcher reduced the effects of this by using different categories of respondents such as the registrars, lecturers and students. This assisted in corroborating and establishing the accuracy of the information given.

ii. ICT use in education is very dynamic and every day new changes are being witnessed in Kenyan universities. It is thus prudent to acknowledge that certain facts and figures presented in the findings of this study may become obsolete very quickly.

1.9 Assumptions of the Study

i. The students, lecturers and senior administrative staff contacted willingly agreed to participate. Their responses were therefore assumed to reflect the true picture of the situation as it was on the ground.

ii. Respondents were knowledgeable on the area of ICT integration and therefore they truly gave opinions on the influence of ICT integration on academic and human resource management.

1.10 Definition of Terms

The following terms are defined as used in this study:

Academic management- This is the function of running and controlling educational processes like students admissions, registration, enrolment; course planning, resource allocation (e.g. lecturers, classrooms, timetabling), tutoring/mentoring; class management (e.g. lists, attendance); academic performance, examinations, academic records, certification, transcripts; and students financial records (i.e. invoicing of fees, receipting of payments, account balances, debtors) (Sevilla, 2008). In this study academic management refers to the functions that facilitate a learner to go through university education i.e. admission, registration, course enrolment, resource allocation, class management and academic performance transcription and certification.

Efficiency- Refers to performing tasks or functions in the best possible way with the least wastage of time and effort (Oxford University Press (OUP) (2010). In this study it refers to delivering academic and human resource management services adequately and in the fastest time possible to ensure customers' satisfaction.

Effectiveness- Refers to the capability of accurately and completely producing the desired results or services (OUP, 2010). In this study it refers to delivering academic and human resource management services correctly and satisfactorily to customers.

Human Resource Management- This is the function of attracting, developing and retaining sufficient numbers of qualified and committed employees to perform the activities necessary to achieve organizational goals (Armstrong, 2001). In this study HRM refers to the process of staff recruitment and selection; training and development; employees record management; payroll administration as well as performance management.

Information Communication Technologies- These refer to tools which allow digitized information to be accessed, stored, manipulated and exchanged (Acosta, 2004). In this study, they refer to a combination of technologies (hardware and software) used to collect, create, store and disseminate information to support decision making, coordination, control and general management of academic and human resource management processes in public universities in Kenya.

Integration- It refers to the seamless incorporation of information communication technologies to support and enhance management functions in higher educational institutions for the attainment of the institutions management effectiveness and efficiency (Laudon & Laudon, 2003). In this study it refers to leveraging ICTs in academic and human resource management processes in public universities in Kenya so as to facilitate acquisition, use and management of information that is critical for decision making.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of related literature under the following sub headings: the impact of ICT in society today; integration of ICT in the management of higher educational institutions (HEIs); the influence of ICT integration on organizational management; integration of ICT for institutional management by universities in Kenya; and challenges to ICT integration in HEIs management processes. At the end of the review, the theoretical and conceptual frameworks that guided the study are given.

2.2 The Impact of ICT in Society Today

The emerging digital age has been noted as "a new technological paradigm" with current advancements in ICT heralded as being of greater significance than both the industrial and print revolutions (Castells, 2000). Technology is touted as being potentially the most significant agent of change in the modern world (Chambers, 2006). Floridi (2002) argues that no previous generation has ever been exposed to such an extraordinary acceleration of technological power with its corresponding social changes. The new ICT tools have fundamentally changed the way people communicate and do business. They have produced significant transformations in industry, agriculture, medicine, business, engineering and other fields (Baruah & Handique, 2009).

Literature reports that ICT use can provide advantage for businesses in the form of access to extended markets, information (Zinkhan, 2002), resources (Baourakis, Kourgiantakis, & Migdalas, 2002), improved efficiency (Buhalis & Main, 1998), and networking (Smallbone, North, Baldock, & Ekanem, 2002). ICTs are both strategic and practical tools for addressing the challenges of development and inclusion. They are key to access and empowerment, and they act as a medium for information and knowledge transfer. Providing access to information to all users is key to development, and ICT can assist in doing this. Inclusion in the context of an information society involves connecting people, giving them access to information and to affordable communication tools. It involves empowering them by building their human potential and capacity. This entails expanding access to education and skills development as well as reducing gaps in ICT usage. It also involves the use of ICT to overcome exclusion, improve economic performance, employment opportunities, quality of life, social participation and cohesion (Timmers, 2008).

Copenhagen (2002) notes that the key change ICT brings into the society is that it allows people to make new connections which challenge traditional assumptions about what is possible and when it is possible. As people continue to use ICT, new social interactions appear through use of the email and chart rooms, and these have profound implications for the social support networks. Social norms are being affected by ICT especially the internet, which is creating new networks through which individuals can share values and experiences. This supports a better life since some of the cultural barriers are relaxed while the strong cultural practices that encourage health seeking behaviours are promoted (Casal 2007).

The increasing computing power, decreasing bandwidth and telecommunication costs have on the other hand progressively reduced the cost of information access and exchange, making it possible to employ more innovative, cost effective and user friendly ICT solutions in education (Asian Development Bank (ADB), 2009). The use of ICT in higher educational institutions (HEIs) has the potential to enhance the quality and quantity of teaching and learning, the research productivity of the faculty and students, and the management and effectiveness of institutions (Soumitra & Amit, 2003).

2.3 Integration of ICT in the Management of Higher Educational Institutions (HEIs)

Information and communication technologies have revolutionized management of HEIs bringing forth new ways of doing things innovatively, efficiently and more effectively. Acosta (2004) notes that quick and accurate decisions by HEIs managers require readily available and relevant information, a fact that makes ICT a vital tool in today's HEIs business world. The author further points out that HEIs must cope with the emerging trends of competing on the ICT platforms thus needing to continually assess their current statuses, and that of their competitors to formulate and manage their own strategies if they have to stay abreast of the latest challenges of the information age.

UNESCO (2009) observes that using ICTs in higher educational management is fundamentally about harnessing technology for better planning, setting standards, effecting change and monitoring results of the core functions of universities. UNESCO further notes that more and more universities are looking into developing ICT applications that will do the following things: Improve on the quality and capacity of management information systems to support strategic decision-making and policy implementation; stimulate and facilitate free flow of information throughout the higher education system; and respond to the needs and

demands of the academic community (especially the digital natives) for better and increased access to university services and information through the web.

According to Nyandiere (2007) information management in HEIs, like many other institutions, is shaped by the demands of the various entities that interact with the institutions both from within and from outside. Wanjohi (2006) notes that within universities, information management focuses on staff, students and resource management. The information products include both student details, that is, personal information of students and human resource (staff) information which includes records of employees in various cadres. Under the academics, there are details of courses on offer in various departments, examination details, lecturers teaching various courses, relevant books and journals and all relevant academic information necessary to enhance the core business of a university-teaching and research. In addition, there is financial information relating to fees payments, expenditures and donations.

On the side of human resource management, Rawat (2008) notes that integrated systems like the Human Resource Information System (HRIS) will enable universities to format a profile of their staff –their strengths and weaknesses- so as to know what they have in the human resource sense. Accordingly, they will be able to structure appropriate development, promotion, training and recruitment hence ensuring that institutions have the right personnel in all its sectors at the right time and in the right numbers. Rawat (2008) also argues that nowadays higher education institutions face a significant challenge of improving learning environments at reduced administrative operating cost. Moreover, the ability to effectively budget for and manage different types of employees, recruit and retain skilled staff requires full integration of HR data with student information systems. Therefore, with so many demands, higher learning institutions need powerful ICT solutions that would help them manage student academic, human resource and financial data.

The most common benefits of HRIS include improved accuracy of information, its timely and quick provision, as well as saving of costs (Ngai & Wat, 2006). Likewise, Beckers and Bsat (2002) stated five reasons that justify why organizations should use HRIS as: increasing competitiveness by developing and enhancing HR procedures and activities; generating a greater range of HRM reports necessary for decision making; shifting the role of HRM from transactional to strategic human resource management (SHRM)- a more favourable approach

to managing human resources that supports long-term business goals and outcomes with strategic framework; and reengineering HRM departments in organizations.

University integrated information management systems bring about faster and better decision making given their guaranteed access to high quality, accurate, well maintained and easily retrievable information. Notable systems implemented in universities include Enterprise Resource Planning (ERP) systems (popularly known as enterprise systems) which represent one of the largest investments of human and financial resources by many higher educational institutions (Dewey & DeBlois, 2006). Enterprise systems enhance standardization, streamlining of operations, and integration of business processes as a large number of stand-alone applications are replaced by one system that is comprehensive and on a single information and technology architecture (Sullivan & Bozeman, 2010). ERP benefits to a university generally include increased efficiency and effectiveness of processes, reduced ICT costs, improved decision making, building business innovation and supporting strategic change (Sullivan & Bozeman, 2010; Roman, 2009; Zornada &Velkavrh, 2005). However, due to the integration of various systems into one large system, enterprise systems implementation can be complex, costly and time consuming, and involving to management, staff, consultants and vendors, with possible conflicts between an established organizational culture and the "ERP" culture (Basoglu, Daim, Kerimoglu, 2007).

Kashorda et al. (2007) in a survey on the status of e-readiness of higher educational institutions in Kenya noted that universities were ready to use ICT for teaching, learning, research and management. However, the survey did not go deep into investigating the influence of ICT integration in the various aspects of institutional management. This study therefore delved further and investigated the stakeholders' perceptions on the influence of integration of ICT in two key management processes namely academic and human resource so as to get a clearer picture of the benefits that the universities could be getting. The findings will help in the formulation of appropriate ICT policies that will enhance maximization of ICTs benefits in public universities management in Kenya.

2.4 Influence of ICT Integration on Organizational Management

According to Tusubira and Mulira (2005) the integration of ICT in organizational functions brings about three main benefits namely: Increased efficiency; cost effectiveness; and competitiveness. Consequently, it may be important to unpack these benefits to see how they impact organization.

2.4.1 ICT and Organizational Efficiency

Efficiency refers to the performance of a task in the best possible way with the least wastage of time and effort (Oxford University Press (OUP) (2010). Management of information in the current business environment has become a powerful driver in performance of business processes as it determines organizational growth and sustainability (Siriginidi, 2007). With increased globalization, firms are facing unprecedented competition since they operate in a dynamic environment (Watanabe & Hobo, 2003). This has seen them invest heavily in information systems in the effort of integrating and coordinating their activities for efficiency and effectiveness.

In the provision of higher education for instance, information technology has helped transform the role of universities as trans-national institutions. Through the concept of Open and Distance Learning, an increased number of Open Universities are evolving in different parts of the globe to meet the needs of higher and tertiary education. Opportunities for working adults who are unable to attend regular timetabled classes to access learning have been increased (ADB, 2009). The internet allows students to enroll for courses in external universities rather than locally situated ones, thus increasing the diversity and choice of programs available to the learner (Oliver, 2002). The increased use of ICT to deliver instruction holds promise ensuring students isolated by geographical barriers can join together with others through video-conferencing facilities (Baruah & Handique, 2009). All types of learner support services, for example academic counseling and provision of study materials can be provided through ICT.

The efficiency which ICT may bring about into the universities' management can be achieved in areas of ease of access to students and staff records, data on assets of the institutions as well as in front office operations and management of key processes like admissions and examinations (Tusubira & Mulira, 2005). Katz (2001) asserts that the ICT infrastructure is likely to influence and even shape the nature of higher education institutions and the practices of faculty and administrators. The author notes that the faculty, parents, staff and students are demanding more information from the HEIs in form of grades, loan re-payment and tracking, class registration and contract administration, thus necessitating HEIs information systems to operate automatically, be integrated and accessible to users 24 hours a day, 7 days a week, 365 days a year. Katz further points out that information resources and tools can be invoked to help guide increasingly complex and consequential institutional decisions through tools provided by the systems. HEIs thus are investing in systems that

make it relatively easy and cost effective to acquire, store and manage volumes of information about institution's stakeholders.

ICT based systems such as the integrated human resource management information system support planning, general administration, decision making and control functions of an organization. The system also support applications such as employee selection and placement, payroll, pension and benefits management, intake and training projections, performance and productivity evaluation. The information system increases administrative efficiency, produces reports capable of improving decision-making and enhances accountability in service delivery (Gerardine, 2006).

2.4.2 ICT and Cost Effectiveness in Organizational Management

Information communication technologies are now fairly priced and therefore more affordable to many institutions (Nyandiere, 2007). On his part, Wanyembi (2002) points out that the strong interest in the adoption of ICT emerged in Sub-Saharan Africa for three reasons. Firstly, there was revolution in ICT that has resulted into computer systems -hardware and software- becoming cheaper, and therefore, more widely affordable. Secondly, the substantial value added utility of ICT in the provision of and access to information services for improved planning and organizational management has become more widely recognized. Thirdly, international development agencies and donor countries have exerted significant pressure upon many governments, institutions of higher learning and other recipients of their aid to adapt extensive use of ICT so as to help reduce their operational costs, improve their work performance and efficiency in organizational management. Golola (2005) points out that the speed of ICT developments, their increasing spread and availability, the nature of their content and their reducing cost, are major implications for teaching and learning, research, libraries and information services, and university management.

ICT use in HEIs is essentially observed to be breaking down the walls of the traditional universities by making learning available to all and removing constraints imposed by insufficient accommodation facilities and increasing the diversity of learning approaches and resources available to the teachers and learners (UNESCO, 2009). This has the implication of reducing the cost of higher education because learning can take place online without involving the physical presence of the teacher and the class. Institutional management functions can as well be conducted via online platforms thus cutting down the costs associated with paper work, space and time to both the institution and the client. ICT is also

enhancing internationalization of higher education by promoting borderless universities, thereby promoting accessibility to affordable and diverse choice of programs (Oliver, 2002). This is already evidenced by the number of universities offering online degrees across international borders to those connected to the internet, at a much lower cost, as compared to local residential institutions.

In recognition of this ability of ICT to help cut down the costs of running organizations, the Kenyan government required all public university Vice Chancellors to sign performance contracts with the Ministry of Education (RoK, 2013). The 10th Cycle for Performance Contracting guidelines indicated that all the public universities were supposed to automate their operations and to spend up to 10% of their recurrent budgets on information systems. Therefore, every year public universities would be required to automate some processes, which has led many universities today to have most of their operational systems automated (Kashorda & Waema, 2014). This study thus set out to investigate how the investment in ICT systems by public universities were benefiting the academic and human resource management processes.

2.4.3 ICT and Organizational Competitiveness

Competition among various businesses is the main force behind strategic actions that each enterprise takes. Academic institutions are not spared from competition for excellence and therefore need to make strategic moves, especially taking advantage of information technology (Nyandiere, 2007). The author continues to posit that for HEIs to survive in this competition, they have to ensure that their processes are faster, less cumbersome and that the processes are designed in such a way as to facilitate faster data collection and dissemination for management decision-making. Alter (2001) supports this argument by noting that organizations invest in information systems because they believe the systems will make a difference in the way the organization conducts its business- processes and functions, basically giving the enterprise competitive advantage.

Glazer (1993) on his part argues that successful firms have invested in ICT like everyone else but have differentiated themselves by viewing the management of information produced by these systems as being of paramount importance. This author continues to note that as these organizations identify the relationship between corporate and ICT strategies, they use information to integrate and manage links between the two- the corporate and ICT. Such organizations succeed because of their ability to differentiate themselves from their

competitors, especially on the ICT platform. Supporting this view, Parker et al. (1988) maintain that justification for an ICT application should be based on one of two conditions; either it improves the performance of the current organization or it improves the outlook for new business opportunities and strategies of the enterprise. In addition, Hammer (1990) points out that the best rationale for acquiring ICT is strategic alignment of the business and the resultant benefits.

Regionally most organizations including universities have embraced integrated information systems to automate their business processes in order to decrease costs, enhance efficiency and gain competitive position over their competitors (Nour & Mouakket, 2011). With the advent of electronic business and increased importance to leveraging of various sources of information within an organization, information solutions such as Enterprise Resource Planning (ERP) software has come out as a major area of interest to most organizations (Hendrickson, 2010). This author further notes that successfully implemented ICT integration can benefit an organization tremendously even though expensive to acquire. For instance, an organization benefits from it by having increased customer service and reduced manufacturing or production costs.

Wanyembi (2002) further notes that colleges and universities in Kenya have felt the pressure to invest in computer-based information systems to manage their business processes and more so to manage the vast amounts of data they handle. Accordingly, information and communications technology resources in Kenya continue to increase in numbers, value and sophistication as more and more institutions invest in the new technologies. Ahmad (2009) cautions that integrated information solutions give higher education institutions competitive advantages thus institutions which might not switch to them will find it difficult to retain their market share of students. This is because students will sooner or later demand services offered by other institutions.

2.5 Integration of ICT in Institutional Management by Universities in Kenyan

Kenyan universities, just like other institutions elsewhere in the world, are implementing various information systems to facilitate their operations. They include ERP systems which are implemented to enhance institutional management given their abilities to standardize, streamline operations, and integrate business processes (Nyandiere, Kamuzora, Lukandu & Omwenga, 2012). In their study, Nyandiere et al. (2012) established that Kenyan universities have mainly implemented systems for finance and accounting, student admission,

examinations management, and library services. The authors also established that there are no significant differences in information systems needs among Kenyan universities, but there are significant differences in strengths and weaknesses among the private and public universities in the capabilities of systems they have implemented with the private universities having better ICT systems. These authors further observed that despite fears especially on delays in project implementation and system costs, Kenyan universities are in a position to implement enterprise systems to facilitate their operations. They however noted that universities need to allocate more funds to systems implementation if they have to successfully implement enterprise systems which generally require more resources than ordinary software applications.

Kenyatta University (KU), one of the three universities targeted for this study, was noted to have implemented multiple integrated Management Information Systems (MIS) which include: UNIPLUS for registration (allowing students to register online), student finance (allowing students to check their fee balances online), and examinations (allowing students to check their results online); the Sage Accpac Enterprise Resource Planning (ERP) system for integrating all financial data and processes of the university into a consolidated system; the Human Resource MIS, for capturing staff records and staff-related processes. The university had also in place a Corporate SMS service for students to communicate with the university to obtain fee balances, fee statements, examination results, important dates and emergency alerts (SAIDE & RUFORUM, 2010). The other two public universities, University of Nairobi and Moi University, also targeted by this study were as well noted to have implemented use of integrated information management solutions such as the enterprise resource planning (ERP) so as to support and improve efficiency in their finance, academic and human resource management (Kashorda et al. 2007 and Nyandiere et al. 2012). It was thus of interest for this study to establish the influence that these ICT systems were having on the academic and human resource management processes of the said universities.

In a study to assess the implementation of ERPs in Kenyan public universities using a case of Masinde Muliro University of Science and Technology, Makokha, Musiega and Juma (2013) found that 85% of implementation of ERP system was focused on the integration of Human Resource, Finance, Procurement and Students Affairs. Kanake and Nyakego (2015) in a study to assess the utilization of Human Resource Information Systems (HRIS) in selected universities in Kenya established that the institutions used both the automated and the manual HRIS. HRIS was found to be commonly used for payroll and record management as well as

staff recruitment, promotions and skills inventory. The study recommended that the management of Kenyan universities should allocate adequate resources for the implementation and maintenance of the system. It also recommended that since universities in Kenya had adopted different types of HRIS (automated and manual), these systems needed to be integrated in order to increase availability and readiness of information to support universities management on decision making.

In terms of the quality and manner of implementation, Nyandiere (2007) posits that universities that have or are implementing computer-based systems take different strategies, but the most common is a combination of strategies. There are those that develop their applications internally. This assumes that the institution has enough capacity- finances and staff to undertake computerization projects. The demerits of this are usually poorly developed and implemented systems. This author further observes that where institutions want to guarantee quality, many go for off-the-shelf packages while others contract specialist developers to implement their systems. In such cases, Sevilla (2008) notes that an institution can choose to contract local vendors who understand standard commercial applications or go for international vendors with proven systems and long track records. The demerits here are that the former are often inexperienced on academic requirements and usually offer unclear long term sustainability and support while the latter are usually very costly and may require expensive travelling.

In addition, Nyandire (2007) notes that some institutions are going for freeware or what are commonly referred to as Free and Open Source Software (FOSS). Here, the institutions customize these systems to their needs and where it is done well, there are no regrets. A good example in this front is Strathmore University in Kenya that has successfully implemented freeware systems to enhance its integrated management processes. One of the FOSS, the Academic Management System (AMS) has been customized and implemented to support the following academic sub processes at the institution: Admissions, registration, enrolment; course planning, resource allocation (e.g lecturers, classrooms, timetabling), tutoring/mentoring; class management (e.g lists, attendance); academic performance, examinations, academic records, certification, transcripts; and students financial records (i.e invoicing of fees, receipting of payments, account balances, debtors etc). In addition, the AMS has the following features: It is fully web–based and platform independent; offers proper access control (i.e administrators, lecturers, students, each access what is relevant);

and the system integrates with other systems like Finance Management System (FMS), Integrated Library System (ILS) and Learning Management System (LMS) (Sevilla, 2008).

Ayoo (2006) in his report on the East African Varsity Net, a project of the Inter-University Council of East Africa (IUCEA), indicates that a number of universities already have information systems for handling students' records, some based on open source systems, others on proprietary software bought off the-shelf, while others are donated by international partners. Ayoo however notes that many of the systems donated by international donors are experiencing support problems, especially after donors have left the scene, perhaps due to lack of local expertise to continue with their maintenance.

Sangrà and González (2004) advise that ICT integration must be done in an explicit, planned and systematic manner, involving the whole organization and their members at individual and collective levels so as to become an agent of change and improvement for the university. The institutional approach of this issue requires an active participation and the motivation of different agents within the institution, where faculty members and a strong institutional commitment are very important.

Sevilla (2008) cautions that implementing the right software is only part of the solution. The author argues that successful project implementation requires the following things: a full study of user requirements; an identification of functional procedures; full involvement and support from top management; proper change management; and adequate resources (i.e hardware and a committed project team). Despite the studies reviewed showing the types of information solutions commonly adopted by HEIs in Kenya and their perceived strengths and weaknesses, none had clearly shown the influence that these solutions had on the institutions' management processes.

2.6 Challenges to effective Integration of ICT in HEIs Management

Many of the higher educational institutions (HEIs) have been shown to experience a number of challenges in their quest to integrate ICTs in their management processes. Tusubira and Mulira (2005) observe this and note that firstly, there is lack of awareness and a supportive mindset among staff leading to unqualified resistance and wanting to stick to the old ways of working. Secondly, there is no commitment from top level management thus bringing forth bureaucracy and red-tape in system implementation. Thirdly, the HEIs experience lack of appreciation of ICT as a tool and not panacea for organizational transformation. The authors argue that this emanates from some people beliefs that the presence of ICTs can by itself be

relied upon to bring the desired results in a place. Such HEIs also adopt poor strategies in making ICT responsive to their organizational visions and missions, with the thinking that ICT can set direction for an organization. Tusubira and Mulira (2005) further observe that there is lack of a systematic method of system implementation- integration of ICT in HEIs needs to be fully conceptualized and defined before implementation. This involves clearly studying the needs of the institutions and finding the best ICT solutions to fill in the existing gaps. Lastly, these authors note that lack of project ownership which often results due to non involvement of employees and users in system implementation is detrimental to effective integration of ICT in institutional management. According to Nyandiere et al. (2012) other challenges are noted as inhibiting initial costs of hardware and software; lack of funding for sustainability and continuity in maintenance/replacement of equipment; and non motivation of ICT staff who maintain information systems.

On his part, Chacha (2005) notes that there has been insufficient training and re-skilling of end users as well as technical staff that support the systems in HEIs. This is coupled with the inability of many institutions to recruit and retain qualified information systems staff. For some institutions, technological complexity results to the challenge of security concerns for the data and the systems, especially where students have to access the institutional systems. Wanjohi (2006) points out that without proper controls, students can hack into the systems and change examination grades, fees balance statuses or other modifications, which can have serious ramifications on the institution. Universities are thus advised to pay special attention to building the capacity of the ICT support staff so as to ensure that the complex campus networks are secure and well managed. Their continuous training should majorly focus in advanced campus infrastructure areas, cyber security and information systems for automation. In addition, the institutions need to invest in a critical mass of high-end ICT staff that will design and manage the complex campus infrastructure and information systems (Kashorda & Waema, 2014).

In a study on human resource information system implementation Ngai and Wat (2006) found that many organizations have problems when implementing new technologies including human resource information system due to several barriers. These barriers include lack of sufficient capital and skills, cost of setting up and maintaining the system, inadequate top management support and commitment, dearth of HRM knowledge by system designers and lack of applications for human resource users. Moreover, Beckers and Bsat (2002) observe that the cost of setting up and maintaining a human resource management

information system (HRMIS) can be high, which is the major obstacle in their implementation. Other obstacles include: Lack of staff; insufficient budget; problems with time management; the need to work with other departments; and the lack of information technology support.

The lack of staff could be either in terms of the number of staff available and/or the human resource practitioners that are competent in information technology. The lack of a budget implies that most organizations do not provide for a separate budget to cater for the implementation of HRMIS. Time management issues arise when planning and implementation is not undertaken according to a properly set out operational plan, which also needs to stipulate how the human resource department will work with other departments in ensuring that human resource management systems are implemented successfully. Such success can further be underpinned by adequate information technology support in terms of both hardware and software utilization which lacks in most organizations (Beckers & Bsat, 2002).

Malviya et al. (2009) as well note that implementation of computerized human resource functions is a great challenge for the organization. The macro- and micro-factors influencing an institution are very dynamic. This leads to the requirement of continuous monitoring to accommodate the changes in the implementation strategy accordingly. The main challenges faced during the implementation process include: transfer of huge unstructured and scattered legacy data from various sources to human resource management information system database; to incorporate the upcoming changes, with unpleasant surprises in the processes; and maintaining a high motivational level among the users. In the long process of migration, maintaining the integrity of data and ensuring the continuous updating of the transferred data is the real test. However, a detailed implementation strategy, right from the beginning of the project would resolve these problems.

Laudon (2000) introduces the challenge of staff layoff which comes with ICT integration that could lead to morale problems. The integration of departments also lead to reduced need for many staff to man operations hence leading to staff layoffs. The institution may lack resources to compensate employees over their job loss and it is a painful experience to have to let go some staff that have worked with the institution for many years. Therefore, managers must anticipate resistance to information systems, especially when business process reengineering has to be undertaken.

2.7 Theoretical Framework

This study was guided by the Organizational Information Processing Theory (OIPT) which was proposed by Galbraith (2005). This theory identifies three important concepts: Information processing needs, information processing capability, and the fit between the two to obtain optimal performance in organizations. According to the theory, organizations need quality information to cope with environmental uncertainty and improve their decision-making. Environmental uncertainty stems from the complexity of the environment and its dynamism, or the frequency of changes taking place in the various environmental variables. The theory further states that organizations have two strategies to cope with uncertainty and increased information needs for their management processes: Firstly, develop buffers to reduce the effect of uncertainty and secondly, implement structural mechanisms and information processing capabilities to enhance the information flow and thereby reduce uncertainty. Figure 1 provides a diagrammatic representation of model of the theory.

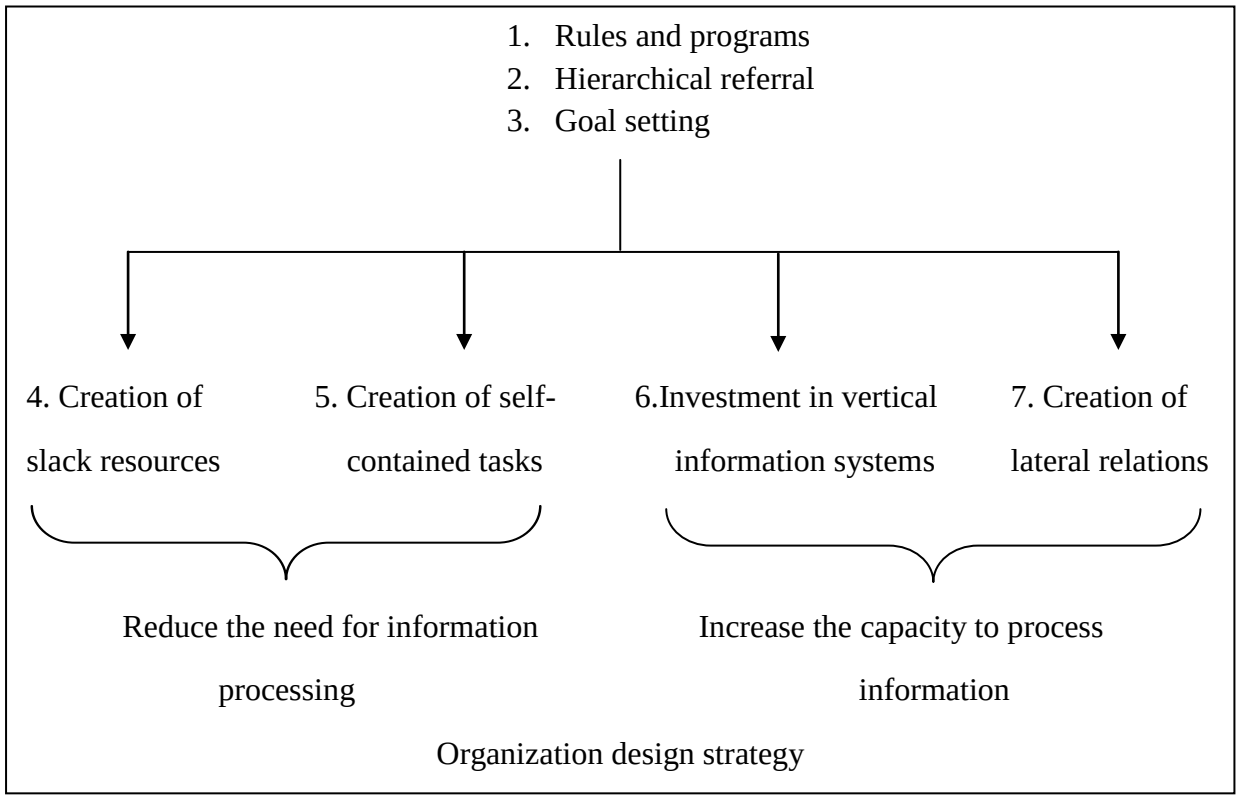

Figure 1: Organizational Information Processing Model

Source: *Galbraith (2005)*

The model shows that organizations' design has sub units. These sub units require an integrated information technology (IT) system that will improve information flow and reduce uncertainty within the sub units. Increasing the capacity to process information required in management processes will require an investment in vertical information systems and creation of lateral relations to portray an image of how the levels of management will interact in the management processes. Creation of slack resources and self-contained tasks will reduce the need for information processing after a satisfactory confirmation that indeed output of a process does not require further intervention of an information processing system. Increasing the capacity to process information and reducing the need for information processing are products aimed at fulfilling management goals which are key entities of management.

This theory was deemed appropriate for this study because it acknowledges the fact that accurate and timely information is a key ingredient in management processes and that an integrated IT system is an important tool in enhancing information flow and reducing uncertainty within organizational sub units. This is in line with the premise of this study that appropriate integration of ICT in management processes of public universities will help improve the effectiveness and efficiency of their service delivery because of the availability of accurate and timely records.

2.8 Conceptual Framework

The influence of ICT integration on academic and human resource management may be articulated by the perception of lecturers, students and senior administrative staff. Figure 2 exhibits a diagrammatical representation of the relationship between the variables.

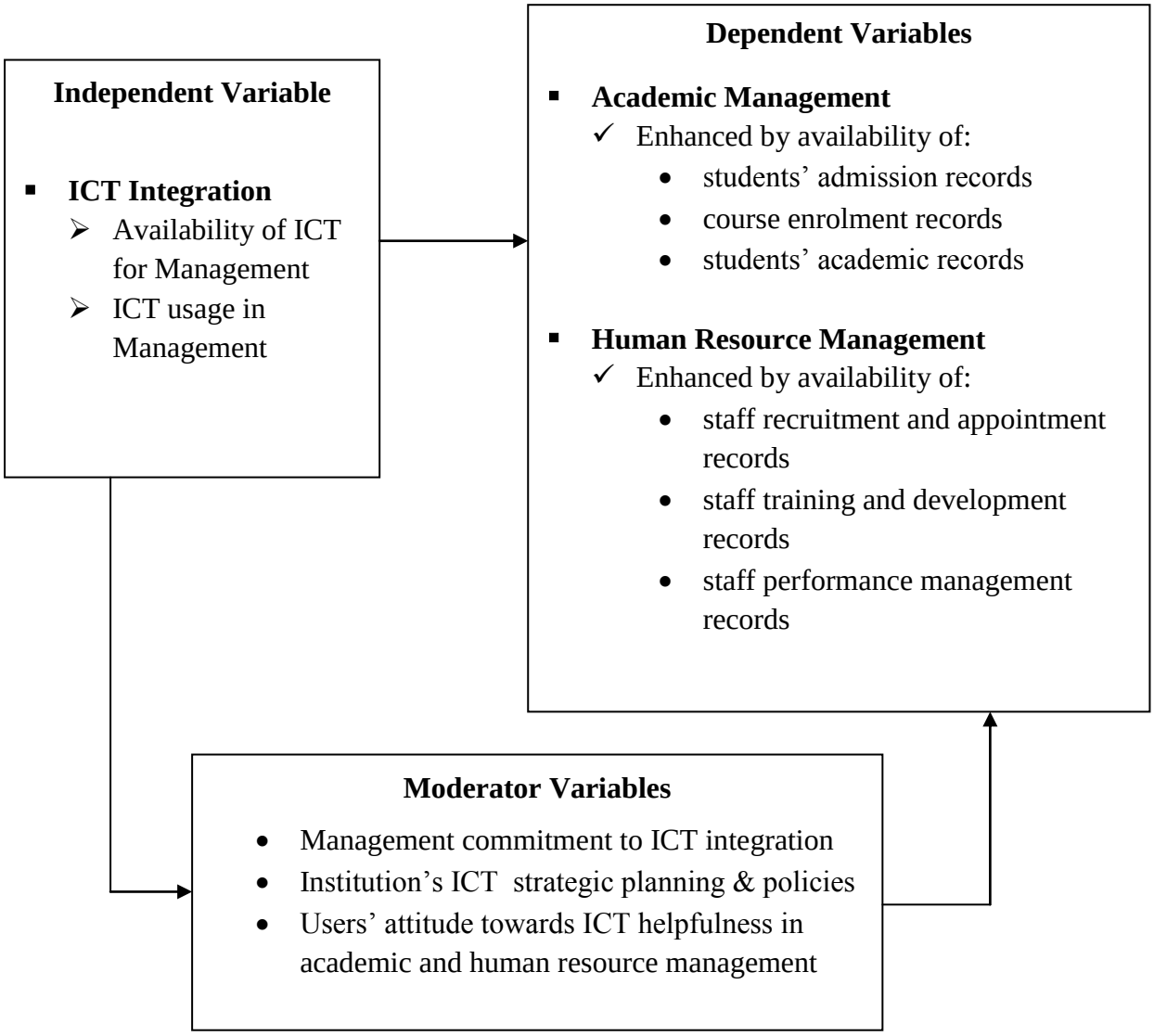

Figure 2: Relationship between Independent, Dependent and Moderator Variables of the Study

From the conceptual frame-work, the independent variable (IV) of the study was ICT integration, which encompassed availability of ICT for supporting management and ICT usage in management processes in the universities. On the other hand, the dependent variables (DVs) of the study were shown as academic and human resource management. In an ideal situation, the conceptual framework indicates that ICT integration in the universities' management processes is expected to leverage academic and human resource management. The resultant effect is enhanced institutional decision making process that is facilitated by availability of information in form of academic and human resource management records. However, in reality the conceptual framework shows that there are some moderator variables (MVs) which affect the causal relationship of ICT integration and academic and human

resource management. These moderator variables include management commitment to ICT integration; institution's ICT strategic planning and policies as well as users attitudes towards the value of ICT integration in their institutions. The effects of these variables were reduced by holding them constant during the time of the study.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research procedures adopted by the study. It presents the research design, location of the study, target population, sampling procedures and sample size, instrumentation, validity and reliability of research instruments, data collection and analysis procedures used.

3.2 Research Design

This study adopted a descriptive survey research design. This design can be used to describe the characteristics of a particular individual or group of variables (Kothari, 2007). In a descriptive survey design, information is collected from respondents about their experiences and opinions about a particular topic under study in order to generalize the findings to the population that the sample is intended to represent (Borg & Gall, 2003). This design is the most appropriate for obtaining factual and attitudinal information or for research questions about self-reported beliefs, opinions, characteristics and present or past behaviours (David & Sutton, 2004). It was ideal for this study because surveys are suitable for sampling a relatively large population. Ndirangu (2000) argues that surveys are very good vehicles for collecting original data for the purpose of studying attitudes and orientations of a very large population.

3.3 Location of the Study

The study was conducted in three public universities in Kenya namely the University of Nairobi, Moi and Kenyatta Universities. The three universities are the oldest and most established going by their students' enrolment and population of lecturers. The three universities had also been noted to have designed and implemented use of ICT to support their institutional management functions (Kashorda et al. 2007; Nyandiere et al. 2012).

3.4 Target Population

The target population comprises of all individuals and objects that the researcher could reasonably generalize findings to (Cooper & Schindler, 2006; Mugenda, 2008). This study targeted all the 240,551 students in the 22 public universities that were fully chattered by the year 2012, their 5,189 lecturers, 22 registrars administration and 22 registrars' academics (Commission for Higher Education (CHE) 2013). The 41,879 students who joined public universities in the academic year 2012/2013 through the now defunct universities Joint

Admission Board (JAB) formed the accessible population. These students were in their fourth year of study during the time of fieldwork and were required to give their experiences and opinions about the influence of ICT integration on academic management in their respective universities. This cohort of students was more likely to give accurate information because they had interacted longer with most academic services in their institutions than their juniors. The lecturers were targeted to give information on their experiences and opinions about the influence of ICT integration on both academic and human resource management because they usually interact with the two functions in the course of their work. The two categories of registrars (academic and administration) were targeted because their offices were the ones charged with the academic and human resource management functions that concerned this study. Table 1 shows the study population from which the samples were drawn.

Table 1
Study Population

Category	Population
Students	41,879
Lecturers	5,189
Registrar (Academic Affairs)	22
Registrar (Administration)	22
Total	**47,112**

Source: CHE (2013)

3.5 Sampling Procedures and Sample Size

Sampling is the process of selecting a sub-set of cases (sample) in order to draw conclusions about the entire set while a sample is a small part of a large population, which is thought to be representative of the larger population (Orodho, 2009). In this study, purposive sampling technique was used to select three public universities in Kenya namely the University of Nairobi, Moi and Kenyatta Universities from a list of seven initial ones that were started before the year 2012. The rest of the universities were just being upgraded around this time after having been constituent colleges of the seven initial ones and thus could not be relied upon for such a technological resource intensive study. According to Orodho (2009) purposive sampling technique involves handpicking the cases to be included in the sample on the basis of the researcher's judgment of their important role in the study. The three are the most established public universities in Kenya and were noted to have implemented use of ICT in there institutional management processes (Kashorda et al., 2007; Nyandiere et al.,

2012). CHE (2013) notes that in the academic year 2012/2013, the three universities together admitted a total of 13,713 students through the now defunct JAB with the University of Nairobi admitting 4,832 while Moi and Kenyatta, 4,505 and 4,376 respectively. CHE (2013) also notes that the three universities had a total of 3,307 teaching staff with 1,610 of them working at the University of Nairobi while Moi and Kenyatta had 736 and 961 respectively.

The determination of the sample size for the students and the lecturers was done using Cochran's (1977) formula. In Cochran's formula, the alpha level is incorporated into the formula by utilizing the t-value for the alpha level selected (e.g. t-value for alpha level of 0.05 is 1.96 for sample size above 120). For categorical data, 5% margin of error is acceptable (Krejcie & Morgan, 1970). Cochran's sample size formula for categorical data is:

$$n = \frac{(t)^{2} * (p)\,(q)}{(d)^{2}} = 384$$

$$n = \frac{(1.96)^{2}(.5)\,(.5)}{(.5)^{2}} = 384$$

n= the desired sample size

t= value of selected alpha level of .025 in each tail=1.96 (the alpha level of .05 indicates the level of risk the researcher is willing to take, true margin of error may exceed the margin of acceptable margin of error.

(p)(q) =estimate of variance =.25 (Maximum possible proportion (.5)* 1-maximum possible proportion (.5) produces maximum possible sample size)

d= acceptable margin of error for proportion being estimated=.05 (Error researcher is willing to accept)

Thus, for a population of 13,713 students, the required sample is calculated as follows:

$$n_f = \frac{n}{(1+n/\text{Population})} = 384$$

$$n_f = \frac{384}{(1+384/13{,}713)} = 374$$

And for a population of 3,307 teaching staff, the required sample size is:

$$n_f = \frac{384}{(1+384/3{,}307)} = 344$$

Proportional allocation method was then used to allocate the selected samples among the students' and lecturers' strata. Orodho (2009) observes that in this method, each stratum contributes to the sample a number that is proportional to its size in the population. In order to obtain the corresponding category of the samples, a sampling fraction was calculated and then multiplied by each category of the population. Orodho notes that for a simple random sample, the sampling fraction equals the probability of any member of the population being selected for the sample and is defined by the equation; f= n/N

Where;

f= Sampling fraction
n= Sample
N= Population
Thus the sampling fraction for the students is calculated as:
f = 374/13,713
f= 0.0273
And for the lecturers:
f = 344/3,307
f= 0.104

To select the students and the lecturers, the academic departments were conveniently sampled and then systematic sampling technique employed. Orodho (2008) explains that systematic sampling technique involves selecting members at equal intervals by picking some random point in a list and every *nth* element is selected until the desired sample size is obtained. As a result, 132 students from the University of Nairobi; 123 from Moi and 119 from Kenyatta

plus 167; 77 and 100 lecturers from the three universities respectively were selected to participate in the study. The three Registrars (Academics Affairs) and the three Registrars (Administration) of the sampled universities were purposively selected to participate in the study. Table 2 shows the sample size of the study.

Table 2
Sampled Subjects by their Respective Categories

Category	Population (N)	Sample Size (n)
Students	13,713	374
Lecturers	3,307	344
Registrar (Academics)	3	3
Registrar (Administration)	3	3
Total	**17,026**	**724**

3.6 Instrumentation

The researcher used questionnaires to collect data from the registrars, lecturers and students. According to Kombo and Tromp (2006) questionnaires facilitate the collection of data from a large sample and diverse regions. The questionnaires were preferred because they allow greater uniformity of questions, hence ensuring greater comparability of the information elicited by each set. The four questionnaires used were:

i. Registrars (Academics Affairs) Questionnaire (RAAQ)

This contained the following: Section 'A': demographic data; section 'B': the existence of ICT integration in academic management in public universities in Kenya; Section 'C': influence of ICT integration on academic management in public universities in Kenya; and Section 'D': challenges that prevented effective integration of ICTs in academic management process. In total, the RAAQ had 38 items consisting of 31 close ended and 7 open ended.

ii. Registrar (Administration) Questionnaire (RAQ)

This contained the following: Section 'A': demographic data; section 'B': the existence of ICT integration in human resource management in public universities in Kenya; Section 'C': influence of ICT integration on human resource management in public universities in Kenya; and Section 'D': challenges that prevented effective integration of ICTs in human resource management process. In total, the RAQ had 40 items consisting of 31 close ended and 9 open ended.

iii. Lecturer questionnaire (LQ):

This contained the following: Section 'A': Demographic data; Section 'B': the existence of ICT integration in academic management; Section 'C': existence of ICT integration in human resource management; Section 'D': the influence of ICT integration on academic management; Section 'E': the influence of ICT integration on human resource management; Section 'F': the challenges that prevent effective integration of ICT in academic management; Section 'G': the challenges that prevented effective integration of ICT in human resource management. In total, the LQ had 43 items consisting of 34 close ended and 9 open ended items

iv. Student questionnaire (SQ)

This contained the following: Section 'A': Demographic data; Section 'B': the existence of ICT integration in academic management; Section 'C': the influence of ICT integration on academic management; and Section 'D': the challenges that prevented effective integration of ICT in academic management. In total, the SQ had 29 items consisting of 25 close ended items and 4 open ended items.

3.6.1 Validity of the Research Instruments

Mugenda and Mugenda (2003) define validity as the accuracy and meaningfulness of inferences, based on the research results. To determine the content validity, the researcher firstly went through the instruments and compared their content with the set objectives to ensure that they contained all the information that addressed the study objectives. Secondly, the researcher sought expert judgment from the supervisors, senior members of the Curriculum, Instruction and Educational Management (CIEM) department together with ICT experts at Egerton University and thereafter incorporated their recommendations and inputs so as to improve on content validity of the instruments. The instruments were also piloted in two public universities namely Egerton and Jomo Kenyatta University of Agriculture and Technology that were not in the final sample of universities. The pilot group constituted 162 (1.03%) respondents that included 123 students, 33 lecturers, two Registrars (Academics) and two Registrars (Administration). A pilot sample of between 1% and 10% of the target population of the study is considered acceptable (Mugenda & Mugenda, 2003).The researcher used the results of the pilot test to adjust the instruments' items and make them appropriate and understandable thereby increasing their validity.

3.6.2 Reliability of the Research Instruments

According to Mugenda and Mugenda (2003) reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials. After conducting the pilot study as described in section 3.6.1, the reliability coefficient was estimated by computing Cronbach alpha coefficient. The overall reliability coefficient of the students' questionnaire was 0.79; the lecturers' 0.73; registrars' academic affairs 0.82 and registrars' administration 0.80. Reliability coefficient of 0.70 or above was acceptable for the research (Frankel & Wallen, 2002). Cronbach Alpha was the most appropriate method for use when the items are weighted or the rating scale is summated (Gliem & Gliem, 2003).

3.7 Data Collection Procedures

Data collection procedures refer to the protocols that must be followed to ensure that data collection tools are applied correctly and efficiently (Mugenda, 2008). The researcher obtained a letter of introduction from the Egerton University Graduate School and then visited the National Commission for Science, Technology and Innovation (NACOSTI) to apply for a research permit. After this, participating universities were contacted for permission to conduct the research in their institutions. Administrators, lecturers and students of the selected universities were then informed of the intended study in writing. Appointments were booked when the researcher would visit the universities to administer the questionnaires. The researcher administered the questionnaires in person to the respondents in order to increase the response rates. The respondents were given two weeks to fill them in and thereafter the instruments were collected for analysis. Immediately the questionnaires were received, they were checked for accuracy. This was done by checking whether the responses were legible, whether all important questions were answered, whether the responses were complete and whether all the contextual information was included (Kombo & Tromp, 2006).

3.8 Data Analysis

A coding system was used to find a quick and easy way to organize the data so that it could be analysed. Codes are used to identify particular responses (Robson, 1993). The coded data was then entered into the Statistical Package for Social Sciences (SPSS) version 22 computer program for analysis. Descriptive statistics that included frequencies and percentages were used to analyse the data collected from objectives one and four of the study that looked at the status of ICT integration and the challenges affecting effective integration of ICT

respectively. Inferential statistics in form of simple linear regression analysis was also employed to establish the influence of the independent variable (ICT integration) on the dependent variables (academic and human resource management). The assumption in using simple linear regression analysis was that the data type was interval data that was normally distributed from a randomly selected sample. Simple linear regression analysis was useful in determining the statistical relationship between ICT integration and academic and human resource management (Orodho, 2009; Lim & Ting, 2013). All tests of significance were done at a confidence level of 95%. Analysed data was then presented in form of Tables.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results and discussion of the research findings on the influence of integration of ICT on academic and human resource management in Kenyan public universities. Data was analyzed using descriptive statistics such as frequencies and percentages as well as inferential statistics namely simple linear regression analysis with the help of SPSS version 22. The results are presented in form of Tables, interpreted and their implications discussed. The study addressed the following research questions:

i. What is the status of ICT integration in academic and human resource management in public universities in Kenya?
ii. What is the influence of ICT integration on academic management in public universities in Kenya?
iii. What is the influence of ICT integration on human resource management in public universities in Kenya?
iv. What are the challenges affecting effective integration of ICT in academic and human resource management processes in public universities in Kenya?

4.2 Response Rate

Data was collected using questionnaires for students, lecturers and registrars. Table 3 indicates the response rate.

Table 3
Response Rate

Respondents	N	(f)	(%)
Students	374	268	71.6
Lecturers	344	243	70.6
Registrars (Academics)	3	3	100
Registrars (Administration)	3	3	100

Table 3 shows that the response rate for all categories of respondents was over 70%. This was deemed adequate for the study because according to Mugenda and Mugenda (2003) and Punch (2003) in survey research, when the response rate is at 50% it can be taken as 'adequate'; at 60% 'good' and at 70% and above 'very good'. Saunders, Lewis and Thornhill

(2007) further suggest that an average response rate of 30% to 40% is reasonable while Hager, Wilson, Pollack and Rooney (2003) recommend a 50% response rate for descriptive surveys.

4.3 Demographic Data

The demographic data sought by this study from the respondents included their gender, length of work experience for the registrars and the lecturers, and source of institutional information for both lecturers and students. The results are presented and discussed as follows:

4.3.1 Gender of the Respondents

The results showed that among the registrars' academic and administration who participated in the study, majority (83.3%) were male. This shows that the senior positions in public universities in Kenya are dominated by male which goes against the Country's' Constitution that demands one-third of key positions to be reserved for women (RoK 2010). There was an improvement to this trend where 30.4% of the lecturers who participated in the study were found to be females. The 2015 State of University Report in Kenya developed by the Commission for University Education (CUE) showed that employment of female lecturers at public universities was at 32% against 68% males (Mukhwana et al. 2016). This resonates well with the policy of at least one-third gender rule. However, affirmative action is needed to ensure that more women get the top positions in the universities. Among the students, the statistics were still in favour of the male respondents (56.7%). This could be attributed to the fact that male students are still the majority enrolled in public universities in Kenya (Mukhwana et al. 2016).

4.3.2 Work Experience

The length of time one had worked, in case of the registrars and lecturers, was sought by this study. All the registrars were found to have been in their current positions for more than five years. This was favourable for the study because they were all experienced enough to give accurate information on the status of ICT integration and its perceived influence on either academic or human resource management. The study also established that most (79%) of the lecturers who participated had worked in their current institutions for more than five years. This was equally found to be good for the credibility of the study because such duration of stay meant that they could give accurate information about the perceived influence of

integration of ICT in both academic and human resource management areas that they often interacted with in the course of their stay at the universities.

4.3.3 Source of Institutional Information for Lecturers and Students

The study also sought to know how the institutions communicated with the lecturers and students. The lecturers stated that the most used channel of communication between them and their employers was internal memos (56%). Emails and staff portals only formed 25% of the means of communication. These indicated that the participating universities were minimally using ICT tools for internal communication with their staff. Ball (2011) argues that staff portals can be used to post most of the organizational communication to employees, which they may access any time of the day whether they are within the organization or outside.

The students also stated that most of the communications from their universities were still done in writing such as on notice board posted memos and newsletters (54%). The students' portals were minimally used to post institutional information (29%). According to UNESCO (2011), Hong Kong University (HKU) uses students' web portals to post notices, information about courses available and their entry requirements, lecture venues, learning outcomes and assessment methods, transcripts, and other support services. This platform enables students to access and query institutional information at their own times and places even when they are away from the campus.

4.4 ICT Integration in Academic and Human Resource Management

The first objective of the study sought to determine the status of ICT integration in academic and human resource management in public universities in Kenya. This objective was measured at two levels: Integration in academic management and human resource management (HRM) based on the perceptions of students, lecturers and registrars respectively.

4.4.1 Students' Perceptions on ICT Integration in Academic Management

On ICT integration in academic management, students were requested to indicate on a 5 point likert scale coded as 1- Strongly disagree (SD); 2- Disagree (D); 3- Undecided (U); 4- Agree (A) and 5- Strongly agree (SA), their perceptions on items designed to measure the existence of ICT integration in academic management in their institutions. Their responses were as indicated on Table 4:

Table 4
Students' Perceptions on ICT Integration in Academic Management

Item	Responses (%)					
	N	**SD**	**D**	**U**	**A**	**SA**
University has ICT based programs to support academic management processes	268	6.3	4.1	0.0	34.3	55.2
Number of computers allocated for academic management services is adequate	268	20.1	28.4	0.7	46.6	4.1
Internet connectivity available for student's access to academic management services	268	1.1	5.2	3.0	66.4	24.3
Students equipped with ICT skills to access academic management services	268	9.3	11.2	2.2	63.1	14.2

Source: Field data

Table 4 shows that majority of students (89.5%) indicated that their universities had put into place ICT based programs to support academic management processes such as students' admissions and academic records management. Sullivan and Bozeman (2010) observe that universities have implemented ICT integrated systems in their management processes. These systems are preferred because they enhance standardization, streamlining of operations, and integration of management processes as stand-alone applications are replaced by one system that is comprehensive and on a single information and technology architecture.

At the same time, the universities had provided Internet connectivity for students' use in obtaining academic management services (90.7%), as well as equipped them with requisite ICT skills for accessing such services (77.3%). The high percentage of responses on Internet connectivity may be attributed to the many efforts and initiatives undertaken by the government and the private sector to improve Internet connectivity in the country. Ndirangu and Kabira (2012) observe that key initiatives include the Kenya Education Network (KENET) Bandwidth Expansion Project at a cost of US$ 12 million and the East African Marine Cable System at a cost of about Ksh. 6 billion. These authors add that universities are increasing bandwidth and connectivity, as well as enhancing their other infrastructure to harness the potential of ICT use in education activities. Additionally, the high percentage

indicated of students with requisite ICT skills to access on-line services may imply that most universities in Kenya are providing ICT literacy as a common course to students.

The results on Table 4 however indicate that only slightly over half of the respondents (50.7%) observed that the number of computers allocated for accessing academic management services was adequate. The insufficiency could be attributed to what Shabaya (2009) notes as insufficient funding of the universities for the acquisition of adequate ICT infrastructure. This results into a low student computer ratio. Further, Ogeto (2015) argues that the high enrolment rates of students witnessed in Kenyan public universities since the implementation of the double intake policy of 2011 has put a strain into virtually every resource in the institutions.

4.4.2 Lecturers' Perceptions on ICT Integration in Academic Management

Lecturers were also requested to indicate on a 5 point likert scale, their perceptions on items designed to measure the existence of ICT integration in academic management in their institutions. Their responses were as indicated on Table 5:

Table 5
Lecturers' Perceptions on ICT Integration in Academic Management

Items	Responses (%)					
	N	**SD**	**D**	**U**	**A**	**SA**
University has ICT based programs to support academic management processes	243	6.6	7.0	0	36.6	49.8
Number of computers allocated for academic management processes is adequate	243	24.3	13.6	2.5	35.8	23.9
Internet connectivity available for academic management processes	243	1.2	13.2	3.7	37.9	44.0
Lecturers equipped with skills to integrate ICT in management of academic processes	243	9.5	25.9	4.9	46.9	12.8
Deans of schools and chairs of departments are properly prepared to use ICT based systems in academic management processes	243	7.0	21.4	12.3	44.0	15.2

Source: Field data

Table 5 shows that majority of the lecturers (86.4%) indicated that their universities had installed ICT based programs to support academic management processes such as students' admissions and academic records management. Also, the lecturers expressed the view that there was Internet connectivity necessary for online transmission and access of academic management services (81.9%). These two results are comparable to students' responses on Table 4 which indicated high percentages of responses on the same aspects. Wanyembi (2002) notes that universities in Kenya have felt the pressure to invest in computer-based information systems to manage their academic processes and more so to manage the vast amounts of data they handle. Accordingly, information and communications technology resources in Kenya continue to increase in number, value and sophistication as more and more institutions invest in the new technology.

The results on Table 5 however indicated a near average percentage on the sufficiency of computers allocated to support academic management processes (59.7%). The insufficiency of computers was also noted by students as indicated on Table 4 thus confirming that public universities do not have enough computers for students' and lecturers' use to obtain and provide academic management services respectively. Tusubira and Mulira (2005) in their study to assess the integration of ICT in institutional management in Makerere University noted that prohibitive initial costs of computing devices, lack of funding for recurrent costs, replacement of equipment and emolument of ICT staff who maintain ICT infrastructure were major challenges to ICT integration in higher educational institutions (HEIs) in Africa. In addition, Kashorda et al. (2007) in a survey to assess the level of preparedness of HEIs in Kenya to use ICT in teaching, learning, research and management found that there was low access to personal computers by staff and students. These authors also established that minimal financial resources were allocated for the procurement of ICT in the HEIs.

Other results that indicated near average percentages of responses on Table 5 were lecturers ICT integration skills (59.7%) and preparedness of deans of faculties/schools and chairs of departments to integrate ICT in academic management (59.2%). These results imply that the universities had not adequately equipped the lecturers with requisite skills to integrate ICT in management of academic processes such as updating learners' class attendance; recording students' assessments and examination grades; as well as tracking, updating and managing learners' records. The results also imply that the universities deans of faculties/schools and chairs of departments were not adequately equipped with requisite capacity to integrate ICT in academic management. Chacha (2005) observes that there has been insufficient training

and re-skilling of end users as well as technical staff that support ICT systems in HEIs in Africa. The author also identified lack of ICT capacity and utilization in the running of the institutions as one of the key challenge facing higher educational institutions today.

4.4.3 Registrars' (Academics) Perceptions on ICT Integration in Academic Management

Registrars in charge of academic affairs in respective universities were the other group of respondents who were requested to indicate using the same format of 5 point likert scale, their perceptions on items designed to measure ICT integration in academic management of their institutions. Their responses were as indicated on Table 6:

Table 6
Registrars' (Academics) Perceptions on ICT Integration in Academic Management

Items	Responses (%)				
	SD	D	U	A	SA
University has ICT based programs to support academic management processes	0	0	0	0	100
Number of computers allocated for academic management processes is adequate	0	0	0	33.3	66.7
Internet connectivity available for academic management processes	0	0	0	0	100
Academic staff equipped with skills to integrate ICT in management of academic processes	0	0	0	33.3	66.7
Deans of schools and chairs of departments are properly prepared to use ICT based systems in academic management processes	0	0	0	33.3	66.7

Source: Field data

Results on Table 6 show that the registrars' had strong ratings on availability of computer based programs (100%) as well as Internet connectivity (100%) for supporting academic management. These results are similar to those of students and lecturers on the same aspects as indicated on Tables 4 and 5 respectively. The results are a further corroboration that public universities in Kenya have invested reasonably well in ICT integrated systems as well as

Internet connectivity necessary for supporting academic management. UNESCO (2009) posits that the need to manage the increasing student numbers and monitor their progression through the education system has necessitated HEIs administrators to turn to ICT for solutions. Similarly, the growing power, effectiveness and potential of ICT also provide possibilities that did not exist three decades ago such as online admission processing of students, online examination results and transcripts, financial databases and management information capacities.

Table 6 however shows that the number of computers allocated for academic management (66.7%) was inadequate based on the responses from the registrars. This finding is comparable to the perceptions of students and lecturers on the same aspect as indicated on Tables 4 and 5 respectively. The implication that may be drawn here is that universities have not allocated enough computers for use in academic management probably due to insufficient resources. Manyasi (2010) while studying how using information technology could increase access to higher education through distance learning in Kenya found that public universities lacked the necessary technologies and that they only had a few computers for students and lecturers use. Ministry of Education (MOE) (2012) observes that the key challenges facing ICT in education sector in Kenya include access, funding and inadequate ICT facilities. Further, it goes on to acknowledge that there are challenges in financing public universities that impinge upon this which include: Inadequate budgetary support; inadequate funds for capital development; lack of programme differentiated unit cost in provision of funds from Government; inadequate internal income generating capacity by the universities; and system inefficiencies. Moreover, the source points out that the larger portion of allocation to public universities caters for salaries of university staff and very little money is left for teaching/learning materials and other equipment. All these could explain why public universities are resource constrained in providing adequate computers for use in academic management.

The other areas that were rated relatively lowly by the registrars as shown on Table 6 were academic staff skills to integrate ICT in the management of academic processes (66.7%) as well as deans of schools and chairs of departments' capacity to integrate ICT in academic management (66.7%). These results agree with perceptions of lecturers on the same aspects as depicted on Table 5. The implication is that public universities academic staff as well as administrators at school and departmental levels lack the necessary skills and capabilities to integrate ICT in the management of academic processes. The results conform to findings of a

study by Makokha and Mutisya (2016) on the status of e-learning in Kenyan public universities which established that lecturers had limited ICT skills and were not competent to handle online platforms. On the same study, interviews with key university managers involved in academic matters also revealed that they lacked adequate capacity to handle e-learning resources which was also linked to low ICT skills. Nyerere, Gravenir and Mse (2012) also found that most public university academics who facilitated open, distance and e-learning (ODeL) had not been well trained to handle the ICT resources involved. On their part, Gitonga, Ndirangu and Githeko (2013) found out that there was an underutilization of the online ICT resources in Kenyan universities especially in instruction. Gitonga et al. (2013) linked this under use to ICT skills deficiencies and conjectured that the universities could have been spending a lot of resources in providing the ICT tools, but not training their staff and students on how to use them. These empirical studies give credence to the findings of the current study that public universities academic staff as well as administrators involved in academic departments could be skills and capacities constrained to integrate ICT in academic management.

The registrars were further requested to specify the ICT based programs installed in their respective universities to support various academic management processes. The findings were as indicated on Table 7:

Table 7
ICT Based Programs Supporting Academic Management in Universities

ICT Program	(%)
Students Management Information Systems (SMIS)	100
Finance Management Information Systems (FMIS)	100
Halls Management Information Systems (HAMIS)	66.7
Health Management Information Systems (HEMIS)	66.7

Source: Field data

Table 7 indicates that all the participating universities had installed integrated Students Management Information Systems (SMIS) for supporting processes such as students' admissions as well as academic records management. All these universities were also using integrated Finance Management Information Systems (FMIS) for managing students' financial records (invoicing of fees, receipting of payments, and showing account balances). Nyandiere et al. (2012) observe that Kenyan universities, just like other institutions elsewhere

in the world, are implementing various information management systems given their efficiencies to standardize, streamline operations and integrate processes. In their study to assess the implementation of ICT integrated systems in Kenyan universities, these authors established that the institutions had mainly implemented integrated information systems for student admissions, examination management, finance and accounting as well as library services.

In addition, Table 7 shows that 66.7 % of the universities were using Halls Management Information Systems (HAMIS) to manage students' accommodation and residential services. Another 66.7% had students' Health Management Information Systems (HEMIS) for managing students' medical services. The notably lower percentages in HAMIS and HEMIS are indicative that some public universities in Kenya have not yet embraced ICT integrated systems to support the management of key students' services. This points to lack of a systematic method of systems implementation where some crucial aspects such as students' accommodation and health still run on manual and cumbersome structures. Tusubira and Mulira (2005) argue that integration of ICT in an organization's functions needs to be fully conceptualized and defined before implementation to avoid dissipation of resources through implementation of unrelated or uncoordinated projects. With their experiences at Makerere University, these authors argue that there is need to quantify the requirements of the institution starting from the number of students and staff, the extent of physical infrastructure, ICT resources and systems already in use. This would set the direction, functions and boundaries as well as targets of ICT in the organization, providing a framework for the development of specific projects aimed at increasing efficiency and cost effectiveness.

4.4.4 Lecturers' Perceptions on ICT Integration in Human Resource Management

On the second aspect of the first objective, lecturers were requested to indicate using a 5 point likert scale their perceptions on items designed to measure the existence of ICT integration in human resource management in their institutions. Their responses were as shown on Table 8:

Table 8
Lecturers' Perceptions on ICT Integration in Human Resource Management

Item	Responses (%)					
	N	SD	D	U	A	SA
University has ICT based programs to support HRM processes	243	4.9	4.1	7.0	58.4	25.5
Number of computers allocated for HRM services is adequate	243	16.9	41.6	5.3	32.1	4.1
Internet connectivity available for supporting HRM processes	243	2.5	11.1	9.9	55.6	21.6
Lecturers equipped with ICT skills for accessing HRM services	243	10.3	40.7	6.2	27.6	15.2
Deans of schools and chairs of departments are properly prepared to use ICT based systems in HRM processes	243	7.8	39.9	10.7	30.0	11.5

Source: Field data

Table 8 shows that majority of the lecturers (83.9%) indicated that the universities had installed ICT based programs to support human resource management processes. Further, HRM services were available online with Internet connectivity provided for their access (77.2%). These results agree with Makokha et al. (2013) whose study to assess the implementation of Enterprise Resource Planning (ERP) systems in Kenyan public universities found that 85% of the implementation of ERPs involved the integration of human resource management, finance and students' affairs. Mathis and Jackson (2010) point out that human resource management has become more complex due to the fast growth in specialized occupations, the need to train and promote highly skilled employees and the growing variety of employees' benefits. Likewise, the use of technology in HR has expanded spectacularly and is continuing to enhance HR management activities of executives, managers, and employees.

For instance, one of the commonly implemented ICT based program for HRM is the Human Resource Information System (HRIS) also known as the Human Resource Management System (HRMS). Its application is considered as a systematic procedure for collecting, storing, maintaining, and recovering data required by the organizations about their human resources, personnel activities and organizational characteristics (Kovach et al., 2002). HRIS

has become an important strategic tool since it supports the collection, management and reporting of information for decision-making. It also enables integration of organizational information about human resources in areas such as finance and production (Tansley & Newell, 2006).

Additionally, Table 8 indicates that the number of computers allocated to teaching staff for obtaining HRM services was inadequate (36.2%). This implies that public universities have not provided sufficient computers for lecturers to use in obtaining HRM services. The results correspond to findings on availability of adequate ICT resources for academic management which were indicated as insufficient as shown on Tables 4, 5 and 6 respectively. Kanake and Nyakego (2016) identified inadequate funding as a major challenge for Kenyan universities to acquire enough computing devices for HRM use. Ngai and Wat (2006) on their part pointed out lack of capital as well as inadequate top management support as barriers to the acquisition of ICT infrastructure for use in HEIs management of their HR.

Further, the teaching staff of the participating universities did not have sufficient ICT skills for accessing HRM services (42.8%). Also, deans of schools and chairs of departments lacked ability to integrate ICTs in the management of human resource (41.5%). These results too correspond to the findings on the same aspects relating to academic management as depicted on Tables 5 and 6 showing the responses of lecturers and registrars (academics) respectively. Lack of ICT skilled staff and low level of IT literacy have been noted as barriers to the integration of ICT in HRM. (Kanake & Nyakego, 2016; Ngai & Wat, 2006; Rawat, 2008 and Beckers & Bsat, 2002). In addition, Kanake and Nyakego, (2016) observed that there is lack of management support towards training and development of universities staff in Kenya on IT related aspects as is evident in this study.

4.4.5 Registrars' (Administration) Perceptions on ICT Integration in HRM

Registrars in charge of administration in respective universities were also requested to indicate using the same 5 point likert scale, their perceptions on items designed to measure the existence of ICT integration in human resource management in their institutions. The findings are presented on Table 9:

Table 9
Registrars' (Administration) Perceptions on ICT Integration in Human Resource Management

Item	Responses (%)				
	SD	D	U	A	SA
University has ICT based programs to support HRM processes	0	0	0	0	100
Number of computers allocated for HRM services is adequate	0	33.3	0	33.3	33.3
Internet connectivity available for supporting HRM processes	0	0	0	0	100
Lecturers equipped with ICT skills for accessing HRM services	0	33.3	0	66.7	0
Deans of schools and chairs of departments are properly prepared to use ICT based systems in HRM processes	0	33.3	0	66.7	0

Source: Field data

Table 9 shows that all the three universities had installed ICT based programs to support HRM processes. Also, there was Internet connectivity necessary for transmitting and obtaining HRM services online. These results compare with those obtained from the lecturers on the same aspects as shown on Table 8. They thus help to confirm that public universities in Kenya have in place the necessary ICT based systems for supporting HRM processes. Beckers and Bsat (2002) argue that organizations invest in HRM information systems because of the need to: Increase competitiveness by developing and enhancing HR procedures and activities; generate a greater range of HRM reports necessary for decision making; shift the role of HRM from transactions to strategic human resource management (SHRM); and re-engineer their HRM departments.

On the other hand, although 66.6% of the registrars indicated that the number of computers allocated to support HRM processes was adequate, only 33.3% strongly agreed to this assertion thus implying that most of them were not entirely satisfied with the sufficiency of the devices. This compares with the lecturers' view on the same aspect as shown on Table 6. It also corresponds to similar views that show insufficiency of computers in the other aspect of academic management as expressed by students, lecturers and registrars (academics)

responses on Tables 5, 6 and 7 respectively. This finding thus helps to substantiate the view that public universities in Kenya have a shortage of computers necessary for use by staff to obtain human resource management services.

In addition, although 66.7% of the registrars indicated that the universities had equipped the lecturers with ICT skills to access HRM services, none strongly agreed to this statement. The registrars also did not strongly rate the capacities of deans of schools as well as chairs of departments to integrate ICT in the management of human resource. Both views were similar to those of lecturers' on the same aspects as indicated on Table 8. These results confirm that public universities lecturers lacked the necessary skills for obtaining HRM services. As well, deans of schools and chairs of departments were handicapped in terms capacities necessary for facilitating delivery of HRM services.

The administrators were further requested to specify the ICT based programs installed in their respective universities to support various HRM processes. Their responses indicated that 66.7% of the universities had in place Human Resource Management Information System (HRMIS) for supporting processes such as staff recruitment; staff development and training; salary administration as well as staff record management. This result implies that some public universities in Kenya (33.3%) had not integrated ICT in the management of their human resources and were relying on manual systems. The finding agrees with Kanake and Nyakego (2015) who in a study to assess the utilization of Human Resource Information Systems (HRIS) in selected universities in Kenya, established that manual systems were still in use in the management of human resources.

These authors argued that the undependability of HR manual systems may explain why significant decisions are not based on accurate and timely information. This compromises performance of these institutions. It has also led to massive losses of personnel information as well as loss of a lot of money in form of salaries for otherwise redundant or even non-existent employees. A recent casing point is Moi University in Kenya which according to Ngila (2016) was found to have in its payroll 505 employees who neither had any known designations nor departments of deployment. The matter led to leakage of Kshs. 541.5 million in three years before an audit commissioned by Ministry of Education (MoE) discovered the mess. Ngai and Wat (2006) observe that most organizations hesitate to apply HRIS since they are unaware of the attached benefits such as improved accuracy, the provision of timely and quick access to information, and the saving of costs. Some

universities may just be rigid and comfortable with the old manual systems which administrators can manipulate for their selfish gains.

4.5 Influence of ICT Integration on Academic Management

The second objective of the study sought to determine the influence of ICT integration on academic management in public universities in Kenya. This objective was measured at three levels: The levels of perceptions by students, lecturers and registrars respectively. The findings are presented in that order.

4.5.1 Students' Perceptions on the Influence of ICT Integration on Academic Management

Students were requested to indicate on a 5 point likert scale, their perceptions on items designed to measure the influence of ICT integration on academic management. Their responses were as indicated on Table 10:

Table 10
Students' Perceptions on Influence of ICT Integration on Academic Management

Function	Responses (%)					
	N	SD	D	U	A	SA
Support online application	268	4.1	15.7	0.0	19.0	61.2
Manage readmission of students who had discontinued their studies	268	6.0	10.8	1.1	69.4	12.7
Capture details of students' personal information	268	6.3	4.1	1.5	65.3	22.8
Raise invoices based on selected courses which are then used to facilitate fees payment	268	2.2	13.4	4.9	66.0	13.4
Students check their debtor status online	268	12.3	12.3	4.9	59.0	11.5
Students view their academic transcripts online	268	8.6	6.0	3.0	49.6	32.8
Students query and receive academic management related information via SMSs on their mobile phones	268	20.1	38.4	10.8	22.8	7.1

Source: Field data

Results on Table 10 indicate that students' in the participating universities were able to apply for admissions online (80.2%) while those who had deferred their studies would as well seek readmission through the same platform (82.1%). Administrators could also retrieve personal information about any student because the same was captured during the online registration process and stored in the integrated system (88.1%). Table 10 also indicates that students could raise invoices on their selected courses wherever they were, the invoices could then be seen by cashiers (on the system) who in turn facilitated fee payments (79.4%). Similarly, students could access information about their account balances (70.5%) as well as academic performance (82.4%) from wherever they were by logging into their university students' portal. These results are a clear indicator that the participating universities had integrated ICTs in their academic management processes and students were accessing services online.

The findings on Table 10 are indicative of the ability of public universities in Kenya to leverage ICTs in their academic management just like other modern universities elsewhere in the world. UNESCO (2009) posits that HEIs all over are engaging in ICT-mediated management in areas such as student admission and records, examination results and transcripts, finance and human resource databases and management information. For instance, Hong Kong University (HKU) a high ranking international university uses its Students Information System (SIS) to provide real-time information regarding student registration, personal particulars, course enrolment, and examination timetables. Once students are enrolled in the system, they can navigate through a series of screens to find the information they need.

They are able to update their information whenever necessary on the system without the need to fill and or submit any paper forms. This system also calculates standard scores of the exams, analyses the results and manages the transcripts (UNESCO, 2011). In addition, UNESCO (2011) further notes that there are a number of functional modules accessed through the university web portal for administrative staff to use in handling academic/student matters, such as: Course Approval System; Course Database Enquiry; Departmental Student Load; Enrolment Information; Marks Entry System; Provisional Class Lists and Transcript Data Entry System.

Table 10 however shows that the universities were doing badly in one area: students' ability to query and receive academic management related information via SMSs on their mobile phones (29.9%). This means that the universities have been slow in adopting short messaging

service (SMS) platform in their academic management. Mavuso, Makana and Anbu (2012) argue that when used correctly, SMS technology can offer immediate response, more engagement and interaction between organizations and their clients. In addition, bulk SMS messaging enables instantaneous sharing of information by a target group of people, regardless of their location, on an issue of common interest. Raju (2011) points out that when sending the bulk SMS, there is the assurance that it reaches the inbox of the correct recipient and in most cases, it will be the intended recipient who will open it. Further, it has been noted by Lenhart et al. (2010) that one in every three teens among future students is likely to send more than 100 text messages a day or 3,000 texts within a month. Smith (2011) moreover observed that 9 in 10 Smartphone owners used text messaging with about 95% of 18 to 29 year olds sending or receiving text messages. Considering these trends, public universities administrations could consider taking advantage of this technology already in the hands of students and use it for academic management of their institutions.

A simple linear regression analysis was conducted to determine the influence of integration of ICT on academic management based on the perceptions of students. The regression analysis model summary showing the correlation coefficient (R) and the coefficient of determination (R square) is as presented on Table 11:

Table 11
SPSS Output for Regression Analysis Showing Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.754[a]	.568	.567	.52902

a. Predictors: (Constant), ICT Integration

The correlation coefficient of simple linear regression model was 0.754 as indicated on Table 11. This illustrates that there was a high and positive correlation between ICT integration and academic management. The coefficient of determination (R square) was 0.568 indicating that the independent variable (ICT integration) accounted for 56.8% of the cause of variation in dependent variable (academic management).

The overall viability of the regression model was checked by undertaking Fisher's one way Analysis of Variance (ANOVA). This was informed by the fact that the data under consideration was likert scale items which is a group of related items utilizing a similar scale

measurement (Young, 2009). The regression analysis showing the results of the ANOVA test is as indicated on Table 12:

Table 12
SPSS Output for Regression Analysis Showing ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97.992	1	97.992	350.147	.000[b]
	Residual	74.442	266	.280		
	Total	**172.434**	**267**			

a. Dependent Variable: Academic Management

b. Predictors: (Constant), ICT Integration

Data is considered good fit for model if the p value of ANOVA is less than .05 (Young, 2009). In this context, as illustrated on Table 12 the observed p value was .000 which is less than .05 indicating that the available data was good fit for the regression model. This showed that the regression model was reliable to give accurate predictions on the relationship between ICT integration and academic management.

To determine the predictive effect of the independent variable (ICT integration) on the dependent variable (academic management), the regression coefficients were used as indicated on Table 13:

Table 13
SPSS Output for Regression Analysis Showing Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.789	.166		4.766	.000
	ICT Integration	.819	.044	.754	18.712	.000

a. Dependent Variable: Academic management

The results on Table 13 showed a constant of 0.789 and a regression coefficient of 0.819 in respect to ICT integration. This is mathematically represented below:

$y= 0.789+0.819x_1$; where

y= Academic management

x_1= ICT integration

The regression model on Table 13 indicates that a unit increase in ICT integration will lead to a 0.819 increase in academic management. This implies that there is a high positive influence of ICT integration on academic management as illustrated by regression coefficient of 0.819. Studies have shown that integration of ICT in academic management in HEIs helps to improve information access for planning and managing the institution. It also enables users to access students' information, academic records and other data needed to complete their daily work (King, Kvavik & John, 2002; Davis & Huang, 2007). This in turn leads to improved business processes and services provided to the faculty, students and other staff (Davis & Huang, 2007). A study to investigate the impact of ICT integrated systems on business process and performance in higher education in Australia also found that the said systems potentially improved business performance in higher education institutions by enhancing services offered to students, faculty and staff (Judith, 2005).

4.5.2 Lecturers' Perceptions on the Influence of ICT Integration on Academic Management

Lecturers were also requested to indicate on the same 5 point likert scale, their perceptions on items designed to measure the influence of ICT integration on academic management in their institutions. Responses were as indicated on Table 14:

Table 14
Lecturers' Perceptions on Influence of ICT Integration on Academic Management

Function	Response (%)					
	N	SD	D	U	A	SA
Support online admission processing of applicants	243	5.8	16.0	2.5	46.5	29.2
Capture details of students' personal information	243	4.5	22.2	5.3	37.0	30.9
Raise invoices based on selected courses which are then used to facilitate fees payment	243	11.5	7.4	11.9	44.9	24.3
Students check their debtor status online away from campus	243	6.6	10.7	8.2	45.7	28.8
Lecturers update class attendance and view statistics on the same	243	14.0	16.5	28.4	23.9	17.3
Lecturers record and process assessments and examinations	243	4.0	9.5	12.7	39.2	34.6
Students view academic transcripts online	243	9.5	13.2	4.1	36.6	36.6

Source: Field data

Table 14 shows that the integrated academic management systems in public universities in Kenya enable prospective students to apply for admissions online (75.7%). In addition, details of students' personal information are captured during the online registration process, stored in the system and may be retrieved whenever need arises (67.9%). The system also raises invoices based on selected courses which are then used to facilitate fees payment (69.2%). Moreover, students may check their debtor status online (74.5%) as well as view their academic transcripts (73.2%). These findings corroborate the results presented on Table 10 about students' perceptions on influence of ICT integration on academic management. The students had indicated that ICT integration was enabling them to apply online for admissions, register their details, access their fee invoices and payment receipts, and view their provisional academic transcripts via the same online platform.

Seventy three point eight percent (73.8%) of the lecturers also indicated that the integrated academic management systems enhanced recording and processing of students' examination results. These results agree with Nyandiere et al. (2012) who established that Kenyan universities have as well invested in integrated systems that manage examination processes from the time students enroll to the time they graduate. Balasubramanian et al., (2009) and UNESCO (2009) point out that ICT can aid in processing voluminous data, produce reliable and consistent records as well as make it easy to search and find required information quickly. The same authors argue that ICT can monitor students' progress and maintain an account of students' performance and results.

Table 14 nonetheless indicates that lecturers barely used the integrated academic management systems to update class attendances and view statistics on the same (41.2%). This means that public universities in Kenya are slow in using ICT to monitor students' class attendance. Boggs (2010) argues that electronic management systems make it easy to track, update and manage learners' records. The low use of the ICT tools to manage class attendance could be attributed to insufficiency of ICT skills on the side of the lectures as shown on Table 5.

To determine the influence of integration of ICT on academic management as perceived by the lecturers, a simple linear regression analysis was conducted with ICT integration as the independent variable and academic management as the dependent variable. The regression analysis model summary showing the correlation coefficient (R) and the coefficient of determination (R square) is presented on Table 15:

Table 15
SPSS Output for Regression Analysis Showing Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.580[a]	.336	.333	.87221

a. Predictors: (Constant), ICT integration

Table 15 shows that the R indicated there was a moderate and positive correlation between ICT integration and academic management (0.580). The coefficient of determination (R Square) of 0.336 indicated that ICT integration accounted for 33.6% of the variation in academic management.

ANOVA was used to test whether the available data was good fit for regression model. The results are presented on Table 16:

Table 16
SPSS Output for Regression Analysis Showing ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	92.829	1	92.829	122.024	.000[b]
	Residual	183.340	241	.761		
	Total	276.169	242			

a. Dependent Variable: Academic management
b. Predictors: (Constant), ICT integration

According to Young (2009) data is considered good fit for model if the p value of ANOVA is less than .05. In this context, Table 16 shows that the observed p value was .000 thus indicating that the available data was good fit for the regression model. This implied that the regression model could be relied upon to give accurate predictions on the relationship between ICT integration and academic management.

To determine the predictive effect of the independent variable (ICT integration) on the dependent variable (academic management), the regression coefficients were used as indicated on Table 17:

Table 17
SPSS Output for Regression Analysis Showing Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.323	.216		6.126	.000
	ICT Integration	.635	.058	.580	11.046	.000

a. Dependent Variable: Academic management

Table 17 shows that the regression coefficient of the ICT integration was 0.635 while the constant of the regression model was 1.323 as illustrated in the equation:

$y= 1.323 + 0.635x_1$; where

y= Academic management

x_1= ICT integration

This regression model indicates that a unit increase in ICT integration will lead to a 0.635 increase in academic management. There is thus a positive influence of integration of ICT on academic management as illustrated by regression coefficient of 0.635. This finding corroborated the result of the regression model presented on Table 13 showing the same perception by students.

Zornada and Velkavrh (2005) argue that ICT integrated systems use in HEIs incorporates administrative functions that had been supported by separate legacy systems in the past. Separate legacy systems are disparate and often lead to duplication of resources and services (Allen & Kern, 2001). Today ICT integrated systems enables HEIs to consolidate disparate data and legacy systems and adopt best-of-breed processes. As different departments across an institution share an integrated database, end users are able to access data in real time. Best-of-breed information technologies such as web technologies, mobile phones and on-line services offer additional benefits not only to the administration within an institution, but also to people who constantly interact with the institution – faculty, students, and staff (Murphy, 2004; Zornada & Velkavrh, 2005). According to King (2002), the main advantages of ICT integrated systems in HEIs are: improved information access for planning and managing the institution; improved services for the faculty, students and staff; lower business risks; and increased income and decreased expenses due to improved efficiency.

4.5.3 Registrars' Perceptions on Influence of ICT Integration on Academic Management

Registrars in charge of academic affairs in respective universities were also requested to indicate on the same 5 point likert scale, their perceptions on items designed to measure the influence of ICT integration on academic management in their institutions. Their responses were as indicated on Table 18.

Table 18
Registrars' (Academics) Perceptions on Influence of ICT Integration on Academic Management

Function	Response (%)				
	SD	D	U	A	SA
Support online admission processing of applicants	0	0	0	0	100
Manage readmission of students who had discontinued their studies	0	0	0	33.3	66.7
Capture details of students' personal information	0	0	0	33.3	66.7
Raise invoices based on selected courses which are then used to facilitate fees payment	0	0	0	0	100
Students check their debtor status online	0	0	0	0	100
Lecturers update class attendance and view statistics on the same	0	0	0	66.7	33.3
Lecturers record and process assessments and examinations results	0	0	0	0	100
Students view their academic transcripts online	0	0	0	0	100
Students query and receive academic management related information via SMSs on their mobile phones	0	0	0	33.3	66.7

Source: Field data

The ability to make informed decisions quickly is the hallmark of every successful organization. University integrated information management systems have been noted to bring about faster and better decision making, given their guaranteed access to high quality, accurate, well maintained and easily retrievable information (Sullivan & Bozeman, 2010).

Table 18 shows that the participating universities were experiencing an enhancement in their academic management after integrating ICTs. It is evident from the Table that the universities prospective applicants were getting admitted and enrolled in courses of their choice online thus saving them time and expenses that they would have incurred if they had traveled to campuses for manual admissions.

During the process of online registration, details of students' personal information could be captured and stored in the integrated systems for retrieval anytime they would be required. In addition, the integrated systems could raise invoices based on selected courses which would then be used to facilitate fees payment thus enhancing efficiency in financial records management. Students would also be provided with ability to check their debtor status online as well as view their academic transcripts from wherever they could be. Recording as well as processing of examinations results was also facilitated by the integrated systems. All these findings corroborate the results on Tables 10 and 14 which represent students' and lecturers' perceptions on influence of ICT integration on academic management. The two groups had also noted that integration of ICT in academic management by the participating universities enabled students to apply online for admission, register their personal details, access their fees invoices and payment receipts, as well as their provisional academic transcripts.

However, the findings on Table 18 showing that lecturers updated class attendance and viewed statistics on the same; and students' queried and received academic management related information via SMSs on their mobile phones contradict the results on Tables 10 and 14 respectively on the same functions. While all the registrars indicated that ICT integration supported these two functions, only 29.9% students' indicated that they queried and received academic management related information via SMSs on their mobile phones. At the same time, only 41.2% of the lecturers indicated that they usually updated students' class attendance and viewed statistics on the same through the integrated management systems. These results may imply two things: firstly, the universities integrated systems could be having some potentials that are not benefiting the institutions due to their under use. Strohmeier (2001) argues that the main factors that cause failure of information technology systems in organizations are mainly human as opposed to technical or malfunction of the actual systems. From this assumption, there is need for university administrators to closely monitor the actual implementation of the ICT systems integrated by their institutions for them to be assured of maximum benefits. Secondly, the contradiction may also be explained by what Fisher (1993) terms as social desirability bias. This refers to the attempt by respondents

to portray themselves or their organization in a more favorable light especially when responding to survey items. If this was the case, the registrars were then agreeing with the above two statements that students and lecturers had disputed just to portray their institutions as being techno-savvy probably for the purpose of appealing to prospective clients.

A further concern of the study was on the perceived benefits of ICT integration in academic management by this category of respondents. The responses given are indicated on Table 19:

Table 19
Registrars' (Academics) Perceptions on Benefit of ICT Integration on Academic Management

Benefit	**Response (%)**				
	SD	D	U	A	SA
Affords greater management control over the academic processes	0	0	0	0	100
Increases customer satisfaction due to faster processing and accurate data capture and analysis	0	0	0	0	100
Better performance in fees collection, management and reporting of student debtors	0	0	0	0	100
Cost-effectiveness in operations (e.g. users view information/data via web-browser rather than maintaining bulky physical documents)	0	0	0	0	100
Improves communication of the university management with academic departments	0	0	0	33.3	66.7
Improves efficiency for lecturers by enabling them to enter examination marks electronically as soon as they are available	0	0	0	0	100
Improves graduation rates due to enhanced efficiency in the university	0	0	0	33.3	66.7

Source: Field data

Generally, the benefits of ICT integration to universities management have been noted to include increased efficiency and effectiveness of processes, reduced management costs, improved decision making, building business innovation and supporting strategic change (Sullivan & Bozeman, 2010; Roman, 2009; Zornada &Velkavrh, 2005). Table 19 shows that all the registrars (academics) who participated in the study indicated that ICT integration afforded greater management control over the academic processes at their universities that

had resulted into higher performances in academic work. ICT integration also increased customer satisfaction due to faster processing and accurate data capture and analysis. In addition, the participating universities did better in fees collection as well as saved on operational costs. Moreover, ICT integration improved the efficiency for lecturers who were now able to enter examination marks electronically as soon as they were available.

Nevertheless, the investment in ICT integration in the participating universities had not yet entirely enhanced communication of universities management with academic departments (66.7%) as well as the graduation of more students (66.7%). These inabilities could be explained by the lack of ICT capacities at the departments and schools levels as noted by lecturers and registrars (academics) on Tables 5 and 6 respectively. Niederman and Beise (1999) argue that ICT-enabled communication which range from telephone to the Internet and cellular technologies enhances quality of decision making, reduce time taken to reach decisions and increases degree of focus on tasks. This in turn increases efficiency, productivity, improves collaboration, and makes easier coordination of activities. Thus, proper integration of ICT in intra-universities communication may enable them reap the benefits of timely quality decisions, participation and a high degree of efficiency in coordination of activities. Enhanced efficiencies in universities could in turn lead to improved graduation rates. This is because ease of access to crucial information such as students' marks, course registrations and attendance as well as fees clearance records would be sorted out quickly to enable deserving students to graduate without undue delays.

UNESCO (2011) on its part observed that Hong Kong University derived the following benefits after integrating ICT in its academic management: there was better integration of functions within and between administrative sections of the university. This helped to improve efficiency and eliminate errors. ICT integration also enhanced comprehensive reporting and timely availability of management information in addition to improving accessibility of relevant information to all authorized users because it was placed online. It also brought about better support for students, including the availability of student self-service because the system provided course information such as lecture venues, learning outcomes and assessment methods. The integration also enabled students to view online and print their own unofficial academic transcripts and debit notes from the university. Kenyan universities could share in these benefits if they addressed the impediments to proper ICT integration in academic management. Key obstructions noted by this study include inadequate computing devices; insufficient ICT based programmes to support academic

management; administrators' inadequate ICT capacities; and users' inadequate ICT skills which are indicated in Tables 4, 5, 6 and 7.

4.6 Influence of ICT Integration on Human Resource Management

The third objective of the study sought to determine the influence of ICT integration on human resource management in public universities in Kenya. This objective was measured at two levels: The levels of perceptions by lecturers and registrars respectively. The findings on the perceptions of lecturers were as indicated in subsection 4.6.1.

4.6.1 Lecturers' Perceptions on the Influence of ICT Integration in HRM

Lecturers were requested to indicate on a 5 point likert scale, their perceptions on items designed to measure the influence of ICT integration on human resource management in their institutions. Their responses were as indicated on Table 20:

Table 20
Lecturers Perceptions on Influence of ICT Integration in Human Resource Management

Function	Responses (%)					
	N	SD	D	U	A	SA
Enables online staff recruitment processes	243	4.5	29.8	13.6	37.7	14.4
Captures information on staff profiles	243	4.5	14.1	13.6	36.7	15.4
Enables easy accessing of employee's information when needed	243	9.5	4.9	9.9	60.1	15.6
Enables HR department to collect and assess employees' work information	243	9.1	13.3	23.0	46.4	8.2
Supports payroll administration as well as pension and benefits management	243	1.6	4.1	14.0	60.9	19.3
Enables employees to view their pay slips online	243	8.6	14.0	3.3	36.6	37.4
Enables monitoring of employees work attendance	243	16.9	18.5	35.0	17.3	12.3
Enables employees to apply for leave online	243	18.5	19.3	11.1	39.9	11.1
Enables employees to query and receive HRM related information via SMSs on their mobile phones	243	14.0	15.2	14.8	39.9	16.0

Source: Field data

Results on Table 20 show that integration of ICT in the universities' human resource management had enhanced easy access to employee's information (75.7%), payroll administration (81.2%) as well as online pay slips (74.0%). These are mainly administrative functions. Martinsons (1994) in a study to assess the uses of human resource information systems (HRIS) in companies in Canada and Hong Kong, described applications of HRIS in functions such as employee record-keeping, payroll and payroll benefits administration as 'unsophisticated' uses of HRIS. Altarawneh and Al-Shqairat (2010) noted that the subsequent effects of these applications help HRIS to achieve basic purposes of cost and time reduction, process automation and efficiency gains in an organization. According to Martinsons (1994) sophisticated uses of HRIS that include support for employees recruitment and performance management aid in achieving an organization's long term strategic objectives.

Table 20 also indicates that ICT integration had a somewhat average influence on the following processes: Staff recruitment management (52.1%), staff profiles management (52.1%), work information management (54.6%), leave application management (51%) as well as use of SMS to query and receive HRM information (55.9%). It was also evident that the least application of ICT in the universities HRM was on monitoring employees work attendance (29.6%). These average and low applications of ICTs in the management of human resource imply that the universities were not in a position to reap the full benefits associated with ICT integration in HRM. The results can be explained by lack of investments in requisite ICT programs, skills and capacities by the universities. Section 4.4.5 for instance depicted that 33.3% of the participating universities lacked integrated ICT based programs for HRM. Likewise, Tables 8 and 9 showed that the participating universities were constrained in terms of requisite computing devices, staff ICT skills as well as departments' and schools' capacity to integrate ICT in HRM.

Rawat (2008) argued that proper integration of ICT in universities would enable them to create a profile of their staff, their strengths and weaknesses, so as to know what they have in the human resource sense. Accordingly, the institutions would be able to structure appropriate development, promotion, training and recruitment criteria of staff hence ensuring that they have the right personnel in all their work sections at the right time and in the right numbers. Rawat further explains that nowadays higher education institutions face a significant task of improving learning environments at reduced administrative operating cost. Moreover, the ability to effectively budget for and manage different types of employees, recruit and retain

skilled members requires full integration of HR data with student information systems. Therefore, with so many demands, higher learning institutions need appropriately integrated and resourced ICT solutions that will help them in managing student academic, human resource and financial data.

To determine the influence of integration of ICT on human resource management, a simple linear regression analysis was conducted. The regression analysis model summary showing the correlation coefficient (R) and the coefficient of determination (R square) is as presented on Table 21:

Table 21
SPSS Output for Regression Analysis Showing Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.498[a]	.248	.245	.74992

a. Predictors: (Constant), ICT integration

The correlation coefficient of model summary was 0.498 as indicated on Table 21. This illustrates that there was a positive correlation between ICT integration and human resource management. The coefficient of determination (R square) was 0.248 indicating that the independent variable (ICT integration) accounted for 24.8% of the cause of variation in the dependent variable (human resource management).

The reliability of the regression model was checked by undertaking ANOVA. This was because the data under consideration was likert scale items utilizing a similar scale measurement (Young, 2009). The regression analysis showing ANOVA is as indicated on Table 22:

Table 22
SPSS Output for Regression Analysis Showing ANOVA

Function				**Response %**		
Model		Sum of squares	df	Mean Square	F	Sig.
1	Regression	44.670	1	44.670	79.430	.000[b]
	Residual	135.534	241	.562		
	Total	180.205	242			

a. Dependent Variable: Human resource management

b. Predictors: (Constant), ICT integration

The p value or level of significance of .000 indicated on Table 22 illustrates that the available data was good fit for model (Young, 2009; Lim & Ting, 2013). This implies that there was strong evidence that the regression model gave accurate predictions on the relationship between ICT integration and human resource management.

To determine the predictive effect of the independent variable (ICT integration) on the dependent variable (human resource management), the regression coefficients were used as indicated on Table 23:

Table 23
SPSS Output for Regression Analysis Showing Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.969	.181		10.853	.000
	ICT integration	.477	.053	.498	8.912	.000

a. Dependent Variable: Human resource management

The regression coefficients illustrated on Table 23 showed a constant of 1.969 and a regression coefficient of 0.477 in respect to ICT integration. This is represented by the equation:

$y= 1.969 + 0.477x_1$; where

y= Human resource management

x_1= ICT integration

The regression model indicates that a unit increase in ICT integration will lead to a 0.477 increase in human resource management. These results show that there was a positive influence of integration of ICT on human resource management as illustrated by regression coefficient of 0.477. Ball (2011) argues that integration of ICT in human resource management (HRM) provides an organization with the opportunity to become a more efficient and strategic function by standardizing the majority of the organization‘s HR processes, improving the quality and speed of available information and improving services to employees. Gürol, Wolff and Ertemsir (2010) also argue that human resource information systems (HRISs) play a strategic architectural role as they contribute to overall business performance of organizations by fulfilling or at least supporting the tasks of data storage and retrieval, while at the same time serving as primary administrative support tools of reporting and statistics as well as of program monitoring.

These authors further argue that HRIS helps to decrease costs by automating information and decreasing the number of HR employees needed. This information automation enables employees to control their own personal information while managers get to access relevant information and data, to help them conduct analyses, make decisions and communicate with others without relying on services of HR professionals. Midiwo (2015) in a study to investigate the influence of HRIS on performance of Kenyan public universities found that HRIS application on recruitment and selection, training and development, payroll and performance management cumulatively provided quality, accurate and consistent data that enabled effective and efficient decision making among the institutions. The study’s results further showed that HRIS reduced institutional operational costs as it enhanced maintenance of data with more accuracy and in less time.

4.6.2 Administrators Perceptions on Influence of ICT Integration on HRM

Registrars in charge of administration in respective universities were also requested to indicate using the same 5 point likert scale, their perceptions on items designed to measure the influence of ICT integration on human resource management in their institutions. Their responses were as indicated on Table 24:

Table 24
Registrars (Administration) Perceptions on Influence of ICT Integration in HRM

Function	Responses (%)				
	SD	D	U	A	SA
Enables online staff recruitment processes	0	33.3	0	66.7	0
Captures information on staff profiles	0	0	0	100	0
Enables easy accessing of employee's information when needed	0	0	0	66.7	33.3
Generates reports for addressing HRM issues	0	33.3	0	33.3	33.3
Enables HR departments to collect and assess employees' work information	0	33.3	0	33.3	33.3
Supports payroll administration as well as pension and benefits management	0	0	0	66.7	33.3
Enables employees to view their pay slips online	33.3	0	0	33.3	33.3
Enables monitoring of employees work attendance	33.3	0	33.3	33.3	0
Enables employees to apply for leave online	33.3	0	0	33.3	33.3
Enables employees to query and receive HRM related information via SMSs on their mobile phones	33.3	0	0	33.3	33.3

Source: Field data

Table 24 shows that ICT integration in the participating universities HRM largely enhanced management of staff profiles (100%), accessing employee's information (100%) as well as payroll administration (100%). These findings compare with those from lecturers on the same aspects as indicated on Table 20 where ICT integration is mostly shown to be influencing administrative functions of HRM. However, it is evident from the Table that the more sophisticated applications of ICT in HRM had not been fully embraced by public universities. Such applications include use of ICT in staff recruitment (66.7%), generation of HRM reports (66.6%), work information management (66.6%), texting technology (66.6%) and a very low rating of work attendance management (33.3%).

These results imply that public universities in Kenya have invested in ICT integration in HRM that largely promises efficient operations in employees' record management as well as payroll administration but minimally enhance strategic management of the HR. Marler,

(2009) argues that applications of human resource information systems (HRIS) in processes such as recruitment and selection, training and development, HR planning and performance appraisal are instrumental in supporting an organizations' long-term business goals. This is because employees are systematically sourced, developed and retained based on their value and performance in the organization. The lowly rated functions on public universities HRM could mean reliance on undependable manual systems which could in turn affect significant decisions due to dearth of accurate and timely HR information. This is likely to compromise performance of these institutions like in the case of Moi university that lost more than half a billion Kenyan shillings in form of salaries for the otherwise ghost employees (Ngila, 2016).

The administrators of the participating universities were further requested to indicate on a 5 point likert scale, their perceptions on items designed to measure the benefits of ICT integration in human resource management in their institutions. Their responses were as indicated on Table 25:

Table 25
Registrars' (Administration) Perceptions on Benefits of ICT Integration in HRM

Benefit	Response (%)				
	SD	D	U	A	SA
Improves efficiency of the human resource operations	0	33.3	0	33.3	33.3
Improves quality and timeliness of HR services	0	33.3	0	33.3	33.3
Improves quality of budgeting and payroll management	0	0	0	66.7	33.3
Improves user experience due to availability of accurate, relevant and readily accessible information	0	33.3	0	33.3	33.3
Reduces paper use by enabling applications to be submitted and handled digitally	0	0	0	33.3	66.7
Enhances better information sharing among sections involved with performance, productivity and welfare of employees	0	0	33.3	33.3	33.3
Ensures cost effectiveness due to reduction of office staff who lender services manually	0	0	0	66.7	33.3
Enhances smooth running of university by tracking and analyzing time keeping and work patterns of workforce	0	0	33.3	33.3	33.3
Enhances compliance with statutory obligations due to availability of accurate and timely data	0	0	0	33.3	66.7

Source: Field data

Table 25 shows that ICT integration in public universities HRM was largely benefiting them through automation of processes such as budgeting and payroll management, digitization of employees' applications, reduction of office staff who lender services manually, and compliance with statutory obligations. All these functions were rated 100% based on Agree and Strongly Agree. These results imply that the universities were getting elementary benefits from the investments that they had put into the integration of ICT in their HRM services. However, benefits such as improved quality and timeliness of HR services (66.6%), improved user experiences (66.6%), informed performance management (66.6%) as well as enhanced tracking and analysis of time keeping and work patterns of the workforce (66.6%)

were not fully realized. These results may be because of the inability of the ICT systems in place to leverage strategic human resource management in the participating universities. This is evidenced on Tables 20 and 24 respectively which indicated that ICT integration in these universities was mainly in the areas of employees' record management as well as payroll administration. It scantly supported technical and sophisticated HRM processes such as recruitment and selection, training and development as well as performance management.

Beckers and Bsat (2002) argue that a major justification for organizations to integrate ICT in HRM is the need to shift the role of HRM from transaction to strategic human resource management (SHRM). This is a more favourable approach to managing human resources that supports long-term business goals and outcomes with a strategic framework. Several studies show that there has been an increase in strategic application of ICT in HRM. De Alwis (2010) in a study on Sri Lankan industries showed that the most commonly used modules in HR department were training and development, recruitment and selection as well as performance appraisal. Another study on Indian companies also found that HR professionals had major applications of HRIS as recruitment and selection, compensation, performance appraisal, corporate communication as well as job analysis and design (Saharan & Jafri, 2012). Teo et al., (2001) on their part had predicted the most popular future applications of HRIS as training and development, career development, and performance appraisal/management.

Here in Kenya, the Teachers' Service Commission (TSC) is making headway on integrating ICT in strategic human resource management processes such as recruitment, selection as well as performance appraisal management. The TSC has for instance introduced an online open performance appraisal system for teachers to strengthen supervision and to continuously monitor their performance in curriculum implementation at the institutional level. The appraisal system will be used to provide feedback, improve communication, and clarify roles and responsibilities (TSC, 2016). The TSC online recruitment system also allows prospective job seekers to apply for advertised posts online. The applicants are provided with an online platform where they can upload copies of their academic certificates and other testimonials and they are also given an option of tracking their applications online. After the selection process, the successful applicants are invited for a face to face interview through the email addresses they provided during the application.

4.7 Challenges to Integration of ICT in Academic and Human Resource Management

The fourth objective of the study sought to identify the challenges affecting effective integration of ICT in academic and human resource management processes in public universities in Kenya. This objective was measured at two levels: challenges of integration of ICT in academic and human resource management (HRM) based on the perceptions of students, lecturers and registrars respectively.

4.7.1 Students' Perceptions on Challenges of ICT integration in Academic Management

Students were requested to indicate on a 5 point likert scale, their perceptions on items designed to measure challenges affecting effective integration of ICT in academic management in their universities. The responses given were as indicated on Table 26:

Table 26
Students' Perceptions on Challenges to ICT integration in Academic Management

Challenges	Responses (%)					
	N	SD	D	U	A	SA
Lack of awareness among students on capabilities of ICT integration in academic management	268	8.2	62.7	2.6	23.5	3.0
Lack of commitment from top management that is slowing down systems implementation	268	11.0	46.6	6.2	22.8	13.4
Poor strategy in making ICT responsive to institutional vision and mission	268	7.8	63.8	6.3	15.3	6.7
Integration not fully conceptualized and defined before implementation thus causing a weak system	268	22.8	45.1	5.6	21.6	4.9
Integration not supported by students because they were not inducted	268	31.7	38.1	7.1	13.8	9.3
Inadequate number of skilled ICT staff	268	6.7	47.4	6.3	22.4	17.2
ICT staff display low morale in their work	268	10.4	25.0	11.2	38.1	15.3

Source: Field data

Table 26 shows that students were conscious of the benefits of integrating ICT in academic management (70.9%) and they supported it (69.8%). The Table also shows that the students had confidence with the strategy used in making ICT responsive to institutions visions and missions (71.6%). Similarly, they observed that ICT Integration had been fully conceptualized and defined before implementation (67.9%). These findings imply that the universities could have based their efforts to integrate ICT in academic management on functional ICT strategic planning. According to Tusubira and Mulira (2005) ICT strategic planning, whose outcome is an ICT policy and master plan, makes ICT responsive to the organizational vision and mission, providing systematic methods of implementation through organizational ICT policies, and creating ownership of projects hence leading to sustainability and long term returns from the ICTs. The authors further argue that a well defined and owned ICT policy and master plan is a prerequisite to successful mobilization of funds, both internally and externally, for system implementation.

Moreover, contrary to the findings of previous studies (Wanyembi, 2002; Tusubira & Mulira 2005; and Nyandiere, 2007) that had noted lack of top management support as a major obstacle to ICT integration in academic management in HEIs, Table 19 shows over half of the managements of the participating universities as being committed (57.6%). Sevilla (2008) argues that with strategic planning at organizational level, top level management commitment to ICT implementation is usually explained and understood by every stakeholder.

Additionally, the students indicated that the numbers of skilled ICT staff in their institutions was fairly adequate (54.1%). However, only a few thought that the said staff were motivated in their work (35.4%). These findings imply that public universities could be having ICT staff whose motivation is low. Murgor (2015) argues that developing and retaining ICT human resource is still a major challenge particularly in African universities. The major reason for this is low salaries and poor conditions of service. The lack of trained, experienced and motivated technical personnel to manage, control and maintain the increasingly large number of ICT resources means that their utility, effectiveness and efficiency, cannot be fully exploited. Murgor further observe that the rapid increase in quantities of ICT resources and establishment of ICT units in many organizations across Kenya has created a rapid turnover of the few available trained technical personnel. This has resulted to the less financially endowed organizations failing to attract and retain competent ICT staff. Consequently, it has

created huge ICT management problems for the public universities since they depend on the government for staff salaries, which are low.

4.7.2 Lecturers' Perceptions on Challenges of ICT integration in Academic Management

Lecturers were also requested to indicate on a 5 point likert scale, their perceptions on items designed to measure challenges affecting effective integration of ICT in academic management in their universities. Their responses were as indicated on Table 27:

Table 27
Lecturers Perceptions on Challenges to ICT integration in Academic Management

Challenges	Responses (%)					
	N	SD	D	U	A	SA
Lack of awareness among lecturers on capabilities of ICT integration in academic management	243	8.6	49.8	11.1	18.2	12.3
Lack of commitment from top management that is slowing down systems implementation	243	17.7	39.9	0	27.2	15.2
Poor strategy in making ICT responsive to institutional vision and mission	243	17.3	42.0	5.3	24.3	11.1
Integration not fully conceptualized and defined before implementation thus causing a weak system	243	17.3	37.9	2.5	29.2	13.2
Integration not supported by lecturers because they were not inducted	243	17.7	49.8	3.3	25.5	3.7
Inadequate number of skilled ICT staff	243	22.6	31.7	14.4	25.5	5.8
ICT staff display low morale in their work	243	15.6	32.1	13.5	22.6	16.2

Source: Field data

Table 27 shows that lecturers were also aware of the benefits of integrating ICT in academic management (58.4%) and they were as well in support of it (67.5%). At the same time, they approved the strategies used by their institutions to make ICT responsive to institutions' visions and missions (59.3%). Likewise, most of them (55.2%) held the view that ICT Integration had been well thought out and defined before implementation. These findings imply that there was goodwill from the lecturers who are key to the implementation of ICT integration in academic management. Tusubira and Mulira (2005) point out that it is lack of awareness and a negative mindset among HEIs staff on ICT benefits that may lead to unqualified resistance and wanting to stick to the old ways of working. However, the results on Table 27 show that the lecturers in the participating universities were conscious and appreciative of the important role that integration of ICT in academic management plays in their respective universities.

From the Table, it was also evident that the universities managements were committed to ICT integration in academic management (58.4%). This finding confirms that there is a turnaround as regards the support of ICT initiatives by top management of public universities in Kenya as also indicated by students on Table 26. SAIDE and RUFORUM (2010) argue that there is an emergent of strong leadership in universities in Africa that is focused on driving the ICT processes in their universities. This category of leadership is focused on laying out a robust ICT infrastructure that will help their universities to compete globally with others for academic access and excellence.

Table 27 also indicates that the numbers of skilled ICT staff were fairly adequate (54.3%). Even so, their work morale still emerged as an issue because less than half (47.7%) of the lecturers expressed the view that the former were motivated in their work. These findings correspond with those of students on the same issues as indicated on Table 28. Previous studies, among them (Chacha, 2005, Tusubira & Mulira 2005, Shabaya, 2009, Nyandiere et al. 2012 and Murgor, 2015) have as well noted the challenges of sufficiency and motivation of ICT human resources in HEIs in Kenya and Africa in general.

4.7.3 Registrars' (Academics) Perceptions on Challenges to ICT integration in Academic Management

Registrars in charge of academics affairs were also requested to indicate on a 5 point likert scale, their perceptions on items designed to measure challenges affecting effective

integration of ICT in academic management in their universities. Their responses were as indicated on Table 28.

Table 28
Registrars' Perceptions on Challenges to ICT integration in Academic Management

Challenges	Responses (%)				
	SD	D	U	A	SA
Lack of awareness among users on capabilities of ICT integration in academic management	66.7	33.3	0	0	0
Lack of commitment from top management that is slowing down systems implementation	100	0	0	0	0
Poor strategy in making ICT responsive to institutional vision and mission	100	0	0	0	0
Integration not fully conceptualized and defined before implementation thus causing a weak system	100	0	0	0	0
Integration not supported by users because they were not inducted	66.7	33.3	0	0	0
Lack of sufficient funding for sustenance of ICT integration	66.7	33.3	0	0	0
Inadequate number of skilled ICT staff	66.7	33.3	0	0	0
ICT staff display low morale in their work	33.3	66.7	0	0	0

Source: Field data

From Table 28, it was evident that all registrars' (academics) of the participating universities strongly approved the commitment of the universities top management to integrate ICT in academic management as well as the strategies used. They also indicated that ICT integration in their respective universities was fully conceptualized and made clear before implementation. However, they did not express such strong approvals on users' awareness on capabilities of ICT integration in academic management (66.7%) as well as their support on the integration process (66.7%). Leon (2008) argues that implementation of ICT integrated systems in universities is not a technology but a people project. In this regard, preference should be given to the role of users in determining the implementation of the system. Zhang et al. (2002) further argue that user involvement at initial stages of ICT integrated systems implementation is helpful in understanding a system so as to provide valuable feedback. Motwani et al. (2005) on their part note that matching user needs to choice of system used,

service requirements and functional abilities of the chosen system are essential in determining the success in implementation of an ICT integrated system.

Table 28 also indicates that the registrars did not have strong approval on the sufficiency of funding for sustenance of ICT integration in academic management (66.7%). Other studies have also noted that most universities in Africa are grossly underfunded and therefore are not able to sustain the infrastructure required for securing viable ICTs necessary for effective integration in institutional management (Murgor, 2015; Loing, 2005). The registrars were also shown to have moderate and low approvals on the adequacy of ICT staff (66.7%) as well as ICT staff work morale (33.3%) respectively. Murgor (2015) argues that developing and retaining ICT human resource is still a major challenge particularly in African universities. The major reasons for this are low salaries and poor conditions of service. The lack of theoretical knowledge and practical management, control and maintenance skills of ICT staff leads to these units being managed, controlled and maintained virtually on trial and error basis. This makes it hard to ascertain their utility values, effectiveness and efficiency (Looijen, 1998).

4.7.4 Lecturers' Perceptions' on Challenges to ICT Integration in HRM

The lecturers were also requested to indicate on a 5 point likert scale, their perceptions on items designed to measure challenges affecting effective integration of ICT in human resource management in their universities. Their responses were as indicated on Table 29:

Table 29
Lecturers' Perceptions' on Challenges to ICT Integration in Human Resource Management

Challenges	Responses (%)					
	N	SD	D	U	A	SA
Lack of awareness among lecturers on capabilities of ICT integration in HRM	243	19.8	53.1	0	19.3	7.8
Lack of commitment from top management that is slowing down systems implementation	243	12.8	48.8	0	21.8	16.5
Use of poor strategy in making ICT responsive to institutional vision and mission	243	14.0	41.2	1.2	33.3	10.3
Integration not fully conceptualized and defined before implementation thus causing a weak system	243	12.8	38.7	4.5	35.8	8.2
Integration not supported by lecturers because they were not inducted	243	16.9	53.5	8.6	18.1	2.9
Inadequate number of skilled ICT staff	243	18.1	30.5	13.6	28.0	9.9
ICT staff display low morale in their work	243	14.4	32.5	18.9	23.5	10.7

Source: Field data

Table 29 shows that lecturers in public universities in Kenya were well aware of the potential of ICT integration in human resource management (72.9%) and as well, they were in strong support of the integration (70.4%). Strohmeier (2001) notes that the main factors that may cause failures of information technology systems in organizations are mainly human as opposed to malfunctioning of the systems. Thus, it should be regarded as a positive thing for users to be both aware of the capabilities and support ICT integration in their institutions.

The Table also shows that majority (61.6%) of the lecturers believed that the universities top management were committed to the integration of ICT in HRM. This finding contradicts Ngai and Wat (2006) who had identified lack of top management support and commitment in implementation of human resource management information systems in HEIs as a barrier to

their integrating technology in HRM. This shift can be explained by the fact that HRM has become more complex due to the fast growth in specialized occupations, the need to train and promote highly skilled employees and the growing variety of benefits programs. Likewise, the use of technology in HR has expanded spectacularly and is continuing to change HR management activities with executives, managers, and employees (Mathis & Jackson, 2010).

In addition, Table 29 shows that the strategies used in making ICT responsive to the institutions visions and missions were fairly acceptable (55.2%). Additionally, ICT integration had been reasonably conceptualized and defined before implementation (51.5%). Nyandiere et al. (2012) argue that proper ICT strategic planning helps make ICT responsive to institutional vision and mission and provide systematic method of implementation that create strong systems capable of supporting seamless institutional management functionalities.

Lastly, the Table indicates that the participating universities had problems with adequacy of skilled ICT staff (48.6%) as well as their employee morale (46.9%). Beckers and Bsat (2002) identified lack of information technology support as an obstacle to ICT integration in HRM. The cause of this was observed as inadequate number of ICT staff available and/or the lack of human resource practitioners who are competent in information technology. Chacha (2005) also noted that there had been insufficient training and re-skilling of end users as well as technical staff that support ICT based systems in HEIs in Africa. This was coupled with the inability of many institutions to recruit and retain qualified information systems staff.

4.7.5 Administrators Perceptions' on Challenges to ICT Integration in HRM

Registrars in charge of administration were as well requested to indicate on a 5 point likert scale, their perceptions on items designed to measure challenges affecting effective integration of ICT in human resource management in their universities. Their responses were as indicated on Table 30:

Table 30
Registrars' (Administration) Perceptions' on Challenges to ICT Integration in HRM

Challenges	Responses (%)					
	N	SD	D	U	A	SA
Lack of awareness among users on capabilities of ICT integration in HRM	3	0	66.7	0	33.3	0
Lack of commitment from top management that is slowing down systems implementation	3	0	100	0	0	0
Use of poor strategy in making ICT responsive to institutional vision and mission	3	0	100	0	0	0
Integration not fully conceptualized and defined before implementation thus causing a weak system	3	0	66.7	0	33.3	0
Integration not supported by users because they were not inducted	3	33.3	66.7	0	0	0
Lack of sufficient funding for sustenance of ICT integration	3	0	66.7	0	33.3	0
Inadequate number of skilled ICT staff	3	0	66.7	0	33.3	0
ICT staff display low morale in their work	3	33.3	66.7	0	0	0

Source: Field data

Table 30 shows that all the registrars (administration) of the participating universities believed that their universities' heads were committed to integrate ICT in HRM. They also displayed confidence on the strategies adopted to actualize the integration and as well, approved the users support. In addition, the administrators expressed the view that ICT staff in the universities were motivated and in control of ICT integration in HRM. Helo, Anussornnitisarn and Phusavat (2008) argue that unlike other information systems, the major problems of integrated systems implementation are not technologically related issues such as technological complexity, compatibility, standardization, etc. but mostly [about] organization and human related issues like resistance to change, organizational culture, project mismanagement, top management commitment, etc. Also, top management commitment and support leads to overall organizational commitment across an organization that result in

successful ICT integrated systems implementation (Umble & Umble, 2002). Going by these arguments, the participating universities seem to have made some significant strides on the organizational commitment towards ICT integration in HRM. This is deemed so due to the support and commitment from the top managers, users and technical staff involved as illustrated on Table 30.

Nonetheless, from the administrators' moderate approval, it was evident that some challenges to ICT integration in HRM existed in public universities. One of the challenges related to users' awareness on capabilities of ICT integration in HRM (66.7%). End user training has been recognized as a critical factor for ICT integrated systems implementation (Bajwa, Garcia & Mooney, 2004). Due to the complexity of the integrated systems, end user training is essential for a robust understanding of how the systems work and how to use them. Consequently, appropriate end user education and training help to maximize ICT integrated systems benefits and increase user satisfaction.

The other challenges included conceptualization and definition of ICT integration before implementation; sufficiency of funding for sustenance of ICT integration; and adequacy of skilled ICT staff which were all rated 66.7%. Malviya et al. (2009) put forward the argument that the implementation of computerized human resource functions is normally a great challenge for the organization. This leads to the requirement for continuous monitoring and accommodation of changes in the implementation strategy accordingly. Thus, a detailed implementation strategy clearly outlined in an ICT strategic plan, right from the beginning of project helps resolve most of the ICT integration problems. Additionally, Sangrà and González (2004) argue that ICT integration must be done in an explicit, planned and systematic manner, involving the whole organization and their members on individual and collective levels so as to become a factor of change and improvement for the university. The institutional approach of this issue requires an active participation and the motivation of different agents within the institution, where faculty members and a strong institutional commitment are very important.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The purpose of this study was to investigate the influence of integration of ICT on academic and human resource management in Kenyan public universities from the perception of students, lecturers and registrars. The objectives of the study were to:

i. Determine the status of ICT integration in academic and human resource management in public universities in Kenya.
ii. Determine the influence of ICT integration on academic management in public universities in Kenya.
iii. Determine the influence of ICT integration on human resource management in public universities in Kenya.
iv. Identify the challenges affecting effective integration of ICT in academic and human resource management processes in public universities in Kenya.

5.2 Summary

The following is the summary of the research findings:

All public universities that participated in the study had invested in the following ICT integrated systems: Students Management Information Systems (SMISs) for supporting processes such as students' admissions, course registration as well as academic transcripts and Finance Management Information Systems (FMISs) for managing students' financial records. Also, all the universities had Internet connectivity necessary for supporting academic management. Moreover, students had requisite ICT skills for obtaining online services. However, only some of the universities had in place Halls Management Information Systems (HAMISs) for managing students' accommodation and residential services and Health Management Information Systems (HEMIS) for managing students' medical services. As well, insufficiency of computers necessary for provision and obtaining of academic management services was noted. Lecturers too were found to be lacking the necessary skills for integrating ICT in management of academic processes. The study further found that chairs of departments and deans of school lacked the requisite capacities to integrate ICT in academic management.

As regards to human resource management (HRM), the study found that some universities had in place integrated Human Resource Management Information Systems (HRMISs) for supporting processes such as staff recruitment; staff development and training; salary administration as well as staff record management. The others were relying on manual systems to sustain the said services. All the universities though, had invested in sufficient Internet connectivity capable of transmitting and obtaining HRM services online. However, the universities were found to be lacking sufficient computers for staff use to obtain HRM services. Lecturers also lacked the requisite ICT skills for accessing automated HRM services. Additionally, deans of schools and chairs of departments were found to be handicapped in terms of ICT capacities necessary for facilitating delivery of integrated HRM services.

The study found that integration of ICT in academic management enabled the participating universities to render academic related services to their students online. For instance, students' were able to apply for admissions and re-admissions remotely. The administrators could also retrieve personal information about any student any time because it was captured during the online registration process and stored in the integrated system. In addition, students were able to raise invoices on their selected courses from wherever they were; the invoices could then be seen by cashiers (on the system) who in turn facilitated fee payments. Similarly, students could access information about their account balances as well as academic performances by logging into their university students' portal anytime and anywhere. Lecturers too easily entered students' grades and processed examination results even while away from campuses, thus making the process faster. However, the study established that there was an under-utilization of the integrated system because lecturers still updated class attendance manually. The universities were also very slow in adopting SMS technology to provide academic management services despite its promptness and cost-effectiveness especially when sent in bulk. A simple linear regression analysis showed that there was a statistically significant influence of integration of ICT on academic management as perceived by students and lecturers.

The registrars in charge of academic affairs in the participating universities noted that ICT integration had benefited their universities in the following ways: Firstly, it had resulted into higher performance in academic work since there was now greater management control over the academic processes at their universities. ICT integration had also increased customer satisfaction due to faster processing and accurate data capture and analysis. Moreover, the

universities were doing better in fees collection because it was easier to track students' non-payment of fees. Furthermore, lecturers' efficiency had improved considerably because they were now able to enter examination marks electronically as soon as they were available. Nevertheless, from the registrars' responses about the perceived benefits of integration of ICT in their universities academic management, it was noted that the investment had not yet entirely enhanced communication of universities management with academic departments as well as the graduation of students.

Regarding ICT integration in HRM, the study found out that it had largely leveraged administrative functions such as employee's record management and payroll administration. However, there was a notable under-exploitation of ICT in the more strategic applications such as staff recruitment and selection, training and development as well as performance management. A simple linear regression analysis showed that there was a statistically significant influence of integration of ICT on human resource management as perceived by lecturers.

The administrators of the participating universities noted that ICT integration in HRM largely benefited the institutions through automation of processes such as budgeting and payroll management, digitization of employees' information and compliance with statutory obligations due to availability of accurate and timely data. These are mostly elementary benefits of integrating ICT in HRM. However, benefits such as enhanced efficiency and effectiveness in recruitment and selection as well as in performance management processes were minimal.

The study found several factors to be acting as impediments to effective integration of ICT in academic and human resource management. These included: lack of users' awareness on capabilities of ICT integration in academic and human resource management; insufficient funding for ICT integration; inadequate ICT staff and their low work motivation.

5.3 Conclusions

The following conclusions were made from this study:

Public universities in Kenya have invested reasonably well in some aspects of ICT integration in academic and human resource management. These include: requisite ICT based programs for supporting academic and HRM processes; adequate Internet connectivity

necessary for transmitting and accessing online services; and students' ICT skills necessary for obtaining automated academic services. Both areas however face the following inadequacies: insufficient computers necessary for provision and accessing automated academic and HRM services within the institutions; lack of requisite ICT skills by lecturers for use in facilitating the provision of academic management services to students as well as for obtaining HRM services; and inadequate ICT capacities for deans and chairs of departments to integrate ICT in academic and HRM processes.

Integration of ICT has had a positive influence on academic management processes in public universities in Kenya. Students today are able to apply for admissions online, register for their courses of choice, make and track their fee payments and account balances as well as obtain their provisional academic transcripts remotely. The leveraging of ICT in academic management has led the universities to get the following benefits: higher performances in academic work because of enhanced management control; increased customer satisfaction; enhanced fees collections; cost-effectiveness in operations; and improved lecturers' efficiency. Nevertheless, this investment has not yet entirely enhanced intra-university communication as well as the graduation rates of students in public universities. This shortfall could be explained by the ICT impotence at the schools/faculties and departmental levels as observed by this study. There is a notably poor investment in the staff and administrators ICT integration skills together with requisite ICT infrastructure at the said levels thus affecting seamless integration of ICT in academic management services. This in turn could be having a negative impact on the universities internal efficiencies where students flow from one level to another is curtailed by miscommunications on learners' progress, loss of marks and consequently unnecessary delays from graduating.

Integration of ICT has had a positive influence on HRM processes in public universities in Kenya. However, the integration is perceived to have more support on administrative functions such as employee's record management and payroll administration than on the strategic applications such as staff recruitment and selection, training and development as well as performance management. Consequently, most benefits noted are basic such as automation of processes like budgeting and payroll management, digitization of employees' information and compliance with statutory obligations due to availability of accurate and timely employees' data. Thus, benefits that would ensure the attainment of the institutions' long-term goals such as enhanced efficiency and effectiveness in recruitment and selection;

training and development as well as in performance management processes are negligible. There is therefore need for higher focus on exploitation of ICT for strategic human resource management (SHRM) which is a more favourable approach to managing human resources that supports long-term institutional goals and outcomes with strategic framework.

The key impediments to effective integration of ICT in academic and human resource management in public universities in Kenya today are noted as: lack of users' awareness on capabilities of ICT integration in academic and human resource management; insufficient funding for ICT integration; inadequate ICT staff and their low work motivation.

5.4 Recommendations

The following were the recommendations of this study:

With regard to ICT integration in academic and human resource management, public universities in Kenya should seriously consider procuring and placing adequate computing devices in virtually all the secure study and work places within their campuses. This will enhance the access to automated academic and HRM services by students and lecturers respectively. The universities should also invest in regular ICT integration training programmes for lecturers and administrators to equip them with requisite skills. Departments and schools within campuses should be equipped with requisite ICT infrastructure and staff to ensure proper leveraging of integrated academic and HRM services.

Despite the notable benefits accruing from the investment in ICT integration in academic management by public universities, there are still glaring inefficiencies as regards to intra-universities communications and graduation rates. To check on these, the universities need to come up with clear ICT integration policies where they are lacking, as well as compel all those involved to play their roles as service providers and users on the ICT platforms provided. The universities too should be more proactive in the use of modern tools of internal communication such as the SMS technology, university websites as well as the internal e-mail systems. They should also be audacious and encourage the use of social media such as twitter, face book, telegram and whatsapp that are already in use by other cooperates for internal communications. Enhanced intra-universities communication may lead to improved collaboration, timely quality decisions and a high degree of efficiency in coordination of academic activities which could in turn lead to improved graduation rates.

As regards to the influence of ICT integration in HRM, public universities need to shift their focus from using ICT chiefly for HR administrative purposes to integration of ICT as a tool that will enhance HR strategic management. This would require an investment in ICT based programmes that are capable of supporting employees' recruitment and selection; training and development as well as performance management. ICT staff should also be equipped with requisite skills to maintain and administrate such programmes. After ensuring that adequate computers have been provided and all staff trained on their operations, the universities henceforth should insist that all HRM processes are run through the ICT platforms in place.

On the challenges to effective integration of ICT in academic and human resource management, public universities should consider reviewing their ICT strategic plans so as to add more impetus on the following aspects: ICT integration capacity building among the service providers and users within the universities ecosystem; increased budgetary allocation for ICT integration; improved numbers, competencies and motivation of the ICT staff.

5.5 Suggestions for Further Research

The following are the suggestions for further research by this study:

Students and lecturers were aware of how ICT integration was likely to influence academic and human resource management respectively. Equipped with this knowledge, they may have responded to questions on the influence of ICT integration on academic and human resource management respectively with a bias on what ICT was capable of doing and not what was actually happening on the ground. It would be interesting to investigate this potential bias.

It would be interesting to investigate the influence of the mobile technologies such as the mobile phone, tablets and i-pads on academic and human resource management in Kenyan universities. The findings of such a study would be a useful input for institutional-level policy formulation on ICT.

Kenyan universities and other stakeholders have invested heavily on ICT infrastructure and policy frameworks that would enable the former to leverage their key processes such as academic and human resource management. However, that does not automatically translate into benefits. It would be interesting to investigate the measures universities are putting into place to recoup desirable management-related benefits from these investments. Public

universities were using ICT more on HR administrative functions such as supporting employees record management and payroll administration than to leverage more strategic functions such as employees recruitment, training and development as well as performance management. There is need to investigate the prevalence and likely causes of this phenomenon.

There is evidence of the private sector in Kenya having played a key role in the adoption of ICT by the country. It would thus be interesting to investigate how private universities are benefiting from ICT integration in their management processes.

REFERENCES

Acosta, F.R. (2004). *Information Technology Strategic Plan of Olivarez College*. Unpublished Doctoral Dissertation, University of Baguio, Philippines.

Ahmad A. (2009). *Identifying Critical Success Factors of ERP Systems at the Higher Education Sector*. In: ISIICT 2009: Third International Symposium on Innovation in Information & Communication Technology, 15-17 December, 2009, Philadelphia University, Amman, Jordan.

Allen, D., & Kern, T. (2001). Enterprise Resource Planning Implementation: Stories of Power, Politics, and Resistance. *Proceedings of the IFIP TC8/WG8. 2 Working Conference on Realigning Research and Practice in Information Systems Development: The Social and Organizational Perspective,* 149-162.

Alter, S. (2001). *Information Systems: Foundations of e-Business, 4th ed*. New Jersey: Prentice Hall.

Applegate, L.M., Austin, R.D. & McFarlan, F.W. (2004). *Corporate Information Strategy and Management,* 6th ed. Boston: Irwin/McGraw-Hill.

Asian Development Bank (ADB) (2009). *Good Practice in Information Communication and Technology for Education*. Manila: ADB. http://www.adb.org/documents/guidelines/good-practice-in-ict-for-education/ (Accessed on 08.07.13)

Asian Development Bank (ADB) (2008). *Education and Skills. Strategies for Accelerated Development in Asia and the Pacific. Manila*: ADB. Available:www.adb.org/ Documents/ Studies/ Education SkillsStrategie Development.pdf.(Accessed on 10.07.13).

Ayoo, P. (2006). *The East African Varsity Net Project: Development of an Interuniversity Information Based on Open Source Software*. IUCEA.

Bajwa, D. S., Garcia, J. E., & Mooney, T. (2004). An Integrative Framework for the Assimilation of Enterprise Resource Planning Systems: Phases, Antecedents, and Outcomes. *Journal of Computer Information Systems, 44*(3), 81-90.

Balasubramanian, K., Clarke-Okah, W., Daniel, J., Ferreira, F., Kanwar, A., Kwan, A., Lesperance, J., Mallet, J., Umar A. & West, P. (2009). ICTs for Higher Education, Background Paper from the Commonwealth of Learning UNESCO World Conference on Higher Education, Paris.

Ball, K. S. (2011). The use of Human Resource Information Systems: A survey. *Personnel Review, 30(5/6),* 677-693.

Baruah, T.D & Handique, K.K (2009). Effectiveness of ICT in Open and Distance Learning: A Case Study. Available at:http://www.digitallearning.in/articles/article-details.asp?articleid=2537&typ=research%2 0article.

Bates, A.W. (2000). *Managing Technological Change. Strategies for College and University Leaders*. San Francisco: Jossey-Bass.

Basoglu, N., Daim, T. & Kerimoglu, O. (2007). Organizational Adoption of Enterprise Resource Planning Systems: A Conceptual Framework. *Journal of High Technology Management Research, 18 (1),*73-97.

Beckers, A. M. & Bsat, M. Z. (2002). A DSS Classification Model for Research in Human Resource Management Information Systems. *Journal of Information Systems Management, 19(3),* 41-50.

Borg, W.R. & Gall, M.D. (2003). *Educational Research; An Introduction,* (7th ed) New York: Longman.

Buhalis, D., & Main, H. (1998). Information Technology in Peripheral Small and Medium Hospitality Enterprises: Strategic Analysis and Critical Factors. *International Journal of Contemporary Hospitality Management, 10(5),*198-202.

Casal, C.R. (2007). ICT for Education and Development. *Emerald Group Publishing Limited, 9(4),* 3-9.

Castells, M., (2000). Materials for an Exploratory Theory of the Network Society. *British Journal of Sociology, 51(1),*5-24.

Chambers, R., (2005). Critical Reflections of a Development Nomad. In Kothari, U., (ed) 2005. *A Radical History of Development Studies – Individuals, Institutions and Ideologies.* London: Zed Books, 67-87.

Chacha, N C. (2004). *Reforming Higher Education in Kenya: Challenges, Lessons and Opportunities*. IUCEA.

Challis, D., Holt, D. & Rice, M. (2005). Staff Perceptions of the Role of Technology in Experiential Learning: A Case Study from an Australian University. *Australasian Journal of Educational Technology, 21(1),* 9-39.

Chen, I.J. (2011). Planning for ERP Systems: Analysis and Future Trend. *Business Process Management Journal, 7(5),* 374-386.

Cochran, W. G. (1977). *Sampling Techniques* (3rd ed.). New York: Wiley

Commission for Higher Education (CHE) (2013). *Status of University Education in Kenya.* http://www.cue.or.ke/services/accreditation/status-of-universities[Accessed 10thMay 2014].

Copenhagen, (2002). The Race to Productivity and Knowledge: Where does Europe Stand? *IST 2002 Conference, Speech/02/536.*

David, M. & Sutton, C. (2004). *Social Research: The Basics*. London: Sage.

Davis, M., & Huang, Z. (2007). ERP in Higher Education: A Case Study of SAP and Campus Management. *Issues in Information Systems, VIII* (1), 120-126.

Dewey, B. I.& DeBlois, P. B.(2006). *Current IT Issues Survey Report*. EDUCAUSE Quarterly, *29(2),*12-30.

De Alwis, A. C. (2010). The Impact of Electronic Human Resource Management on the Role of Human Resource Managers. *E+M Ekonomie A Management*, 4, 47-60. http://www.ekonomie-management.cz/download/1331826738_3ec7/04_alwis.pdf (June 10, 2012).

Duderstadt, J.J., Atkins, D.E., & Van Houweling, D. (eds.). (2002). *Issues, Trends, and Themes. Higher Education in the Digital Age*. U.S: American Council on Education Praeger Publishers.

Duhon, B. (1998). It's All in Our Heads, *Inform*, Vol. 12, No. 8, September, 1998, p8-13.

Edmond, G. (2008). *Survey of ICT and Education in the Caribbean: A Summary Report, Based on 16 Country Surveys.* Washington, DC: InfoDev/World Bank.

Frankel, J.R. & Wallen N.E. (2002). *How to Design and Evaluate Research in Education*. (4th ed).United States of America: McGraw-hill.

Fisher, R. J. (1993) Social Desirability Bias and the Validity of Indirect Questioning. *Journal of consumer research,* Vol. 20, 303-315.

Floridi, L., (2002). What is the Philosophy of Information? *Metaphilosophy*, 33, 1/2, 123-145.

Galbraith, J.R. (2005) *Designing Complex Organizations*. Reading: MA Addison-Wesley.

Gitonga, R.K., Ndirangu, M. & Githeko, J.M. (2013). *Influence of ICT Integration on Quality of Instruction, Students' Record Management and Intra University Communication in Nairobi Metropolitan Universities in Kenya*. Unpublished Ph.D Thesis: Egerton University, Kenya.

Gerardine, D. (2006). Human Resource Information Systems-A Current Assessment: *Management Information Systems (MIS)* Quarterly 10(1),15-27.

Golola, M. (2005). Role of the ICT Unit of the IUCEA in Enhancing Quality Education in East Africa IUCEA 2005 Systems. *Quality Assurance in Education,* 3(1),30-36.

Gürol, Y., Wolff, A., & Ertemsir, E. (2010). E-HRM in Turkey: A Case Study. *Encyclopedia of E-Business Development and Management in the Global Economy*.

Hager M.A, Wilson, S., Pollak, T.H. & Rooney, P.M. (2003). Response Rates for Mail Surveys of Nonprofit Organizations: A Review and Empirical Test. *Nonprofit and Voluntary Sector Quarterly, 32(2),* 252-267.

Hahn, G. J., & Doganaksoy, N. (2011). *The Role of Statistics in Business and Industry*. John Wiley & Sons.

Helo, P., Anussornnitisarn, P., & Phusavat, K. (2008). Expectation and Reality in ERP Implementation: Consultant and Solution Provider Perspective. *Industrial Management & Data Systems, 108(8),* 1045-1059.

Hendrickson, D. (2010). Getting More Out of ERP. *EAI Journal, December,* 24-27.

Judith, P. (2005). "Good Enough! IT Investment and Business Process Performance in Higher Education. *ECAR, key findings*, June, pp. 1-13.

Katz, R. N. (2001). *The ICT Infrastructure: A Drive for Change.* EDUCAUSE Review.

Kashorda, M., & Waema, T. (2014). *E-readiness survey of Kenyan universities (2013) report*. Nairobi: Kenya Education Network (KENET).

Kashorda, M., Waema, T., Omosa, M. & Kyalo, V. (2007). *E-readiness Survey of Higher Institutions in Kenya.* Nairobi: Kenya Education Network (KENET).

Kerlinger. F. N. (1973). *Foundation of Behaviour Research*. New York: Holt Reinhart and Winston Inc.

Krejcie, R.V. & Morgan, D.W. (1970). Determining Sample Size for Research Activities. *Educational & Psychological Measurement*, 30, 607-610.

King, P. (2002). The Promise and Performance of Enterprise Systems in Higher Education, Respondent Summary. ECAR Respondent Summary 2002. Available at http://www.educause.edu/ir/library/pdf/ecar_so/ers/ers0202/EKF0204.pdf [20.1.2015]

King, P., Kvavik, R., & John, V. (2002). Enterprise Resource Planning Systems in Higher Education. *EDUCAUSE, 22*, 1-5.

Kombo, D.K. & Tromp, L.A. (2006). *Proposal and Thesis Writing: An Introduction*. Nairobi: Don Bosco printing press.

Kovach, K. A., Hughes, A., Fagan, P., & Maggitti, P. (2002). Administration and Advantages of HRIS. Employment Relations Today,. *Summer*, 43-48.

Kundu, S.C. & Kadian, R. (2012). Application of HRIS in Human Resource Management in India: A study. *European Journal of Business and Management*, *4(21),* 2012.

Laudon, K.C. and Laudon J.P.(2003): *Management Information Systems: Managing the Digital Firm,* 7th ed., New Jersey: Prentice-Hall.

Laudon, K.C. & Laudon, J.P (2000). *Management Information Systems: Organization and technology in a networked enterprise,* 6th ed., New Jersey: Prentice Hall.

Lenhart, A., Ling, R., Campbell, S. & Purcell, K. (2010). Teens, Cell phones and Texting, Pew Research Centre. Re-trieved October 2, 2013, from http://bcsdcybercrimes.com/Documents/Teens,%20Cell%20Phones%20and%20Texting.Pdf.

Leon, A. (2008) *Enterprise Resource Planning (2nd Ed),* McGraw-Hill, New Delhi, India

Lim, W. M., & Ting, D. H. (2013). Research Methodology: A Toolkit of Sampling and Data Analysis Techniques for Quantitative Research. *Journal of Statistics Education*, *4(1),* 23–39.

Looijen, M., (1998). *Information Systems, Management, Control and Maintenance*. Ten Hagen & Stam, The Hague, Netherlands

Magni (2009). ICT Usage in Higher Education. International Technology and Education and Development Conference, Spain March 9-11 2009.

Makokha, G. L. & Mutisya, D. N. (2016). Status of E-learning in Public Universities in Kenya. *International Review of Research in Open and Distributed Learning*, Vol. 17, No. 3.

Makokha, A.N., Musiega, D. & Juma, S. (2013). Implementation of Enterprise Resource Planning Systems in Kenyan Public Universities, A Case of Masinde Muliro University of Science and Technology. *Research Journal of Finance and Accounting*, 4(6), 26-34.

Malviya, D., Dery, K., Hall, R., & Wailes, N. (2009). *Human Resource Information Systems Usage in Australian Firms: A survey Mimeo*: University of Sydney.

Manyasi, B. (2010). OL & DE as a Means of Increasing Access to Higher Learning in Kenya. *A Journal of the KIM School of Management*. 1,123 – 130.

Martinsons, M. (1994). Benchmarking Human Resource Information System in Canada and Hong Kong. *Information and Management, 26(6),* 305-316.

Marler, J. H. (2009). Making Human Resources Strategic by Going to the Net: Reality or Myth. *The International Journal of Human Resource Management, 20(3),* 515-527.

Mathis, R. L, & Jackson, J. H. (2010). *Human Resource Management: Essential Perspectives.* Cincinnati, Ohio: South-Western College Pub.

Mavuso, R., Makana J., P. & Anbu K. (2012). Old Wine in New Wine Skin: Marketing Library Services through SMS-based Alert Service, *Library Hi Tech, 30(2)* 310 – 320.

McClea, M. & Yen, D.C. (2005). A Framework for the Utilization of Information Technology in Higher Education Admission Department. *The International Journal of Educational Management*, 19(2/3), 87-101.

Midiwo, J (2015). *Influence of Human Resource Information Systems on Performance of Kenyan Public Universities*. Unpublished Thesis.

Motwani J., et al. (2005) Critical Factors for Successful ERP Implementation: Exploratory Findings from Four Case Studies. Communications of the ACM, 56(6).

Mugenda, A.G. (2008). *Social Science Research: Conception, Methodology and Analysis*. Nairobi: Applied Research and Training Services.

Mugenda, O. M. & Mugenda, A.G. (2003). *Research Methods: Quantitative & Qualitative Approaches.* Nairobi: African Center for Technology Studies.

Mukhwana, E. Oure, S. Kiptoo, S. Kande, A. Njue, R. Too, J & Some, D.K. (2016). *State of University Education in Kenya*. Commission for University Education. Discussion Paper 04. Nairobi, Kenya.

Murgor, T.K. (2015). Challenges Facing Adoption of Information Communication Technology in African Universities. *Journal of Education and Practice*, 6(25), 2015.

Murphy, C. (2004). ERP: The Once and Future King of Campus Computing. *Campus Technology*. Syllabus Media Group.

Ndirangu, M. & Kabira, J.G. (2012). The Role of ICT in Kenya's Higher Education. *Techno LEARN*: 2 (2): 221-238.

Newmann, S. (1994). *Strategic Information Systems–Competition through Information Technologies.* New York: Macmillan.

Ngai, E. W. & Wat, F. K. (2006). Human Resource Information Systems. *A Review and Empirical Analysis*, 297-314.

Ngau, P. (2004). *Research Design, Data Collection and Analysis*. Nairobi: University of Nairobi.

Ngila, D. (2016). *Audit Shows Shs. 1 Billion Lost at Moi Varsity*. Sunday Nation, October 2, 2016.

Ngumbi, E. M. (2010). *Challenges of the Management of Higher Learning Institutions*. Nairobi: Kenya Institute of Management.

Niederman, F., & Beise, C.M. (1999). Defining the "Virtualness" of Groups, Teams, and Meetings. *Proceedings of the ACM SIGPR Conference on Computer Personnel Research*, 14-18.

Nour, M. A. & Mouakket, S. (2011). A Classification Framework of Critical Success Factors for ERP Systems Implementation: A Multi-Stakeholder Perspective. *International Journal of Enterprise Information Systems*, 7(1),56-71.

Nyandiere, C. Kamuzora, F. Lukandu, I. A. & Omwenga, V. (2012). Implementing Enterprise Systems for Management: A Case of Kenyan Universities. *Computer Technology and Application* 3 (2012) 558-563.

Nyandiere, C. (2007). *Increasing Role of Computer-Based Information Systems in the Management of Higher Education Institutions.* In M. Kashorda, F. Acosta and C. Nyandiere (*eds*). ICT Infrastructure, Applications, Society and Education: Proceedings of the Seventh Annual Strathmore University ICT Conference. Strathmore University Press: Nairobi.

Nyerere, J. K. A., Gravenir, F. Q., & Mse, G. S. (2012). Delivery of Open, Distance and E-Learning in Kenya. *International Review of Research in Open and Distributed Learning, 13(3).* 185-205

O'Brien, J. (1999). *Management Information Systems: Managing Information Technology in the Internetworked Enterprise*, 4th Ed. Boston: McGraw Hill-Irwin inc.

Ogeto, A. (2015). *High Student Enrolment has Led to Shortage of Facilities and Services.* Daily Nation Monday, October 5, 2015.

Oliver, R. (2002). The Role of ICT in Higher Education for the 21st Century: ICT as a Change Agent for Education, *HE21 Conference Proceedings*, 1-9.

Orodho, J.A. (2009). *Elements of Education and Social Sciences Research Methods* (2nd Ed). Maseno: Kenezja Publishers.

Orodho, J.A. (2008). *Techniques of Writing Research Proposals and Reports in Education and Social Sciences.* Maseno: Kenezja HP Enterprises.

Oxford University Press (OUP) (2010). *Advanced Learners Dictionary* (8thEd). Oxford: Oxford University Press.

Phillips, R. (2005). Challenging the Primacy of Lectures: The Dissonance between Theory a nd Practice in University Teaching. *Journal of University Teaching and Learning Practice*, *2(1),*1-12.

Pittinsky, M.S. (ed.). (2003). *The Wired Tower: Perspectives on the Impact of the Internet on Higher Education*. New York: Pearson Education.

Punch, K.F. (2003). *Survey Research: The Basics*. London: Sage Publication Ltd.

Raju, S. (2011). Bulk SMS Services; Published in Cell Phone SMS. Retrieved November 20, 2015, from -http://www.sooperarticles.com/communications-articles/mobile-sms-articles/bulk-sms-services-274689.html.

Republic of Kenya (RoK) (2013). *Performance Contracting Guidelines, 10th Edition:* Division of performance contracting.

Republic of Kenya (RoK) (2010). *The Constitution of Kenya*. Nairobi: Government Printer

Republic of Kenya (RoK) (2006a). *National ICT Policy*. Ministry of Information and Communication. Nairobi: Government Printer.

Republic of Kenya (RoK) (2006b). *National Information and Communication Technology (ICT) Strategy for Education and Training.* Ministry of Education Science and Technology. Nairobi: Government printer.

Republic of Kenya (RoK) (2005). *Kenya Education Sector Support Programme*. Nairobi: Government printer.

Robson, W. & David, F. (2004). *Strategic Management Concepts*. London: Pearson.

Roman, K. (2009). *Benefits of Implementing an ERP: Top 10benefits an ERP Implementation can Bring to your Institution*. Collegiate Project Services.

Rawat, M. (2008). Application of Human Resource Information System (HRIS) In Higher Education-Holistic Approach. *Trusting Islam, Knowledge and Professionalism in ECER Development Conference*, 15-17.

Ryan, Y. & Stedman, L. (2002). *The Business of Borderless Education 2001 Update. Evaluations and Investigations Programme.http://www.dest.gov.au/archive/highered/eippubs/eip02_1/eip02_1.pdf*, Accessed June, 2013.

Saharan, T., & Jafri, S. (2012). *Valuation of HRIS Status an Insight of Indian Companies' Perspectives.* In Kundu, S.C., Punia, B.K., Narwal, K.P. and Singh, D. (Eds), Business Management: Key Research Issues, Excel Books, New Delhi, pp. 113-127.

SAIDE & RUFORUM (2010). *The Use of ICT at Kenyatta University*. Partnership for Higher Education in Africa.

Sangrà, A. & González, M. (2004). *La Transformación de Lasuniversidades a Través de Las TIC: Discursos y Prácticas.* Editorial UOC. Barcelona. P.95

Saunders, M., Lewis P., & Thornhill, A., (2007). *Research Methods for Business Students.* 4th ed. Harlow: FT Prentice Hall.

Sevilla, J. (2008). *Collaborative Framework for the Implementation of Integrated ICT University Systems: The Strathmore University Experience-The Elimu Project. Nairobi*: Strathmore Research and Consultancy centre.

Sevilla, J. & Shabaya, P. (2007). *Implementing an Academic Management System: The Case of Strathmore University*. Nairobi: Strathmore Research and Consultancy centre.

Shabaya, P. (2009). *The Changing Role of Information and Communication Technologies (ICTs) for Instruction in Higher Education Institutions in Kenya*. Paper submitted to Strathmore University ICT 2009 Conference, Nairobi, Kenya.

Siriginidi, S.R. (2007). Enterprise Resource Planning in Reengineering Business. *Business Process Management Journal, 6*(5), 376-391.

Smallbone, D., North, D., Baldock, R., & Ekanem, I. (2002). *Encouraging and Supporting Enterprises in Rural Areas*. Report to the Small Business Service, London.

Smith, A. (2011). *Americans and Text Messaging*, Pew Research Center. Retrieved January 12, 2012, from http:// pe-winternet.org/Reports/2011/Cell-Phone-Texting-2011.aspx

Soumitra, D. & Amit, J. (2003), "Networked Readiness of Nations", in Global IT Report 2002- 2003, *World Economic Forum*, 1 – 24, June 2003.

Strohmeier, S. (2007). Research in e-HRM: Review and Implication. *Human Resource Management Review, 2007* (12), 19-37.

Sullivan, L. & Bozeman, W.(2010). Post-Implementation Success Factors for Enterprise Resource Planning (ERP) Student Administration Systems in Higher Education Institutions. *College & University Journal of the American Association of Collegiate Registrars and Admissions Officers* 86 (2) (2010) 22-31.

Swartz, D. & Orgill, K. (2001). Higher Education ERP: Lessons Learned. *Educase* Quarterly 2001;24:20 – 27.

Tansley, C., & Newell, S. (2006). Project Social Capital, Leadership and Trust: A study of Human Resource Information Systems Development. *Managerial Psychology, 22(4),* 350-365.

Teo, T. S. H., Soon, L. G.., & Fedric, S. A. (2001). Adoption and Impact of Human Resource Information Systems (HRIS). *Research and Practice in Human Resource Management, 9(1),* 101-117.

Teachers Service Commission (TSC) (2016). *Teachers Performance Appraisal and Development Tool*. Nairobi: Government printer.

Timmers, P. (2008). EU E- inclusion policy in context. *Emerald Group Publishing Limited, 10(5/6),* 12-19.

Tusubira,F. F. & Mulira, N. (2005). *Integration of ICT in Higher Education Institutions: Challenges and Best Practice Recommendations Based on Experience of Makerere University & Other Organizations*. Makerere University.

Umble, E. J., & Umble, M. M. (2002). Avoiding ERP Implementation Failure. [Referred from Rabaa'i (2009)] *Industrial Management, 44(1),* 25-33.

UNESCO (2011). *ICT for Higher Education: Case Studies from Asia and the Pacific*. Bangkok: UNESCO Bangkok Asia and Pacific Regional Bureau for Education.

UNESCO (2009). ICTs for Higher Education. Paper Presented at the 2009 World Conference on Higher Education (WCHE), Paris.

UNESCO (1999). *World Communication and Information Report 1999-2000*. Paris: UNESCO.

Wanyembi, G. (2002). *Application of a Model for Improving ICT Management: A Case Study*. International Academy of Information Management, Delft University.

Watanabe, C. & Hobo, M. (2003). Creating a Firm Self-Propagating Function for Advanced Innovation-Oriented Projects: Lessons from ERP. *Technovation, 23,* 1-15.

World Bank (1994). *Higher Education: The Lessons of Experience.* The International Bank for Reconstruction. USA.

Young, N. (2009). *Understanding the Research Process and Methods: An Introduction to Research Methods*. Las Vegas: Acts Press.

Yuen, H.K., Law, N., Lee, M.W. & Lee, Y. (2010). *The Changing Face of Education in Hong Kong: Transition into the 21st Century*. Hong Kong: Centre for Information Technology in Education, The University of Hong Kong.

Zhan, K. *et al.* (2002) Critical Success Factors of Enterprise Resource Planning Systems Implementation Success in China. *Proceedings of the 36th Hawaii International Conference on Systems Sciences,* pp.61-75.

Zornada, L. & Velkavrh, T.B. (2005). Implementing ERP Systems in Higher Education Institutions. 27th Int. Conf. *Information Technology Interfaces ITI 2005,* June 20-23, 2005, Cavtat, Croatia.

Zinkhan, G.M. (2002). Promoting Services via the Internet: New Opportunities and Challenges. *Journal of Services Marketing, 16(5),*412-23.

APPENDIX I: INTRODUCTORY LETTER TO RESPODENTS

Dear respondent,

I am a doctoral candidate in the Department of Curriculum, Instruction and Educational Management at Egerton University. I am undertaking a study to investigate stakeholders' perceptions on the influence of Information and Communication Technology (ICT) integration on academic and human resource management in Kenyan public universities. The attached questionnaire is a data collection instrument designed to actualize the study.

You are kindly requested to respond to all the questions by either ticking (✓) or by providing the information on the spaces provided. All participants, sites and data involved in this survey will be handled with utmost confidentiality. The information provided will be used only for the purpose of this study.

Your participation and honest responses will be highly appreciated.

Yours sincerely,

Daniel Karanja

APPENDIX II: REGISTRAR (ACADEMIC AFFAIRS) QUESTIONNAIRE

A. Demographic Data

1. Gender: Male ( ) Female ( )
2. Length of time as a Registrar (Academics)

   Less than 5 years ( ) 6-10 years ( ) 11-15 years ( ) 16 years and above ( )

B. Status of ICT Integration in Academic Management

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the existence of ICT integration in academic management in your university.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
a) The university has installed ICT based programs to support academic management processes.					
b) The number of computers allocated to support academic management processes is adequate.					
c) There is Internet connectivity for supporting academic management processes.					
d) There is Intranet connectivity for supporting academic management processes.					
e) The university has equipped the academic staff with skills to integrate ICT in the management of academic processes.					
f) The deans of schools/faculties and chairs of departments are properly prepared to use ICT based systems for supporting academic management processes.					

2. Please indicate the ICT based programs installed in your university to support the following academic management processes.
   a) Students admissions (i.e. applications, registration and course enrolment)…….
      ……
      ……

b) Course planning and resource allocation (e.g. timetabling, lecturers, rooms etc):

……

……..

c) Academic performance records (e.g. transcripts and certificates):……..

……

……

d) Students financial records (i.e invoicing of fees, receipting of payments, account balances, and debtors):…… ……

e) Others, please specify……..……

……

……

3. If none, please explain how the above functions are carried out in your university.

……

……

……

C. <u>Influence of ICT Integration on Academic Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate the extent which you would agree/disagree that integration of ICT in your Institution's academic management has led to the following influence:

Influence	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
The integrated system in this university allows for on-line admission processing of applicants.					
The integrated system manages readmission for those students who had discontinued their studies for various reasons e.g. deferment, fees, disciplinary action etc.					
Influence	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
The integrated system captures details of students' personal information including their photos, contacts of parents/sponsors etc.					
Students are provided with an interface with the integrated system for registering themselves for course units in a given semester.					

The system is able to raise invoices based on the selected courses by the student which are then seen by cashiers (in the system) and used to facilitate fees payment.					
The system allows students to check their debtor status on-line away from campus.					
The system enhances the academic timetabling process in the university.					
Lecturers are provided with an interface with the system for updating class attendance and viewing statistics on the same.					
Lecturers are provided with an interface with the system for entry of examinations and assessments marks.					
Students are provided with an interface with the system where they can view their course work assessments.					
The system can fully manage the examination process from the time the student enrolls to the time they graduate.					
The system provides students with the ability to view online/print their unofficial academic transcripts.					
The university has a corporate Short Messaging Service (SMS) that allows students to query and receive some academic processes related information via their mobile phones.					

2. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate the extent which you would agree/disagree that integration of ICT in your Institution's academic management contribute to the following benefits:

Benefit	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
ICT integration in this university affords greater management control over the academic processes that has resulted into higher performance in academic work					
ICT integration in this university increases customer satisfaction due to faster processing and accurate data capture and analysis					
ICT integration in this university enhances better performance in fees collection, management and reporting of student debtors					

ICT integration in this university ensures cost-effectiveness in operations (e.g. users view information/data via web-browser rather than maintaining bulky physical documents)					
ICT integration improves communication of the university management with academic departments					
ICT integration improves efficiency for lecturers by enabling them to enter examination marks electronically as soon as they are available					
ICT integration enables students to view online/print their unofficial academic transcripts					
ICT integration improves the graduation rates due to enhanced efficiency in the university					

D. <u>Challenges to Effective Integration of ICT in Academic Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the challenges to effective integration of ICT in your university's academic management.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
There is lack of awareness among the academic staff on the capabilities of ICT integration in academic management.					
There is lack of commitment from top management that is slowing down systems implementation.					
There is use of a poor strategy in making ICT responsive to the institutional vision and mission.					
ICT integration has not been fully conceptualized and defined before implementation thus causing a weak system that does not offer unified services.					
ICT integration is not supported by staff because they were not inducted.					
The initial costs of ICT hardware and software is inhibiting thus limiting the extent of integration.					
There is lack of sufficient funding for sustenance of ICT integration.					
There is inadequate number of skilled ICT staff.					
The ICT staff display low morale in their work.					

APPENDIX III: REGISTRAR (ADMINISTRATION) QUESTIONNAIRE

A. Demographic Data

1. Gender: Male ( ) Female ( )
2. Length of time as a Registrar (Administration)

   Less than 5 years ( ) 6-10 years ( )11-15 years ( ) 16 years and above ( )

B. Status of ICT Integration in Human Resource Management (HRM)

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the existence of ICT integration in human resource management in your university.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
a) The university has installed ICT based programs to support human resource management processes.					
b) The number of computers allocated to support human resource management processes is adequate.					
c) There is Internet connectivity for supporting human resource management processes.					
d) There is Intranet connectivity for supporting human resource management processes.					
e) The university has equipped the HRM staff with skills to integrate ICT in the management of human resource.					
f) The deans of schools/faculties and chairs of departments are properly prepared to use ICT based systems for supporting human resource management processes.					

2. Please indicate the programs installed in your university to support the following human resource management processes.
   a) Staff recruitment:…..…… ……
   b) Staff development and training:…… ……
   c) Staff performance management: ……..……..
   d) Salary administration:…… ……..……
   e) Staff record management:...…… ……..……...

f) Others, please specify……..……

……..……

……..……

3. If none, please explain how the functions listed above are carried out in your university

……

……

……

……

……

C. <u>Influence of ICT Integration on Human Resource Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate the extent which you would agree/disagree that integration of ICT in your Institution's human resource management has led to the following influence:

Influence	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
The integrated system in this university supports staff recruitment processes such as online job advertisement, application, pre-screening,					
The integrated system captures staff profiles e.g. the employee photo, employment number, job grade, academic qualifications, important dates,					
Influence	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
The integrated system enables employee's information to be easily traced back when need arises. E.g. can aid in evaluation of whether an employee is accomplishing the given tasks					
The system allows authorized users to capture and manipulate employees' data for various uses.					
The system can automatically generate reports that may help in addressing HRM functions such as succession planning, compensation planning, performance appraisal results, aspects of career development, training projections etc.					

The system allows human resource professionals to adequately collect and assess employees' work information.					
The system supports payroll administration as well as pension and benefits management of employees.					
The system enables employees to view their pay slips online.					
The system provides a platform where employees may forward their online pay slips to third parties e.g. banks, SACCOs, insurance companies etc. for personal financial purposes.					
The system supports the monitoring of the employees work attendance. E.g. They are able to log in and out of their work stations.					
The system enables employees to apply for all types of leaves online and get feedback through the same platform.					
The university has a corporate Short Messaging Service (SMS) that enables employees to send and receive some work related messages via their mobile phones.					

2. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate the extent which you would agree/disagree that integration of ICT in your Institution's human resource management contribute to the following benefits:

Benefit	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
ICT integration in this university improves efficiency of the human resource operations. E.g. staff recruitment, staff appraisal, salary					
ICT integration in this university improves quality and timeliness of HR services. E.g. some HR services are accessible online and via mobile phone					
ICT integration improves quality of budgeting and payroll management (i.e. due to availability of inbuilt data validation and reporting techniques)					

ICT integration improves transparency and user experiences as a result of availability of accurate, relevant and readily accessible information					
ICT integration reduces use of paper by enabling benefits applications to be submitted and handled digitally					
ICT integration enhances better and faster information sharing among all the sections and departments involved with the performance, productivity and welfare of the employees					
ICT integration ensures cost effectiveness due to a reduction of office staff who lender services manually. E.g. messengers, clerks, secretaries etc					
ICT integration enhances smooth running of the university by tracking and analyzing the time keeping and work patterns of the workforce					
ICT integration enhances compliance with statutory obligations e.g. P.A.Y.E, NSSF, NHIF etc due to availability of accurate and timely data					
ICT integration increases administrative efficiency e.g. produces reports capable of improving decision-making					

D. <u>Challenges to Effective Integration of ICT in Human Resource Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the challenges to effective integration of ICT in your university's human resource management.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
There is lack of awareness among the HRM staff on the capabilities of ICT integration in human resource management.					
There is lack of commitment from top management that is slowing down systems implementation.					
There is use of a poor strategy in making ICT responsive to the institutional vision and mission.					
ICT integration has not been fully conceptualized and defined before implementation thus causing a weak system that does not offer unified services.					
ICT integration is not supported by staff because they were not inducted.					
The initial costs of ICT hardware and software is inhibiting thus limiting the extent of integration.					
There is lack of sufficient funding for sustenance of ICT integration.					
There is inadequate number of skilled ICT staff.					
The ICT staff display low morale in their work.					

Thank you

APPENDIX IV: LECTURERS QUESTIONNAIRE

A. Demographic Data

1. Gender: Male ( ) Female ( )
2. Length of time as an employee of this university?

   Less than 5 years ( ) 6-10 years ( )11-15 years ( ) 16 years and above ( )
3. What is your main source of institutional information in order of importance? **(1 – Most Important; 2- More Important; 3-Important; 4- Less Important; 5 – Least Important)**

Memos	
Newsletters	
E-mail	
Telephone	
Staff portal	

B. Status of ICT Integration in Academic Management

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the existence of ICT integration in academic management in your university.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
a) The university has installed ICT based programs to support academic management processes such as students' admissions, timetabling, academic records (e.g transcripts) etc.					
b) The number of computers allocated to support academic management processes is adequate.					
c) There is Internet connectivity for supporting academic management processes.					
d) There is Intranet connectivity for supporting academic management processes.					
e) The university has equipped the teaching staff with skills to integrate ICT in the management of academic processes.					
f) The deans of schools/faculties and chairs of departments are properly prepared to use ICT based systems for supporting academic management processes.					

C. <u>Status of ICT Integration in Human Resource Management (HRM)</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the existence of ICT integration in human resource management in your university.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
a) The university has installed ICT based programs to support HRM processes e.g. staff recruitment, development & training, performance management etc.					
b) The number of computers allocated to teaching staff for obtaining human resource management services is adequate.					
c) There is Internet connectivity for supporting human resource management processes.					
d) There is Intranet connectivity for supporting human resource management processes.					
e) The university has equipped the teaching staff with ICT skills for obtaining human resource management services.					
f) The deans of schools/faculties and chairs of departments are properly prepared to use ICT based systems for supporting human resource management processes.					

D. <u>Influence of ICT Integration on Academic Management</u>

1. Using a scale where **1= Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree,** indicate the extent which you would agree/disagree that integration of ICT in your Institution's academic management has led to the following influence:

Influence	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
The integrated system allows for on-line admission processing of applicants.					
The system captures details of students' personal information including their photos, contacts of parents, sponsors etc.					
Students are provided with an interface with the system for registering themselves for course units in a given semester.					
The system is able to raise invoices based on the selected courses by the student which are then seen by cashiers (in the system) and used to facilitate fees payment.					
The system allows students to check their debtor status on-line away from campus.					
The system enhances academic timetabling in the university.					
Lecturers are provided with an interface with the system for updating class attendance and viewing statistics on the same.					
Lecturers are provided with an interface with the system for entry of examinations and assessments marks.					
Students are provided with an interface with the system where they can view their course work assessments.					
The system can fully manage the examination process from the time the student enrolls to the time they graduate.					
The system provides students with the ability to view online/print their unofficial academic transcripts.					
The university has a corporate Short Messaging Service (SMS) which allows students to query and receive academic processes related information via their mobile phones.					

E. <u>Influence of ICT Integration on Human Resource Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate the extent which you would agree/disagree that integration of ICT in your Institution's human resource management has led to the following influence:

Influence	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
The integrated system supports staff recruitment processes such as online job advertisement, application, pre-screening, selection and placement etc.					
The integrated system captures staff profiles e.g. the employee photo, employment number, job grade, academic qualifications, important dates, contacts etc.					
The system enables employee's information to be easily traced back when need arises. E.g. can aid in evaluation of whether an employee is accomplishing the given tasks according to their fullest potential or not.					
The system allows authorized users to capture and manipulate employees' data for various uses.					
The system can automatically generate reports that may help in addressing HRM functions such as succession planning, compensation planning, performance appraisal results, aspects of career development, training projections etc.					
The system allows human resource professionals to adequately collect and assess employees' work information.					
The system supports payroll administration as well as pension and benefits management of employees.					
The system enables employees to view their pay slips online.					
The system provides a platform where employees may forward their online pay slips to third parties e.g. banks, SACCOs, insurance companies etc. for personal financial purposes.					
The system supports the monitoring of the employees work attendance. E.g. They are able to log in and out of their work stations.					
The system enables employees to apply for all types of leaves online and get feedback through the same					

platform.					
The university has a corporate Short Messaging Service (SMS) that enables employees to send and receive some work related messages via their mobile phones.					

F. <u>Challenges to Effective Integration of ICT in Academic Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the challenges to effective integration of ICT in your university's academic management.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
There is lack of awareness among the teaching staff on the capabilities of ICT integration in academic management.					
There is lack of commitment from top management that is slowing down systems implementation.					
There is use of a poor strategy in making ICT responsive to the institutional vision and mission.					
ICT integration has not been fully conceptualized and defined before implementation thus causing a weak system that does not offer unified services.					
ICT integration is not supported by staff because they were not inducted.					
There is lack of sufficient funding for sustenance of ICT integration.					
There is inadequate number of skilled ICT staff.					
The ICT staff display low morale in their work.					

G. <u>Challenges to Effective Integration of ICT in Human Resource Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the challenges to effective integration of ICT in your university's human resource management.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
There is lack of awareness among the teaching staff on the capabilities of ICT integration in human resource management.					
There is lack of commitment from top management that is slowing down systems implementation.					
There is use of a poor strategy in making ICT responsive to the institutional vision and mission.					
ICT integration has not been fully conceptualized and defined before implementation thus causing a weak system that does not offer unified services.					
ICT integration is not supported by staff because they were not inducted.					
There is lack of sufficient funding for sustenance of ICT integration.					
There is inadequate number of skilled ICT staff.					
The ICT staff display low morale in their work.					

Thank you

APPENDIX V: STUDENT QUESTIONNAIRE

A. Demographic Data

1. Gender: Male ( ) Female ( )
2. Age group (years): Less than 30 ( ) 31-40 ( ) 41-50 ( ) 51 and above ( )
3. What is your main source of institutional information in order of importance? **(1 – Most Important; 2- More Important; 3- Important; 4- Less Important; 5 – Least Important)**

Memos	
Newsletters	
E-mail	
Telephone	
Student portal	

B. Status of ICT Integration in Academic Management

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the existence of ICT integration in academic management in your university.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
a) The university has installed ICT based programs to support academic management processes such as students' admissions, academic records (e.g. transcripts), financial records (e.g. fees receipts) etc.					
b) The number of computers allocated to students' for obtaining academic management services is adequate.					
c) There is Internet connectivity provided by the university for students' use in obtaining academic management services.					
d) The university has equipped students with ICT skills for obtaining academic management services.					

C. <u>Influence of ICT Integration on Academic Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate the extent which you would agree/disagree that integration of ICT in your university's academic management has led to the following influence:

Influence	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
The integrated system allows for on-line admission processing of applicants.					
The integrated system manages readmission for those students who had discontinued their studies for various reasons e.g. deferment, fees, disciplinary action etc.					
The system captures details of students' personal information including their photos, contacts of parents, sponsors etc.					
Students are provided with an interface with the system for registering themselves for course units in a given semester.					
The system is able to raise invoices based on the selected courses by the student which are then seen by cashiers (in the system) and used to facilitate fees payment.					
The system allows students to check their debtor status on-line away from campus.					
Lecturers are provided with an interface with the system for updating class attendance and viewing statistics on the same.					
Lecturers are provided with an interface with the system for entry of examinations and assessments marks.					
Students are provided with an interface with the system where they can view their course work assessments.					
The system provides students with the ability to view online/print their unofficial academic transcripts.					

The university has a corporate Short Messaging Service (SMS) which allows students to query and receive academic processes related information via their mobile phones.					

D. <u>Challenges to Effective Integration of ICT in Academic Management</u>

1. Using a scale where **1= Strongly Disagree (SD); 2 = Disagree (D); 3 = Undecided (U); 4 = Agree (A); 5 = Strongly Agree (SA),** indicate how you would agree/disagree with the following statements that describe the challenges to effective integration of ICT in your university's academic management.

Statement	**1 SD**	**2 D**	**3 U**	**4 A**	**5 SA**
There is lack of awareness among the students on the capabilities of ICT integration in academic management.					
There is lack of commitment from top management that is slowing down systems implementation.					
There is use of a poor strategy in making ICT responsive to the institutional vision and mission.					
ICT integration has not been fully conceptualized and defined before implementation thus causing a weak system that does not offer unified services.					
ICT integration is not supported by students because they were not inducted.					
There is lack of sufficient funding for sustenance of ICT integration.					
There is inadequate number of skilled ICT staff.					
The ICT staff display low morale in their work.					

Thank you

APPENDIX VI: NACOSTI Research Authorization

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/16/93852/9490**

Date: **4th April, 2016**

Daniel Karanja
Egerton University
P.O Box 536-20115
EGERTON.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Influence of Information and Communication Technology (ICT) integration on academic and human resource management in Kenyan Public Universities,"*** I am pleased to inform you that you have been authorized to undertake research in **Kiambu, Nairobi and Uasin Gishu Counties** for a period ending **1st April, 2017.**

You are advised to report to **the Vice Chancellors of selected Universities, the County Commissioners and the County Directors of Education, Kiambu, Nairobi and Uasin Gishu Counties** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The Vice Chancellors
Selected Universities.

The County Commissioner
Kiambu County.

APPENDIX VII: NACOSTI Permit

THIS IS TO CERTIFY THAT:

MR. DANIEL KARANJA

of EGERTON UNIVERSITY, 9719-20100 Nakuru,has been permitted to conduct research in Kiambu Nairobi, Uasin-Gishu Counties

on the topic: INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTEGRATION ON ACADEMIC AND HUMAN RESOURCE MANAGEMENT IN KENYAN PUBLIC UNIVERSITIES

for the period ending:

1st April,2017

Permit No : NACOSTI/P/16/9385/9490

Date Of Issue : 4th April,2016

Fee Recieved :Ksh 2,000

Applicant's Signature

Director General National Commission for Science, Technology & Innovation

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 8449

CONDITIONS: see back page

APPENDIX VIII: LETTERS OF DATA COLLECTION APPROVAL FROM THE UNIVERSITIES

UNIVERSITY OF NAIROBI
OFFICE OF THE DEPUTY VICE - CHANCELLOR
(Research, Production & Extension)
Prof. Lucy W. Irungu B.Sc., M.Sc., Ph.D.

P.O. Box 30197-GPO.
00100,Nairobi-Kenya
Telephone: +254-20-2315416 (DI), 318262

Fax:0202317251
Email:dvcrpe@uonbi.ac.ke

UON/RPE/3/5/Vol.XVI/ **May 4, 2016**

Daniel Karanja
PO Box 9719-20100
NAKURU

Dear Karanja

AUTHORITY TO CONDUCT RESEARCH

I refer to your requested dated April 21, 2016 to conduct research at the University of Nairobi, for your Ph.D Thesis entitled: ***"Assess the Influence of Information Communication and Technology (ICT) Integration on Academic and Human Resource Management in Kenyan Public Universities."***

I write to inform you that your request has been approved.

You are however required to share the findings of your study with the University of Nairobi by depositing a copy of your research findings with the Director, Library & Information Services on completion of your study.

PROF. JANE MARIARA
AG. DEPUTY VICE-CHANCELLOR
(RESEARCH, PRODUCTION AND EXTENTION)

Copy to: Vice-Chancellor
DVC (A&F)
DVC (AA)
DVC (SA)
Registrar, Academics
Registrar, Administration
Director, Library & Information Services
Director, Quality Assurance

BW/jwn

KENYATTA UNIVERSITY

OFFICE OF DEPUTY VICE-CHANCELLOR, RESEARCH, INNOVATION AND OUTREACH

P. O. Box 43844 - 00100
Nairobi. Kenya
Tel. 254-20-810901 Ext. 026
E-mail: dvc-rio@ku.ac.ke

Ref: KU/DVCR/RCR/VOL.2/10

29th April, 2016

Daniel Karanja,
Egerton University ,
Njoro.

Dear Mr Karanja ,

RE: **REQUEST TO COLLECT RESEARCH DATA AT KENYATTA UNIVERSITY**

This is in reference to your letter dated 26th April, 2016 requesting for authorization to collect research data at Kenyatta University on the topic: *Influence of Information Communication and Technology Integration on Academic and Human Resource Management in Kenyan Public Universities.*

I am happy to inform you that considering the purely academic nature of your research and the uncontroversial nature of your data collection instruments, your request has been approved by University Management. It has been noted that you will collect data from the offices of the Registrar, Academic, Registrar, Administration, teaching staff and students.

With this approval, you are requested to complete the form attached that commits you to sending to me a hard & soft copy of your PhD thesis whenever you complete and return it to my office prior to the collection of data.

Yours Sincerely,

Prof. F. Q. Gravenir
Deputy Vice-Chancellor
Research, Innovation & Outreach
cc. Vice-Chancellor
DVC, Academic
Registrar, Academic
Registrar, Administration

MOI UNIVERSITY

OFFICE OF THE DEPUTY VICE CHANCELLOR
ACADEMICS, RESEARCH AND EXTENSION

Tel: (053) 43355
(053) 43620
Fax: (053) 43412
Email: dvc_are@mu.ac.ke *or* dvcresearchmu@gmail.com

P.O. Box 3900
Eldoret - 30100
Kenya

REF: MU/DVC/REP/27B **Date:** 3rd May, 2016

TO WHOM IT MAY CONCERN

RE: PERMISSION TO CARRY OUT RESEARCH – DANIEL KARANJA

The above subject matter refers.

Mr. Daniel Karanja who is a Doctoral Student at Egerton University has applied for authority to conduct research within Moi University. We would be grateful if he is permitted to conduct his research on *"The Influence of Information Communication and Technology (ICT) Integration on Academic and Human Resource Management in Kenyan Public Universities."*

By a copy of this letter authority is hereby granted to him to conduct the research.

After the completion of the research, a complete report both on hard and soft copy will be handed over to the office of Deputy Vice-Chancellor, Academics, Research & Extension.

Any assistance accorded to him will be highly appreciated.

Thank you.

Yours faithfully,

PROF. I. N. KIMENGI
AG. DEPUTY VICE-CHANCELLOR
(ACADEMICS, RESEARCH & EXTENSION)

SKM sa