

Factors Affecting Research Productivity in Public Universities of Kenya: The Case of Moi University, Eldoret

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Abstract

The importance of research to a University cannot be overemphasized; it leads to generation of new knowledge, engenders innovations, enhances the quality of teaching staff, increases an institution's reputation and its economic status. However, there has been a low level of research production and a contraction in participation in research activities by Moi University. It is therefore pertinent to understand the factors that influence research productivity by university staff. The aim of this study was thus to investigate the factors affecting research output in Moi University. Specifically, the study aimed at determining the relationship between accessibility to research funds, the amount of time allocated for research, the qualifications of the researchers and the research environment with research output by the staff. The study used a descriptive survey design to collect the pertinent data. The target population consisted of all the 1424 academic staff of Moi University. A combination of stratified and simple random sampling methods was used to select 242 respondents. Stratified sampling was used to divide the university teaching staff into categories as per their levels of employment. Random sampling was then used to select the respondents proportionately from each category. Data was collected using structured questionnaires. The data collected was analyzed using Descriptive statistics (frequencies, percentages, means and standard deviations) and inferential statistics (ANOVA, Pearson Correlation and Multiple Regression). The Pearson Correlation (r) indicated that research environment ($r=0.417$, $p < .000$), funding ($r=0.367$, $p = <0.000$), researcher's qualification ($r=0.486$, $p = .000$) were significantly and positively related to research output. Nevertheless, time ($r= -0.383$, $p = .000$) was negatively related to research output. MLR results reported that time allocated to research, researchers qualification, research environment and funding explain 50.9% variation of research output ($R^2 = 0.509$). Further, MLR showed that the staff qualifications positively influenced research output the most ($\beta = .441$), followed by research environment ($\beta = .200$), and lastly funding ($\beta = .145$). Time negatively influenced research output ($\beta = -.433$). The study concluded that the staff qualifications, research environment, funding, and time available to staff could predict significantly the research output by the university staff. The study therefore recommended that universities and the government must improve the research environment, funding, time availability and hire qualified staff in order to improve research output in the universities; further, it also recommends that more studies should be conducted to identify other ways of dissemination research output other than publications and other measures of research productivity such as optimization of funding, as well as comparative studies which will give more comprehensive results to guide further improvement.

Keywords: academic staff, research output, public universities, factors affecting research, university qualifications, research management.

INTRODUCTION

Research is described as a systematic attempt to provide answers to questions. Tuchman (1978:1). It comprises of creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of people, cultures and societies, and the use of this stock of knowledge to devise new applications. Research aims at producing new and better goods and services and developing new and better ways of offering or distributing them. It also results in efficient use of

present resources and waste products. University laboratories have become the scene of many technological breakthroughs, including hybrid seeds, satellite communications, genetic engineering, nuclear energy, and the internet, among others. The entire high tech industries such as computers and biotechnology have their roots in major research universities (McConnell 2002). Moi University, for instance has successfully managed to produce fabric dye which it uses in its textile factory (RIVATEX). Other successful researches include those from

School of Medicine, which have been used by the Government in carrying out malaria vaccinations, as well as research from the Schools of Science and Agriculture at Chepkolele University College, where research has been conducted on soil acidity and maize productivity and the recommendations applied within the university farms and taught to farmers during extension and outreach programs.

Research plays a key role in development and dissemination of knowledge; it leads to development of new knowledge as well as contributing to existing knowledge. It also provides an important background for academic staff to become successful lecturers- it enhances the quality of teaching effectiveness and reinforces many of the skills that are required for effective teaching (Lertputtarak 2008). Lecturers actively involved in research activities are usually in touch with the latest developments in their field and are more likely to be on the forefront of their discipline, compared to the research dormant lecturers. Further, several academic and research institutions' reward system base the promotion criterion on quantity and quality of research productivity. A study conducted by Perry et al. (2000) showed that academic staff viewed successful research as an important factor in evaluation, and believed that publications are an essential requirement for promotions.

University lecturers are today being asked to increase their research output and productivity, in order to meet the ever changing demands on the 21st century. Governments expect universities to become more efficient in the area of research, and have set out various strategies to emphasize this (President Kibaki's Speech at Pan African Christian University, Kasarani, 15th February, 2008). In Moi University, several factors can be held accountable for low. There is limited allocation of funds for research and conference kitty. For instance, the University Annual Research grant program only allocates up to Ksh. 500,000/- per school (Moi University Research Policy, 2008) which is quite inadequate; lecturers are faced with heavy teaching workload, made worse by the University expansion program to satellite campuses, the introduction of trimester classes, doubled by the government's double intake decision; other factors include bureaucracy in processing of funds, both internal, within the university and external, from the government, and low levels of motivation. From the above background, this study sought to investigate academic staff research productivity in public universities in Kenya by studying the case Moi University. The study intended to examine factors that determine the production of academic research. From the results of the analysis, the study shows that the determinants identified satisfactorily determine the output of research.

STATEMENT OF THE PROBLEM

Article 4c of the Moi University Act (1984) specifies the development and transmission of knowledge through research as one of the major functions of the University. However, it has been noted that there has been a low levels research production and dwindling participation in research activities especially in Moi University, Kenya. Analysis of Annual reports (2000-2009) from the Research Office and Moi University Press show that there has been a decline in the number of publications obtained over the years. These figures indicate trend of low research activity within the university. Apart from concern over the number of publications, teaching content and lecture notes have been found to be below average. Student Evaluation Reports of 2009 and 2010 show that many lecturers are fond of "hand- outs" and repeated yellow notes year after year. In addition, analysis of Human Resource records (2000- 2009) provide an alarming insight into the status of staff involvement in research. It has been observed that there has been a trend of teaching staff "mark- timing" on the same positions for over ten years, e.g. senior lecturers who have not been promoted to associate professorship; lecturers who have not been promoted to senior lecturer; assistant lecturers and graduate assistants who have not been promoted a step further. This is mainly because promotion is based on research and publications. These factors are an important consideration in the scheme of service and promotions criteria employed by all universities in Kenya.

With this deteriorating situation, the following questions needed to be addressed: what determines research production at the University? What can be done to improve the level of staff participation and involvement in research? It is against this background that this study examined the factors which affect research activities and productivity, and therefore, provide a framework by which academic research can be managed.

OBJECTIVES OF THE STUDY

The main objective of this study was to examine the factors that affect research productivity at Moi University.

Specifically, the study intended to:

1. Determine the extent to which funding affect research output in Moi University
2. Determine the extent to which research environment affect research output in Moi University
3. Determine the extent to which staff qualifications affect research output in Moi University
4. Determine the extent to which time available to staff affect research output in Moi University

RESEARCH HYPOTHESIS

The study tested the following hypotheses for the specific objectives:

H₀₁: there is no significant relationship between funding and research output

H₀₂: there is no significant relationship between the research environment and research output

H₀₃: there is no significant relationship between staff qualifications and research output

H₀₄: there is no significant relationship between time available to staff and research output

LITERATURE REVIEW

According to Creswell (1986), Research Productivity includes research publications in professional journals and in conference proceedings, writing a book or chapter, gathering and analyzing original evidence, working with post-graduate students on dissertations and class projects, obtaining research grants, carrying out editorial duties, obtaining patents and licenses, writing of monographs, developing experimental designs, producing works of an artistic or creative nature, engaging in public debates and commentaries. Oloruntoba and Ajayi, (2006) observed that research publication in the university is a major or most significant indicator of academic staff productivity, and that research attainment is determined by the number of published articles in refereed journals and conference proceedings of repute. Research productivity in academic institutions is reflected in the number and quality of articles published by the affiliated faculty. Often, departments evaluate their faculty on their "publication count" (Hadjinicola and Soteriou, 2005). Further, Rotten (1990) stated that a universal approach to measuring research productivity was to count the number of books, articles, technical reports, bulletins, and book reviews published, as well as presentations given and grants received through reviewing curriculum vitae or other print materials. For the purpose of this research, research output refers to publications of papers in professional journals, books and articles or presentation of research papers in conference proceedings or displaying on the web or making its presentation on the television or radio. Research productivity in academic institutions is reflected in the number and quality of articles published by the affiliated faculty. Often, departments evaluate their faculty on their "publication count" (Jaunch and Glueck, 2010). Research productivity evaluation has a significant impact on tenure decisions and promotions in general, salary raises, and mobility, especially in research-oriented schools.

Motivation Theories

According to Greenberg (1999), motivation has been defined as the process of arousing and maintaining goal directed behavior. Motivation is key in the

establishment and further development of quality in higher education (Rowley 1996). There are many theories that relates to motivation such as Adams's equity theory, Vroom's expectancy theory, reinforcement theory, and goal setting theory (Greenberg 1999). However, the study only discussed the Vroom's expectancy theory, as it considered it most relevant.

Factors Influencing Academic Research Output

Several studies have been conducted to examine the relationship between research output and the factors that support researchers in their efforts to publish. Different variables were identified that correlate with research output. Earlier studies primarily focused on analyzing association of productivity with variables such as institutional size, academic rank, age, gender, etc. More recent studies incorporate psychological and other latent variables in analyzing productivity. This study focused on four core variables that appear to be discussed in most of the studies. These are funding for research, time allocated for research, research environment and academic qualifications of researchers.

MATERIALS AND METHODS

Research Design

The study adopted a descriptive and an explanatory research design. Kombo and Tromp (2006) define the descriptive survey design as a description of the state of affairs as it exists whose purpose is not only restricted to fact finding. This involved the use of questionnaires to collect, analysis, and interpretation of data. An explanatory research design aimed at explaining factors affecting research output in public universities.

Study Area

The study was conducted at Moi University because of its convenience to the researcher, and the possibility to access relevant data in the institution. Moi University is located in Eldoret, 310 kilometers northwest of Nairobi. As at 2012, the University had a total of thirteen (13) Schools and six (6) Directorates. According to the Moi University Revised Strategic Plan 2009/10-2014/15, the University had a total of 4370 staff as at 2010.

Target Population

This study was conducted on the academic section of the university. Respondents comprised of teaching staff. Moi University's academic staff population was 1424 as at 2010 (Revised Strategic Plan 2009/10-2014/15). However, taking into account the gazettelement of Chepkoilel, Karatina and Rongo University Colleges, and also factoring the number of staff on unpaid leave, the active academic staff population is 660. (Selected personnel records, 2011)

Sampling Design

The study employed stratified sampling which was used to draw 242 respondents according to the different cadres of employment. This was to ensure that respondents ranging from full professors to graduate assistants and research fellows were equally considered. The stratified sampling strategy ensures an equal probability sample and avoids misrepresentation of any strata that might occur by chance if a simple non-stratified sample would be drawn.

Primary Data and Sources

Primary data was intensively used in this research. The data collected addressed the five main variables namely; research output, funding, research time, qualification of researchers and, research environment. Other information collected through the questionnaires included respondents' perception concerning commercialization of research outputs and their opinion on efforts to improve research activities. Secondary data was referred to and was collected from various university reports, such as Quality Assurance reports, financial reports, reports from research office, and personnel records.

Data Collection Instrument and Techniques

Questionnaires were the main instrument of data collection. The questionnaire consisted of four parts. A five point likert scale, (1 being strongly agree to 5, being strongly disagree) was used. This enabled comparison to be reached as to the extent to which each variable affected the output. The questionnaires along with the cover letter were administered to the respondents. In the questionnaire, working definitions for the categories were provided followed by questions or statements.

Data Analysis

Data entry and management was undertaken using SPSS version 17.0. Data was converted to numerical codes, and entered in a predesigned data entry spreadsheet in SPSS. Similar information was then categorized and grouped together to give a summary of results using descriptive statistics. The descriptive statistics used included measures of central tendency (mean), and measures of dispersion (standard deviation). These statistics were used to determine the relative importance of the critical factors of both the dependent and independent variables. Pearson's correlation was conducted to determine the relationship between the different types of variables. The correlation coefficient indicated both the magnitude and direction of the linear relationship of the variables. The correlation matrix was then used as the standard form of reporting the correlation results. A multiple linear regression was used to develop a model that could predict research output using the independent variables funding, time, environment

and qualification. The regression equation below was used for development of the research model:

$$\hat{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \quad 1$$

Where:

$\hat{Y}$ = Expected value of the dependent variable, in this case, research output

α = Y-intercept (a constant term)

$\beta_1, \beta_2, \beta_3, \beta_4$ = Slope parameters

X_1, X_2, X_3, X_4 = independent variables, where X_1 - research funding, X_2 - research time, X_3 - research environment and X_4 - qualifications of researcher

ϵ = Residual (error term)

The regression model assumes the following: the relationship between the dependent and independent variables is linear; the variance around the regression line is constant (i.e. homoscedastic); for each combination of the values of the independent variables, the values of the dependent variables are independent and normally distributed; and lastly, the ϵ s are independent and normally distributed with a mean of zero. The T-tests were used to determine the statistical significance of the correlation coefficient; all tests were two-tailed, and significance levels were measured at 95% confidence level with significant differences recorded at an alpha level of 0.05 ($p < 0.05$); inferential statistics were used to allow for prediction and extrapolation of population parameters from sample statistics.

RESULTS

The study findings indicated that 77 (39.8%) and 35 (18.1%) of the male and female respondents respectively reported that gender had no effect on their ability to conduct research. 13.4% male and 5.7% female revealed that there was very low extent of effect of gender on their ability to conduct research, while 9.3% of the male and 7.8% of female respondents argued that gender had low effect on their ability to conduct research. The above statistics were supported by Pearson Chi-Square value of 66.136 with P value = 0.000 ($\alpha = 0.05$) indicated that there was independency between gender and ability to conduct research. Thus, according to this study, gender does not affect ability to conduct research.

Study shows that 80.8% of the respondents strongly agreed that funding influences carrying out of research, as evidenced by a mean of 1.27 and standard deviation of 0.686. The findings also indicate that an average of 36.8 of the respondents disagreed that research funds from Moi university were easily accessible (mean = 3.55 "Disagreed"), they were neutral on the ease of access of funds from Government and/ or Donors (mean of 3.4 and 3.38 respectively). The respondents were also neutral as to whether they were satisfied with the level of funding in the University (mean = 3.43). More study findings reported that the respondents disagreed that funds

from donors were adequate for research (mean of 3.76), that personal finances were adequate for their research activities (mean of 3.58), that funds granted by the university were adequate for my research activities, or that funds granted by the government were adequate for their research activities" (mean of 3.11). Most of the respondent consequently agreed that they often sponsored themselves in carrying research (mean = 2.44). Upon studying the descriptive items that relate to research funding, the study then sought to examine the relationship between money secured annually for research and the research output variables

The findings further indicate that on money secured annually for research in relation to research undertaken and publication count. On the question of number of research undertaken, 32.1% of the respondents who had received below 50,000KES conducted 1 to 2 researches, while 14% of them had 3 to 4 researches. Of those who had received between 50,000KES to 250,000KES, 10.9% had undertaken 1 to 2 researches, whereas 11.4% had 3 to 4 research counts. Further, majority of the respondents who had 7 and above research undertakings (5.2%) had received between 251,000- 450,000KES, and 5.2% more had received more than 450,000KES, as compared to 2.6% with 51,000- 250,000KES, and 0% at funding level below 50,000KES. Similarly, 8% of respondents who had 5 to 6 research undertakings had secured between 250,000- 450,000KES compared to 0.5% who had received between 51,000- 250,000KES. This implies that there is a positive relationship between money secured for research the number of research activities undertaken. The relationship is verified by Pearson's R value of 0.689 with a P value with of 0.000.

Regarding book publication, majority (31%) of the respondents who had received below 50,000 KES had not published any book. and 19.2 % had published only 1 to 2 books. Of those who had received between 50,000 – 250,000 KES, 15.5% of them had not published any book, while 8.8% of them had published 1 to 2 books, and 1% had 3 to 4 books published. Further, 9.3% of those in the bracket of 215,000 – 450,000 KES had published 1 to 2 books and 4.1% had published 3 to 4 books. In group of more than 450,000KES, 2.1% and (1%) of the respondents had published 1 to 2 and 5 – 6 books respectively. The relationship between allocation of research funds annually and book publication was supported by Pearson's R value of 0.411 (41% relationship) with P value of $0.00 < \alpha = 0.05$.

Analysis on the relationship between money secured for research and local journals published, respondent who received 50,000KES and below, majority (23.3%) had 1 to 2 publications, 18.7% had no publication and 8.8% had published 3 to 4 journals.

For those who had secured 50,000 – 250,000 KES, 13% had 1 to 2 local journal publications, while 6.2% and 2.1% had 3 to 4 and 7 and above local journals publications. Majority (6.2%) of those in group of 215,000 – 450,000 KES 7 and above publications. 1% of those who have received more than 450, 000 KES had 3 to 4, 5 to 6 and more than seven (7) publications each. There was positive relationship between local journals published and funds allocated to research as recorded by Pearson's R value of 0.544 with P value of $0.00 < \alpha = 0.05$.

Results further shows relationship between amount of money secured annually for research and conference presentations. Majority of the respondents (27.5%) who had 1 to 2 local presentations had received below 50,000 KES, and 7.8%, others who have received the same amount had 3 to 4 local conference presentation. 2.1% of the same category had had 5 to 6 and 7 and above local conference presentations respectively. For those who have received 51 – 250,000 KES, majority (10.4%) had 3 to 4 conference presentations, while 3.1% had presented 7 or more presentations. For those who had received 251 – 450,000 KES annual research fund, majority (6.2%) had seven (7) and above local conference presentation. The relationship therefore was defined as positive by a Pearson' R value of 0.527 with p value of 0.000

Further analysis showed a positive relationship between money secured for research and papers / presentations in international conferences. The study finding reported that majority (64%) of those who received 50,000 KES and below had not had any international conference presentation; while 8.3% of them had 1 to 2 presentations. In the category of 50,000 – 250,000KES, majority (16%) had no presentation, 6.2% had 1 to 2 conference presentation between 2002 and 2010 and 1.6% had at least 3 to 4 presentations. For those with 251 – 450, 000 KES, most (7.3%) of them had presented 1 to 2 papers in international conferences and 4.1% of them had 3 to 4 papers. Pearson's R value derived was 0.379 with P value of $0.00 < \alpha = 0.05$

Further comparison shows that the respondents tended to have more print media presentation as compared to electronic media (radio/ television) presentation (33 versus 18 respondents). On relating print media presentation to funds secured for research, findings from those who received 50,000 KES and below revealed that 49.2% of them had no print media presentation while only 4.1% had 1 to 2 presentations; of those who had 51,000 – 250,000KES, 21.2% had no such presentation, (6)3.1% had 1 to 2 presentations and only (2) 1.3% had 3 to 4 media presentations. From those who received 251,000 – 450,000 KES, (12) 6.2% had no print media presentation, and (10)5.2% had 3 to 4.

Finally, of those who received more than 450,000 KES, 2.1% had no print media presentation, while (2)1% had more than seven print media presentation. Pearson's R value of 0.47 with P value of 0.00 $<\alpha=0.05$ hence shows that there is positive and significant relationship between funds allocated to research and print media presentation. This implies that an increase in funds allocated to research would increase media presentation by 47%.

Study findings indicated that respondents strongly agreed that "time is a factor that affects research activities in the University" as rated by mean of 1.51 with standard deviation of 0.817. They further agreed they often lacked time to carry out research activities (mean = 2.82), but were neutral on "time dedicated to administrative duties affects my research activities" (mean= 2.92), and "time dedicated to teaching affects research activities" (mean of 2.72). 51.8% of the respondents also agreed that if the institution sets aside time for research work for members of staff, there would be more research activities going on. In general respondents agreed that time was a factor to be considered when conducting research (mean = 2.3876). Given that the respondents agreed positively that time affected research activities, the study then sought to examine the relationship between time allocated for research on a daily basis with the research output of the same respondents.

Results also indicate that majority (32%) of those who allocated 3 hours or less had undertaken 1 to 2 research; 19% of them had conducted 3 to 4 research; (16) 8.3% had no research undertaken, while 5.2% and 2.1% had conducted 5 – 6 and 7 and above researches respectively. Of those who allocated 4 to seven hours to research, most of them (11%) had undertaken 3 – 4 research, while 8.3% had conducted 1 – 2 research and another 8% had conducted 7 and above research. However, Pearson's R value 0.079 with P value 0.28 $>\alpha=0.05$, reveals that there is no relationship between time allocated to research and research undertaken.

On number of books published, study findings reported that, of those who allocate 3 hours or less majority 45% had not published any book, 21.2% of them had published 1 to 2 books and (2) 1.3% had published 3 to 4 books. Of those who allocated 4 to seven hours most (16.1%) had had published 1 to 2 books, 8 % had published 3 to 4 books and 5.2% had not published any book. Similarly, of those who had dedicated 8 – 11 hours to their research, (3) 2% had published 1 to 2 books, while only (2) 1.3% had published 5 to 6 books. However, Pearson's R value 0.226 with P value 0.002 $<\alpha=0.05$, reveals that there is a relationship between time dedicated to research and publications. Regarding local journals published, results shows that, of those who allocated 3 hours or less, majority (29%) had 1 to 2 publications in local

journals, 20 % of them had not published at all, and (26) 14% of them had 3 to 4 publications. Of those who allocated 4 to 7 hours most (8.8%) had 1 to 2 publications, while 6 % and 4% had 3 to 4 publications and no publications respectively. Further, (3) 2% of those who had dedicated 8 – 11 hours to research had 1 to 2 local journal publications, while only (2) 1.3% had 5 to 6 publications. However, Pearson's R value 0.226 with P value 0.002 $<\alpha=0.05$, reveals that there is no relationship between time dedicated to research and publications. A similar trend was observed regarding international and professional journal publications. 90 (46.63%) and 86 (44.6%) of the respondents had no publications at all in either international or professional journals respectively, regardless of the time allocated to research. Pearson's R value 0.086 with P value 0.239 $>\alpha=0.05$ for international journal publications and 0.05 with P value 0.499 $>\alpha=0.05$, reveals that there is no relationship between time dedicated to research and the publications count.

Study findings on time allocated to research in relation to conference presentation indicate that on local conference presentations, majority of the respondents (31%) had only 1 to 2 publications, with 3 hours or less committed to research per day and 13.5% had 3 to 4 publications with 3 hours or less, while 9.3% had 1 to 2 presentations and 8.3% had 7 or more publications with 4 to 7 hours per day on research respectively. The Pearson's R value of 0.189 with P value 0.121 $>\alpha=0.05$, revealed that there is no relationship between time dedicated to research and local conference presentation. Regarding international conference presentation, results shows that, of those who allocated 3 hours or less, majority 48.2% had had presentations, while 13.3% and 4% of them had 1 to 2 and 3 to 4 international conference presentations respectively. Of those who allocated 4 to seven hours most (12.4%) had 1 to 2 international conference presentations, 5% had 3 to 4 international conference presentation and 2.1% had seven or more international conference presentation. In addition, 3% of those who had dedicated 8 – 11 hours in their research had 7 and above International conference presentations. Similarly, the Pearson's R value 0.121 with P value 0.096 $>\alpha=0.05$, revealed that there is no relationship between time dedicated to research and publications.

Results indicate that researchers with PhD qualification tend to undertake more researches as shown by 12.4 % of them undertaking 3 to 4 researches, 7% undertaking 5 to 6 researches and 10% undertaking seven and above researches, as compared to masters' degree holders. Of those with masters as the highest level of qualification most of them (29.5%) had undertaken 1 to 2 researches. Interestingly, 7.7% of the respondents with undergraduate qualifications had undertaken research

1 to 2 researches. These results imply that the level of qualification influences the research undertaken by individuals. The results are supported by Pearson's R value of 0.596 with P value 0.000 which show that there is positive and significant relationship between academic qualification and research undertaken. On the question of books published between year 2002 and 2010, the PhD holders had published more as shown by 18% with 1 to 2 books, 8.3% with 3 to 4 books, and 1.3 % with 5 to 6 books. 21% of the master's degree holders had published 1 to 2 books, and only 0.5% had 3 to 4 books. Regarding international journals, the findings indicated that those with Ph.D, 20.2% had 1 to 2 publications, and 8% had 7 or more publications and 71.8 % of the PhD holders in Moi University had no publications in international journals at all! On the other hand, 15% of the masters degree holders had 1 to 2 publications, 2.1% had 3 to 4 publications while 82.9 % had no publications in international journals at all!. Pearson's R value of 0.513 with P value 0.000 shows that there is positive and significant relationship between academic qualification and international journal publications.

Findings of academic qualification in relation to conference presentations show that majority (11.4%) of the PhD holders had 7 and above local conference presentations, while 9.3%, 9% and 5.2% had 1 to 2, 3 to 3 and 5 to 6 presentations respectively. These

figures are higher compared to master's degree holders who reported to have 1 to 2 presentations (31%) and 3 to 4 (10.4%) presentations. These results further support that academic qualification affects research output, as evidenced by Pearson's R value of 0.513 with P value 0.000, showing positive and significant relationship between academic qualification and international conference presentation. Study of analysis shows that respondents were neutral on the question as to whether they were satisfied with the level of support accorded by the university management regarding research activities, as rate by mean of 3.45. the respondents agreed that the university organizes research seminars, workshops and conferences (mean = 2.45), the university facilitates and promotes research networks (mean = 2.77), the university has appointed research coordinators/ research fellows/ research assistants (mean = 2.37), productive research is fostered with the private sector (mean = 2.82) and that they are often assigned the role of supervising students carrying out research activities in my school (mean = 2.98). Generally, respondents were positive on research environment as a factor affecting research output, as recorded by mean of 2.98.

Research Output

The descriptive analysis of the components measuring research output was also undertaken, and the results were as presented below.

Table 1. Publications Count

	7 and above	5 to 6	3 to 4	1 to 2	None	Mean	Std. Deviation
• Research Undertaken	8.3%	43%	29.5%	7.3%	10.9%	2.69	1.092
• books published between year 2002 and 2010	0%	1%	8.8%	39.4%	49.7%	1.61	0.694
• chapter contributions published between year 2002 and 2010	2.1%	5.2%	18.1%	39.4%	33.7%	3.99	0.965
• publications local journals between year 2002 and 2010	11.4%	5.7%	19.2%	39.4%	23.3%	3.58	1.236
• publications international journals between year 2002 and 2010	9.3%	2.6%	4.1%	36.3%	46.6%	4.09	1.21
• publications professional journals between year 2002 and 2010	7.3%	4.7%	10.4%	31.1%	44.6%	4.03	1.194
• publications co-authored with your colleague(s)	2.6%	5.7%	12.4%	44.6%	32.6%	4.01	0.968
Publication Count						1.983	0.85596

Table 1 shows that the respondents had undertaken 3 to 4 research activities between year 2002 and 2010 (mean= 2.69), and had published 5 to 6 books each (mean= 1.61). Further, the respondents had each published an average of 1 to 2 chapter contributions (mean= 3.99), local (mean= 3.58), international (mean= 4.09) and professional journal publications (mean= 4.03) respectively. It was also observed that most of the publications were co-authored with colleagues (mean= 4.01). Findings relating to presentations made in conferences and through media indicate that respondents had averagely presented 3 to 4 papers in local conferences (mean= 3.48), 1 to 2 papers in national conferences (mean= 3.94) and

another 1 to 2 in international conferences (mean = 4.04). Majority of the respondents had no media presentations as shown by 90.7% majority with no radio presentations (mean= 5.89), 81.9% majority with no print media presentation (mean= 4.71) and 98% majority with no presentation on television (mean= 4.96)

Regression Analysis

Regression analysis is one of the most commonly used statistical techniques in social and behavioral sciences as well as in physical sciences. Its main objective is to explore the relationship between a dependent variable (research output) and one or more

independent variables (funding for research, time allocated to research, research environment and academic qualification). Regression analysis involves finding the best straight line relationship to explain how the variation in a dependent variable, depends on the variation in a independent variable.

This study adopted multiple regression technique, where the dependent variable is predicted by a linear combination of the possible explanatory variables.

The coefficient of determination R squared was derived as 0.509. This shows the ratio of explained variation to total variation. It implies that 50.9% of the variation of the research output can be accounted for by the independent variables (funding for research, time allocated to research, research environment and academic qualification) studied in this model. Thus the statistical results prove that positive and strong linear relationships exist between the dependent and independent variables.

Table 2. Analysis of Variance for Goodness of Fit

	Sum of Squares	Df	Mean Square	F	Si
Regression	87.774	4	21.944	50.831	.000
Residual	81.159	188	0.432		
Total	168.934	192			

Predictors: (Constant), research environment, Time allocated to research, academic qualification, funding for research
Dependent Variable: Research output

Furthermore, the F statistic of 50.831 in table 2 is statistically significant at the 95% level, ($p < 0.05$). On this basis thereof, it may be concluded that the multiple linear regression line that predicted research output from the variables- funding for research, time allocated to research, research environment and academic qualification, by minimizing the sum of the square of the vertical distances of the points from the regression line. $R^2 = 0.509$ measure goodness of the linear regression given as under:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad 2$$

$$\text{Research output} = (1.486) + FR (0.145) - TR (0.433) + AQR (0.441) + RE (0.200) + 0.819 \quad 3$$

The F ration shows linearity of the data that helped to predict a best fitted model as the residuals (difference between observed and expected values) is low or close to zero. The residual mean square is a measure of how poorly or how well the regression line fits the actual data points. A large residual mean square indicates poor fit. If residual mean square is large, the value of F would be low and F ratio may become non-significant. If F ratio is statistically significant it implies that the null hypothesis $H_0: b = 0$ is rejected. Hence we can infer that the model used in this study is fit in predicting the research output.

Table 3 Coefficient of Estimate

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1.486	0.352		4.223	0.000
Funding For research	0.296	0.139	0.145	2.129	0.035
Time allocated to research	-0.3	0.035	-0.433	-8.506	0.000
academic qualification	0.492	0.059	0.441	8.304	0.000
research environment	0.355	0.122	0.2	2.919	0.004

Dependent Variable: Research output

From table 3, funding for research recorded $\beta_1 = 0.145$, the parameter was significant as reported by its p value (0.035) which is less than 0.05 (level of significance), hence we reject null hypothesis that funding for research has no positive effect on the research output and conclude that funding for research has a positive effect on research output. This implies that increasing research funding for research with one unit will increase research output with 0.145. More results shows that inadequate time allocated for research scored coefficient estimates of $\beta_2 = -0.433$ with p value of 0.000, since the p value is less than 0.05 we shall reject the null hypothesis that inadequate time allocated has no positive effect research output and infer that inadequate time allocated has positive effect on research output. This implies that reducing time allocated to research with

one unit will decrease research output with 0.443 units. Academic qualification indicated coefficient estimates of $\beta_3 = 0.441$ which was significant in predicting the research output, as reported by p values of 0.000 which is less than 0.05 hence we reject null hypothesis that academic qualification has no positive effects on research output and conclude that academic qualification has positive effects on research output. With a t ratio of 8.304 which is the highest indicating that academic qualification characteristic had the highest effect on research output. Research environment was reported to have coefficient estimates of $\beta_4 = 0.200$ and p value of 0.000 which is less than 0.05 and was significant in predicating research output, hence we reject the null hypothesis that research environment has no positive effects on research and conclude that research output has positive effect on research output.

CONCLUSION

The aim of this study was to investigate the factors affecting research output in Moi University. Specifically, the study aimed at determining the relationship between accessibility to research funds, the amount of time available to staff, the qualifications of the researchers and the research environment with research output by the staff. In examining the research environment, the study focused on University support towards research, provision of resources such as up-to-date library materials, promotion of journals and research networks, as well as allocation of funds for research. Based on the standard beta values arrived at, the study concluded that the researcher's qualification was the variable that influenced the most research output. This was followed by research environment, funding, and lastly, by time. The results therefore indicated that better qualifications, improvement in research environment, increased funding, and more time available to staff for research will likely increase research output.

RECOMMENDATIONS

This study has identified the researcher's qualifications as a key factor in research productivity. Universities should therefore implement plans that will encourage staff to pursue higher degrees, as well as acquire specialized skills in research methodology. The University should also encourage their graduates, especially those already teaching, to convert their theses into publications. The study recommends also that universities should improve the research environment by supporting in house journals as the study results showed that there were more local journal publications as compared to international journals. The in house journals will encourage staff to publish more and will improve the publication count. In addition, allocation of resources such as updated library materials, internet access, computers and laboratories should be enhanced in order to improve the environment. The university should also establish research centers to coordinate the research activities for schools, and should establish linkages and partnerships for collaborative research with local and international partners. The findings also suggest the importance of funding for research. The University should identify areas and undertake programs that will attract funding for research and attract more donors in order to boost the level of funding. In addition, it should put in place measures that enhance accessibility of these funds, and reduce bureaucratic procedures involved.

SUGGESTIONS FOR FURTHER STUDIES

The results of this study showed low counts of media presentation of research findings, as compared to book and journal publication, and conference presentations. Further research can therefore be conducted to identify other means of dissemination

research findings, media presentations being one of them. Lastly, other measures that relate to research productivity such as optimization of allocated funds to determine the output efficiency can be studied.

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